CITY OF DAVIS

SOURCE REDUCTION AND RECYCLING ELEMENT

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SECTION 1

EXECUTIVE SUMMARY

With the enactment of Assembly Bill 939, the State of California has required each city and county to prepare solid waste management planning documents that will demonstrate how each jurisdiction will divert from landfill 25 percent of its waste by 1995 and 50 percent by the year 2000. The planning document that is required of all cities and counties is a Source Reduction and Recycling Element (SRRE). This document constitutes the SRRE for the City of Davis and contains the following components:

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Particular attention should be paid to the Source Reduction, Recycling, Composting, and Special Waste components as they discuss the specific programs that will be implemented to achieve the 25 percent and 50 percent diversion goals. The Integration Component provides a detailed summary of these components and illustrates how all the programs work together in an integrated fashion.

This document is written so that it is in compliance with California Integrated Waste Management Board (CIWMB) regulations. Components 4, 5, 6, 7, and 8 are constructed along the following lines:

1) Goals and Objectives
2) Existing Conditions
3) Evaluation of Alternatives
4) Selection of Programs
5) Implementation
6) Monitoring and Evaluation

Within each component, different waste diversion programs are listed. Under the Evaluation of Alternatives section, each alternative is written and assessed as an individual program the City could adopt. In the Selection of Alternatives, the City defines the programs selected and outlines

and their integrated, cumulative effect on the waste stream both in the short term (to 1995), and the medium term (1996-2000).

The entity responsible for regular maintenance of the programs outline in this plan is the City of Davis Department of Public Works (DPW). The Recycling Coordinator from the DPW will report directly to the City Council at least annually.

Since the City has in place several effective waste diversion programs, the alternatives described in this plan focus on education and public information campaigns. These campaigns will focus on increasing awareness of source reduction, recycling, and composting programs in the City. From increased awareness, the City expects to increase participation and to "capture" more materials from the waste stream.

This SRRE utilizes the information from the Waste Generation Study as the basis for solid waste projections. For the purposes of initial evaluation, all programs outlined in this plan are measured in 1990 constant terms. For estimates on facility sizing and program costs, growth in the City's waste stream is factored and presented. This growth is based on County projections and is estimated to average 1.8 percent throughout the planning period.

The following table summarizes the expected diversion by percentage in 1995 and 2000 by component.

Table 1-1. Program Diversion by Percentage

Program	Current Diversion Percentage	Diversion Percentage by 1995	Diversion Percentage by 2000
Source Reduction	9.0	9.1	9.3
Recycling	10.7	13.0	17.2
Composting	4.7	6.7	11.0
Special Waste	12.8	14.9	14.9
Totals:	37.2	43.7	52.4

As determined in the Waste Generation Study, the City has already met and exceeded the 25 percent diversion goal for the short term (to 1995). This level of diversion should increase through the medium-term planning period (1995 to 2000) until the 50 percent diversion level is attained in 1997. **For a more detailed summary of all of the diversion programs presented in this SRRE, refer to the Integration Component (Section 11).**

SECTION 2

AB 939 OVERVIEW

The amount of solid waste generated in California, coupled with diminishing landfill space and potential adverse environmental impacts from landfilling, created an urgent need for state and local agencies to enact and implement an aggressive new integrated waste management program. The response from the State is Assembly Bill 939 (AB 939), the California Integrated Waste Management Act of 1989. The goals of AB 939 are to:

- Specify the responsibilities of local governments to develop and implement integrated waste management programs.
- Maximize the use of all feasible source reduction, recycling, and composting options in order to reduce the amount of solid waste that must be disposed of by transformation and land disposal.
- Improve regulation of existing solid waste landfills.
- Ensure that new solid waste landfills are environmentally sound.
- Streamline permitting procedures for solid waste management facilities.

2.1 REQUIREMENTS

AB 939 requires both city and county governments to develop and implement solid waste management plans covering a 15-year projected period (through 2005). AB 939 also establishes both guidelines and deadlines for the required documents.

AB 939 outlines the requirements for each incorporated city and the county unincorporated area to develop plans, a Source Reduction and Recycling Element (SRRE), to potentially divert 25 percent of all solid waste from landfill disposal and transformation by 1995 and a total of 50 percent by the year 2000. The SRRE, including implementation plans, must be submitted to the appropriate county on or before July 1, 1991. Legislation is currently pending in Sacramento which would push this date back to July 1, 1992. This SRRE utilizes the information from the county-wide Waste Generation Study as the basis for their solid waste projections.

In addition, each county is required to develop a county-wide Integrated Waste Management Plan (IWMP) which outlines the solid waste management plans for each of its jurisdictions (the incorporated cities and the county unincorporated area). Upon receipt of all SRREs from the jurisdictions, the county will evaluate the disposal capacities and disposal needs of the jurisdictions and conduct a Siting Element study to plan either expansion and/or new locations

of landfills for the solid waste generated in the next 15 years (through 2005). The Siting Element and the individual SRREs are then integrated by the county to develop the county Integrated Waste Management Plan (IWMP). The IWMP is due on January 1; the year - 1992, 1993, or 1994 - depends on the current landfill capacity.

2.2 APPROVAL PROCESS

Each city and the unincorporated county are required to hold a minimum of one public hearing prior to approving the SRRE.

The county is required to hold a minimum of one public hearing, which includes the cities within the county, prior to approval and subsequent submittal of the IWMP to the California Integrated Waste Management Board (CIWMB).

The CIWMB will review each city and unincorporated county SRRE when the county IWMP is submitted for evaluation. The CIWMB will render its approval/disapproval of the plans within 120 days of receipt. A notice of disapproval will include specific recommendations for correction.

2.3 ENFORCEMENT

At least every two years the CIWMB will review each city/county SRRE and hold a public hearing in the local agency's jurisdiction (when possible). If the CIWMB determines that the city/county has failed to implement the programs, the Board will issue an order of compliance with specific deadlines.

Should the City not meet the July 1 planning deadline, the 25 percent diversion level by 1995, or the 50 percent requirements by 2000, the CIWMB may levy a $10,000 per day fine on the City until compliance is attained. At this time, the CIWMB has announced a policy of not imposing the fines should the planning deadline of July 1, 1991 not be met.

SECTION 3

WASTE CHARACTERIZATION COMPONENT

As specified in Section 18722(a) of the California Code of Regulations (CCR), each jurisdiction must prepare an Initial Solid Waste Generation Study which provides data to allow a jurisdiction to fully understand, in quantifiable terms, its current solid waste disposal and diversion practices, as well as forecast future solid waste generation rates. This information is then used as the basis for planning all future waste handling, disposal and diversion programs and is used throughout this SRRE. This Solid Waste Characterization Component presents the findings of the Solid Waste Generation Study that was performed by EBA Wastechnologies in the Spring and Summer of 1991. The study was completed as a part of a regional study that included the Cities of Davis, Woodland, West Sacramento and Winters, as well as the unincorporated area of Yolo County. The study was performed in accordance with the requirements presented in Section 18724 of the CCR.

The Waste Generation Study characterizes the waste which is generated from residential, commercial, industrial, and other waste sources in the City. It is pointed out that while the County-wide study includes information from the U.C. Davis campus, these numbers are not reflected in the City totals since the campus is not within the City limits.

Definitions of the source categories are as follows:

- Residential solid waste - waste originating from single-family dwellings.
- Multi-family waste - waste originating from multi-family dwellings including apartments, condominiums, and other residential sources.
- Commercial solid waste - waste originating from retail businesses, offices, warehouses, distribution centers, etc.
- Industrial solid waste - waste originating from manufacturing facilities and construction and demolition companies.

As required by AB 939, the Waste Generation Study includes the following sections:

- Waste Disposal Characterization
- Waste Diversion Characterization
- 15-year Waste Generation Projections

The Waste Disposal Characterization provides estimates of the composition and quantity of solid waste disposed of annually. The quantities of waste disposed of are reported both in terms of weight and landfill in-place volume estimates. Waste disposed from residential, commercial, and industrial sources was characterized through field sampling and visual characterization at the Yolo County Central Landfill during the period of April 1 through April 18, 1991. Wastes were characterized into 34 waste types and then quantified using records provided by Davis Waste Removal, the City's franchised waste hauler.

The Waste Diversion Characterization provides estimates of the composition and quantity of solid waste currently being diverted (recycled, composted, and transformed) from the City. Waste diverted from disposal was quantified through existing waste diversion data and a survey of the City's largest waste generators and recyclers. The quantity of waste which is diverted can be applied to the overall waste diversion goals of 25 and 50 percent. Only those wastes which are normally disposed of at permitted solid waste disposal facilities can be included. Waste diverted to transformation (incineration) facilities is not applicable to the short-term 25 percent goal, but may account for up to 10 percent of the medium-term 50 percent diversion goal.

The 15-year Waste Generation Projection is based on the quantities of waste which are currently disposed of and diverted from the waste stream. This rate of waste generation is then projected for the next 15 years based on available planning data for the City. The waste generation forecast was based upon the extrapolation of present levels of waste generation for a 15-year period using estimates of annual development provided by the City of Davis Public Works Department.

After the programs and forecast diversion in the SRRE have been developed, a second set of Revised 15 Year Projections is presented. The Revised Projections present the forecast diversion and disposal estimates after implementation of the SRRE. These projections are presented in the Integration Component, Section 11 of this SRRE.

3.1 SUMMARY OF EXISTING CONDITIONS

As shown in Table 3-1, the results of the study conclude that the City of Davis generated solid waste at a rate of 60,768.5 tons per year in 1990. Of that amount, approximately 40.1 percent of the material (24,362.5 tons per year) is being recycled, reused, or composted. The remaining 59.9 percent (36,406.0 tons per year) is being landfilled in the Yolo County Central Landfill (YCCL).

Table 3-1. Summary of Solid Waste Disposal, Diversion and Generation Rates in 1990

Waste Type (Major Categories)	Generated (TPY)	Diverted (TPY)	Incinerated (TPY)	Total Disposed (TPY)	Diversion Rate (% of total waste generated)
Paper	14,950	5,200.0	0	9,750.0	8.6
Plastic	2,121	45.8	0	2,075.2	0.1
Glass	2,081	1,139.2	0	941.8	1.9
Metal	1,789	111.2	0	1,677.8	0.2
Yard Waste	8,204	2,836.1	1,796.2	5,367.9	4.7
Other Organic Waste	16,266	5,467.5	702.8	10,798.5	9.0
Other Non-Organic Waste	11,278	7,005.0	0	4,273.0	11.5
Special Waste	4,079	0	58.7	4,079.0	0.0
Total	60,768.0	21,804.8	2,557.7	38,963.2	35.9

The recycling of inert solids such as concrete and asphalt is included as "Other Non-Organic Waste" in Table 3-1 (representing a 11.5 percent diversion rate). This material is used at the YCCL as wet weather decking. Consideration is currently being given by State Legislature to eliminate these materials from inclusion in the diversion rate calculation. If such a change were to occur, the City's diversion rate might be reduced 33.1 percent. (17,337.5/52,472.0)

One other material type that is a large contributor to the current diversion rate is wood waste (included in the "Other Organic Waste" category). Wood waste is a large component of the waste stream that is brought to the landfill, however, the material is processed at the landfill by Valley By-Products and then sold for fuel, resulting in a 1.2 percent diversion rate. In addition, DWR processed an estimated 1,769.2 TPY of yard waste and wood which were diverted to transformation. Lastly, approximately 58.7 TPY of tires were incinerated for energy. As mentioned earlier, this type of diversion will not be creditable by the City until the medium term, after 1995.

All totalled, 2,557.7 TPY (4.2 percent of the generated waste stream) of wastes generated in the City in 1990 were diverted to transformation. Thus, only a 35.9 percent diversion (40.1 - 4.2) is being achieved through the more conventional diversion programs which target materials, such a paper, aluminum cans, food cans, and plastic. As presented in Table 3-1, significant amounts of these types of materials are still currently being landfilled. After 1995, incinerated wastes may be creditable and the diversion rate will be 40.1 percent.

3.2 BACKGROUND INFORMATION

3.2.1. Demographic Profile for Yolo County

The City of Davis is one of four incorporated cities located within Yolo County. The following information was obtained from the Yolo County Population and Housing Estimates published by the California Department of Finance Demographic Research Unit, April 26, 1990. Population and housing estimates for each jurisdiction are summarized in Tables 3-2 and 3-3.

Table 3-2. Population Characterization By Jurisdiction

Jurisdiction	1980	1990	Percent Change	Annual Growth Rate
Davis	36,640	45,310	23.7	1.53
West Sacramento	0	27,331	-	0.07*
Winters	2,652	4,545	71.4	10.05
Woodland	30,235	39,797	31.6	3.54
Unincorporated Area	43,847	22,193	50.6	- 1.81*
County Total	113,374	139,176	22.8	2.23

* Prior to January 1, 1987, West Sacramento was part of the unincorporated area of Yolo County. This accounts for the small or negative annual growth rates reported.

Table 3-3. Housing Characteristics by Jurisdiction

Jurisdiction	Single Family	2 to 4 Units	5 Plus Units	Mobile Homes
Davis	9,282	1,752	6,741	373
West Sacramento	6,981	851	2,558	1,555
Winters	1,243	142	195	59
Woodland	9,482	1,010	3,794	649
Unincorporated Area	4,445	366	1,136	375
County Total	31,433	4,121	14,424	3,011

* MFD - Multi-family Dwellings = 10 or more units

It is recognized by the City that a very large proportion of the population consists of university students. They tend to arrive in the fall and leave in the early summer on a schedule corresponding with the school year. About 10 percent of the population in Davis changes annually.

3.2.2. Current Waste Handling Practices

The City of Davis contracts with Davis Waste Removal, Inc. (DWR) to provide pickup of trash and recyclables, pickup of yard refuse, and street sweeping for residences, apartments, and businesses within the city limits. Billing for sanitation service (trash and recycling) is handled by the City Finance Department. A drop-off and buy-back center is also provided by DWR. A list of other Davis buyback centers certified by the State to redeem California Redemption Value Beverage Containers is provided in this section. Refuse collection services and service fee structures include the following:

- Residential accounts are provided with unlimited can service at curbside at a monthly service rate. Many commercial accounts and residential units other than single-family dwellings receive can service on a scheduled basis. Service fees are based on a cost per unit for the first can with a lesser amount charged for each additional can set out. It is noted that the commercial can rate is different from the residential can rate.

- Bin service is provided to commercial accounts. Service fees are based on a cost per cubic yard which remains constant regardless of container size utilized.

- A curbside spring cleanup program is offered annually to all residents.

Curbside Service

For residents in single-family houses, duplexes, or complexes with nine or fewer units, weekly curbside recycling and trash pickup is available.

Service for Apartments

Complexes with ten or more units receive communal service. Recycling carts are located in or near trash enclosures.

Service for Businesses

Commercial sanitation fees include trash service and recycling service. Businesses may arrange with Davis Waste Removal for placement of 90-gallon recycling carts.

Drop-Off Service

DWR provides a drop-off service for recyclables and used motor oil at 1818 Fifth Street. The drop-off center is open:

Monday - Friday	7:00 a.m. - 5:00 p.m.
Saturday	8:00 a.m. - 4:00 p.m.

Pickup Schedules and Hours

Curbside trash and recycling pickups take place once a week. Pickup schedules for trash and recyclables at multi-unit dwellings and businesses are arranged by Davis Waste Removal. Collection starts at 6:00 a.m. during the summer months and 7:00 a.m. the rest of the year. Containers may be brought to the curb after 5:00 p.m. on the day before pickup and should be removed by 7:00 a.m. on the day following collection. DWR operates as usual on all holidays except Christmas and New Years days.

Trash Containers

Trash should be put in either metal or plastic cans with handles and lids or in plastic trash bags. No container should exceed 32 gallons of capacity or weigh more than 60 pounds when filled. Containers should be kept clean and sanitary to reduce odors and insects. Air-tight lids and regular rinsing of garbage cans are important elements in preventing the breeding of flies.

Recycling Bins and Carts

For curbside pickup, recyclables (mixed paper and food / beverage containers) may be put in containers of the residents' choice (such as boxes, paper bags, metal cans, or plastic containers). Corrugated cardboard should be flattened and stacked separately. Sets of three stacking recycling bins are currently available at Davis Waste Removal, 1818 Fifth Street or a local hardware store (Davis Lumber and Hardware), for $14.75 including tax. The bins are labeled and may be placed at the curb. (They may also be used in apartment units and by businesses to collect and transport recyclables).

Large, green 90-gallon wheeled carts are used by apartment complexes and businesses for recycling mixed paper and food/beverage containers. They are approximately 42 inches high and 23 inches by 34 inches in width and depth. Inquiries about carts or about bins for recycling large quantities of corrugated cardboard may be directed to DWR.

Yard Material

Brush, leaves, and prunings should be placed in the street near the curb of residences or businesses and are usually collected on the same day as garbage and recyclables. Branches should not exceed eight inches in diameter. Each pile of yard waste should be no larger than five feet in any dimension. Bike lanes should never be blocked. Sod, soil, fruit, concrete, and stumps are not accepted. No contaminants (cans, flower pots, bottles, etc.) should be put in or on the piles.

Billing

The City of Davis sets and collects the sanitation fee for residential and commercial services provided by Davis Waste Removal. Billing is handled by the City Finance Department.

Technical Assistance Programs for Businesses

Assistance in planning and implementing source reduction and recycling programs at business locations can be requested from the City's Recycling Coordinator. Information on conducting waste audits and copies of the booklet "Business and the Earth: Global Ideas for Local Solutions" are also available to all members of the Davis Chamber of Commerce.

Certified Buyback Centers

The state of California certifies and provides oversight of redemption centers which redeem California Redemption Value (CRV) beverage containers. Types of containers which can be redeemed include beverage aluminum or steel cans and glass or plastic bottles containing carbonated soda, mineral water, beer and malt beverages, wine coolers, and distilled spirit coolers. CRV is currently 2.5 cents per container under 32 ounces. These centers are not obligated to accept non-CRV containers or other recyclables. In Davis, the general public can take bottles and cans to the following locations:

Redemption Centers	Davis Addresses	Buyback Days/Hours
Davis Waste Removal	1818 Fifth Street	Monday - Friday, 9:30 - 2:00 Saturday, 8:00 - 4:00
20/20 Center - University Mall	871 Russell Boulevard	Tuesday - Saturday, 11:00 - 5:00
20/20 Center - Oaktree Plaza	1414 Covell Boulevard	Tuesday - Saturday, 11:00 - 5:00
20/20 Center - Lucky Shopping Center	1900 Anderson Road	Tuesday - Saturday, 11:00 - 5:00

Landfill

The Yolo County Central Landfill (YCCL) is owned and operated by Yolo County and serves all the communities within the County. It is located on County Road 28H east of County Road 104; one mile northeast of Davis. The YCCL is also home to a drop-off recycle center, wood processing facility, and a methane gas collection facility. The landfill is open:

Monday - Saturday	6:30 a.m. - 4:00 p.m.
Sunday	9:00 a.m. - 5:00 p.m.

Tipping fees are dependent on size of vehicle and the type of waste.

Drop-Off Recycling Center

The YCCL has operated a drop-off recycling center since 1981. Receptacles are available for the following products:

- glass
- aluminum and steel cans; aluminum scrap
- newspaper and white office paper
- automobile batteries and waste oil
- plastic (PET, HDPE, and PVC pipe)
- automobile tires

There is no fee for using the drop-off center except for tires which can cost up to $4 depending on rim size. The Drop-Off Recycling Center is open:

Monday - Saturday	7:00 a.m. - 4:00 p.m.
Sunday	9:00 a.m. - 4:00 p.m.

Wood Recycling Center

Valley By-Products Wood Recycling Center is located one mile from the gate of the YCCL entrance. The center collects clean wood for local biomass power plants.

Acceptable wood includes:

- tree and brush prunings, stumps and tree trunks
- wooden boxes and pallets
- clean construction and demolition wood waste
- wood with nails and paint is okay

Unacceptable wood waste includes:

- pressure treated wood
- telephone poles and railroad ties
- leaves, palm fronds and palm trunks

The Wood Recycling Center is open:

Monday - Saturday	7:00 a.m. - 4:00 p.m.
Sunday	9:00 a.m. - 4:00 p.m.

As of January 1, 1992, the standard tipping fee is $8.75 per ton ($5.00 minimum charge). Some materials cost more.

Methane Gas Recovery Facility

In 1988 the YCCL began recovering methane gas to reduce atmospheric emissions and generate electric power. After the gas is compressed and cooled during a cleansing process, it is burned to generate electricity which is then sold to Pacific Gas and Electric to help meet some of the local electricity demands.

3.3 WASTE DISPOSAL CHARACTERIZATION

This section summarizes the project approach and presents the quantity and composition of wastes disposed of from residential, commercial, and industrial waste sources for Davis.

3.3.1. Project Approach

The estimated quantities of waste disposed of from residential, commercial, and industrial waste sources were based on information obtained from Davis Waste Removal, field data obtained through sampling, and annual tonnage disposal information obtained from YCCL waste disposal data.

Waste composition for the different waste sources in the City were estimated through a combination of field sampling at the point of generation for residential single-family units and sampling and visual characterization at the point of disposal for commercial, industrial, residential multi-family, and other waste sources.

A summary of the methodology used to estimate the quantity and composition of waste generated and disposed of from Davis is supplied in the Yolo County AB 939 Waste Generation Study, Preliminary Draft, August 1991, Section 3.

3.3.1.1. Waste Quantity

Sources and methods for estimating the quantity of waste generated from residential, commercial, industrial, and other waste sources are summarized below.

Residential Sources

The quantity of waste disposed of from single-family dwellings (SFD) for the City of Davis was based on available information obtained from Davis Waste Removal.

The average waste generation rate for multi-family dwellings in the City of Davis was based on available hauler data for April, 1990. The average disposal rate per single-family home per week was estimated to be 42.0 pounds.

Commercial, Industrial, and Institutional Sources

The quantity of waste disposed of from commercial, industrial, and institutional sources for the City of Davis was based on available information obtained from Davis Waste Removal, and YCCL waste disposal records.

In addition to individual hauler disposal data for each City, the County maintains records of the quantity of waste disposed of from companies that haul their own waste to the landfill. This data is referred to as "nonaccount" waste disposal data. The quantity of waste disposed of from nonaccount waste generators was allocated to jurisdictions based on the City where each company is located. County-wide, approximately 20 percent of these companies consist of construction and demolition firms which generated up to 70 percent of the nonaccount waste disposed of during 1990. It is likely that some of the waste generated by these construction/demolition firms did not originate from the jurisdictions they are located in; however, information is not available on its source.

Self-Haul Sources

Approximately 10 percent of the waste disposed of in Davis is from self-haul sources. Self-haul sources consist of individuals who haul their own waste utilizing pick-up trucks, automobiles, and small trailers. A study recently conducted by YCCL estimates the average quantity of waste disposed of per self-haul vehicle to be 644 pounds. During the waste sampling period, approximately 1,500 individuals hauling their own waste to the landfill were surveyed by YCCL personnel to identify the jurisdiction they were from. Based on the above information and the total number of self-haul vehicles which disposed of waste in 1990, the quantity of self-haul waste disposed for the City was estimated.

Estimates of Waste Disposed (by volume)

Estimates of the volume of waste disposed of from Davis were based on an in-place landfill density study recently conducted by the YCCL. Estimates for in-place density were approximately 1,200 pounds per cubic yard. This value was applied to the quantity of waste disposed (by weight) for the City of Davis to arrive at disposed volume estimates.

3.3.1.2. Summary of Waste Composition Sampling Methodology - City of Davis

The number of samples obtained for the City during the field sampling program was based on the following:

- The formula for normal approximation as defined in "Sample Weights in Solid Waste Composition Studies," A. L. Klee and D. Carruth, American Society of Civil Engineers, Journal of the Sanitary Engineering Division, Volume 96, August 1970.

- Quantity and availability of waste disposed of from waste generation sources.

Using the formula for normal approximation, the number of samples to be taken is based on the waste type which is expected to contribute the largest percentage of material to the overall waste composition. Assuming a maximum percentage composition value of 35 percent, what normally would be expected for waste paper, the number of samples necessary for statistically valid sampling with corresponding levels of precision are as follows:

Table 3-4. Minimum Number of Samples Required to Maintain Statistically Valid Precision Levels

Number of Samples	Precision Level (+/- percent)
19	3
7	5
2	10

3.3.1.3. Number of Samples Taken - City of Davis, 1990

Sources of information and methods for estimating the composition of waste disposed of from residential, commercial, industrial, and other waste sources are summarized below.

Residential Waste Sources

Residential sources of waste generation included single-family and multi-family dwellings for the City:

a) Single-Family Dwellings Waste Composition

A total of 40 residential samples were obtained from SFDs from the City. Samples were obtained at random from areas within Davis identified as being low, medium, and high income areas. The waste generated from one household was considered to be a single sample. Collected samples were transported to YCCL for sorting.

b) Multi-Family Dwelling Waste Composition

Five MFD samples, averaging 244 pounds, were obtained from the City of Davis. The City of Davis offers communal recycling to MFDs in the City; therefore, these samples were not combined with the regional composition sample grouping.

Commercial/Industrial/Institutional Waste Sources

A total of 17 samples were obtained from commercial, industrial, and institutional sources. The majority of commercial and industrial samples were selected at random at the point of disposal. Samples from roll-off loads were obtained from sections of the discarded loads identified by the field supervisor to be representative of the load. Samples from front-end refuse collection vehicles were obtained by identifying sections of the load which were representative of the waste source targeted (i.e., residential, commercial or industrial). Samples were manually removed in columns or sections of waste to account for light and heavy fractions.

Self-Haul Waste Sources

A total of 125 self-haul vehicles were visually surveyed at YCCL for white goods, mixed yard waste, bulky wastes, and construction and demolition debris, with the remaining refuse characterized as miscellaneous waste. Field personnel made visual estimates of the volume of the targeted self-haul waste types being discarded. These volume estimates were then converted to weight estimates utilizing "loose" volume/weight conversion factors and then allocated across the jurisdictions, including Davis, based upon population.

Seasonal Variations

Monthly waste disposal rates for each jurisdiction over the last four years were charted to identify any fluctuations in the waste stream due to seasonal variations.

3.3.2 FINDINGS AND CONCLUSIONS

Section 3.3.2.1 presents estimates for the composition and quantity of refuse disposed of from Davis. Section 3.3.2.2 presents available seasonal information or monthly variations in waste generation.

3.3.2.1 City of Davis

Estimates of the total quantity of waste disposed of by waste source are summarized in Table 3-5.

Table 3-5. Waste Disposal Summary by Source - City of Davis

Source	Tons per year	Percent
Residential SFD	8,501	23.4
Residential MFD	5,919	16.3
Commercial	12,417	34.1
Industrial	3,729	10.2
Self-haul	4,067	11.2
Other	1,772	4.8
Total	36,405	100.0

Residential Waste Sources

The total quantity of waste disposed of by the residential sector is approximately 40 percent of the entire disposed waste stream. Based on hauler waste disposal data the average household generates approximately 30 pounds of waste per week. Field sampling data from the households selected indicates a disposal rate of 42 pounds per week per household. This may be attributed to an anomaly of the samples and is not necessarilly indicative of the actual disposal rate.

Waste composition data for single-family dwellings indicate a significant reduction in waste types targeted by curbside recycling. Newspaper and California redemption glass are the primary examples. Waste types prevalent in the waste stream which can be targeted through source reduction, recycling, and composting programs are mixed waste paper, other recyclable glass, tin, grass clippings, food waste, and disposable diapers.

The waste composition for MFDs shows a higher percentage of newspaper, cardboard, and glass as compared to SFD data. This could be indicative of the lower participation rates in MFD recycling.

Commercial/Industrial Waste Sources

The total quantity of waste disposed of by the commercial and industrial waste sectors accounts for approximately 34 and 10 percent of the disposed waste stream respectively. Waste types prevalent in the commercial and industrial waste streams are cardboard, food waste, and wood waste. Inert waste also makes up a considerable portion of the industrial waste stream at approximately 21 percent. Industrial waste largely consists of waste disposed of from construction and demolition firms and an agricultural food processor.

Self-haul Waste Sources

Based on the results of the YCCL survey, 25 percent of self-haul waste disposed from the County is from the City of Davis. Self-haul wastes account for approximately 11 percent of the City's discarded waste stream.

Other Waste Sources

Waste materials identified as Other Wastes for the City of Davis include materials characterized as miscellaneous waste, bulky wastes, and other special wastes. Miscellaneous wastes account for waste materials discarded at the pit box located at DWR. Bulky wastes include those materials which are collected as special pick-ups by DWR and "other special wastes" consist of street sweepings.

The tables on the following pages depict the percentages of waste disposed per sector.

Table 3-6 Residential Waste Composition, Single-Family Dwellings - City of Davis (all values % by weight)

			Min Value	Max Value	Mean	Std Dev	90% Confidence Interval Lower	90% Confidence Interval Upper
PAPER	TOTAL	34.7%						
Newspaper			0.0	13.1	1.5	2.9	0.8	2.3
Corrugated			0.0	34.5	4.2	6.1	2.6	5.8
High-Grade			0.0	18.1	1.6	3.4	0.7	2.5
Mixed			0.0	65.9	13.2	14.8	9.3	17.0
Cont. Paper			0.0	43.5	14.2	10.0	11.5	16.8
PLASTIC	TOTAL	5.7%						
PET			0.0	1.4	0.2	0.4	0.1	0.3
HDPE			0.0	2.6	0.1	0.4	0.0	0.3
Pigmented HDPE			0.0	2.9	0.4	0.7	0.2	0.5
PS			0.0	2.5	0.6	0.5	0.5	0.8
Film			0.0	4.6	1.8	1.2	1.4	2.1
Other Plastic			0.0	7.6	2.6	1.7	2.2	3.1
GLASS	TOTAL	3.0%						
CA redemption			0.0	4.4	0.2	0.8	0.0	0.4
Other recyclable			0.0	21.4	2.7	5.0	1.4	4.0
Non-recyclable			0.0	1.6	0.1	0.3	0.0	0.2
METAL	TOTAL	4.9%						
Aluminum cans			0.0	1.0	0.1	0.2	0.0	0.1
Bi-metal/tin			0.0	9.0	2.7	2.2	2.2	3.3
Ferrous metal			0.0	35.6	1.5	5.8	0.0	3.0
Non-ferrous metal			0.0	8.0	0.7	1.4	0.3	1.0
White goods			0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE	TOTAL	18.3%						
Grass, leaves			0.0	100.0	12.1	24.0	5.8	18.4
Prunings			0.0	66.7	6.2	14.3	2.4	10.0
OTHER ORGANIC	TOTAL	22.8%						
Food			0.0	46.0	13.9	12.5	10.6	17.2
Tires			0.0	0.0	0.0	0.0	0.0	0.0
Rubber			0.0	1.7	0.1	0.3	0.0	0.2
Wood waste			0.0	24.0	1.0	4.1	0.0	2.0
Wood (press board, etc.)			0.0	7.6	0.2	1.2	0.0	0.5
Ag crop residue			0.0	0.0	0.0	0.0	0.0	0.0
Manure			0.0	18.3	1.2	4.0	0.1	2.2
Disposable diapers			0.0	47.6	3.8	11.2	0.9	6.8
Textiles, leather			0.0	19.3	2.7	5.1	1.3	4.0
OTHER WASTE	TOTAL	9.6%						
Inert solids			0.0	42.2	4.4	10.3	1.7	7.1
Composite materials			0.0	62.4	2.4	10.2	0.0	5.1
HHW matl/container			0.0	14.9	0.7	2.4	0.1	1.4
Misc.			0.0	9.5	2.0	2.6	1.3	2.7
SPECIAL WASTE	TOTAL	0.9%						
Ash			0.0	23.7	0.8	3.8	0.0	1.8
Medical waste			0.0	3.3	0.1	0.5	0.0	0.2
Auto shredder			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
Bulky waste			0.0	0.0	0.0	0.0	0.0	0.0
Other special			0.0	2.5	0.1	0.4	0.0	0.2
TOTAL					100.0			

	Min Value	Max Value	Mean	Std Dev	90% Confidence Interval Lower	90% Confidence Interval Upper
WASTE DISCARDED PER HOUSEHOLD (LBS/WK)	9.2	129.7	42.0	29.9	34.1	49.8

OF SAMPLES: 40

Table 3-7 Residential Waste Composition, Multi-Family Dwellings - City of Davis, 1990
(all values % by weight)

			Min Value	Max Value	Mean	Std Dev	90% Confidence Interval Lower	90% Confidence Interval Upper
PAPER	TOTAL	37.5%						
Newspaper			0.0	13.4	4.3	4.7	0.1	8.6
Corrugated			3.3	10.2	6.9	2.4	4.8	9.1
High-Grade			0.2	4.6	1.5	1.6	0.1	3.0
Mixed			6.7	14.6	9.5	2.8	7.0	12.0
Cont. Paper			5.9	32.2	15.2	9.0	7.1	23.3
PLASTIC	TOTAL	7.3%						
PET			0.0	0.7	0.4	0.2	0.1	0.6
HDPE			0.3	1.6	0.9	0.4	0.6	1.3
Pigmented HDPE			0.2	0.9	0.6	0.3	0.3	0.8
PS			0.2	2.0	0.6	0.7	0.0	1.2
Film			1.7	4.8	2.6	1.1	1.6	3.7
Other Plastic			0.0	3.5	2.2	1.2	1.1	3.3
GLASS	TOTAL	4.6%						
CA redemption			0.2	4.7	1.5	1.6	0.0	2.9
Other recyclable			1.7	5.6	3.1	1.4	1.8	4.4
Non-recyclable			0.0	0.2	0.1	0.1	0.0	0.1
METAL	TOTAL	5.0%						
Aluminum cans			0.0	1.7	0.6	0.6	0.1	1.1
Bi-metal/tin			1.2	3.9	2.6	0.9	1.8	3.5
Ferrous metal			0.0	2.3	1.1	0.8	0.4	1.8
Non-ferrous metal			0.1	2.0	0.6	0.7	0.0	1.3
White goods			0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE	TOTAL	12.3%						
Grass, leaves			1.6	27.0	11.2	9.4	2.7	19.6
Prunings			0.0	4.4	1.1	1.7	0.0	2.6
OTHER ORGANIC	TOTAL	20.1%						
Food			6.0	22.6	13.2	5.7	8.1	18.3
Tires			0.0	0.0	0.0	0.0	0.0	0.0
Rubber			0.0	0.3	0.1	0.1	0.0	0.2
Wood waste			0.0	1.4	0.3	0.6	0.0	0.8
Wood (press board, etc.)			0.0	3.2	1.1	1.3	0.0	2.2
Ag 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
Disposable diapers			0.1	7.4	2.7	2.7	0.3	5.1
Textiles, leather			1.3	4.4	2.7	1.2	1.6	3.8
OTHER WASTE	TOTAL	13.3%						
Inert solids			0.0	6.9	1.7	2.6	0.0	4.1
Composite materials			0.0	31.8	7.6	12.3	0.0	18.6
HHW matl/container			0.0	0.5	0.3	0.2	0.1	0.4
Misc.			3.4	5.1	3.8	0.6	3.3	4.4
SPECIAL WASTE	TOTAL	0.0%						
Ash			0.0	0.0	0.0	0.0	0.0	0.0
Medical waste			0.0	0.0	0.0	0.0	0.0	0.0
Auto shredder			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
Bulky waste			0.0	0.0	0.0	0.0	0.0	0.0
Other special			0.0	0.0	0.0	0.0	0.0	0.0
TOTAL					100.0			

AVERAGE SAMPLE WEIGHT: 243.8 LBS.

NO. OF SAMPLES: 5

Table 3-8 Commercial Waste Composition - City of Davis, 1990
(all values % by weight)

			Min Value	Max Value	Mean	Std Dev	90% Confidence Interval Lower	90% Confidence Interval Upper
PAPER	**TOTAL**	**32.5%**						
Newspaper			0.0	3.2	**1.6**	1.2	1.0	2.2
Corrugated			0.2	18.4	**9.2**	7.4	5.3	13.0
High-Grade			0.0	15.8	**2.9**	4.6	0.5	5.2
Mixed			0.0	14.2	**5.6**	4.4	3.3	7.9
Cont. Paper			0.0	27.5	**13.2**	9.1	8.5	18.0
PLASTIC	**TOTAL**	**7.3%**						
PET			0.0	0.2	**0.0**	0.1	0.0	0.1
HDPE			0.0	1.8	**0.3**	0.5	0.1	0.6
Pigmented HDPE			0.0	0.9	**0.2**	0.3	0.0	0.3
PS			0.0	1.7	**0.5**	0.6	0.2	0.9
Film			0.0	6.6	**2.8**	2.1	1.7	3.8
Other Plastic			0.0	13.9	**3.5**	3.9	1.5	5.6
GLASS	**TOTAL**	**3.2%**						
CA redemption			0.0	6.9	**1.5**	2.2	0.4	2.6
Other recyclable			0.0	5.1	**1.4**	1.6	0.6	2.2
Non-recyclable			0.0	2.5	**0.3**	0.7	0.0	0.7
METAL	**TOTAL**	**5.3%**						
Aluminum cans			0.0	0.5	**0.2**	0.2	0.1	0.3
Bi-metal/tin			0.0	9.0	**1.6**	2.6	0.2	2.9
Ferrous metal			0.0	10.7	**1.9**	3.3	0.2	3.7
Non-ferrous metal			0.0	15.2	**1.6**	4.5	0.0	4.0
White goods			0.0	0.0	**0.0**	0.0	0.0	0.0
YARD WASTE	**TOTAL**	**7.5%**						
Grass, leaves			0.0	30.3	**6.2**	10.1	0.9	11.4
Prunings			0.0	11.9	**1.3**	3.5	0.0	3.1
OTHER ORGANIC	**TOTAL**	**43.0%**						
Food			0.0	40.7	**18.6**	14.6	11.0	26.2
Tires			0.0	0.8	**0.1**	0.2	0.0	0.2
Rubber			0.0	2.0	**0.7**	0.8	0.3	1.1
Wood waste			0.0	61.3	**10.1**	18.4	0.5	19.6
Wood (press board, etc.)			0.0	88.0	**12.5**	26.6	0.0	26.3
Ag 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
Disposable diapers			0.0	0.5	**0.1**	0.2	0.0	0.1
Textiles, leather			0.0	5.0	**1.0**	1.5	0.2	1.8
OTHER WASTE	**TOTAL**	**1.2%**						
Inert solids			0.0	1.9	**0.2**	0.6	0.0	0.5
Composite materials			0.0	1.0	**0.2**	0.4	0.0	0.4
HHW matl/container			0.0	0.1	**0.0**	0.0	0.0	0.0
Misc.			0.0	3.5	**0.8**	1.2	0.2	1.4
SPECIAL WASTE	**TOTAL**	**0.0%**						
Ash			0.0	0.0	**0.0**	0.0	0.0	0.0
Medical waste			0.0	0.2	**0.0**	0.1	0.0	0.1
Auto shredder			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
Bulky waste			0.0	0.0	**0.0**	0.0	0.0	0.0
Other special			0.0	0.0	**0.0**	0.0	0.0	0.0
TOTAL					100.0			

AVERAGE SAMPLE WEIGHT: 254.6 LBS.

NO. OF SAMPLES: 10

Table 3-9 Industrial Waste Composition - City of Davis, 1990
(all values % by weight)

			Min Value	Max Value	Mean	Std Dev	90% Confidence Interval Lower	90% Confidence Interval Upper
PAPER	TOTAL	14.8%						
Newspaper			0.0	8.5	1.4	2.9	0.0	3.3
Corrugated			0.0	26.5	7.0	9.1	1.3	12.6
High-Grade			0.0	0.1	0.0	0.0	0.0	0.0
Mixed			0.0	20.4	3.0	7.1	0.0	7.4
Cont. Paper			0.0	17.5	3.4	6.1	0.0	7.2
PLASTIC	TOTAL	6.6%						
PET			0.0	0.0	0.0	0.0	0.0	0.0
HDPE			0.0	0.1	0.0	0.0	0.0	0.0
Pigmented HDPE			0.0	0.0	0.0	0.0	0.0	0.0
PS			0.0	3.3	0.5	1.1	0.0	1.2
Film			0.0	6.6	2.4	2.8	0.7	4.1
Other Plastic			0.0	14.5	3.7	5.8	0.1	7.3
GLASS	TOTAL	0.4%						
CA redemption			0.0	0.3	0.1	0.1	0.0	0.2
Other recyclable			0.0	0.9	0.1	0.3	0.0	0.3
Non-recyclable			0.0	0.8	0.2	0.3	0.0	0.3
METAL	TOTAL	6.6%						
Aluminum cans			0.0	0.7	0.1	0.2	0.0	0.3
Bi-metal/tin			0.0	17.2	2.6	6.0	0.0	6.3
Ferrous metal			0.0	8.9	3.5	3.5	1.3	5.6
Non-ferrous metal			0.0	2.5	0.4	0.9	0.0	0.9
White goods			0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE	TOTAL	8.7%						
Grass, leaves			0.0	9.1	3.0	3.8	0.7	5.4
Prunings			0.0	34.8	5.7	12.0	0.0	13.1
OTHER ORGANIC	TOTAL	41.5%						
Food			0.0	30.7	4.8	10.6	0.0	11.4
Tires			0.0	0.0	0.0	0.0	0.0	0.0
Rubber			0.0	0.0	0.0	0.0	0.0	0.0
Wood waste			0.0	80.6	26.2	28.1	8.7	43.7
Wood (press board, etc.)			0.0	35.2	10.4	11.7	3.1	17.7
Ag 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
Disposable diapers			0.0	0.0	0.0	0.0	0.0	0.0
Textiles, leather			0.0	0.4	0.1	0.2	0.0	0.2
OTHER WASTE	TOTAL	21.4%						
Inert solids			0.0	85.4	21.3	33.8	0.3	42.3
Composite materials			0.0	0.4	0.1	0.1	0.0	0.1
HHW matl/container			0.0	0.2	0.1	0.1	0.0	0.1
Misc.			0.0	0.4	0.1	0.1	0.0	0.1
SPECIAL WASTE	TOTAL	0.0%						
Ash			0.0	0.0	0.0	0.0	0.0	0.0
Medical waste			0.0	0.0	0.0	0.0	0.0	0.0
Auto shredder			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
Bulky waste			0.0	0.0	0.0	0.0	0.0	0.0
Other special			0.0	0.0	0.0	0.0	0.0	0.0
TOTAL					100.0			

AVERAGE SAMPLE WEIGHT: 364.2 LBS

NO. OF SAMPLES: 7

Table 3-10 Estimated Waste Disposal Rate by Weight - City of Davis, 1990

WASTE TYPE	RESIDENTIAL S.F.D. (TONS/YEAR)	RESIDENTIAL M.F.D. (TONS/YEAR)	RESIDENTIAL TOTAL (TONS/YEAR)	COMMERCIAL (TONS/YEAR)	INDUSTRIAL (TONS/YEAR)	SELF-HAUL (TONS/YEAR)	OTHER WASTE (TONS/YEAR)	TOTAL WASTE (TONS/YEAR)	PERCENT WASTE (BY WEIGHT)
PAPER									
Newspaper	131	257	388	200	54	0	0	642	1.8
Corrugated	358	411	769	1,138	260	0	0	2,166	6.0
High-Grade	138	90	228	356	1	0	0	585	1.6
Mixed	1,118	561	1,679	695	111	0	0	2,485	6.8
Cont Paper	1,204	899	2,103	1,641	127	0	0	3,871	10.6
PLASTIC									
PET	15	21	36	4	0	0	0	41	0.1
HDPE	12	55	68	40	1	0	0	108	0.3
Pigmented HDPE	31	33	64	21	0	0	0	85	0.2
PS	55	38	92	68	20	0	0	180	0.5
Film	150	155	305	343	89	0	0	737	2.0
Other Plastic	223	129	351	435	137	0	0	924	2.5
GLASS									
CA redemption	17	86	103	188	4	0	0	294	0.8
Other recyclable	232	182	414	173	5	0	0	592	1.6
Non-recyclable	10	3	13	36	6	0	0	55	0.2
METAL									
Aluminum cans	5	35	40	24	4	0	0	68	0.2
Bi-metal/tin	233	156	388	193	97	0	0	678	1.9
Ferrous metal	124	66	190	239	130	0	0	559	1.5
Non-ferrous metal	57	37	94	203	14	0	0	311	0.9
White goods	0	0	0	0	0	61	0	61	0.2
YARD WASTE									
Grass, leaves	1,029	661	1,690	767	114	0	0	2,571	7.1
Prunings	525	65	590	158	212	0	0	960	2.6
Mixed yard waste	0	0	0	0	0	41	0	41	0.1
OTHER ORGANIC									
Food	1,184	783	1,968	2,310	179	0	0	4,456	12.2
Tires	0	0	0	10	0	0	0	10	0.0
Rubber	9	5	13	89	0	0	0	102	0.3
Wood waste	82	18	99	1,251	976	0	0	2,327	6.4
Wood (press board, etc.)	19	64	83	1,549	388	0	0	2,020	5.5
Ag crop residue	0	0	0	0	0	0	20	20	0.05
Manure	98	0	98	0	0	0	0	98	0.3
Disposable diapers	324	159	484	9	0	0	0	492	1.4
Textiles, leather	226	160	386	123	3	0	0	511	1.4
OTHER WASTE					0				
Inert solids	376	100	476	23	793	0	0	1,293	3.6
Composite materials	206	448	653	23	2	0	0	679	1.9
HHW matl/container	63	15	78	2	2	0	0	82	0.2
Misc.	170	227	397	100	2	1,474	246	2,220	6.1
SPECIAL WASTE									
Ash	65	0	65	0	0	0	0	65	0.2
Medical waste	7	0	8	3	0	0	0	10	0.0
Auto shredder	0	0	0	0	0	0	0	0	0.0
Auto bodies	0	0	0	0	0	0	0	0	0.0
Bulky waste	0	0	0	0	0	71	595	667	1.8
Other special	5	0	5	0	0	0	911	917	2.5
Construction/Demolition	0	0	0	0	0	2,420	0	2,420	6.6
TOTAL	8,501	5,919	14,420	12,417	3,729	4,067	1,772	36,406	100.0

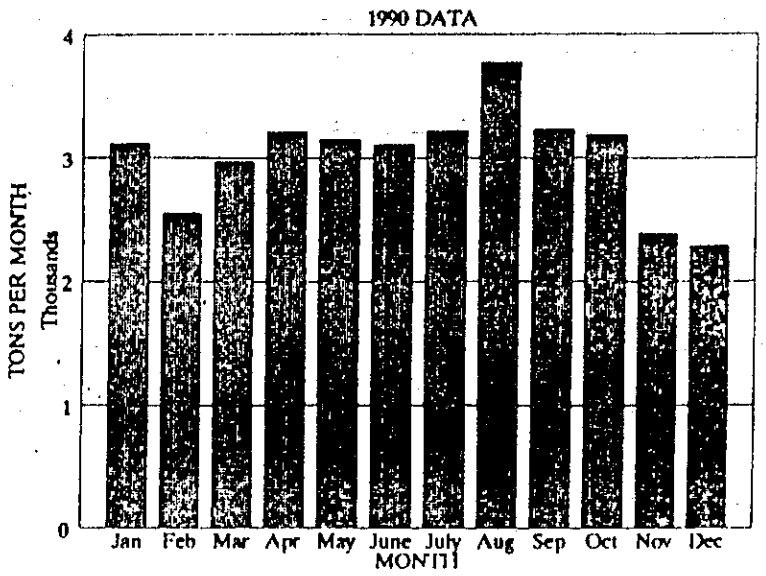
Table 3-11 Disposal Rate by Volume - City of Davis, 1990
(all figures in cubic yards)

WASTE TYPE	TOTAL WASTE (TONS/YEAR)	VOLUME GENERATED (YD^3/YEAR)	PERCENT BY VOLUME
PAPER			
Newspaper	642	1,070	1.76
Corrugated	2,166	3,610	5.95
High-Grade	585	975	1.61
Mixed	2,485	4,142	6.83
Cont. Paper	3,871	6,452	10.63
PLASTIC		0	
PET	41	68	0.11
HDPE	108	180	0.30
Pigmented HDPE	85	142	0.23
PS	180	300	0.49
Film	737	1,228	2.02
Other Plastic	924	1,540	2.54
GLASS		0	
CA redemption	294	490	0.81
Other recyclable	592	987	1.63
Non-recyclable	55	92	0.15
METAL		0	
Aluminum cans	68	113	0.19
Bi-metal/tin	678	1,130	1.86
Ferrous metal	559	932	1.54
Non-ferrous metal	311	518	0.85
White goods	61	102	0.17
YARD WASTE		0	
Grass, leaves	2,571	4,285	7.06
Prunings	960	1,600	2.64
Mixed yard waste	41	68	0.11
OTHER ORGANIC		0	
Food	4,456	7,427	12.24
Tires	10	17	0.03
Rubber	102	170	0.28
Wood waste	2,327	3,878	6.39
Wood (press board, etc.)	2,020	3,367	5.55
Ag crop residue	20	33	0.05
Manure	98	163	0.27
Disposable diapers	492	821	1.35
Textiles, leather	511	852	1.40
OTHER WASTE		0	
Inert solids	1,293	2,155	3.55
Composite materials	679	1,132	1.87
HHW matl/container	82	137	0.23
Misc.	2,220	3,700	6.10
SPECIAL WASTE		0	
Ash	65	108	0.18
Medical waste	10	17	0.03
Auto shredder	0	0	0.00
Auto bodies	0	0	0.00
Bulky waste	667	1,111	1.83
Other special	917	1,529	2.52
Construction/Demolition	2,420	4,033	6.65
TOTAL	**36,403**	**60,672**	**100.0**

3.3.2.2 Seasonal Variations

Seasonal variations in monthly refuse disposal quantities were tabulated for each jurisdiction in Yolo County, including Davis. This included waste generated from residential, commercial, and industrial waste sources. This information was used to provide an indication of the variability of the waste stream for the City. The 1990 seasonal fluctuations are presented in the table below.

Table 3-12. Seasonal Variations in the Waste Stream - City of Davis, 1990



3.4 WASTE DIVERSION CHARACTERIZATION

The Waste Diversion Characterization study provides estimates of the composition and quantity of solid waste diverted (recycled, composted, transformed) during the year 1990. The quantity of waste which is diverted is applied to the overall waste diversion goals of 25 and 50 percent. Only those wastes which are normally disposed of at permitted solid waste disposal facilities are included. Waste diverted to transformation (incineration) facilities is not applicable for the short-term 25 percent goal, but may account for up to 10 percent of the medium-term 50 percent diversion goal.

3.4.1. Project Approach

The quantity of waste diverted through source reduction, recycling, composting, and transformation was estimated through a combination of available waste diversion data and recycling surveys. Recyclable material brokers, certified recycling centers, major employers, grocery operations, diaper services, and tire retailers were surveyed to identify existing waste diversion. The quantity of waste diverted through certified recycling centers was based on information provided by the Department of Conservation - Division of Recycling. Information with respect to City sponsored recycling programs were obtained through Davis Waste Removal or by formal surveys.

The quantity of wood and yard waste diverted at YCCL was estimated through available tonnage records and a survey of self-haul sources. Clean loads of wood and yard waste delivered to YCCL are currently diverted and processed as wood fuel. The total quantity of waste processed at the facility during 1990 was approximately 7,000 tons. During the period of April 1 through June 1, 1991, YCCL personnel surveyed 478 individuals hauling wood and yard waste to the recovery facility to determine the jurisdiction from which the waste originated.

The quantity of inert waste diverted for landfill construction purposes was estimated through available YCCL tonnage data. The quantity of inert waste allocated to Davis was based on the proportion of Davis's population to the rest of the County.

The quantity of waste diverted by the use of diaper services was estimated through a phone survey of diaper service companies servicing the City. Based on the number of clients per week and the average number of diapers used per client, the quantity of waste diverted through this source reduction activity was estimated.

Another significant source of diversion is the 5,206 TPY of Agricultural Wastes. These wastes consist primarily of tomato processing waste which is diverted to animal feed.

Estimates of waste diversion for Davis are summarized in Table 3-13. Table 3-16 presents estimates of the total generated and percent diversion.

Table 3-13. City of Davis Waste Diversion, 1990

Waste Type	Source Reduction (TPY)	Recycling (DWR) (TPY)	Recycling (Commercial) (TPY)	Composting (TPY)	Transformation* (TPY)
Newspaper		3,219.8			
Cardboard		941.2	1,039.0		
Other plastic		35.4	10.4		
CA Glass		142.5	10.0		
Other glass		984.7	2.0		
Aluminum		111.2			
Yard waste				2,836.1	1,796.2
Food	38.5				
Tires					58.7
Diapers	223.0				
Agricultural waste	5,206.0				
Inert waste			7,005		
Wood waste					702.8
Total	5,467.5	5,434.8	8,066.4	2,836.1	2,557.7*

.* not creditable towards diversion until after 1995

Based upon the information in the Waste Generation Study, the following materials will be targeted for diversion through the programs outlined in this SRRE.

Table 3-14. Waste Types to Be Targeted for Diversion

Waste Type	Example Material
Paper	Old corrugated cardboard (OCC), kraft liner board, mixed paper, newsprint, high-grade paper, and other paper products
Plastics	HDPE, PET, polystyrene, film
Glass	Redeemable beverage, nonredeemable beverage, other recyclable glass
Metals	Bimetal/steel food and beverage cans, aluminum cans, other ferrous, nonferrous and aluminum scrap, appliances/ white goods
Yard waste	Leaves, grass, prunings,
Other organics	Food waste, tires/rubber, wood wastes
Other wastes	Inert solids (rock, concrete, brick, sand, soil, fines, asphalt, sheetrock), household hazardous waste (including waste oil and car batteries)
Special wastes	Used tires, sewage sludge

3.4.3. Waste Types Which Cannot Easily Be Diverted

Not all waste types are easily diverted from the waste stream through source reduction, recycling, or composting programs. Waste types that are particularly difficult to divert are listed in Table 3-15. Each waste material is accompanied by an explanation of why it is currently not feasible to divert that material.

Table 3-15. Waste Types That Are Difficult to Divert

Waste Type	Problem
Textiles/leather	No available markets in the area
Medical waste	Potentially hazardous
Contaminated paper	This material type is not acceptable for recycling
Composite materials	Due to their nature, they are often difficult to recycle
Other plastic	These plastics currently have no market
Non-recyclable glass	This material type is not acceptable for recycling
Disposable diapers	No aftermarket

Table 3-16. Total Waste Generation Summary. City of Davis, 1990

WASTE TYPE	WASTE DISPOSED (TONS/YEAR)	WASTE DIVERTED (TONS/YEAR)	TOTAL GENERATED (TONS/YEAR)	PERCENT DIVERSION
PAPER				
Newspaper	642	2,092.9	2,734.9	4.51
Corrugated	2,166	1,980.2	4,146.6	3.26
High-Grade	585	161.0	746.0	0.26
Mixed	2,485	965.9	3,450.9	1.59
Cont. Paper	3,871	0.0	3,871.2	0.00
PLASTIC				
PET	41	23.8	64.4	0.01
HDPE	108	22.0	130.4	0.01
Pigmented HDPE	85	0.0	85.2	0.00
PS	180	0.0	180.3	0.00
Film	737	0.0	737.3	0.00
Other Plastic	924	0.0	923.8	0.00
GLASS				
CA redemption	294	152.5	446.6	0.25
Other recyclable	592	986.7	1,578.8	1.62
Non-recyclable	55	0.0	55.2	0.00
METAL				
Aluminum cans	68	111.2	179.4	0.18
Bi-metal/tin	678	0.0	678.3	0.00
Ferrous metal	559	0.0	559.0	0.00
Non-ferrous metal	311	0.0	311.1	0.00
White goods	61	0.0	61.0	0.00
YARD WASTE				
Grass, leaves	2,571	0.0	2,570.6	0.00
Prunings	960	0.0	960.2	0.00
Mixed yard waste	1,837	2,836.4	4,673.0	4.67
OTHER ORGANIC				
Food	4,456	38.5	4,494.7	0.06
Tires	69	0.0	68.7	0.00
Rubber	102	0.0	102.3	0.00
Wood waste	3,030	0.0	3,030.0	0.00
Wood (press board, etc.)	2,020	0.0	2,020.2	0.00
Ag crop residue	20	5,206.0	5,226.0	8.57
Manure	98	0.0	97.9	0.00
Disposable diapers	492	223.0	715.4	0.37
Textiles, leather	511	0.0	511.3	0.00
OTHER WASTE				
Inert solids	1,293	7,005.0	8,297.5	11.53
Composite materials	679	0.0	678.7	0.00
HHW mat'l/container	82	0.0	82.4	0.00
Misc.	2,220	0.0	2,219.9	0.00
SPECIAL WASTE				
Ash	65	0.0	64.6	0.00
Medical waste	10	0.0	10.5	0.00
Auto Shredder	0	0.0	0.0	0.00
Auto bodies	0	0.0	0.0	0.00
Bulky waste	667	0.0	666.5	0.00
Other special	917	0.0	917.3	0.00
Construction/Demolition	2,420	0.0	2,419.9	0.00
TOTAL	38,963.7	21,804.8	60,768.5	35.9

*Does not include 2,577.1 TPY of wastes which were diverted to transformation facilities

3.5 FUTURE DATA COLLECTION

The waste reporting system in the City is fairly well developed. DWR operates most of the programs and produces quarterly updates and an annual summary report. This report summarizes all solid waste activities including total waste disposed, total diverted by material type, and by generator (residential, commercial/industrial, or buy-back). This breakout includes materials recovered through recycling activities and yard waste collected and sent to the compost facility for processing. The only refinement foreseen at this time will be for DWR to develop a breakdown by multi-family and commercial/industrial. This should be accomplished during the short term planning period.

Activities by the 20/20 Buy-Backs operating in the City are recorded by the Department of Conservation. This information is requested annually by the Recycling Coordinator.

Summary reports of disposal and diversion activities originating from Davis at the Yolo County Central Landfill will be provided to the City by the County.

Any non-DWR commercial recycling activity (primarily corrugated cardboard from supermarkets, and diaper services) will be tracked through commercial waste audits and surveys by the Recycling Coordinator.

Lastly, the Recycling Coordinator will attempt to track diversion activities from backyard composters via composting workshops and an annual survey of workshop participants.

3.6 WASTE GENERATION PROJECTIONS

The waste generation projections are based on population growth and estimates of tons of waste generated per capita. Waste generated per capita includes waste disposed of and diverted by residential, commercial, industrial, and other waste sources.

Projections for population growth were provided by City and County Planning Departments and are summarized in Table 3-17. The quantity of waste generated per person annually, tons per capita (TPC), is based on the quantity of waste generated during 1990. It was assumed that the per capita generation rate increases annually at a rate of 1.8 percent.

Table 3-17. Population Projections

Jurisdiction	Population (1991)	Population (1995)	Annual Growth Rate (1991-1995) (%)	Population (2010)	Annual Growth Rate (1995-2010) (%)
Davis	46,209	50,000	1.8	65,000	1.8

Table 3-18. 15 Year Waste Generation Projections Assuming Existing Conditions - City of Davis as Measured in Tons Per Year

Material	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Newspaper	3,862	3,900	3,940	3,977	4,016	4,055	4,087	4,119	4,151	4,183	4,216	4,249	4,282	4,315	4,349	4,383
Corrugated Cardboard	4,147	4,188	4,230	4,270	4,312	4,354	4,388	4,422	4,456	4,491	4,526	4,561	4,597	4,633	4,669	4,705
High-Grade Paper	585	591	597	603	609	615	620	625	630	635	640	645	650	655	660	665
Mixed Paper	2,485	2,509	2,535	2,559	2,584	2,609	2,629	2,650	2,671	2,692	2,713	2,734	2,755	2,776	2,798	2,820
Contaminated Paper	3,871	3,909	3,949	3,986	4,025	4,064	4,096	4,128	4,160	4,192	4,225	4,258	4,291	4,324	4,358	4,392
PET	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
HDPE	190	192	194	196	198	200	202	204	206	208	210	212	214	216	218	220
Polystyrene	180	182	184	186	188	190	191	192	193	195	197	199	201	203	205	207
Film Plastic	737	744	751	758	765	772	778	784	790	796	802	808	814	820	826	832
Other Plastics	970	980	990	999	1,009	1,019	1,027	1,035	1,043	1,051	1,059	1,067	1,075	1,083	1,091	1,100
CA Redemption Glass	447	451	456	460	465	470	474	478	482	486	490	494	498	502	506	510
Other Recyclable Glass	1,579	1,594	1,611	1,626	1,642	1,658	1,671	1,684	1,697	1,710	1,723	1,736	1,750	1,764	1,778	1,792
Non-Recyclable Glass	55	56	57	58	59	60	60	60	60	60	60	60	60	60	60	60
Aluminum Cans	179	181	183	185	187	189	190	191	192	193	195	197	199	201	203	205
Bi-Metal/Tin Cans	678	685	692	699	706	713	719	725	731	737	743	749	755	761	767	773
Ferrous Metals	559	564	571	576	582	588	593	598	603	608	613	618	623	628	633	638
Non-Ferrous Metals	311	314	317	320	323	326	329	332	335	338	341	344	347	350	353	356
White Goods	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
Yard Wastes	8,204	8,284	8,369	8,448	8,531	8,615	8,682	8,750	8,818	8,887	8,956	9,026	9,096	9,167	9,239	9,311
Food Waste	4,495	4,539	4,585	4,628	4,673	4,719	4,756	4,793	4,830	4,868	4,906	4,944	4,983	5,022	5,061	5,100
Tires & Rubber	171	173	175	177	179	181	182	183	184	185	186	187	188	189	190	191
Wood Waste	5,050	5,099	5,152	5,200	5,251	5,302	5,343	5,385	5,427	5,469	5,512	5,555	5,598	5,642	5,686	5,730
Ag Crop Residue	5,226	5,277	5,331	5,381	5,434	5,487	5,530	5,573	5,616	5,660	5,704	5,748	5,793	5,838	5,884	5,930
Manure	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113
Disposable Diapers	715	722	729	736	743	750	756	762	768	774	780	786	792	798	804	810
Textiles, Leather	511	516	521	526	531	536	540	544	548	552	556	560	564	568	572	576
Inert Solids	8,298	8,379	8,465	8,545	8,629	8,714	8,782	8,850	8,919	8,989	9,059	9,130	9,201	9,273	9,345	9,418
Miscellaneous Other Waste	2,899	2,927	2,957	2,985	3,014	3,044	3,068	3,092	3,116	3,140	3,164	3,189	3,214	3,239	3,264	3,289
HHW	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
Ash	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Medical Waste	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Bulky Waste	667	674	681	687	694	701	706	712	718	724	730	736	742	748	754	760
Other Special Waste	917	926	935	944	953	962	970	978	986	994	1,002	1,010	1,018	1,026	1,034	1,042
Construction/Demolition Waste	2,420	2,444	2,468	2,491	2,515	2,540	2,560	2,580	2,600	2,620	2,640	2,661	2,682	2,703	2,724	2,745
Totals	60,768	61,364	61,990	62,573	63,186	63,805	64,303	64,805	65,310	65,819	66,332	66,849	67,370	67,895	68,425	68,959

Table 3-19. 15 Year Waste Diversion Projections Assuming Existing Conditions - City of Davis as Measured in Tons Per Year

Material	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Newspaper	2,093	2,114	2,135	2,155	2,176	2,197	2,214	2,231	2,248	2,266	2,284	2,302	2,320	2,338	2,356	2,374
Corrugated Cardboard	1,980	1,999	2,019	2,038	2,058	2,078	2,094	2,110	2,126	2,143	2,160	2,177	2,194	2,211	2,228	2,245
High-Grade Paper	161	163	165	167	169	171	172	173	174	175	176	177	178	179	180	181
Mixed Paper	966	975	985	994	1,004	1,014	1,022	1,030	1,038	1,046	1,054	1,062	1,070	1,078	1,086	1,094
Contaminated Paper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PET	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
HDPE	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Polystyrene	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Film Plastic	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
CA Redemption Glass	153	154	156	157	159	161	162	163	164	165	166	167	168	169	170	171
Other Recyclable Glass	987	997	1,007	1,016	1,026	1,036	1,044	1,052	1,060	1,068	1,076	1,084	1,092	1,101	1,110	1,119
Non-Recyclable Glass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aluminum Cans	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126
Bi-Metal/Tin Cans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferrous Metals	0	0	0	0	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	0	0	0	0
White Goods	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yard Wastes	2,836	2,864	2,893	2,920	2,949	2,978	4,902	4,940	4,979	5,018	5,057	5,096	5,136	5,176	5,216	5,257
Food Waste	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
Tires & Rubber	0	0	0	0	0	0	62	62	62	62	62	62	62	62	62	62
Wood Waste	0	0	0	0	0	0	744	750	756	762	768	774	780	786	792	798
Ag Crop Residue	5,206	5,257	5,310	5,360	5,413	5,466	5,509	5,552	5,595	5,639	5,683	5,727	5,772	5,817	5,862	5,908
Manure	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Disposable Diapers	223	225	227	229	231	233	235	237	239	241	243	245	247	249	251	253
Textiles, Leather	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inert Solids	7,005	7,074	7,145	7,212	7,283	7,354	7,411	7,469	7,527	7,586	7,645	7,705	7,765	7,826	7,887	7,949
Miscellaneous Other Waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HHW	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
Medical Waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulky Waste	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
Construction/Demolition Waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	21,806	22,020	22,240	22,449	22,669	22,891	25,777	25,978	26,181	26,385	26,591	26,798	27,007	27,218	27,430	27,644

Table 3-20. 15 Year Waste Disposal Projections Assuming Existing Conditions - City of Davis as Measured in Tons Per Year

Material	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Newspaper	1,769	1,786	1,804	1,821	1,839	1,857	1,871	1,886	1,901	1,916	1,931	1,946	1,961	1,976	1,991	2,007
Corrugated Cardboard	2,167	2,188	2,210	2,231	2,253	2,275	2,293	2,311	2,329	2,347	2,365	2,383	2,402	2,421	2,440	2,459
High-Grade Paper	424	428	432	436	440	444	447	450	454	458	462	466	470	474	478	482
Mixed Paper	1,519	1,534	1,549	1,564	1,579	1,594	1,606	1,619	1,632	1,645	1,658	1,671	1,684	1,697	1,710	1,723
Contaminated Paper	3,871	3,909	3,948	3,985	4,024	4,063	4,095	4,127	4,159	4,191	4,224	4,257	4,290	4,323	4,357	4,391
PET	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
HDPE	168	170	172	174	176	178	179	180	181	182	183	184	185	186	187	188
Polystyrene	180	182	184	186	188	190	191	192	193	195	197	199	201	203	205	207
Film Plastic	737	744	751	758	765	772	778	784	790	796	802	808	814	820	826	832
Other Plastics	970	980	990	999	1,009	1,019	1,027	1,035	1,043	1,051	1,059	1,067	1,075	1,083	1,091	1,100
CA Redemption Glass	294	297	300	303	306	309	311	313	315	317	319	321	324	327	330	333
Other Recyclable Glass	592	598	604	610	616	622	627	632	637	642	647	652	657	662	667	672
Non-Recyclable Glass	55	56	57	58	59	60	60	60	60	60	60	60	60	60	60	60
Aluminum Cans	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
Bi-Metal/Tin Cans	678	685	692	699	706	713	719	725	731	737	743	749	755	761	767	773
Ferrous Metals	559	564	570	575	581	587	592	597	602	607	612	617	622	627	632	637
Non-Ferrous Metals	311	314	317	320	323	326	329	332	335	338	341	344	347	350	353	356
White Goods	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
Yard Wastes	5,368	5,421	5,475	5,526	5,580	5,635	3,780	3,809	3,839	3,869	3,899	3,929	3,960	3,991	4,022	4,053
Food Waste	4,456	4,500	4,545	4,588	4,633	4,678	4,714	4,751	4,788	4,825	4,863	4,901	4,939	4,978	5,017	5,056
Tires & Rubber	171	173	175	177	179	181	120	121	122	123	124	125	126	127	128	129
Wood Waste	5,050	5,099	5,150	5,198	5,249	5,300	4,597	4,633	4,669	4,705	4,742	4,779	4,816	4,854	4,892	4,930
Ag Crop Residue	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Manure	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113
Disposable Diapers	492	497	502	507	512	517	521	525	529	533	537	541	545	549	553	557
Textiles, Leather	511	516	521	526	531	536	540	544	548	552	556	560	564	568	572	576
Inert Solids	1,293	1,306	1,319	1,331	1,344	1,357	1,368	1,379	1,390	1,401	1,412	1,423	1,434	1,445	1,456	1,467
Miscellaneous Other Waste	2,899	2,927	2,956	2,984	3,013	3,043	3,067	3,091	3,115	3,139	3,163	3,188	3,213	3,238	3,263	3,288
HHW	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
Ash	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Medical Waste	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Bulky Waste	667	674	681	687	694	701	706	712	718	724	730	736	742	748	754	760
Other Special Waste	917	926	935	944	953	962	970	978	986	994	1,002	1,010	1,018	1,026	1,034	1,042
Construction/Demolition Waste	2,420	2,444	2,468	2,491	2,515	2,540	2,560	2,580	2,600	2,620	2,640	2,661	2,682	2,703	2,724	2,745
Totals	38,962	39,344	39,737	40,111	40,504	40,901	38,526	38,827	39,130	39,435	39,743	40,053	40,365	40,680	40,997	41,317

3.7 WASTE TYPE DESCRIPTIONS

PAPER

Newspaper: Post consumer newspaper and shredded newsprint, including newspaper inserts such as magazine, comics, etc.

Corrugated paper: Paperboard containers fabricated from two layers of kraft linerboard sandwiched around a corrugated medium. Kraft paper was also included in this category.

High-Grade paper: Continuous form computer paper, and white and colored ledger.

Mixed paper: All other paper including envelopes, magazine, clipboard, paper packaging, etc.

Contaminated paper: Various grades of paper which had been contaminated with food waste or had a high moisture content.

PLASTIC

HDPE (high-density polyethylene) containers: Nonpigmented plastic containers for milk, water, etc.

PET (polyethylene teraphthalate) containers: Beverage containers.

Film plastics: Trash bags, grocery bags, food bags, plastic food wrap, and sheet plastic.

PS (polystyrene) plastics: Food, beverage, packaging, other product containers made of expanded and nonexpanded polystyrene.

Other plastics: Liquid containers and dispensers, food containers, disposable utensils and plates, molded products, extruded pipes, etc.

GLASS

California redemption containers: Glass bottles labeled "California Redemption Value."

Other recyclable containers: All food, beverage, and other glass containers with the exception of California redemption containers.

Other glass: Nonrecyclable glass products such as plate glass, light bulbs, mirrors, and other glass materials.

METALS

Aluminum cans: Redemption and nonredemption aluminum cans; soda, beer, and food containers.

Tin cans: Containers for food, beverage, or other products which include tin.

Ferrous metals: Metal material with magnetic properties.

Nonferrous: Nonmagnetic metals such as scrap aluminum, copper tubing, brass fixtures, aluminum furniture, aluminum foil, etc.

White goods: Large appliances such as dishwashers, hot water heaters, stoves, washer, dryers,etc.

YARD WASTE

Grass / Leaves: Grass clippings, leaves, and other organic waste resulting from landscaping activities.

Pruning: Shrub and brush pruning, small tree clippings (natural wood, up to a diameter of 8 inches), and other landscaping and gardening waste.

Mixed yard waste: Yard waste resulting from the separate yard waste collection.

OTHER ORGANIC MATERIALS

Food waste: Animal, fruit, or vegetable wastes resulting from the preparation, cooking, or handling of food.

Tires / Rubber products: Automobile tires, scrap rubber from manufacturing operations, rubber mats, etc.

Wood waste: Pallets, scrap wood, and dimensional lumber.

Wood Waste (press board, etc.): Wood which has been treated. Materials included particle board, press board, plywood, and wood which had been painted.

Agricultural crop residue: Agricultural crop residue such as rice hulls and tomato by-products from farming or food processing operations.

Manure: Animal excrement.

Disposable Diapers: All diapers consisting of plastic and paper intended for one-time-only use.

Textiles / Leather: Discarded clothing and waste from garment, rug, and leather product manufacturers.

OTHER WASTE

Asphalt waste: A tar-like substance used in paving applications.

Concrete waste: Building material made of cement, sand, gravel, and similar materials.

Other inert solids: Ceramic, rock, brick, gravel, soil, sheet rock, and other similar materials.

Composite materials: Products consisting of several different materials such as metal and plastic. Products characterized as composite materials category included TV sets, food processors, etc.

Household Hazardous Waste (HHW): Waste resulting from products purchased by the general public for household use which may pose a hazard to human health or the environment. Examples of HHW include paint, pesticides, cleaners, batteries, petroleum products, and other similar household products. Recorded weights of HHW included the weight of the containers.

Miscellaneous: A mixture of organic and inorganic materials less than two inches in diameter not easily sorted out for characterization. Contaminated waste paper from fast restaurants was also included.

SPECIAL WASTE

Ash: Waste resulting from the combustion of organic materials.

Medical Waste: Medical waste from the residential and commercial sectors included hypodermic needles, syringes, prescription drugs, bandages, etc. Medical waste disposed of by UCD during the waste characterization study included animal parts, needles, bandages, and vials of blood.

Auto shredder waste: Waste resulting from the shredding of automobiles, trucks, discarded appliances, etc., consisting of a combination of metals, plastics, glass, paints, and other non metallic materials.

Auto bodies: Discarded automobiles and trucks.

Bulky Items: Items such as discarded furniture and mattresses.

Construction / Demolition debris: Construction and demolition debris identified as being generated from self-haul sources consisted largely of wood, asphalt, inert solids, and metals.

SECTION 4

SOURCE REDUCTION COMPONENT

Source reduction is defined by the California Integrated Waste Management Board as "any action which causes a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of nonrecyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, reducing the amount of yard wastes generated, establishing garbage rate structures with incentives to reduce the amount of wastes that generators produce, and increasing the efficiency of the use of paper, cardboard, glass, metal, plastic, and other materials. Source reduction does not include steps taken after the material becomes solid waste or actions which would impact air or water resources in lieu of land, including, but not limited to, transformation." Recycling, composting, and incineration are therefore addressed in separate components.

Source reduction is an approach that precedes waste management and addresses how products are designed, manufactured, purchased, and used so as to reduce the quantity and toxicity of waste produced when the products are purchased, as well as when they reach the end of their useful lives. Technical options for communities considering source reduction include product reuse, reduced material volume and/or weight specifications, reduced toxicity, increased product lifetime, and decreased consumption.

In general, source reduction is not currently a widely understood concept by the general public. It is, therefore, difficult to quantify the actual impact that source reduction programs will have on the waste stream. However, source reduction may be practiced at the business and household levels through selective buying patterns and extending the utilization of products and materials. Because it requires changing attitudes and behavioral patterns, a major effort must focus on education. Source reduction programs also require research, financial incentives and disincentives, regulations, and technological developments.

The Waste Generation Study for The City of Davis identified target materials available for source reduction programs as: yard waste, wood, food, paper, inerts, metals, plastics, and construction and demolition materials.

4.1 GOALS AND OBJECTIVES

Reducing the amount of garbage generated at a source (a home or business, for example) is the number one waste management priority of the City of Davis. Reducing the number of items a resident or business person needs to dispose of involves considering the ramifications of disposal before making purchasing choices, some people call this "precycling." Some suggestions for source reduction include:

- purchase durable goods and repairable goods
- avoid purchasing disposable goods such as paper towels and disposable razors
- buy in bulk when possible
- buy products made with minimal or recyclable packaging
- buy products packaged with materials which are recyclable in our area, e.g., buy eggs in cardboard cartons, not in styrofoam cartons
- avoid products packaged in materials which are not recyclable here in Davis, e.g., squeezable ketchup bottles
- buy products made with recycled materials
- bring your own bag to the store
- carry a reusable mug
- use the library
- make double-sided copies
- use old one-sided paper for scratch paper and note pads
- voice your product packaging preferences to store managers and business owners.

Source reduction is critical in the overall integrated waste management plan. By taking steps to prevent waste from entering the waste stream, the City of Davis can avoid costly programs that will recycle, compost, or transport and dispose of the material. The City must develop and implement source reduction programs which work well at the municipal level, while providing support to the activities which can best be accomplished on a larger scale at the State and Federal levels. In light of this goal, the City of Davis has adopted the following objectives for accomplishment during the short- and medium term planning periods. These are:

- Reduce the use of non-recyclable materials.

- Purchase repairable products.

- Replace disposable materials and products with reusable materials and products.

- Reduce the amount of junk mail received by residents and businesses.

- Reduce the amount of disposable diapers through the use of local diaper services by City residents.

- Educate residents and companies regarding the concept and practice of source reduction including descriptions of materials or products which are generally re-usable. Target awareness levels are 80 percent of City residents by 1995 and 90 percent by 2000.

- Devise methods of quantifying source reduction by residents (backyard composting) and businesses such as thrift shops and other commercial or industrial activities.

- Gain a better understanding of the commercial waste stream through waste evaluations to 90 percent of businesses producing more than 10 cubic yards of waste per week (approximately 100 businesses) to be performed by the businesses with assistance from the City.

- Evaluate the provision of economic incentives in the form of differential licensing rates to businesses which participate in waste evaluations and source reduction programs.

- Where possible, work with industry, local government, and the State to encourage reduction in packaging by considering durability, reusability, and responsibility as product selection criteria.

- Work to improve drop-off facilities for thrift shops.

- Continue to improve the efficiency of office paper use in City offices and contracts.

- Take part in a waste information exchange program as promoted by the State.

- Reduce the amount of yard wastes entering the waste stream by attaining a 5 percent participation rate of all City households in backyard composting in the short term and up to 10 percent during the medium term.

- Initiate a compost training program in the City to educate residents about proper backyard composting techniques during the short term planning period.

Priority Materials for Waste Diversion

The type and amount of materials to be targeted by source reduction activities are shown in Table 4-1.

Table 4-1. Target Materials for Source Reduction Programs

Materials	Amount Disposed (TPY)	Percentage of Disposed Waste Stream	Criteria for Selection Potential Methods to Source Reduce
Corrugated containers	2,166	5.9	• reusable
High grade paper	585	1.6	• recycle re-use in offices • electronic mail
Mixed paper	2,485	6.8	• reduced junk mail
Plastics	2,075	5.7	• conversion from styrene • replace disposables with reusables
Wood wastes	4,347	11.9	• reuse for new items
Yard waste	3,302	9.1	• backyard composting
Food waste	4,456	12.2	• food banks • animal feed
Tires & rubber	112	0,3	• consider life cycle when purchasing
White goods	61	0.2	• repairs, thrift shops
Textiles & Leather	511	1.4	• repairs, thrift shops
Diapers	492	1.4	• diaper services
Totals	20,592	56.6	---

4.2 EXISTING CONDITIONS

Thrift Shops and Charitable Organizations

The City of Davis currently has several thrift shops and a number of service organizations which promote the re-use of items. These businesses and organizations are listed below:

Thrift Stores

- Davis Community Church
- Hospice
- Reruns
- Salvation Army
- SPCA Yolo County

The following is a list of some local and county agencies and organizations which accept a variety of items including food, clothing, and furniture. City residents may call individual groups or the umbrella organization MANNA - Medical Auxiliary Networking Needy Agencies for more information on needed items and methods of pickup or drop-off.

- Battered Women's Center of Yolo County, Wdlnd.
- Citizens Who Care, Davis
- Davis Community Meals, Davis
- Loaves and Fishes, Sacramento (Davis representatives)
- Sexual Assault and Domestic Violence Center, Wdlnd.
- Short Term Emergency Aid Committee, Davis
- West Sacramento Resource Center, West Sac.
- Yolo Comm. Care Continuum, Davis
- Yolo County Coalition Against Hunger, Wdlnd.
- Yolo County Network for Teenage Parents, Davis
- Yolo Wayfarers' Center, Wdlnd.

Many other agencies, including a number in Sacramento, accept donations of usable goods. A couple (the National Kidney Foundation of No. California and the Volunteers for America) even accept automobiles.

While the City currently has no method of including or estimating waste diverted through these activities, it will be a goal to promote the concept of source reduction to all waste generators.

Donating, Selling, and Buying Reusable Goods

In addition to the many community agencies which welcome donations of goods, there are many places where citizens can not only give away or sell your re-usable items but can also buy used items. This "give and take" approach to possessions is sound from a solid waste management standpoint. The City encourages residents to patronize both nonprofit and commercial operations which further the re-use ethic. Since the number of such establishments is so extensive, the City has tried to include all of them here but have listed a range of reusable items and how to find them.

Books and Recent Magazines

Yolo County Public Library, in Davis, accepts used books and magazines.

Medical Equipment and Supplies

- RACORSE Network - collects and distributes used medical equipment (e.g. crutches, walkers) and extra medical supplies (e.g. dressings, tapes, tubing)
- Lions Blind Center - collects and distributes used eyeglasses.

Miscellaneous Merchandise

- Ca.; Materials Exchange or CALMAX - CALMAX is operated by the California Integrated Waste Management Board; for no charge, CALMAX lists available surplus materials as well as materials needed.
- Gifts in Kind America, accepts all types of excess business inventory to be matched with charities.

Packing Materials

Polystyrene packing peanuts (#6) can be brought to Mail Boxes Etc. or Parcel Dispatch, PDQ for re-use.

Toys

Woodland Toy Library accepts donations and lends toys.

Garage Sales/Yard Sales and Community Sales

Other ways to re-use durable goods are through holding yard or garage sale or by donating these items to local civic groups, school groups and churches which hold periodic fundraising yard sales and flea markets.

Pallet Repair

There are no pallet recovery and repair businesses operating in the City of Davis. However, pallet repair firms in the regional area take pallets generated in Davis. The number of pallets currently being diverted through these companies is difficult to assess, but conservative estimates from within the pallet recycling industry place the number above 50 per month, or approximately 26,400 pounds or 13 tons per year.

Food Waste

Grocery stores in the City diverted approximately 38.5 TPY of food waste for re-use as animal food. In addition, a tomato processing plant diverted an estimated 5,206 TPY or of reject tomatoes for re-use as animal food. This material is identified as Ag Crop Residue in the Waste Generation Study.

Newspaper Rubber Bands and Plastic Bags

The Davis Enterprise re-uses these items for newspaper deliveries.

Clothes Hangers

Many dry cleaners and thrift shops accept used hangers.

Backyard Composting

It is very difficult to gauge the level of participation in backyard composting; however, it is a normal gardening activity that can be assumed to be occurring at some locations in the community. The City also plans to establish a demonstration project during the short term.

Product Substitution

While it is again difficult to quantify, the number of businesses and organizations moving away from disposable food service products and towards reusable is ever-growing. The most common changes being made are from disposable cups to ceramic cups.

Double-sided Photocopies

Although difficult to quantify, the number of businesses and organizations moving away from single-sided copies and towards double-sided copies and the use of scrap paper as note paper is increasing. The use of double-sided copying is standard within the City offices.

Diaper Services

Two diaper services currently service 386 residences in the City. At an average use of fifty diapers per week, the City presently diverts 223.0 TPY of disposable diapers (1,003,600 per year divided by 4,500 diapers per ton). This amount can be counted as diversion credit towards the City's diversion goals mandated by AB 939. The 223.0 TPY represents 0.4 percent of the solid waste generated in 1990. The diaper services plan to continue service in the City during the short term planning period.

Cloth diaper laundry companies servicing the Davis area are:

- Cloud Nine Diaper Service
- Tidee-Didee Diaper Service
- Mother Earth Diaper Service

Paper Versus Plastic

Another debate has focused on the use of paper grocery bags versus plastic grocery bags; both have environmental negatives. A better alternative than either of them is a cloth or string bag which can be used over and over again.

Government Non-procurement Source Reduction Programs

City government in Davis currently has a policy to favor and promote the use of reusable products such as ceramic mugs and scrap paper. Such use is almost universal throughout City offices.

Government Procurement Programs

City government in Davis currently operates under an ordinance requiring the purchase of products for City use based not only on cost, but recyclability and recycled content. A copy of this ordinance (#1565) is included in Appendix D.

Education Programs

The City currently promotes recycling, source reduction, composting and other environmentally oriented programs and activities through workshops with the Regional Science Center, promotion and outreach at special events, newspaper features, pamphlets, a weekly newspaper column written by the City's Recycling coordinator, videos, flyers, and school programs.

Recycling Coordinator - Davis Waste Removal

DWR has established the position of Recycling Coordinator to promote source reduction and recycling activity in the City.

4.2.1 Summary of Current Diversion

Table 4-2 summarizes current diversion through source reduction and re-use in Davis during 1990..

Table 4-2. Summary of Current "Diversion Through Source Reduction and Re-Use - City of Davis, 1990.

Material	Amount Diverted (TPY)	Classification
Diapers	223.0	• cloth diaper service
Food	38.5	• animal food
Ag Crop Residue	5,206.0	• animal food
Total	5,467.5	-----

As presented in Table 4-2, total diversion through source reduction and re-use was 5,467.5 TPY or 90 percent of the waste stream.

4.3 EVALUATION OF ALTERNATIVES

There are many ways in which source reduction can be accomplished. This section presents evaluations of eight source reduction programs that are worthy of consideration. Each program is evaluated by criteria that have been specified by the California Integrated Waste Management Board.

Source reduction alternatives presented in this section fall into four categories: rate structure modifications, economic incentives, technical assistance, and regulatory programs. Rate structure modifications provide financial incentives to reduce the amount of solid waste generated in the home, in businesses, and in industries through increased disposal fees. Economic incentives are ways in which the City can encourage the development of source reduction practices in business, government, and industry and by consumers through establishment of financial incentives and disincentives such as grants, loans, and fines. Technical assistance programs teach businesses, industries, and consumers to recognize and reduce waste at the source. Regulatory programs refer to policies, laws, and regulations adopted by the City to reduce waste generation.

Through two public workshops and several meetings with the Davis Natural Resource Commission, 8 alternatives for source reduction were selected for evaluation.

The eight source reduction alternatives described and evaluated in this section and whether or not they were ultimately selected are listed by category below:

Economic Incentives

Alternative 1. Loans, Loan Guarantees, Grants, and Contributions (not selected)
Alternative 2. Commercial Business Compliance Programs (not selected)

Rate Structure Modifications

Alternative 3. Quantity-Based Variable Rates or User Fees (not selected)

Technical Assistance

Alternative 4. Waste Evaluations/Waste Minimization (selected)
Alternative 5. Backyard (On-Site) Composting Programs (selected)
Alternative 6. Educational Efforts (selected)
Alternative 7. Awards and Public Recognition (selected)

Regulatory Programs

Alternative 8. Product Bans (not selected)

These alternatives are described below and evaluated according to the California Integrated Waste Management Board specified criteria.

4.3.1 Economic Incentives

Alternative 1. Loans, Loan Guarantees, Grants, and Contributions

Loans, loan guarantees, grants, and contributions enhance the effectiveness of other programs and alternatives. Under this alternative, the City would provide loan guarantees or actual loans or grants to encourage the economic development of businesses, nonprofit groups, or associations that promote source reduction or otherwise encourage waste reduction. In addition, the City can also lend its support in exploring and developing other funding sources such as grants, industry financial support, in-kind support (donations of composting bins or use of facilities for workshop seminars), and private foundation contributions to be used in developing and implementing source reduction methods.

The City may determine that a particular entity qualifies for financial assistance if that entity's program(s) will further the interests of local source reduction efforts. The entity in question might fulfill a role within the community that supports other community programs such as public education, source reduction awareness efforts, and any other aspect or component of the overall waste reduction effort. For example, a community could provide a grant to a local organization to develop and implement composting workshops. These workshops could be scheduled one weekend a month and be timed to coincide with the beginning of other programs and

alternatives, such as backyard composting programs. The community could also provide funding and meeting rooms for workshops on source reduction techniques given by local chapters of conservation groups for the managers of commercial procurement programs.

This alternative emphasizes the provision of nominal amounts of support to facilitate the primarily volunteer efforts of local or regional groups and associations seeking to foster source reduction efforts at the community level. The City can provide both physical resources and financial assistance to defray some of the costs of providing technical assistance and public education offered by these groups. This is one way that the City can forge a relationship and working partnership with volunteer and community interest groups and associations who seek to further community waste management goals and objectives. This alternative enables the city to take advantage of the expertise and resources of what are essentially volunteer groups.

The targeted source for this alternative depends on the source reduction activity planned by the community group. For example, if the community group is the 4-H Club and the project is a backyard composting workshop, then the targeted source would be residential generators of yard wastes. Potential any elements of the waste stream that may be diverted from the landfill including paper products, plastic packaging, food waste, yard waste, and wood.

Effectiveness

This alternative can be highly cost effective because (1) it requires only nominal financial outlays from the City for staff and physical resources; (2) it makes use of the in-house expertise and skill of the City staff in researching and developing other funding sources for the target entity (volunteer or community group); and (3) it allows the City to better utilize the existing resources of the community in terms of expertise and organizational support for community source reduction efforts and policies. In the field of waste management, and especially in changing individual generator and household behavior, this kind of an alliance between community groups and waste management authorities is invaluable.

Hazards

No environmental hazards are created by this alternative.

Ability to Accommodate Change

This alternative can be developed and/or administered to be very flexible because it relies on existing community groups that are interested in promoting source reduction efforts through public awareness and technical assistance. As the community, the waste management system, and the waste stream change over time, the expertise and ability of these groups will change also. New techniques and approaches will become available to the City by virtue of the informal relationship between the public agencies and these community groups. This alternative's funding mechanism seeks to capitalize upon the stock of community knowledge and expertise existing at any point in time. Thus, this alternative is easily adaptable to change as new methods and programs are developed.

Consequences on Waste Stream Composition

Direct community support for carefully implemented programs will reduce the amount of solid waste discarded. Changes in the waste stream composition will depend on the materials targeted for reduction by the programs supported and implemented. The most likely candidates for the support provided by this alternative are backyard composting programs, commercial purchasing and procurement programs, office source reduction programs, and consumer purchasing awareness programs. The waste stream materials affected by these types of programs are yard wastes and wood cuttings, office paper and plastic packaging, corrugated cardboard, and other packaging products.

Ability to be Implemented

This alternative can be implemented within the short term planning period.

Need for Facilities

No facilities are required for this alternative.

Consistency with Local Policies, Plans, and Ordinances

This alternative presents no direct conflicts with current policies, nonfinancial related plans, and ordinances.

Institutional Barriers to Implementation

The ability of local staff to grant funding and loan guarantees and to explore outside funding options would have to be approved most likely through the budgetary process.

Costs

The costs of this alternative would involve the direct dollar amount of any grants or funding provided by the City and/or use of City staff resources to develop and administer the program. The program is assumed to fund at most ten loans, grants, etc. each year. Staff time of approximately 50 - 120 hours per year might be required to develop, approve, implement, and administer each community project funded. For projects where staff assist community groups to obtain alternative funding from other sources (State, trade associations, foundations), an additional 80 hours might be required. Generally, these operating grants might be provided funds anywhere from $1,000 to $2,500 and would not be expected to exceed a maximum of $4,500. Total cost for this option is from $4,000 to $7,500 per grant or loan.

Market Availability

No markets are required for this alternative.

Public Acceptance

High profile and high impact programs using well-known and respected community groups may gain rapid public acceptance and promote public involvement.

Regional Applicability
This alternative lends itself particularly well to a regional approach, e.g., the County. This would allow for an excellent working and problem-solving relationship to develop, and would take advantage of the presence of many community groups in the region.

Alternative 2. Commercial Business Compliance Programs

Under this alternative the City would require the development and implementation of source reduction programs and practices in local businesses by requiring businesses to complete a short document providing data and information on their waste streams and outlining their present and proposed source reduction practices as part of their business license application. Technical assistance could be provided to businesses for this program in the form of a pamphlet and informational flyer describing the kinds of data and information sought by the City and the financial and other benefits, i.e., health of the work environment, that could accrue to the business.

The City may require waste reduction planning and reporting requirements for large commercial or institutional waste generators that are similar to what the State of California has required of Cities and Counties. Thus the City would delegate the responsibility for implementing source reduction programs to the larger waste generators in the community. These entities would be held responsible for developing and implementing a plan that reduces the amount of waste generated through source reduction (as well as recycling and composting) that helps the City satisfy the required diversion requirements of AB 939. Like the City itself, these businesses would report their progress regularly (e.g., when they apply for certain permits, pay their taxes, or before the city or any private waste hauler renews a waste disposal agreement with them).

This alternative targets all commercial waste generators. Materials to be diverted include: paper, plastic, packaging, food waste, yard waste, and wood.

Effectiveness
This alternative could be very cost effective as it would eventually assess a penalty on businesses that do not participate in waste reduction efforts, thus providing an economic incentive to develop and implement a source reduction program.

Hazards
No hazards are associated with this alternative.

Ability to Accommodate Change

This alternative is readily adaptable to changes in available source reduction technologies and applications. As newer types of manufacturing, processing equipment, packaging or new formats for marketing products become available, this alternative allows businesses to take advantage of them in their procurement planning. As waste reduction practices and waste streams change over time, this alternative will incorporate those changes readily and with little additional effort on the part of either the public or private sector.

Consequences on Waste Stream Composition

Carefully implemented programs will reduce the amount of solid waste disposed of at landfills. Changes in the waste stream composition will depend on the types of businesses that comply and the materials targeted for reduction by the programs they implement. Changes in the waste stream composition will also depend on the availability of alternative products and on the effectiveness of these procurement programs on the materials targeted for reduction.

Ability to be Implemented

This alternative would be implemented in the short term for businesses applying for building permits. After successful implementation of the program for new and changed businesses, this alternative would be applied to all businesses in the City.

Need for Facilities

No facilities are required by the City for this alternative. The extent that businesses would require additional or modified facilities to comply with the program cannot be determined at this time.

Consistency with Local Policies, Plans, and Ordinances

This alternative would require the passage of a new ordinance or series of ordinances.

Institutional Barriers to Implementation

Implementing a program to penalize businesses not complying with waste reduction and planning requirements of this alternative would probably require the involvement of more than one governmental entity within the City. For example, the agency collecting the fees might be different from the agency tracking the forms themselves. This could delay implementation and lead to additional cost and administrative burden. Some degree of coordination between public agencies would be necessary to ensure that businesses not filing forms were assessed the fine and that businesses attempting to comply with the reporting requirements could do so in the course of making regular business filings and payments.

Because this program will impact existing plans, budgets and policies of businesses, it is likely that the business community will oppose this program.

Costs

The costs to the City associated with this alternative will be primarily staff time necessary to develop and administer the program. Potentially this program could require up to one half-time person for the City. Costs for the businesses required to evaluate their waste stream and develop and implement source reduction programs cannot be determined at this time. However, businesses will benefit from these efforts as a result of lower disposal costs as well as potential cost savings in procurement.

Fees can be collected by staff who currently collect similar revenues from businesses. The tracking of the waste reduction and planning forms could be easily adapted to the processes currently used to monitor business compliance with other local regulations.

There can be considerable investment costs associated with businesses implementing the source reduction measures in new and modified facilities and equipment.

Market Availability

Markets are not required for this alternative.

Public Acceptance

This type of program may be accepted by the public if the program requirements are presented as part of the cost of responsible business practices. Therefore, those being penalized are assumed not to be in compliance with responsible waste management practices. Furthermore, every effort should be made to ensure that the reporting process is brief, provides only the level of data and detail useful to the City, and is easily complied with through regular channels between businesses and the City. It is unlikely that the business community will respond favorably to this alternative.

4.3.2 Rate Structure Modifications

Alternative 3. Quantity-Based Variable Rates or User Fees

Quantity-based variable rates or user fees are primarily intended to foster source reduction at residential sources, although they may also be applied to commercial (including multi-family dwellings) and industrial waste generators.

The current garbage rate structure in Davis allows residents using the can rate to dispose of an unlimited quantity of refuse per week for a flat fee per month. Because not all of the residents will use all of the capacity (limitless), the effect of such a rate structure is that residents disposing of smaller quantities pay a higher rate per gallon.

Variable rate fees involve calculating collection and disposal fees based upon the amount of waste collected. This is similar in principle to other service-based utility charges such as water and electricity. As a result, households are charged fees according to the number of cans used, the number of bags collected, or the frequency of collection. These fees are directly proportional to actual disposal costs rather than collection and disposal costs; consequently, residents have the opportunity to reduce costs by generating less waste.

Among the variants to the rate structure alternative are:

- Use of a base subscription fee to cover fixed collection costs plus a flat per unit volume charge that increases as more waste is disposed.
- A mini-can rate to encourage reduced volume. (i.e. a reduced rate for a 20 gallon can as opposed to larger cans)
- Fees that rise according to increasing volume.
- Fees that are essentially flat by volume.
- Charges based upon weight instead of volume.

Implementation of quantity-based variable rates or user fees may require the purchase of new collection equipment, including: trucks, retro-fit dumping equipment, on-board scales, bar coding equipment, stickers, bags, waste wheelers, et al.

Most systems that currently charge a variable fee do so according to volume. However, given that not every container is necessarily full and the densities of some wastes are different from others, the argument has been made that weight-based systems would be more equitable. Some communities are experimenting with these systems; they require more collection time and require the collection vehicle to have a scale and a bar-code reader to read the homeowner's account number from the container.

Cities implementing variable rate programs have frequently found that they do result in reduced quantities of waste; therefore, the revenues generated by the collection are often overestimated and insufficient to cover the fixed costs of the hauler. The solution to this problem is the use of a fixed subscription fee to cover fixed costs, plus a variable rate fee for the actual quantities of waste collected.

Variable rate fees that rise rapidly with increasing volume tend to place a strong economic incentive upon reducing the amount of waste. Variable rate structures thus provide an excellent impetus for participation in recycling and yard waste programs. In fact, it is very important that recycling and yard waste programs be provided in conjunction with a quantity-based collection rate structure to provide alternatives to standard waste collection and disposal. Furthermore,

variable rate structures may require both anti-dumping ordinances and anti-scavenging ordinances to deter these activities as the variable rates and the recycling programs will tend to provide incentives for both dumping and scavenging.

The materials most affected by implementation of this alternative will be: all materials accepted in the curbside program, i.e., food, diapers, and yard waste.

Effectiveness

Rate structure modifications provide financial incentives to residents to reduce the amount of solid waste generated in the home. Residents will become more conscious of waste generation and may alter their habits to reduce the amount of material generated through purchasing decisions, backyard composting, product reuse, and other source reduction activities. Reduced volume through increased compacting is expected as residents increase the amount of material placed into trash containers. Additionally, variable rate structures provide an incentive for increased participation in recycling and community composting programs.

The amount of estimated reductions in the waste stream resulting from a variable rate structure will depend on the level of participation among households (defined as the "participation rate" or percentage of generators actively participating) and the effectiveness of the participants' reduction efforts (defined as the percentage of reduction achieved, or "reduction rate"). As garbage rates increase, the participation rate and reduction rate will increase. As rates increase beyond what is perceived as reasonable, illegal dumping will begin to occur.

Participation and reduction rates are sensitive to the impact of other alternatives such as public education and awareness programs, expansion of curbside and commercial programs, mandatory recycling laws and separate yard waste collection. In the case of businesses, variable rates will tend to increase source-reduction by affecting procurement policies and will also tend to increase participation in recycling programs.

Hazards

No direct environmental hazard is associated with rate structure modifications. However, increased rates for garbage collection may result in illegal dumping, both on public property and in the disposal containers of commercial businesses. Variable rate structures may necessitate the installation of locking dumpster mechanisms for some commercial containers. Dumping on open, private, or public property can result in environmental and public health hazards. Further, economic incentives to participate in curbside programs may result in more unacceptable materials being placed at the curb for collection and subsequently rejected by the route collector, thereby increasing the potential for litter.

Ability to Accommodate Change

Rate structure modifications can require review, public hearings and independent cost and feasibility studies. Generally speaking, rate changes are met with public resistance. It is, therefore, in the City's interest to structure rates so as to be flexible and require review no more often than is absolutely necessary, e.g., every three years.

Consequences on Waste Stream Composition

This alternative will reduce the amount of solid waste generated, and consequently the amount of waste going to landfills. In addition, variable rate structures provide a strong incentive to separate and divert items from the waste stream when other programs are available; therefore, this alternative will be most effective in conjunction with both recycling programs and yard waste composting programs. Additionally, this alternative (if volume-based) may result in increased use of compactors, resulting in a more dense waste stream which would be more difficult to sort after collection.

Ability to be Implemented

Changes to rate structure will require the approval of the appropriate agency such as the City Council or other regulatory body and may require public hearings and extensive review. Implementation may take as long as six months from the time the decision is made to begin rate review.

Need for Facilities

No additional facilities are required for implementation of this alternative. However, Davis Waste Removal may need new equipment such as trucks, bar code readers, or radio frequency identification equipment. This type of program structure would also require new cans. It is assumed that the present facilities will be able to include those items of additional equipment that may need to be accommodated by the program. Also, recycling and composting programs that complement this alternative will require facilities. Lastly, to deter illegal dumping, commercial dumpsters would need to be locked.

Consistency with Local Policies, Plans, and Ordinances

While there appear to be no local policies or ordinances prohibiting a change in rate structure, there exists a franchise agreement with Davis Waste Removal which would require amendments or renegotiation.

Institutional Barriers to Implementation

The City of Davis has achieved great success in waste diversion through promotion of voluntary programs. The City generally does not believe that creation of an economic disincentive to waste disposal will be as effective as promotion and education and may therefore be unwilling to pursue an expensive change in the refuse, recycling and composting collection and processing funding mechanisms. This type of program would require changes in the current billing system, and new methods for accounting. In addition, this would be impractical for multi-family dwellings.

Costs

Implementation of this alternative requires (1) a rate study to determine appropriate rate structures for achieving the desired level of source reduction; (2) a determination of whether the proposed rate would support the fixed and variable costs of collection and disposal, once source reduction has begun; (3) review and approval by the regulatory bodies (including public hearings); (4) generation of informational and educational materials; and (5) modification of existing billing operations. Total projected costs for implementation of this option could range from $15,000 to $140,000 for the City depending upon the type of rate changes made and the type and amount of additional equipment needed to implement the associated waste collection program.

In addition, significant costs would have to be incurred by Davis Waste Removal. These costs may include new trucks, special cans costing up to $100 per residence, plus tracking equipment on each truck and a computer in the main office. These additional costs would likely be incorporated into the rate structure.

Market Availability

Markets are not necessary for this alternative.

Public Acceptance

The change from a fixed fee system to a variable rate system, especially in conjunction with other source reduction or diversion programs (recycling and yard waste programs), will entail a great deal of effort on the part of the City and Davis Waste Removal to prepare the public for the new system, explain how it works, explain that it is both necessary and equitable, and explain how it can be conveniently adapted to. Initial public resistance can be mitigated if there is a strong perception that the program is necessary, fair, and results in better service. Reducing public resistance and motivating public behavior are aspects of the programs that are contained in the Education and Public Information Component and are essential for the success of this alternative.

4.3.3 Technical Assistance

Alternative 4. Waste Evaluations and Waste Minimization

This alternative requires the City and DWR hauler to assist selected, larger, commercial/industrial generators in the community to conduct waste evaluations to identify what types and amounts of wastes are being generated and to assist them in identifying and implementing waste minimization techniques. An example would be for all businesses generating more than ten cubic yards per week of waste. Restricting, or selecting, the number of entities that complete these evaluations allows the community to reduce the administrative burden and cost to both the public and private sectors. Additionally, restricting the scope of this program enables the community to ensure greater compliance by focusing on larger generators

contributing significantly to the waste stream. Waste evaluations might also be restricted to certain categories of commercial generators according to the Standard Industrial Code, employee size, or by the quantity and type of wastes known to be generated by those enterprises. In addition, thrift shops, appliance repair stores and other source reduction activity in the City could be tracked in this alternative.

Data collected from the waste evaluations could be used for several purposes: (1) establishing a waste generation database from which to measure future progress in waste reduction; (2) assisting establishments in reducing waste generated or disposed; (3) controlling the disposal of banned wastes into the waste stream (e.g., some organic wastes, household hazardous wastes, and some special wastes); and (1) (4) assessing proper waste disposal fees. These evaluations could be required periodically to provide information on the generator's progress.

This alternative could be required of the selected waste generators as a provision of their permitting, licensing or waste disposal contract (i.e., waste haulers would not be allowed to collect or dispose of wastes generated by entities not meeting certain criteria after a given date). The program would be voluntary. The waste evaluations could be funded by the generator or be partially funded by the community as a service or through a grant program (see Alternative 2). The primary purpose of the waste evaluation alternative is to increase commercial/industrial awareness of the need for, and benefits of, waste reduction programs and to assist businesses to design and implement programs reducing waste generation.

Effectiveness

This alternative can be effective because it seeks to target a limited number of large waste generators. This alternative reinforces other educational and awareness programs and will generate baseline data on commercial wastes in the community including businesses currently engaging in source reduction activity. Furthermore, because of the smaller number of entities and the high contribution to the waste stream, the impact of source reduction programs aimed at these entities can be significant while the administrative burden and cost minimal.

The effectiveness of this alternative would be based on the criteria that the City uses to select the participants and the materials generated by each facility. As such, the effectiveness of this alternative is difficult to quantify.

Hazards

No hazards are created by this alternative.

Ability to Accommodate Change

This alternative readily accommodates change in the stock of generators, the types and quantities of wastes generated, and in the City who would administer the program. This alternative provides a mechanism for measuring change in the waste stream and the impact of source reduction programs on commercial generators. This alternative also develops baseline data on commercial wastes and allows public agencies to make decisions based upon the impact of local programs.

Consequences on Waste Stream Composition

This alternative has no direct effects on the waste stream. However, the alternative provides the data and awareness necessary to implement commercial source reduction programs. The secondary impact of this alternative, therefore, may be a reduction of the materials cited above as being most likely to respond to source reduction efforts.

Ability to be Implemented

This alternative can be implemented in the short term planning period. It will involve staff from the City (Recycling Coordinator) and Davis Waste Removal.

Need for Facilities

No new facilities are required for this alternative.

Consistency with Local Policies, Plans, and Ordinances

This alternative presents no direct conflicts with current policies, plans, and ordinances.

Institutional Barriers to Implementation

The successful implementation of this program would involve the cooperation and participation of business management, employees, and the City.

Costs

The costs for this alternative depend on the level of information collected in the waste evaluation. Requiring a full-scale waste characterization study by the larger commercial generators would be prohibitively expensive and probably unnecessary. The wealth of data generated by such an effort would not be required to meet the main goals of this alternative, which are to increase awareness of need for commercial source reduction efforts and to generate data on local commercial waste streams. The City should structure the requirements of this alternative so that target generators can conduct the waste evaluation using in-house staff and expertise, if possible. If necessary, resources may be required for outside consulting services. The overall costs of implementing this alternative should be in the range of 20 to 40 hours for one member of the generator's staff and four to eight hours of a City staff member's time for each audit. Additional staff time would be needed to process the data from the waste evaluations.

Market Availability
Markets are not necessary for this alternative.

Alternative 5. Backyard (On-Site) Composting Programs

This alternative involves developing programs to encourage backyard composting of yard and food waste by homeowners. Yard waste is one of the largest components of the residential waste stream; source reduction programs targeted at these wastes can significantly affect the amount of waste going to the landfill. Source reduction and diversion efforts aimed at yard waste could be an important factor in the City's efforts to achieve its source reduction goals.

This alternative focuses on residential yard waste composting programs, defined as composting activity taking place on the property of the homeowners or waste generators. This alternative could also be applied to commercial and institutional generators of yard waste, including public agencies. Although residential generators contribute a greater proportion of yard waste to the waste stream, they are also more numerous and require regulatory and economic incentives as well as educational and technical assistance programs to participate. Institutional generators, however, are fewer in number and often have commercial grounds management services to whom yard waste responsibilities could be delegated.

Under this alternative, the City would encourage all generators of yard wastes, especially homeowners, to separate their food and yard wastes from the waste stream and re-use these wastes through composting. The City can foster this approach through a number of activities designed to support backyard composting, as illustrated in the following examples.

(1) Consider an ordinance banning yard wastes from garbage containers. This option would be implemented only in conjunction with an established community composting program providing yard waste collection.

(2) Impose a very high fee for non-source-separated yard waste collection, providing an incentive for the generator to compost the waste on-site. This option would be implemented only in conjunction with an established community composting program providing source-separated yard waste collection.

(3) Provide yard waste generators with low-cost bins designed for composting and a flyer on how to start composting.

(4) Develop and/or support educational awareness and technical assistance programs related to backyard composting. These programs could be developed and delivered by public agencies. In addition, the City could make use of other community resources in the form of volunteer and special interest groups capable of providing regular workshops and seminars on composting programs and techniques including demonstration projects. These efforts could be funded by community grants (Alternative 1).

The fundamental premise of this alternative is that the yard waste does not enter the waste stream at any time and is not collected, processed, or disposed of by the City or its contractors. This alternative must meet these requirements in order to qualify as a source reduction program. Programs that rely on the City providing collection and composting services for yard wastes do not qualify as source reduction programs and are treated separately.

This distinction serves to highlight the purpose of source reduction alternatives, which is to encourage reduction in the generation of wastes such that the community waste disposal programs are not required to collect, process, or dispose of these wastes. While these two approaches to composting programs serve different goals (reduction versus diversion) they may be complementary when implemented with appropriate rate structures. Further information on alternatives for community composting programs and services can be found in Section 6, the Composting Component, of this report.

Effectiveness

It is estimated that only a small percentage of households will participate in a backyard composting program. A successful, well-run program is targeted to attract a 10 percent participation; however, those households that do compost yard and food wastes will probably achieve high reduction rates. Based upon these figures, the following tables present the estimated diversion through backyard composting:

Table 4-3. Expected Diversion of Residential (Single Family Dwellings) Wastes Through Backyard Composting in the Short Term

Material	Amount Generated (TPY)	Participation Rate (%)	Capture Rate (%)	Diversion* (%)	Diversion (TPY)
Yard Wastes	1,029.0	5	75	3.75	38.6
Food	1,184.0	5	50	2.5	29.6
Total	2,213.0	---	---	---	68.2

* Participation Rate X Capture Rate = Diversion

Table 4-4. Expected Diversion of Residential (Single Family Dwellings) Wastes Through Backyard Composting in the Medium Term

Material	Amount Generated (TPY)	Participation Rate (%)	Capture Rate (%)	Diversion * (%)	Diversion (TPY)
Yard Wastes	1,133.3	10	90	9.0	102.0
Food	1,292.5	10	75	7.5	85.0
Total	2,425.8	---	---	---	187.0

* Participation Rate X Capture Rate = Diversion

If a community-wide backyard composting program is implemented and the diversion subsequently tracked, it will cause an estimated reduction of 68.2 TPY or 0.1 percent of the total waste stream during the short term. In the medium term, diversion may rise to 187.0 TPY or 0.3 percent as projected in Table 4-4. However, it should be kept in mind that the promotion of backyard composting may significantly affect other composting programs discussed in the Composting Component (Section 6) of this SRRE.

Hazards

The City may seek to ensure through educational programs that proper composting techniques are used so that no public health or fire hazards are created. For example, if backyard composting is encouraged, especially with food wastes, the potential exists for rodents, flies, odors, and other health concerns. Education programs will have to be undertaken to ensure proper composting methods are used.

Ability to Accommodate Change

This alternative can readily be changed to meet new conditions and situations. This alternative could be adopted and developed and then subsequently changed in size and scope to accommodate changing needs for yard waste reduction and ability to support technical assistance and education programs.

Consequences on Waste Stream Composition

This alternative will alter the mix of organic material in the waste stream as well as the total quantity of waste discarded. The Btu value and the biodegradability of the waste stream will be reduced, possibly effecting both potential incineration and methane production options.

Ability to be Implemented

This alternative could be implemented in the short term planning period. Combining disposal/dumping bans, fees, and public education and technical assistance programs could result in a highly effective program within one year.

Need for Facilities
There are no facility requirements for this alternative. However, should the City choose to establish a demonstration project, then a suitable site would have to be identified.

Consistency with Local Policies, Plans, and Ordinances
This alternative presents no direct conflicts with current policies, plans, or ordinances.

Institutional Barriers to Implementation
There are no institutional barriers to implementation of this alternative. However, if a demonstration facility (or series of facilities) were to be established, it would perhaps require the cooperation and support of the City Parks Department.

Costs
The costs of this alternative include the expenses for a public awareness and technical assistance program, as well as a possible subsidy for part of the cost of composting bins to homeowners (perhaps as much as $20 per bin).

Public awareness program costs would vary depending on the scope of the program and the tools used to convey the message. Program expenditures might include: pamphlets and flyers for each household (10 to 25 cents each), door hangers (10 to 25 cents each), public service notices placed on utility bills (5 to 10 cents each) billboard advertisements ($6,000 to $12,000), staff resources to develop, implement, and monitor the program ($8,000 to $20,000). City staff time of approximately 100 to 160 hours might be required to develop, approve, implement, and administer each community project funded.

Other costs include the direct dollar amount of any grants or funding for instruction seminars and training sessions to implement the program. Generally, dollar amounts for these grants might be in the $1,000 to $2,500 range each and would not be expected to exceed $4,500 for a series of several workshops.

Market Availability
It is assumed that the compost is used by the generator.

Alternative 6. Educational Efforts (Also refer to the Public Education Component Section 8)

This alternative involves expansion of the current efforts to (1) educate the public about the need for, and the benefits of, source reduction, and (2) provide information to the public on ways to actually implement source reduction techniques in their personal and business activities. This alternative involves developing and/or sponsoring consumer awareness programs, school curricula, seminars, and public forums that will increase awareness of the solid waste problem, the economic and environmental benefits of source reduction programs, and of any regulatory

requirements that require certain types of source reduction activities. For example, this alternative may also seek to change consumer purchasing patterns to reflect source reduction concerns, by reinforcing the concepts of "bulk shopping" and "product substitution" to the community.

This alternative requires the City to act as a catalyst for source reduction efforts within the community. The City would serve as a clearinghouse for information on source reduction techniques and provide a means for different segments of the community (public and private, residential, and commercial) to gain access to each other to promote the rapid and effective expansion of source reduction activities. For example, the City could provide businesses with specific methods and techniques on how to reduce waste disposal by creating office procedures which minimize the amount of waste paper generated. Source reduction pointers ranging from procurement practices to the use of double-sided copying and using waste paper as scratch paper, could also be provided to the community. Consumer organizations could be encouraged to meet with businesses to develop different approaches to product retailing. Businesses engaged in promoting source reduction (such as bulk-purchase stores or stores catering to yard waste composting activities) could be offered the opportunity to conduct a workshops or seminars.

The effective implementation of this alternative is vital to the success of other source reduction alternatives, such as yard waste composting, and is linked in scope and purpose to Alternative 1 on grant funding for community groups seeking to participate in the community's source reduction efforts.

Educational efforts should target all waste generators within the City including businesses, residences (single-family and multi-family) and institutions. Materials targeted for source reduction include: paper products and packaging, plastic products and packaging, food waste, yard waste, wood, nonrecyclable packaging and containers. Also, disposable products such as pens, razors, cameras, beverage containers, disposable diapers, car tires, batteries, and appliances could be targeted.

Effectiveness

Education can be highly effective relative to dollars spent because (1) it potentially requires only nominal financial outlays from the City and (2) it allows the City to fully utilize the existing resources of the community in terms of expertise and organizational support for community source reduction efforts and policies. In the field of waste management, and especially in changing individual generator and household behavior, this kind of cooperative support between public agencies, community groups, households, and commercial waste generators is invaluable.

Educational programs alone can produce source reduction results; however, such programs are most effective when used to enhance the effectiveness of other source reduction programs in the community.

Hazards
No hazards are created by this alternative.

Ability to Accommodate Change
This alternative is very flexible because it relies on existing community resources in encouraging source reduction efforts through public awareness and technical assistance. As the community, the waste management system, and the waste stream itself change over time, the expertise and abilities of community resources will change also. New techniques and approaches will become available to the City by virtue of the informal relationship between public agencies, businesses, households, and community groups. This alternative is easily adaptable to change as new methods and programs are developed.

This alternative also readily accommodates changes in the waste stream as well as changes in consumer purchasing behavior and available products and alternatives. Indeed, since residents in Davis are already sensitized to the City's integrated waste management 4R Program (reduce, re-use, rebuy, recycle), it may in fact be easier to introduce new concepts to further change public behavior.

Consequences on Waste Stream Composition
Direct community and business involvement and participation in carefully implemented programs will reduce the amount of solid waste discarded. Changes in waste stream composition will depend on the effectiveness of the public education effort and on the materials targeted for reduction by those responding to the message of these programs. The most likely areas for significant impact would be programs aimed at backyard composting, commercial purchasing and procurement programs, office source reduction, and consumer purchasing awareness. The waste stream materials that are anticipated to be most affected by these types of programs are yard wastes and wood cuttings, office paper, plastic packaging, corrugated cardboard, other packaging products, and disposable products.

Ability to be Implemented
This alternative can provide a range of options with respect to the scope and duration of the public education effort. Therefore, initial public education efforts can be implemented in the short term. These might include public forums, workshops, flyers, and doorhangers. More involved programs, such as school curricula, could be developed and implemented over the medium term.

Need for Facilities
This alternative requires no facilities.

Consistency with Local Policies, Plans, and Ordinances
This alternative presents no direct conflicts with current policies, plans, or ordinances.

Institutional Barriers to Implementation
This alternative presents no institutional barriers.

Costs
The cost of this alternative will vary dramatically depending upon the scope of implementation. However, many of the other source reduction alternatives, as well as recycling and community composting programs, will depend upon an aggressive and successful public education program. The costs of this alternative would include the use of City staff resources to develop and administer the program. At least one full-time staff member should be devoted to the task of public education programs for the community's source reduction, recycling, and community composting efforts. In addition, there will be costs associated with promotional brochures, pamphlets, flyers, doorhangers, displays, technical assistance, advertisements and production costs for any use of the media or outside consultants.

Market Availability
Markets are not required for this program.

Regional Applicability
Public education programs may be appropriately implemented over a regional area encompassing the County. For example, elements of a source reduction awareness program might include public service messages on radio or television stations; advertisements and press releases might be included in publications with a circulation covering the City. Both of these examples would make it worthwhile for the City to combine its efforts with the County and the Sacramento metropolitan area for these elements of their programs.

Alternative 7. Awards and Public Recognition

The City of Davis and DWR have won state and national awards for the City's recycling program including a 1991 Merit Award from the Department of Conservation's Division of Recycling, a 1991 Commendation from the U.S. EPA, and Best Curbside Recycling Program in 1987 from the National Recycling Coalition. Last year the City advertised the DOC/DOR's "Recycling Achievement Awards" program to the community and encouraged individuals, businesses, and schools to nominate themselves or others for recognition. A local business and the local school district won awards as a result of their entering this statewide competition. As long as the State sponsors the awards program, the City will promote it and will also announce any other recognition programs for which residents or businesses can apply.

In addition, the City has periodically requested that recyclers let staff know about theirs or others' efforts so the City might publicly recognize them. Some of the weekly columns which the Recycling Coordinator writes for the local paper have been devoted to describing and praising the work of businesses, the local post office program, and the contributions of certain individuals. The City plans to continue these activities.

This alternative involves expanding upon these previous achievements to generate public support for source reduction efforts on the part of business and private individuals by recognizing individuals, groups (including apartment complexes), or businesses that actively engage in source reduction and/or minimization efforts and that support the community's source reduction programs. This alternative serves as a complement to other source reduction alternatives such as public education, technical assistance, and grant programs and involves local community organizations and maybe the weekly column in the Davis Enterprise to report exemplary source reduction programs. These programs could increase compliance with other alternatives such as waste audits and reporting requirements for source reduction programs.

A program for communal recyclers may also be developed. Various apartment complexes would be recruited to participate in an intra-complex contest. That is, each complex would compete against itself to decrease its waste production and increase its recycling. Quantities of trash and recyclables would be determined prior to the program start (pre-measuring). Education and promotion would occur, quantities of waste disposed and waste recycled would then be determined and compared against the pre-measured quantities. Recognition would be directed towards complexes which succeed in decreasing trash/increasing recycling.

This alternative could target all waste generators, both residential and commercial, but businesses will be the focus in the short term. The materials diverted by this alternative will depend upon which programs these awards and statements of public recognition are associated with.

Effectiveness

No diversion occurs directly as a result of this program. However, the effectiveness of other diversion programs should be increased.

Hazards

No hazards are created by this alternative.

Ability to Accommodate Change

This alternative easily adapts to new circumstances within the City. Programs for public recognition, local pride, and environmental awareness can all be readily changed in their focus, scope, and intensity to accommodate changes in local waste management programs, changes in the waste stream, seasonal variations in waste characteristics, and other factors.

Consequences on Waste Stream Composition

This alternative seeks to enhance community support for source reduction by highlighting the activities of selected groups, individuals, or businesses involved in source reduction programs. Direct community support for, and involvement in, carefully implemented programs will help reduce the amount of solid waste disposed. Specific changes in the waste stream composition will depend, however, on the effectiveness of the source reduction programs targeted by this alternative.

Ability to be Implemented
This alternative can be implemented in the short term planning period.

Need for Facilities
This alternative requires no facilities.

Consistency with Local Policies, Plans, and Ordinances
This alternative presents no direct conflicts with current policies, plans, or ordinances.

Institutional Barriers to Implementation
There are no institutional barriers to implementation of this alternative.

Costs
This alternative may involve publicity and public relations costs associated with awarding recognition and highlighting specific activities within the community. These costs will most likely take the form of expenses for printed media publicity. Some of the exposure necessary for these kinds of recognition programs can be gained free in the form of press coverage of officially sanctioned events sponsored by the City. If awards or prizes of any inherent value are planned (e.g., cash awards), these costs would need to be considered also. In addition, the sponsoring agency for the programs under this alternative would incur the cost of developing and administering the programs. This option could require significant amounts of staff time to research and develop criteria, evaluate nominations, make contacts, arrange a ceremony, issue a press release, and present the awards.

Market Availability
Markets are not required for this alternative.

Public Acceptance
Public recognition programs are an accepted means of generating public support for, and greater awareness of, efforts contributing to a high-profile community campaign. This is a common tactic in campaigns focusing on health and welfare issues such as blood drives, donations for homeless and indigent citizens, and support for populations such as children or the elderly. Programs to achieve similar results for source reduction programs would find a high degree of public acceptance.

Regional Applicability
This program may be enhanced by expanding it County-wide.

4.3.4 Regulatory Programs

Alternative 8. Product Bans

The City may ban targeted products and packaging techniques to reduce waste at the source and provide a net environmental benefit. Bans might be considered on products and packaging that do not lend themselves to recycling or source reduction. The criteria for product bans are similar to those used to determine the applicability of advance disposal fees; the product must be disposable or difficult to reuse or recycle and must have environmentally sound substitutes (such as disposable razors, nonrefillable pens, nonreusable beverage containers). For example, some communities (Berkeley, California) have banned polystyrene foam packaging from fast food restaurants. There was a push in 1990 to ban polystyrene in Davis. This ban was not pursued to completion at that time, however. Instead, advocates chose to focus on source reduction and to encourage businesses to convert from polystyrene and use durable goods (i.e., ceramics). Other communities have banned items such as nonrecyclable beverage containers. Communities that pursue this kind of alternative often adopt a time limit or phase-out period for the ban to take effect, providing time for residential and commercial consumers to adjust to the policy and identify substitutes.

Effectiveness

Effectiveness is unknown at this time, as it depends on which products are banned. However, the ban would likely have to involve a region since it would be easy for consumers to go to another City to purchase the banned product.

Hazards

This alternative presents no known environmental hazard, although it is critical that the substitute for a banned product has a less significant environmental impact than the banned product.

Ability to Accommodate Change

A product ban, while it is in force, can not respond to changes in the market. Additionally, a product ban clearly forces manufacturers, retailers, and consumers to search for alternatives to the banned product. This can take a significant amount of time. Once in place, banned products will have lost their place in the market or will not likely be brought back if the ban were to be removed.

Consequences on Waste Stream Composition

A product ban will significantly reduce the quantities of the banned product in the waste stream. However, the ban will also tend to increase the presence of product substitutes in the waste stream. The effect of product substitutes must be carefully considered. When implementing a product ban, it is important to ensure that the substitutes do not themselves present problems involving increased volumes or toxicities of wastes going into landfills.

Ability to be Implemented
A product ban can be implemented in the short term. However, most communities allow for some period of time for consumers, producers, and retailers to adjust to the effects of the ban. In addition, implementing a product ban over a longer time frame may allow for the opportunity to pursue this alternative in conjunction with neighboring jurisdictions.

Need for Facilities
No facilities are required for this alternative.

Consistency with Local Policies, Plans, and Ordinances
Local policies would need to be changed to institute product bans.

Institutional Barriers to Implementation
The business community in general, local merchants and many consumers would vigorously oppose this alternative.

Costs
The cost of this alternative involves staff time necessary to develop, review, and present for approval by the appropriate forum, the details associated with implementation of a product ban. Costs to local merchants, consumers, and producers would depend on the banned product.

Market Availability
No markets are required for this alternative.

Public Acceptance
A product ban can meet with significant resistance if the proposal is not carefully designed and implemented. This alternative not only involves changing behavior on the part of the consumer, but also changing the manufacture and marketing of a product or its substitute. These changes can result in real costs to retailers, manufacturers, and consumers, and these costs will have to be carefully explained and justified. The City should be able to clearly identify the environmental benefits to the community from this type of regulatory alternative before implementation.

Regional Applicability
Because of the broad nature of this alternative and the impact it has on an entire market area for a product, it is often more effective to implement a product ban on a larger geographic scale such as a region or a county. When considering this alternative, the City should investigate implementing such a program in conjunction with neighboring jurisdictions.

4.4 SELECTION OF PROGRAMS

This section describes the programs selected by the City for implementation during the short and medium term planning periods. Program selection decisions are based upon two public workshops held by the City, the advisement of the Davis Natural Resources Commission which reports to the City Council, discussions with City personnel and the alternatives' applicability to the City. A discussion of each of the alternatives is provided below:

4.4.1 Selected Programs

Existing Programs

Existing programs include source reduction activities through existing Davis businesses, thrift shops, and charitable organizations. These activities are expected to continue throughout the planning period. While the City does not have direct control over these types of facilities, the City will continue to promote these activities.

Alternative 4. Waste Evaluations/Waste Minimization

This alternative has been selected for implementation in the short term. The City and DWR will implement the program by offering technical assistance to businesses wishing to source reduce and/or recycle. The City will provide its expertise in purchasing and planning and the hauler will provide its expertise in operations and logistics. Participation in this program will be voluntary.

Alternative 5. Backyard (On-Site) Composting

Backyard composting is selected for short term implementation as a source reduction program because yard waste is such a large proportion of the residential waste stream. The City will seek to attain a 5 percent participation rate by all City residents by 1995 and up to 10 percent by the medium term. Expected diversion is anticipated to be approximately 0.1 percent of the total waste stream in the short term and up to 0.3 percent in the medium term. Backyard composting will be promoted through public education.

Alternative 6. Educational Programs

This alternative has been selected for implementation in the short term. As goals, the City will target source reduction awareness levels of 80 percent of City residents and businesses by 1995 and 90 percent by the year 2000. Source reduction information for residential and commercial waste generators will be incorporated into future education and public information materials and brochures. Selected education and public information programs are provided in Section 8.

Alternative 7. Awards and Public Recognition

The on-going activities described on pages 4-28 and 4-29 will continue. This alternative has been selected for expansion in the short term and will focus on promotion in the community of source reduction, recycling, and yard waste collection programs. In addition, the City will seek to develop an awards program for multi-family dwelling recyclers.

The City will seek to establish an awards program in conjunction with the Davis Chamber of Commerce to actively give out awards. Since increased emphasis will soon be placed by the City on encouraging businesses to do waste evaluations and to work on reducing waste and maximizing recycling, the City is selecting this alternative as an additional way to promote the commercial program and to recognize businesses which do a particularly good job.

Lastly, local papers will be encouraged to include articles about local individuals or companies who have effective recycling and source reduction programs. No direct diversion may be attributable to an awards program.

4.4.2 Programs Not Selected

The following source reduction alternatives were not selected for implementation by the City of Davis for the accompanying reasons.

Alternative 1. Loans, Loan Guarantees, Grants and Contributions

The City has determined that the cost and administration required for loans, loan guarantees and/or grants to community organization would not be cost-effective. The City prefers to utilize limited resources to actively promote ongoing programs and facilitate existing source reduction, recycling, and composting activities.

Alternative 2. Commercial Business Compliance Programs

The City has determined that the extent of regulation of business practices required to implement this alternative is not consistent with the City's plans and policies to offer recycling services on a voluntary basis.

Alternative 3. Quantity Based Variable Rates or User Fees

This alternative was not selected as the current system of waste management billing is deemed appropriate and adequate for Davis. The City has had great success in achieving its waste management goals through non-coercive, voluntary means and will continue to rely upon education and promotion to further its aims. The City will, however, follow closely the California Integrated Waste Management Board's study of variable rate structures with special

attention to its applicability in communities such as Davis that enjoy high voluntary rates of participation in waste management programs and high levels of education and affluence among their citizenry.

Alternative 8. Product Bans

This alternative has been rejected as the City does not see product bans as effective in small jurisdictions such as Davis.

4.4.3 Anticipated Diversion

The anticipated, quantifiable diversion from the selected source reduction programs is presented in the following table.

Table 4-4. Cumulative Integrated Effect of Programs Selected

Alternative	Short Term		Medium Term*	
	TPY	%	TPY	%
Existing Diversion**	5,467.5	9.0	5,968.7	9.0
Backyard Composting	68.2	0.1	187.0	0.3
Total	5,535.7	9.1	6,155.7	9.3

* as measured in year 2000 tons
** refer to Table 4-2

4.5 PROGRAM IMPLEMENTATION

This section describes the implementation of the selected alternatives including designation of the persons or agencies responsible, the tasks to be undertaken, the time schedule, and funding required. The City's Recycling Coordinator will generally take the lead in developing, implementing, and monitoring the selected alternatives. All costs are in addition to staff time.

4.5.1 Waste Evaluations/Waste Minimization (Alternative 4)

The City Recycling Coordinator will develop this program and direct it towards commercial waste generators which produce more than 10 cubic yards per week. The business owners or managers will then fill out the evaluations and receive advice from the City regarding methods of source reduction and recycling. The evaluations will be useful in gaining a better understanding of the commercial/industrial waste stream.

Table 4-5. Implementation Schedule for Waste Evaluations/Waste Minimization

Task	Responsible Entity	Start Date	Completion Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Develop pilot program, create initial database from contacts with targeted business	Recycling Coordinator/ DWR	3rd Qtr 92	4th Qtr 92	$500	$ 0	Rate Structure	120 to 160	0
Distribute questionnaire and instructions on how to conduct the evaluation	Recycling Coordinator	1st Qtr 93	3rd Qtr 93	$1,000	$100	Rate Structure	40 to 60	20 to 40
Create database	Recycling Coordinator	2nd Qtr 93	3rd Qtr 93	$1,500	$ 0	Rate Structure	40 to 60	0
Coordinate waste evaluations and advise businesses on source reduction methods	Recycling Coordinator/ Business Owners & Managers	2nd Qtr 93	ongoing	$5,000	$1,000	Rate Structure	400 to 800	60 to 80
Monitor & evaluate	Recycling Coordinator/ DWR	4th Qtr 93	ongoing, bi-annually	$1,500	$500	Rate Structure	60 to 80	20 to 40
Total Implementation Cost	---	---	FY 92/93	$9,500	---	---	660 to 1,160	---
Total Annual Cost	---	---	---	---	$1,600	---	---	100 to 160

4.5.2 Backyard On-Site Composting (Alternative 5)

This alternative will involve determining the scope of the program and the type of the technology to be used for an effective program. Since other backyard composting programs are underway in other communities, the City will utilize the knowledge derived from these programs to develop an educational program for City residents. In addition, the City will seek to initiate programs to educate residents on proper backyard composting techniques, answer questions regarding backyard composting, and to measure participation in the community.

Table 4-6. Implementation Schedule for Backyard Composting

Task	Responsible Entity	Start Date	Completion Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Develop program	Recycling Coordinator	3rd Qtr 92	3rd Qtr 92	$ 0	$0	Refuse Rate Structure	80 to 120	0
Develop public information literature	Recycling Coordinator	3rd Qtr 92	3rd Qtr 93	Refer to Education Component	Refer to Education Component	Refuse Rate Structure	See Education Component	See Education Component
Publicize and provide introductory public workshop	Recycling Coordinator/ 4R Committee	3rd & 4th Qtr 92	ongoing, bi-annually	$500	$500	Refuse Rate Structure	40 to 50	20 to 40
Develop public demonstration project, publicize and conduct workshops	Recycling Coordinator	2nd Qtr 93	ongoing	$500	$500	Refuse Rate Structure	80 to 120	40 to 60
Monitor & evaluate	Recycling Coordinator	4th Qtr 93	ongoing, bi-annually	$500	$250	Refuse Rate Structure	20 to 40	20 to 40
Total Implementation Cost	---	FY 92/93	---	$1,500	---	---	220 to 330	---
Total Annual Cost	---	---	---	---	$1,250	---	---	80 to 140

4.5.3 Educational Efforts (Alternative 7)

For a detailed summary of the Implementation Schedule for Educational Efforts, please refer to the Education and Public Information Component (Section 8) of this SRRE.

4.5.4 Awards and Public Recognition Program (Alternative 7)

The Recycling Coordinator will work with the City and local organizations such as the Chamber of Commerce to develop Awards and Public Recognition programs. Program development will include choosing a suitable forum(s) to present the awards along with development of criteria for selecting who will be distinguished.

Table 4-7. Implementation Schedule for Awards and Public Recognition

Task	Responsible Entity	Start Date	Completion Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Develop informal recognition program	Recycling Coordinator/ Chamber of Commerce	3rd Qtr 92	4th Qtr 92	$1,000	$ 0	Refuse Rate Structure	60 to 80	0
Develop and promote more formal program	Recycling Coordinator/ 4R Committee	1st Qtr 93	2nd Qtr 93	$ 250	$ 500	Refuse Rate Structure	60 to 80	20 to 40
Select recipients	Recycling Coordinator/ Local Civic Groups	2nd Qtr 93	Ongoing, annually	$ 250	$ 0	Refuse Rate Structure	40 to 60	20 to 40
Award certificates, etc.	Recycling Coordinator/ Local Civic Groups	2nd Qtr 93	Ongoing, annually	$ 250	$ 100	Refuse Rate Structure	40 to 80	40 to 80
Monitor & evaluate program	Recycling Coordinator	3rd Qtr 93	Ongoing, annually	$ 0	$ 0	Refuse Rate Structure	10 to 20	10 to 20
Cost to Implement	---	FY 92/93	---	$1,750	---	---	210 to 320	---
Average Annual Cost	---	---	---	---	$ 600	---	---	90 to 180

4.6 MONITORING AND EVALUATION

This section will explain how the selected programs will be monitored and evaluated to assure that the source reduction programs are operating effectively and to quantify reduction for diversion credit. Continual monitoring and evaluation is necessary to measure the success of selected programs and to provide a measure by which adjustments can be made to increase program effectiveness if diversion goals will not be met.

In general, reporting for most programs will be compiled by the Recycling Coordinator annually. City Staff will evaluate these reports and summarize them to the City Council and the Natural Resources Commission each March.

Alternative 4: Waste Evaluations/Waste Minimization

Objective

To encourage private commercial businesses and professional offices to complete waste evaluations developed and distributed by the City Recycling Coordinator who will be available to offer assistance.

The City's objective is to have 90 percent of the large commercial businesses and professional offices in the City complete waste evaluations.

Criteria/Method for Evaluation

The Recycling Coordinator shall summarize the number of waste evaluations completed and the percentage of total commercial accounts this equals.

Responsible Entities

Waste evaluations shall be the responsibility of the companies. They shall be made available upon request by the generator. Information regarding program effectiveness will be provided annually by DWR to the Recycling Coordinator. The Recycling Coordinator will then validate the information and present results to the Natural Resources Commission and the City Council at least annually.

Contingency Plan if Shortfall

If it is found that less than 90 percent of the commercial accounts request waste evaluations, City Staff and the Recycling Coordinator shall consider increasing public information education programs describing alternatives to disposal of garbage via the landfill. Should shortfalls continue, the City will investigate mandatory waste evaluations.

Alternative 5: Backyard Composting

Objective

To achieve a participation level of 5 percent of the detached single-family residents in the City in the short term and up to 10 percent by the medium term.

Criteria/Method for Evaluation

The Recycling Coordinator shall maintain written records describing the total number of residents attending backyard composting workshops. As part of an a periodic recycling/source reduction survey to be conducted by the Recycling Coordinator, the level of participation and volume of materials being composted shall be estimated. The findings of the survey shall be compared to the objectives stated above.

Responsible Entities

Implementation of the workshops shall be shared by both the City and presenting organizations. Documenting the number of participants and quantities of materials being composted shall be completed by the Recycling Coordinator.

Contingency Plan if Shortfall

In the event of a shortfall, the following actions shall be considered:

- Increase costs of curbside collection of non-source separated yard waste.
- Increased public information and education efforts targeted at backyard composting.

Alternative 6: Education Efforts

Objectives

To create an overall awareness of source reduction programs being practiced by the City by 80 percent of its residents by 1995 and 90 percent of the population by the year 2000.

Criteria/Method of Evaluation

The criterion is the achievement of a level of awareness among the City's residents as described above. This shall be evaluated through a periodic survey conducted by the Recycling Coordinator and City Staff asking questions on recycling, source reduction and composting practices currently being done.

Responsible Entity

The Recycling Coordinator shall be the responsible partly for evaluating education efforts directed at source reduction. This shall be done in conjunction with the Public Information and Education Component of this element. Please refer to this component for further details.

Contingency Plan if Shortfall
Please refer to the Public Information and Education Component of this element.

Alternative 7: Awards and Public Recognition

Objective
To encourage recycling, composting and source reduction activities through an awards and public recognition program. This program will be promoted to the maximum extent possible through the local media.

Criteria/Method for Evaluation
The City, DWR, and the Chamber of Commerce will determine the format for structuring a program to recognize businesses which provide exemplary waste diversion programs. This program is designed to increase overall effectiveness of waste reduction programs.

Responsible Entities
The responsible entity is the Recycling Coordinator.

Contingency Plan if Shortfall
No shortfalls in waste diversion are expected through this program.

4.6.1 Funding

Monitoring costs primarily include staff hours on the part of the Recycling Coordinator, City Staff and staff from DWR. Estimated staff hours from the City are estimated to range between 100 and 160 hours annually. Funding for this service will be derived from the Refuse Rate Structure.

SECTION 5

RECYCLING COMPONENT

Recycling is the process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste; and then returning them to the economic mainstream in the form of raw material for new products which meet the quality standards established by the marketplace.

The purpose of the Recycling Component is to identify, evaluate, select, and establish an implementation plan for residential, industrial, and institutional recycling programs that will contribute towards meeting and exceeding the required short and medium term diversion goals of 25 percent and 50 percent, respectively.

The source of statistical information in this component is the Waste Generation Study which describes the waste characterization for the City of Davis.

5.1 GOALS AND OBJECTIVES

The City of Davis is recognized for its long-established commitment to recycling. Recycling has existed in Davis since 1970. Curbside recycling service was offered to City residents in 1974. The City has developed a great deal of momentum in its recycling efforts. The City and the franchised hauler, Davis Waste Removal (DWR) have developed successful recycling programs and will continue to work together to offer recycling services to all waste generators in the City. Services currently offered include:

- Residential Curbside Recycling
- Multi-Unit Residential (Apartment) Recycling
- Commercial, Industrial and Municipal Recycling
- Buy-Backs
- Drop-Offs

These programs are described in greater detail in section 5.2 (Existing Conditions) of this component. The main emphasis for the City will be to fine-tune and further develop the programs already offered. This will be accomplished through effective education programs in order to increase participation and material capture from the existing programs.

Based upon the Existing Conditions in the City and the desire to further capitalize on the momentum already developed within Davis, the City has adopted the following goals and objectives for the short term (through 1995) and the medium term (1996 through 2000):

Short Term Goals

The City will seek to divert through recycling the following amounts of materials during the short term planning period.

- Paper Products - 6,221.0 TPY or 10.2 percent of the total waste stream.
- Plastics - 123.7 TPY or 0.2 percent of the total waste stream.
- Metals - 266.1 TPY or 0.4 percent of the total waste stream.
- Glass - 1,298.2 TPY or 2.1 percent of the total waste stream.

The City will work to reach these goals by:

- Raising the monthly participation rate for residential single-family curbside recycling from 65 percent (in 1989) to 80 percent through targeted education programs.

- Raising the monthly participation rate for multi-family recycling programs from 40 percent to 60 percent through additional, focused education programs.

- Increasing the participation rate among businesses in Davis to 90 percent in the commercial/industrial programs through education programs and the Waste Evaluations described in the Source Reduction Component.

- Further developing, promoting and enhancing a source-separated commercial wood bin recycling program directed towards the construction industry and commercial businesses.

- Installing in the downtown business area and in City parks a system of source-separated recycling bins for glass, paper, plastics and aluminum adjacent to existing public waste disposal canisters.

- Encouraging the County to site their proposed "Separate Bin Transfer Program" at the landfill directed towards the separation and salvaging of self-haul wastes.

Medium Term Goals

The City will seek to divert through additional recycling the following amount of materials during the medium term planning period, as measured in year 2000 tons:

- Paper Products - 8,177.6 TPY or 12.3 percent of the total waste stream.
- Plastics - 126.2 TPY or 0.3 percent of the total waste stream.
- Metals - 459.7 TPY or 0.8 percent of the total waste stream.
- Glass - 1,590.6 TPY or 2.4 percent of the total waste stream.
- Wood - 972.4 TPY of 1.5 percent of the waste stream.

The City will attain these goals by:

- Increasing the monthly participation rate in the residential curbside recycling program to 90 percent through increased awareness and education programs.
- Raising the monthly participation rate for multi-family recycling programs to 75 percent and the capture rate to 60 percent through focused education programs.
- Increasing the commercial/industrial participation rate in Davis to 100 percent through education and the Waste Evaluations programs.

5.1.1 Targeted Materials

The Waste Generation Study identified materials disposed of in the Yolo County Central Landfill which originate in the City of Davis. Based upon the results of the Waste Generation Study and the availability of markets for recovered materials, target materials available for diversion through recycling have been identified as:

- Paper products (newsprint, corrugated cardboard, kraft paper, high grade and mixed paper) - 16.1 percent by weight of the total waste disposed
- Plastics (film plastic, HDPE, pigmented HDPE and PET) - 3.2 percent by weight of the waste disposed
- Metals (aluminum and tin cans) - 4.5 percent by weight of the total waste disposed
- Glass (redemption and other recyclable) - 2.4 percent by weight of the total waste disposed

Targeting the materials that have established markets will assist the City in achieving its medium term diversion goal of 50 percent by the year 2000. Food, diapers, yard waste, tires, and inert materials (dirt, asphalt, concrete) are listed under the Existing Conditions of other components (Source Reduction, Composting, and Special Waste) in this SRRE and comprise other categories which also may be diverted or recycled.

5.1.2 Market Development Objectives

An additional objective is to increase markets for recycled materials by:

- Continuing to educate residential, commercial, and industrial waste generators of the importance of market development in the attainment of City objectives.
- Consider establishing economic incentives to promote the use of recycled materials by business and industry.
- Considering the implementation of incentives to promote consumer and business purchasing of products with recycled material content.
- Continuing to promote procurement practices in the City government which favor the purchase of recycled content items.
- Promoting the CALMAX Waste Exchange Program as currently operated by the State.
- Establishing a Recycled Market Development Zone as currently promoted by the California Integrated Waste Management Board.
- Instituting building codes which encourage the placement of recycling facilities in new buildings.

These objectives can be achieved within the short term planning period but represent ongoing activities which should occur not only during the short and medium terms, but thereafter as well. Once implemented, they have the potential to support recycling in Davis, Yolo County, and elsewhere in the State.

5.2 EXISTING CONDITIONS

5.2.1 History of Recycling in Davis

Community recycling in Davis started in 1970 when a small group of environmentally-concerned citizens began a newspaper drop-off recycling program. The group, later known as the Resource Awareness Committee of Davis, expanded the bi-monthly drop-off program to cans and bottles as well as newspapers.

Curbside collection of newspapers by Davis Waste Removal (DWR) began in 1974. Later the same year, pickup was expanded to include cans and bottles.

In 1976, DWR took over the entire community recycling program. In 1977, DWR moved the recycling operation to its current location at 1818 Fifth Street, and over the years the recycling program has expanded a great deal. Recoverable items now include:

- Mixed Paper (including paperboard)
- Glass (CRV and other recyclable)
- Aluminum Cans and Pie Tins
- Steel and Tin Cans
- Non-pigmented HDPE and PET plastics
- Corrugated Cardboard
- Yard Waste Materials
- Used Motor Oil

5.2.2 Current Recycling Activities

At present there is identifiable recycling activity in the City of Davis in all the sectors listed below:

1. Curbside Recycling
2. Multi-unit Residential Recycling Program
3. Commercial including Municipal Recycling activities (essentially all of the same materials as residential curbside)
4. Drop-Off Recycling
5. California Redemption Container Buy-Back Recycling
6. Food Waste Recycling to Animal Feed

The following programs are operated by Davis Waste Removal:

1. Weekly residential curbside recycling program. Glass, non-pigmented PET and HDPE plastics, mixed paper, bi-metal food cans, aluminum pie tins, corrugated cardboard and aluminum cans are accepted in this weekly program. Stacking containers are available for curbside recycling, however, residents are not limited to using a specific type of curbside container and may use any kind of container they wish (e.g. paper bag or cardboard box.) This service is available to residents living in apartment complexes of less than 9 units.

2. A multi-unit residential recycling program, servicing all apartment buildings of 10 units or more, accepting all materials accepted in the curbside program. DWR has operated this program since 1990.

3. Commercial and Municipal Programs Including:

   - A commercial paper and mixed beverage container recycling program, servicing approximately 100 of the businesses in the City. DWR does not buy the paper and does not sort it or sell it as high grade.

   - A commercial cardboard recycling program, in which a rear-loading refuse vehicle collects loose (unbaled or otherwise compacted) cardboard from the curb, garbage areas and metal refuse containers. In addition, DWR buys 240 TPY of baled corrugated cardboard from commercial and industrial generators in the City of Davis.

   - A bar and restaurant recycling program in which bars and restaurants recycle California redemption and non-redemption glass.

4. A drop-off site at the DWR yard for all recyclable materials in Davis including motor oil.

5. Davis currently has 4 buy-back centers, one of which is located at the Davis Waste Removal yard. This center buys or accepts for donation California Redemption containers.

6. A food waste to animal feed program in which 5,206 TPY of agricultural wastes are diverted from landfill for use as animal feed. (This diversion is addressed in the Source Reduction Component)

In addition to the programs offered by DWR, the following recycling alternatives are available:

Buy-Backs

Currently, there are three 20/20 recycling centers located in Davis. These buy-backs diverted an estimated 327.5 TPY of glass, 96.4 TPY of aluminum, 10.1 TPY of plastic in 1990.

Drop-Off

There is a drop-off at the Yolo County Central Landfill which has been in operation since 1981 which is available to City residents. There is no fee for using the drop-off center except for tires which cost between $2 and $4, depending upon rim size. Receptacles are available for the following products:

- Glass (CRV and other recyclable)
- Aluminum Cans and Aluminum Scrap
- Steel Cans
- Newspaper

- Plastics (PET, HDPE, and PVC pipe)
- Tires
- Automobile Oil and Batteries

Commercial Programs

Supermarkets in Davis initially baled and shipped approximately 1,039.0 TPY of corrugated cardboard in 1990. This material was ultimately shipped to cardboard producers for re-manufacture into new boxes and paperboard.

5.2.3 Summary of Diversion in 1990

Based upon information in the Waste Generation Study the City of Davis diverted a total of 6,496.2 TPY of material through recycling programs in 1990. This translates to an overall diversion of 10.7 percent (6,496.2/60,785.5) through recycling. However, it is stressed that this diversion level accounts for waste materials targeted for diversion through recycling. Other materials, for which there exists diversion activities, are addressed in the Source Reduction, Composting and Special Waste components of this SRRE.

Table 5-1. Waste Diversion Through Recycling in 1990, City of Davis

Material	Total Generated (TPY)	Quantity Recycled (TPY)	Percentage of Material Diverted
OCC/Kraft	4,146.6	1,980.2	47.8
Newspaper	2,734.9	2,092.9	76.5
Mixed Paper	3,450.9	965.9	28.0
High Grade Paper	746.0	161.0	21.6
PET plastic	64.4	23.8	37.0
HDPE plastic	130.4	22.0	16.9
CRV Glass	446.6	152.5	34.2
Other Recyclable	1,578.8	986.7	62.5
Aluminum Cans	179.4	111.2	62.0
Total	13,478.0	6,496.2	48.2

As presented in Table 5-1 above, only 22 percent (13,478.0 TPY/60,768.5 TPY) of the total waste stream is targeted for diversion through recycling. When observing current diversion compared to the targeted waste stream, Davis is achieving a 48.2 percent diversion level for those materials (6,496.2 TPY/13,478.0 TPY).

5.2.4 Anticipated Decrease of Recycling Activities

None of the existing recycling programs described above are expected to close or decrease in activity as Source Reduction and Recycling plans develop. However, conflicts do exist between curbside and buy-back recycling and source separation and material recovery facility operation. It is not expected that any programs will be adversely affected, as all programs are expected to increase in scope and effectiveness.

5.2.5 Programs or Activities Providing Markets for Recycled Materials

The City currently does not provide economic incentives to stimulate markets or give consumers incentives to buy recycled materials in Davis. However, redemption fees for "CA Redemption" containers provide incentive for individuals to recycle, and the City's educational programs promote buying items containing recycled content.

5.2.6 Education Programs

The City of Davis distributes flyers to city residents to educate them regarding curbside recycling. The City of Davis has extensive education programs and promotional efforts through the City's Recycling Coordinator. DWR also has educational materials available at its offices. Refer to the Education Component (Section 8 of this SRRE) for more information.

5.3 EVALUATION OF ALTERNATIVES

The recycling program alternatives that should be considered for recovering recyclable materials from the waste stream are as follows:

Alternative 1.	Increased Promotion of Residential Curbside Recycling (selected)
Alternative 2.	Increased Promotion of Multi-unit Residential Recycling (selected)

Alternative 3.	Expansion and Increased Promotion of Commercial, Industrial and Government Recycling (selected)
Alternative 4.	Additional Drop-off Recycling (not selected)
Alternative 5.	Additional Buy Back Recycling (not selected)
Alternative 6.	Institution of Mandatory Recycling Laws (not selected)
Alternative 7.	Automated Material Recovery Facility (not selected)
Alternative 8.	Landfill Salvaging (not selected)

Each alternative is treated as though it were the only additional program in the jurisdiction along with current recycling activities. Therefore, by not taking an integrated approach, one can determine the impact of each individual program upon the waste stream. This is done as a means of determining whether a given alternative would significantly contribute to the diversion goals mandated in AB 939.

Using the evaluations listed on the following pages, the City will select the programs that will be most effective and appropriate to the needs of residents, institutions, and the business community.

Alternative 1. Increased Promotion of Residential Curbside Recycling

The curbside recycling program currently operated by Davis Waste Removal accepts newsprint, mixed paper, cardboard, container glass, PET, HDPE, and steel and aluminum (beverage and food) containers. The goal of this alternative is to raise participation levels to 90 percent by the medium term. While participation rates in 1990 were estimated to be 65 percent monthly, participation is not mandatory. To increase participation the City should consider increased promotion and public education (see Section 8), Mandatory Recycling Laws (see Alternative 6), and the provision of uniform containers for each participating residence.

Effectiveness

The effectiveness of this option will largely depend on the level of promotion. The City of Davis is currently diverting a large percentage of its residential waste stream through a comprehensive and fully implemented program. As presented in Table 5-2, curbside recycling in Davis diverted an estimated 2,834.7 TPY of materials in 1990. This indicates an overall current diversion rate of 4.7 percent of the total generated waste stream (60,771.5). An effective program should focus on increasing the current monthly participation rate (from 65 percent to 90 percent by the medium term) and on increasing the overall diversion rate.

Table 5-2 presents current capture rates through the curbside recycling program. By directed education efforts to increase participation and achieve targeted capture rates on specific materials, the City and DWR may expect to divert the following materials.

Table 5-2. Effectiveness of Increased Residential (SFD) Curbside Recycling

Material	Amount Currently Generated - SFD in 1990 (TPY)	Amount Currently Diverted Through Curbside Recycling (TPY)	Current Diversion Rate (%)	Amount Currently Disposed (TPY)	Target Diversion Rate (%)	Additional Amount Targeted for Diversion (TPY)
Newsprint	1,512.8	1,381.8	91.3	131.0	95	55.4
Corrugated Cardboard	498.2	140.2	28.1	358.0	50	108.9
High Grade Paper	244.3	106.3	43.5	138.0	50	15.9
Mixed Paper	1,755.7	637.7	36.3	1,118.0	50	240.2
PET	21.5	6.5	30.2	15.0	50	4.3
HDPE*	56.3	13.3	23.6	43.0	40	9.2
Aluminum cans	9.0	4.0	44.4	5.0	50	0.5
Tin and bimetal cans**	233.0	0.0	0.0	233.0	50	116.5
CA redemption glass	196.8	179.8	91.4	17.0	95	7.2
Other recyclable glass	597.1	365.1	61.2	232.0	85	142.4
Totals	5,124.7	2,834.7	---	2,290.0	---	700.5
Diversion Potential (%)	---	4.7%	---	---	---	1.2%

* includes natural and pigmented HDPE

** collected in 91-92 but not in 1990

As illustrated above, 700.5 tons of recyclables would yield an additional 8.2 percent diversion of the disposed single family residential waste stream (8,501 tons) and a 1.2 percent diversion for the entire waste stream (60,768.5 tons). This diversion rate is expected to be maintained as the City experiences population growth through 1995, as long as all new residential areas are served by the program.

All totalled, diversion through residential curbside recycling would account for a 5.8 percent diversion rate as measured in 1990 tonnages (700.5 + 2,834.7 / 60,771.5).

Hazards

There are no hazards directly associated with this option. This option is designed to increase participation in the curbside collection program and may therefore be indirectly responsible for a minor increase in the hazards associated with the curbside program, which are: noise, traffic, and litter. It is important to note, however, that none of these hazards have been realized to any appreciable degree.

Ability to Accommodate Change

This option is very flexible as it affords the City the ability to add to or subtract from its efforts through personnel or the budget.

Consequences on Waste Stream Composition

Increased recycling as a response to increased public education will help the City realize its AB 939 goals, by reducing the amount of recyclable items in the waste stream.

Costs

The costs of the option will be a function of the extent to which the City implements this alternative. Total operational costs per household should not rise more than five percent as a result of increased participation. Should the City decide to provide uniform containers, the additional cost may be $354,500 for the stacking containers (24,000 residences * $14.75 per set). However, costs per household for education and promotion may be higher. For details of the Education budget, see Education Component, Section Eight.

Technical Reliability/Public Acceptance

This alternative is highly reliable and tested and will be perceived as fair and accepted by the public providing inordinate resources are not committed to it.

Ability to be Implemented

Implementation of this alternative requires staff time to develop public education and outreach programs and contracts for printing, advertising, et. al. This can be achieved in several months or in the short term period.

Need for Facilities

No additional facilities will be required for implementation of this alternative.

Consistency with Local Policies, Plans, and Ordinances
Increased promotion of the existing curbside collection program does not conflict with local policies, plans, or ordinances. Should the City consider mandatory participation, an ordinance or series of ordinances may be required.

Institutional Barriers to Implementation
From the perspective of the City government, there are no institutional barriers that would prevent increased promotion of the curbside collection program.

Costs
Increased promotion of the existing program will likely require part of one additional person for promotion, the costs of which will be reflected comprehensively in the Education Component.

Market Availability
No markets are required for this alternative. Markets already exist for material collected in the curbside program.

Public vs. Private Operation
This alternative will be implemented by the City of Davis and Davis Waste Removal.

Alternative 2. Increased Promotion of Multi-Unit Residential Recycling

The Multi-Unit Residential Recycling program currently operated by Davis Waste Removal accepts newsprint, mixed paper, cardboard, container glass, PET, HDPE, and steel and aluminum (food & beverage) containers. While buildings are required to have recycling containers on site, participation by each individual unit is not mandatory. To increase participation in the curbside program, the City should consider more aggressive promotion and public education (see Section 8) and Mandatory Recycling Laws (see Alternative 6.)

Effectiveness
While multi-unit residential recycling programs tend to collect far less material per unit than curbside programs, they are nonetheless effective at diverting material from the waste stream. Typically a multi-unit program will divert half of the material per unit of a curbside program. In 1990, the multi-unit recycling program in Davis diverted an estimated 975.6 TPY which represents 1.6 percent of the City's waste stream.

Increased promotion of the program is generally seen as the key to success in multi-unit residential recycling as tenants are often not aware of the program and are generally less likely to participate as they usually do not pay their own garbage bills. Table 5-3 presents the estimated diversion for targeted, increased promotion of the program.

Table 5-3. Effectiveness of Increased Promotion of Multi-Unit Residential Recycling

Material	Amount Generated - MFD in 1990 (TPY)	Amount Currently Diverted Through Recycling (TPY)	Current Diversion Rate (%)	Amount Currently Disposed (TPY)	Target Diversion Rate (%)	Additional Amount Targeted for Diversion (TPY)
Newsprint	723.5	466.5	64.5	257.0	80	112.3
Corrugated Cardboard	476.8	65.8	13.8	411.0	40	124.9
High Grade Paper	125.9	35.9	28.5	90.0	40	14.5
Mixed Paper	776.3	215.3	27.7	561.0	40	95.2
PET	23.2	2.2	9.5	21.0	40	7.1
HDPE*	92.5	4.5	4.9	88.0	40	32.5
Aluminum cans	36.4	1.4	3.9	35.0	40	13.2
Tin and bimetal cans**	156.0	0.0	0.0	156.0	40	62.4
CA redemption glass	150.4	64.4	42.8	86.0	60	25.8
Other recyclable glass	301.6	119.6	39.7	182.0	50	31.2
Totals	2,862.6	975.6	---	1,887.0	---	519.1
Diversion Potential (%)	---	1.6%	---	---	---	0.9%

* includes natural and pigmented HDPE
** collected in 91-92 but not in 1990

As illustrated above, 519.1 tons of recyclables would yield a 8.8 percent diversion of the disposed multi-family residential waste stream (5,919 tons) and a 0.9 percent diversion for the entire waste stream (519.1/60,771.5 tons). A 0.9 percent diversion rate is expected to be maintained as the City experiences population growth through 1995, as long as all new residential areas are served by the program.

Hazards

There are no hazards directly associated with this option. This option is designed to increase participation in the curbside collection program and may therefore be indirectly responsible for a minor increase in the hazards associated with the curbside program.

Ability to Accommodate Change
This option is very flexible as it affords the City the ability to add to or subtract from its efforts through personnel or the budget.

Consequences on Waste Stream Composition
Increased recycling as a response to increased public education will help the City realize its AB 939 goals, while reducing the amount of recyclable materials in the waste stream.

Technical Reliability/Public Acceptance
This alternative is highly reliable and tested and will be perceived as fair and accepted by the public providing inordinate resources are not committed to it.

Ability to be Implemented
Implementation of this alternative requires staff time to develop public education and outreach programs and contracts for printing and advertising. This can be achieved in several months or in the short term period.

Need for Facilities
No additional facilities will be required for implementation of this alternative.

Consistency with Local Policies, Plans, and Ordinances
Increased promotion of the existing curbside collection program does not conflict with local policies, plans, or ordinances. However, if the City considers mandatory participation, then a new ordinance may be required.

Institutional Barriers to Implementation
From the perspective of the City government, there are no institutional barriers that would prevent increased promotion of the curbside collection program.

Costs
The implementation of this program should see no appreciable changes in capital or operating costs beyond the existing program. Increased promotion is not anticipated to require additional manpower from the City although costs may increase as more promotional materials are developed and distributed. Many of these costs may be shared with the residential recycling program. For more details on program costs, please refer to the Education and Public Information Component (Section 8 of this SRRE).

Market Availability
No markets are required for this alternative.

Public vs. Private Operation
This alternative will be implemented by the City of Davis and Davis Waste Removal.

Alternative 3. Expansion and Increased Promotion of Commercial and Industrial Source Separated Collection Programs

Davis Waste Removal currently operates a comprehensive commercial recycling program, providing containers to any commercial account for recycling of paper fiber products, recyclable glass, aluminum and bi-metal food and beverage containers and PET and HDPE. To increase the capture rate and participation of commercial materials in the City of Davis, Davis Waste Removal will need to expand the breadth of its services, including the Waste Evaluations described in Section 4, thereby attracting more customers to the program, or add a sorting facility to handle paper-rich loads of general refuse. (See Alternatives 7 - 9)

In addition, two additional programs should be further developed during the short term. These programs are:

1) A source-separated wood bin program directed towards the commercial, industrial and construction and demolition generators.

2) Increased locations for source-separated recycling bins in the downtown area and in City parks. These bins would be served by a commercial recycling program.

The wood program should involve a differential rate which would serve to increase participation and diversion.

Effectiveness

Commercial source-separated recycling programs are highly effective at diverting targeted wastes from the waste stream. Levels of contamination may be higher than in curbside programs as materials are collected in large increments and usually cannot be thoroughly inspected before consolidation with other materials already in the truck.

In 1990, the diversion level in the commercial/industrial waste stream amounted to 2,047.5 TPY. This diversion represents a 3.4 percent diversion level for the entire waste stream. By increasing the capture rate through an increased education program, and by offering the recycling service to more businesses and in the downtown area, diversion may be expected to increase as outlined in Table 5-4.

The additional programs should also serve to increase overall diversion. The wood program may expect to divert up to 40 percent of the wood currently disposed by commercial and industrial generators.

Table 5-4. Projected Additional Waste Diverted by a Commercial/Industrial Recycling Program in the City of Davis

Material	Amount Currently Generated (TPY)	Amount Currently Diverted Through Recycling (TPY)	Current Diversion Rate (%)	Amount Currently Disposed (TPY)	Target Diversion Rate (%)	Additional Amount Targeted for Diversion (TPY)
Newsprint	409.5	155.5	38.0	254.0	60	90.2
Corrugated Cardboard	3,142.2	1,744.2	55.5	1,398.0	80	769.6
High Grade Paper	369.0	12.0	3.3	357.0	40	135.6
Mixed Paper	877.8	71.8	8.2	806.0	40	279.3
PET	4.7	0.7	14.9	4.0	40	1.2
HDPE*	42.5	1.5	3.5	41.0	40	15.5
Aluminum cans	4.4	0.4	9.1	4.0	40	1.4
Tin and bimetal cans	290.0	0.0	0.0	290.0	40	116.0
CA redemption glass	213.5	21.5	10.1	192.0	40	63.9
Other recyclable glass	217.9	39.9	18.3	178.0	40	47.3
Wood**	2,227.0	0.0	0.0	2,227.0	40	890.8
Totals	7,798.5	2,047.5	---	5,751.0	---	2,410.8
Diversion Potential (%)	---	3.4%	---	---	---	4.0%

* includes natural and pigmented HDPE

** non-contaminated wood generated from the commercial/industrial sector which will go to incineration and not count for diversion credit until 1996

In the short term, by diverting 1,520.0 tons of recyclables from the waste stream through a commercial collection program, the City could achieve an additional diversion rate of approximately 9.3 percent of the commercial/industrial wastes disposed (1,520.0/16,416.0 tons) which is 2.5 percent of the total waste stream (1,520.0/60,771.5).

By the medium term, when the wood destined for incineration may be accounted for, diversion should rise to 2,410.8 TPY as measured in 1990 tons. This would equal an additional diversion rate of 4.0 percent (2,410.8 TPY/60,768.5 TPY).

Hazards

An increase in commercial collection activity will not pose any significant environmental, health, or safety hazards. However, the program could create minimal traffic and noise problems. Individual businesses or industries may encounter hazards in locating containers of recyclables for pickup.

Costs

Capital costs for this program would involve extra, specially marked recycling bins in the downtown area and in City parks. These bins sets range in price from $300 to $500 per set. Up to 20 sets of these bins may be required. Therefore, costs may expect to be in the $6,000 to $10,000 range. DWR may use existing equipment for the commercial/industrial wood program.

Ability to Accommodate Change

This alternative is very flexible as the program operator is able to add materials to the list of those collected or change collection operations as processing technologies change.

Consequences on Waste Stream Composition

An effective expanded commercial recycling program will remove significant percentages of all paper products, aluminum, glass, wood, textiles, ferrous and nonferrous metals, food and yard waste from the waste stream.

Ability to be Implemented

This alternative can be implemented in the short term or within one year.

Need for Facilities

Because Davis Waste Removal will collect source separated materials, it will be able to dictate the level of purity of the materials and will therefore be able to sell them with little or no processing. It is not anticipated that the markets for the targeted materials will change sufficiently to require the level of intermediate processing available only through an additional facility.

Consistency with Local Policies, Plans, and Ordinances

Implementation of this alternative does not conflict with local policies, plans or ordinances.

Institutional Barriers to Implementation

There are no institutional barriers that would prevent the expansion of the existing commercial recycling program.

Market Availability

No materials will be collected for which markets do not exist.

Public vs. Private Operation

This alternative will be implemented by Davis Waste Removal.

Technical Reliability/Public Acceptance

The source separated collection of commercial wastes is a highly technically reliable option and will receive public acceptance both from the residents of Davis and the business community if it is perceived as fair, not highly intrusive and not too expensive.

Alternative 4. Additional Drop-off Recycling

Increased drop-off recycling for the City of Davis would consist of additional sites within the City which would accept recyclable items. Drop-off centers rely on individuals to haul their own recyclables to the center and to contribute the materials without payment. Generally, they require low investment in capital and operating costs. The drawbacks to drop-off centers are potential contamination of recyclables, vandalism, theft at unattended sites, and the relatively low participation rates and diversion resulting from dependence on customer self-hauling.

Presently in Davis, there is one site located at the Davis Waste Removal facility which accepts all recyclables including cardboard, high grade paper, plastics, and food and beverage cans. At present, DWR accepts for drop-off at its facility approximately 10 tons per month of newspaper, cardboard and mixed beverage containers. There is also a drop-off facility for recyclable paper, mixed beverage containers, cardboard and tires at the Yolo County Central Landfill.

Effectiveness

Generally, drop-off programs do not work efficiently in conjunction with other programs if they do not target self-haul refuse. Because the City has highly successful programs in place, this alternative has been deemed ineffective if implemented with the existing programs. Further, a drop-off facility sited in Davis would be redundant to the facility at the YCCL, which already targets self-haulers.

Table 5-6. Projected Amounts of Waste Diverted by Additional Drop-Off Centers

Material	Amount Currently Disposed (TPY)	Amount Expected to be Diverted Short Term (%)	Amount Expected to be Diverted Short Term (TPY)
Newsprint	642	10	64.2
PET	41	10	4.1
HDPE	193	10	19.3
Aluminum cans	68	5	3.4
Tinned cans	678	10	67.8
CA redemption glass	294	5	14.7
Recyclable glass	572	10	57.2
High grade paper	585	10	58.5
Corrugated cardboard	2,166	10	216.6
Totals	---	---	505.8
Diversion Potential (%)	---	---	0.8%

Participation rates are expected to be low. Ten percent represents a good estimate for most materials. For this program to succeed, it would require that more effort be devoted to education.

In the short term, by diverting 505.8 tons of recyclables from the waste stream through conveniently located drop-off containers, the City could achieve a diversion rate of 0.8 percent of the overall waste stream.

Hazards

A drop-off site located at a landfill or transfer station creates no hazards additional to those associated with the landfill or transfer station operations. A site located elsewhere, however, will create possible traffic congestion, noise, and litter.

Ability to Accommodate Change

This alternative is generally not highly adaptable to change, since users of drop-offs become accustomed to bringing certain items to these locations, even though the drop-off may no longer accept them.

Consequences on Waste Stream Composition
Drop-off centers may remove recyclable materials from the waste stream, thus reducing the amount of recyclable waste being landfilled.

Ability to be Implemented
The design and implementation of a drop-off program not sited at a transfer station or landfill can be accomplished in three to 24 months, depending upon the complexity of the site.

Need for Facilities
An expanded drop-off program will require a site and access to a processing facility where materials can be sorted and prepared for sale to brokers or end-users.

Consistency with Local Policies, Plans, and Ordinances
An expanded drop-off recycling program located at DWR does not conflict with local policies, plans, or ordinances; however, for a site located elsewhere, roll-off containers in specially designated pick-up areas are involved, and zoning issues may therefore have to be addressed.

Institutional Barriers to Implementation
The DWR yard is too small for a more comprehensive drop-off program, so an alternative site would be required. The site would have to be in the City, as a site outside the City would be no better than the site located at the nearby landfill. Zoning issues may therefore have to be addressed. Additionally, convenient lots of adequate size may be too expensive.

Costs
The costs associated with operation of the drop-off facility to be located at the landfill will be incorporated into the tipping fee. Development of an additional site to be located in Davis could cost from $5,000 to $20,000 for site development with annual operating expenses of up to $30,000. Land acquisition costs are not included and could reach to $400,000.

Market Availability
Markets will be available for all of the materials recovered through this program.

Public vs. Private Operation
This alternative is designed to be implemented by the waste hauler.

Technical Reliability/Public Acceptance
Drop-off recycling programs are generally limited if not implemented at a transfer station or landfill while operated in conjunction with commercial and residential source-separated recycling programs. In most cases, however, they enjoy a high degree of public acceptance.

Alternative 5. Additional Buy-Back Recycling

Buy-back centers are typically privately run facilities that pay for some or all of the recyclables they accept, thus providing an incentive to increase participation while still relying on customer delivery of materials. For CA Redemption items, the California Department of Conservation (DOC) sets prices and regulates the operations of buy-backs. Redemption values are set for most beverage containers according to the terms of AB 2020 from 1987. For all other items, the facility operator determines the type and price of recyclable materials purchased. There are four buy-back centers operating in The City of Davis, one of which is operated by DWR and is located at its facility.

While buy-back centers compete with curbside and other collection programs for material, thereby making those programs somewhat less efficient in their operation, buy-backs encourage many who otherwise would not recycle to redeem their beverage containers. Because the curbside recycling collection programs do not pay for material collected, many residents are inclined to believe that the operator(s) of the program(s) are realizing a windfall profit from the redemption value of the containers collected. Buy-back programs offer financial incentives to participate.

According to the Waste Generation Study, large amounts of CA Redemption glass, CA Redemption aluminum cans, Bi-metal cans and CA Redemption PET bottles are presently being landfilled by the residents of Davis and could be redeemed at a buy-back center.

Effectiveness

Buy-back recycling is highly effective at diverting materials that might otherwise go to the landfill. Buy-back recycling does, however compete for materials with recycling collection programs.

Table 5-7. Projected Diversion from an Expanded Buy-Back Program

Material	Amount Disposed in 1990 (TPY)	Targeted Diversion Rate (%)	Amount Expected to be Diverted (TPY)
Newsprint	642.0	10	64.2
Corrugated cardboard	2,166	10	216.6
High grade paper	585	10	58.5
PET	41	25	10.3
HDPE	193	10	19.3
Aluminum cans	68	25	17.0
Tin cans	678	10	67.8
CA redemption glass	294	25	73.5
Other recyclable glass	592	10	59.2
Totals	5,259	---	586.4
Diversion Potential (%)	---	---	1.0

By expanding the services of the existing buy-back centers to accept more materials and providing an increased education program in order that the diversion goals may be met, an additional 1.0 percent (or 586.4 TPY) of materials currently deposited in landfills could be diverted.

Hazards

Buy-back centers can create traffic, noise and litter problems if not properly regulated.

Ability to Accommodate Change

A buy-back center can easily adapt to changing economic and technological conditions. As the value of recyclable materials changes, the choice of materials accepted can change.

Consequences on Waste Stream Composition

Buy-back centers will remove recyclable materials from the waste stream, leaving a greater amount of non-recyclables in waste transported to the landfill.

Ability to be Implemented

The design and implementation of a buy-back center can be accomplished in six to 12 months, the short term planning period.

Need for Facilities
A buy-back center requires a site with adequate space for loading, unloading, and storing materials.

Consistency with Local Policies, Plans, and Ordinances
Developing a buy-back center does not conflict with local policies, plans, or ordinances.

Institutional Barriers to Implementation
A new buy-back center would require zoning and permitting.

Costs
Development of a buy-back center requires the purchase or lease of a site and the development of a facility as well as the purchase of equipment, hiring of operating personnel, and an expenditure of funds to educate the public and encourage participation. Capital costs are generally $30,000 to $50,000 per site. Operating and maintenance costs will depend on the size and the design of the operation. Buy-back facilities are usually profitable enterprises, with the revenues from materials exceeding operating costs and amortized capital expenditures.

Market Availability
Markets are readily available for the recyclable materials recovered at buy-back centers.

Public vs. Private Operation
Because buy-back centers are private sector-driven and therefore usually profit oriented, the City of Davis will likely not wish to become directly involved in their operation.

Technical Reliability/Public Acceptance
There are currently reliable and publicly accepted buy-back centers operating in the City of Davis.

Alternative 6. Institution of Mandatory Recycling Laws

This option would have the City issue ordinances banning from the waste stream those materials that are included in the residential curbside, multi-family collection, and commercial recycling programs. The City would implement an extensive public education campaign to ensure that all effected businesses and residents were appraised of the changes and had available to them the means with which to comply.

Effectiveness
The effectiveness of this option would largely depend on how the enforcement clause of the ordinance and the level of promotion and enforcement dictated by the City. Assuming active promotion and enforcement, such an ordinance may substantially increase participation in curbside and commercial programs. Without enforcement, this alternative would nonetheless serve as a strong statement from City government regarding the City's commitment to recycling.

Hazards
There are no hazards associated with this option.

Ability to Accommodate Change
This option is very flexible as it affords the City the ability to add to its list of prohibited items.

Consequences on Waste Stream Composition
Increased recycling as a response to mandatory recycling laws will reduce the amount of recyclable materials going to the landfill.

Costs
Implementation and operation costs of this alternative can vary significantly, depending upon whether or not enforcement is pursued. If enforcement is pursued, then fines may be designed to equal, exceed or fall short of ordinance implementation and operation costs. Implementation should cost between $5,000 and $15,000 to introduce and pass the ordinance. Operating costs would involve City Staff time and police or code enforcement. Depending upon the level of enforcement, several additional City staff persons would have to be hired to enforce and administer this program, thus making it quite expensive.

Technical Reliability/Public Acceptance
As long as any law mandating recycling is perceived as fair, it will likely be broadly accepted, although some members of the community will attack it as intrusive. Without an enforcement clause such a law will likely be seen as benign and will serve primarily as a statement by the City of Davis on the importance of resource conservation.

Consistency with Local Policies, Plans and Ordinances
Introduction of a mandatory recycling ordinance will require a change in local government attitudes. Prevailing thought in local government is that education and promotion is favorable to an ordinance.

Institutional Barriers to Implementation
Public opposition to such an ordinance may prove to be a significant barrier to implementation.

Market Availability
No markets are required for this alternative.

Alternative 7. Automated Materials Recovery Facility

Automated MRFs are centralized distribution points that receive, separate, process, and market recyclable materials directly from the general waste stream. They are capable of processing mixed municipal waste without prior sorting and to remove targeted recyclable items. In addition, they may be operated in conjunction with both drop-off and curbside collection programs, processing either separated or commingled recyclables. The primary advantage of a mixed waste MRF is the ability to combine and uniformly process a large percentage of materials from a municipality or a region, meeting quantity and quality requirements imposed by the buyers.

An automated MRF can receive the waste stream as it is disposed without the need for prior separation. This can remove the burden of source-separation from the waste generator and the need for any separate collection system for source-separated materials such as curbside programs.

Processing begins when the load arrives on the tipping floor. A primary sorter checks the load. Any potentially hazardous materials are removed as are particularly bulky items such as appliances.

Non-compacted loads such as self-haul and roll-off debris are tipped on a cement floor for separation of wood, dirt, asphalt, cement, yard debris and recyclables by hand and with heavy equipment.

General compacted refuse is deposited onto a conveyor system for both mechanized and manual separation of recyclable materials. Mechanized separation might consist of passing the load over a shaker screen to sort out fine materials, a magnetic separator to remove ferrous items, or air classification items for targeted light materials. Manual separation involves sorters removing targeted items as they pass over the conveyor and placing these items into separate bins for further processing.

Materials are generally processed in the following ways:

- Paper, which often will arrive commingled, is pulled off the production line at various points depending on the types of paper accepted, the system used, and the baler. This material is then baled for shipment to a broker/processor
- Steel cans are pulled from the system using a magnet and shredded or baled depending on the market
- Light aluminum and plastic is separated from glass using either air classification or inclined sorting equipment
- Glass is manually separated by color, then crushed and stored for market

Any residual materials at the end of the conveyor may be diverted to composting programs, Refuse Derived Fuel (RDF), the transfer station, or the landfill for disposal.

An RDF processor may be added to the MRF to convert organic wastes to fuel for incineration should the medium term diversion levels of 50 percent not be reached by 2000. The cost of an RDF processor capable of producing 50 to 100 TPD would be in the $1 million range. Additional materials diverted to incineration would include "contaminated paper," and "other organic waste."

Effectiveness

In general, MRFs have a diversion potential of 30 percent to 40 percent of the total waste stream. Once a given material has been targeted, a 40 percent diversion for that material from the waste stream may be expected. Bulky items such as cardboard as may achieve higher rates. As presented in Table 5-8, if all waste currently disposed were to be processed through a MRF, the City may expect to attain an additional 8.2 percent diversion rate.

Table 5-8. Projected Diversion from an Automated MRF*

Material	Currently Disposed (TPY)	Divertable (%)	Diverted (TPY)
Corrugated cardboard	2,166	80	1,732.8
Mixed paper	2,485	40	994.0
Newsprint	642	40	256.8
High-grade paper	585	40	234.0
Plastic film	737	40	294.8
HDPE	108	40	43.2
PET	41	40	16.4
Polystyrene	180	40	72.0
Bi-metal cans	678	40	271.2
Ferrous metals	559	80	447.2
Non-ferrous metals	711	80	248.8
Aluminum cans	68	40	27.2
California redemption glass	294	40	117.6
Other recyclable glass	592	40	236.8
Totals	---	---	4,992.8
Diversion (%)	---	---	8.2

* Measured in 1990 constant terms

Hazards

As in all working situations where large machinery and equipment are used, health and safety policies at a MRF should be developed and followed by all employees.

Other possible hazards associated with a facility are noise, litter, odor, and traffic. A well-designed program should easily solve these issues.

Ability to Accommodate Change

Changes in the waste stream may require alteration of the operation to accommodate different materials. In an automated MRF, these changes would require alteration of the existing equipment or the purchase of additional equipment.

However, in most cases, the system can be adjusted to address changes in the composition of the waste stream.

Consequences on Waste Stream Composition
An automated MRF will remove recyclable materials from the waste stream, increasing the percentage of non-recyclable materials to be landfilled. This diversion may have positive affects on the life of the landfill due to the diversion of high volume materials such as corrugated cardboard and plastics.

Ability to be Implemented
Implementation of an automated MRF can be accomplished in the short term period, 18 to 30 months.

Need for Facilities
An automated MRF will require site and facility development.

Consistency with Local Policies, Plans, and Ordinances
Development of an automated MRF does not conflict with local policies, plans, or ordinances.

Institutional Barriers to Implementation
There are no institutional barriers to the implementation of an automated MRF at the YCCL.

Revenues
Because the materials collected are commodities, pricing forecasts are subject to constant change. Generally, revenues realized from the sale of materials processed are allocated to offsetting the operating costs of the plant.

Costs
The total cost would largely depend on whether the MRF was a local or regional facility. Figures for both options are not available as of yet, but would be in the range of $25 million.

Market Availability
Markets are available for the materials recovered in this collection program in the short term. However, when having been mixed with general refuse, the notification of buyers may be required prior to large deliveries of materials. Non-recyclable glass could be diverted from the landfill, ground, and used in asphalt or as road base.

Public vs. Private Operation
The facility would likely be operated by a private entity.

Technical Reliability/Public Acceptance

Though the technology is still relatively new, automated mixed waste MRFs are being used successfully throughout the country to divert recyclable materials from the waste stream. A centrally located facility would coordinate well with the existing waste management infrastructure and would provide a very efficient recycling program which the public would likely support.

Alternative 8. Landfill Salvaging

Salvaging operations manually recover bulky goods or useful items from mixed garbage after it is taken to the landfill. In most cases, loads are checked at the landfill gate when each truck or self-hauler arrives. If any given vehicle has a high percentage of clean, recyclable goods, then the vehicle is directed to a special tipping area to discharge the load. Upon tipping the load, the refuse is then sorted manually and recyclables are removed and set aside for future processing. Any non-recyclable materials are then landfilled.

Typical target commodities which may be diverted include, but are not limited to, scrap metals, building materials, and wood, which can not be recycled efficiently through residential and commercial/industrial collection programs. Landfill salvaging is comparatively inexpensive since personnel and equipment are provided by the landfill. Adequate space is required for sorting and storing materials until they are sold.

The majority of targeted recyclable items are covered under the Special Waste Component (Section 7) of this SRRE. Please refer to it for more details.

5.4 SELECTION OF PROGRAMS

Summarized below are the programs selected and not selected and a brief description of the reason(s) why. Program selections are based upon 2 public workshops, input from the Davis Natural Resources Commission, the Davis Department of Public Works, the Yolo County Waste Advisory Committee, Davis Waste Removal, cost effectiveness, and the overall applicability to the current recycling activities in the City.

The targeted goals of each program are presented in the goals and objectives and monitoring and evaluation sections of this component.

5.4.1 Programs Selected

The following alternatives have been selected for implementation by the City of Davis.

Alternative 1. Increased Promotion of Residential Curbside Recycling
This alternative has been selected for implementation in the short term and will continue through the planning period. The City and DWR will promote the existing program and encourage participants to recycle more of the materials indicated by the Waste Generation Study to be frequently disposed of rather than recycled through the curbside program. The City will also study the possible benefits and increased diversion rates from the provision of uniform curbside recycling containers.

Alternative 2. Increased Promotion of Multi-Unit Residential Recycling
This alternative has been selected for implementation in the short term as an extension of the Waste Evaluations outlined in the Source Reduction Component. Increased promotion will continue throughout the planning period. The City and DWR will promote the existing program and encourage participants to recycle.

Alternative 3. Expansion and Increased Promotion of Commercial, Industrial and Government Recycling
This alternative has been selected for implementation in the short term and will continue throughout the planning period. The City and DWR will promote the existing programs and encourage participants to recycle more of the materials indicated by the Waste Generation Study to be frequently disposed of rather than recycled through the existing commercial recycling programs. In addition, the City will oversee the placement of source-separated recycling bins in the downtown area and in City parks to encourage recycling.

The City will work with DWR to further promote a source-separated wood recycling program directed towards commercial/industrial wood waste producers. The City will also direct DWR to target smaller generators of recyclable materials for addition to the program.

5.4.2 Programs Not Selected

The following programs were not selected by the City of Davis.

Alternative 4. Additional Drop-off Recycling
This alternative was not selected by the City as it was deemed to be redundant to the existing program at DWR and the planned comprehensive program at YCCL.

Alternative 5. Additional Buy Back Recycling
This alternative was not selected as it was deemed to be redundant to the four existing buy back facilities already located in Davis. The effort necessary for the City to foster the development of an additional facility was deemed to be excessive with no clearly identifiable benefits.

Alternative 6. Institution of Mandatory Recycling Laws

This alternative was not selected as it was deemed to be too problematic to enforce and potentially alienating to the general public. It was determined that the effort necessary to ensure compliance could be better spent on education.

Alternative 7. Automated Material Recovery Facility

This alternative was not selected as the City of Davis is confident in the ability of the City and DWR to achieve a fifty percent diversion level through education, promotion and source separated collection programs. While a facility is being considered for development at the Yolo County Central Landfill for the sorting of commercial and non-compacted wastes from the three incorporated cities and the unincorporated county, the City of Davis is not planning to rely upon it. The City may, however, unintentionally avail itself of the facility as neither the City nor the hauler will have control of the waste once it passes the gate of the landfill. If the landfill operator or regulations direct the driver of a refuse vehicle to dump at the MRF rather than the active landfill face then the load will be processed.

Further, the facility, as conceived by the County, will be sufficiently large to accommodate all Yolo County commercial, industrial, self-haul, and non-compacted waste as well as an additional margin of imported waste. The percentage of total throughput Davis would contribute would be a small percentage of total waste processed. The City, therefore, may leave open its option to have some useable wastes diverted to the facility in the medium term as a contingency.

Alternative 8. Landfill Salvaging

This alternative was not selected by the City as the City does not have control of the landfill or activities at the landfill. However, current landfill plans as specified in the Report of Disposal Site Information for the Yolo County Central Landfill specify that large quantities of concrete, asphalt, other inerts, white goods and wood waste will be recovered through landfill salvaging. Diversion credit for these activities is being claimed by the City. For further detail, see the Special Waste Component, Section 7.

5.4.3 Cumulative Integrated Effect of the Programs

In total, the combined existing and recommended recycling activities in the jurisdictions would result diversion rates in the short term shown on Table 5-9. Medium term diversion is presented in Table 5-10 and assumes that recycling programs will become more effective. The resulting diversion is from the cumulative affect of all programs - anticipated to be 13.0 percent in the short term, and 17.2 percent in the medium term.

Table 5-9. Summary of All Selected Recycling Alternatives by Material Type (Integrated Approach) in the Short Term as Measured in Tons Per Year (TPY)

Material	Amount Currently Generated (TPY)	Amount Currently Diverted	Additional Amount Diverted Through Recycling Programs (TPY)			Total Diverted (TPY)
			SFD Curbside	Multi-Family	Commercial/ Industrial	
Newspaper	2,734.9	2,092.9	27.7	56.1	45.1	2,221.8
Corrugated cardboard	4,146.6	1,980.2	54.4	62.5	384.8	2,481.9
High-grade paper	746.0	161.0	8.0	7.2	67.8	244.0
Mixed paper	3,450.9	965.9	120.1	47.6	139.7	1,273.3
PET	64.4	23.8	2.1	3.5	0.6	30.0
HDPE	130.4	22.0	4.6	16.2	7.7	50.5
Plastic film	237.3	0.0	0.0	0.0	43.2	43.2
Aluminum cans	179.4	111.2	0.2	6.6	0.7	118.7
Tin cans	678.7	0.0	58.2	31.2	58.0	147.4
CRV Glass	446.6	152.5	3.6	12.9	32.0	201.0
Other recyclable glass	1,578.8	986.7	71.2	15.6	23.7	1,097.2
Total	**14,394.0**	**6,496.2**	**350.1**	**259.4**	**803.3**	**7,909.0**
Diversion %	—	**10.7%**	**0.6%**	**0.4%**	**1.3%**	**13.0%**

Table 5-10. Summary of Selected Alternatives by Material Type (Integrated Approach) for the Medium Term as Measured In Tons Per Year (TPY) in the Year 2000

Material	Amount Generated in 2000 (TPY)	Amount Diverted in 2000	Additional Amount Diverted Through Recycling Programs (TPY)			Total Diverted (TPY)*
			SFD Curbside	Multi-Family	Commercial/ Industrial	
Newspaper	2,985.6	2,284.7	60.5	122.6	98.5	2,566.3
Corrugated cardboard	4,526.7	2,161.7	390.8	136.3	840.1	3,528.9
High-grade paper	814.4	175.8	17.4	15.8	148.0	357.0
Mixed paper	3,767.2	1,054.4	262.2	103.9	304.9	1,725.4
PET	70.3	26.0	4.7	7.8	1.3	39.8
HDPE	142.4	24.0	10.0	35.5	16.9	86.4
Plastic film	804.9	0.0	0.0	0.0	94.3	94.3
Aluminum cans	195.8	121.4	0.5	14.4	1.5	137.8
Tin cans	740.5	0.0	127.2	68.1	126.6	321.9
CRV Glass	487.5	166.5	7.9	28.2	69.8	272.4
Other recyclable glass	1,723.5	1,077.1	155.4	34.1	51.6	1,318.2
Wood	2,431.0	0.0	0.0	0.0	972.4	972.4
Total	**18,689.8**	**7,091.6**	**1,036.6**	**566.7**	**2,725.9**	**11,420.8**
Diversion %	—	**10.7%**	**1.6%**	**0.9%**	**4.1%**	**17.2%**

* As measured in year 2000 tons.

5.4.4 End-Uses for Recycled Materials

Table 5-11 presents a list of potential end uses for recycled materials targeted through Davis' recycling programs.

Table 5-11. End-Uses for Recycled Materials

Materials	Markets	Uses
Kraft paper/corrugated cardboard	Brokers	Paper Products
Mixed Paper	Brokers	Paper products/building products
Newsprint	Brokers	Paper products/building products
High-grade paper	Brokers, Mills	Paper products/building products
Plastic film	Mills	Plastic products
HDPE Plastic	Mills	Plastic products
PET plastic	Mills	New PET bottles/plastic products
Tin food and beverage cans	Mills	Steel products/precipitation mining agent
Aluminum cans	Mills	New aluminum cans
CA Redemption glass	Mills	New glass containers
Other recyclable glass	Mills	New glass containers
Chipped wood	End Users	Boiler fuel

5.4.5 End-Markets for Recyclable Materials Diverted to Selected Programs

A list of end markets for recycled materials is presented in Appendix A of this SRRE.

5.4.6 Contingency Measures if Unfavorable Market Conditions Occur

Of the materials targeted for diversion, or possible diversion, only HDPE, and glass are likely to be subject to market conditions so unfavorable as to require implementation of short-fall management practices.

5.5 PROGRAM IMPLEMENTATION

The following section describes the implementation of the selected recycling programs.

5.5.1 Entities Responsible to Implement Programs

Davis Waste Removal (DWR) and the City Recycling Coordinator will take primary responsibility to develop and implement the selected programs. Throughout the process, the City and DWR will work in tandem. Ultimately, the City Council will have the final word on all programs.

5.5.2 Implementation Tasks - Increased Promotion of Residential Curbside Recycling

DWR will work in conjunction with the City Recycling Coordinator to evaluate the program, what materials should be targeted, target areas of the City, and the types of materials which should be added. In addition, the Recycling Coordinator and the 4R Committee will develop and promote quarterly focused education programs targeting specific materials and waste generators. The Recycling Coordinator and DWR will keep City Staff appraised quarterly and the City Council annually of the program results.

Table 5-12. Implementation Schedule for Increased Emphasis on Curbside Recycling

Task	Responsible Entity	Start Date	Completion Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Expand information materials	Recycling Coordinator	3rd Qtr 92	4th Qtr 92, ongoing, annually	Refer to Education Component	Refer to Education Component	Refer Education Component	Refer to Education Component	Refer to Education Component
Promote and begin accepting pigmented HDPE, PET	DWR/Recycling Coordinator	4th Qtr 92	ongoing	$1,500	$500	Refuse Rate Structure	20 to 40	20 to 40
Distribute informational brochures	Recycling Coordinator	4th Qtr 92	2nd Qtr 93, ongoing, annually	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component
Develop targeted education program	Recycling Coordinator/4R Committee	4th Qtr 92	ongoing, quarterly	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component
Monitor and evaluate program results	Recycling Coordinator/ DWR	4th Qtr 92	ongoing, quarterly	$500	$500	Refuse Rate Structure	20 to 40	20 to 40
Compile annual diversion report	Recycling Coordinator/ DWR City Council	4th Qtr 92	1st Qtr 93, ongoing, annually	$ 0	$ 0	Refuse Rate Structure	20 to 40	10 to 20
Total Implementation Costs	---	---	FY 92/93	$2,000	---	---	60 to 120	---
Average Annual Costs	---	---	---	---	$1,000	---	---	50 to 100

5.5.3 Implementation Schedule - Increased Emphasis on Multi-Family Recycling Programs

A more effective multi-family recycling program involving more effective, focused educational efforts will be targeted to multi-family residents. As in the residential curbside program, the 4R Committee will develop quarterly targeted programs focusing on specific materials. These efforts will be ongoing throughout the planning period.

Table 5-13. Implementation Schedule - Increased Emphasis on Multi-Family Recycling

Task	Responsible Entity	Start Date	Completion Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Determine the types of materials the programs will target	Recycling Coordinator	3rd Qtr 92	4th Qtr 92, ongoing	$ 0	$ 0	Refuse Rate Structure	80 to 120	40 to 60
Develop educational materials	Recycling Coordinator	4th Qtr 92	ongoing, bi-annually	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component
Distribute educational materials	Recycling Coordinator	4th Qtr 92	ongoing, as necessary	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Conponent
Publicize and begin accepting pigmented HDPE, PET	Recycling Coordinator/DWR	4th Qtr 92	ongoing	$ 0	$0	Refuse Rate Structure	20 to 40	20 to 40
Monitor and evaluate program results	Recycling Coordinator/DWR	4th Qtr 92	ongoing, quarterly	$500	$500	Refuse Rate Structure	20 to 40	20 to 40
Compile annual diversion report	Recycling Coordinator/DWR	4th Qtr 92	1st Qtr 93 ongoing, annually	$0	$0	Refuse Rate Structure	20 to 40	10 to 20
Total Implementation Cost	---	---	FY 92/93	$500	---	---	140 to 240	---
Average Annual Cost	---	---	---	---	$500	---	---	90 to 160

5.5.4 Implementation Tasks for an Expanded Commercial Recycling Program

The City will take the lead in developing and distributing effective commercial recycling information packets and materials. DWR and the Recycling Coordinator will implement the program based upon information obtained from the Waste Evaluations (see Source Reduction), from business manager/owner contact, and from monitoring and of evaluating programs. The City will also assist DWR in further developing and promoting a source-separated wood recycling program directed towards the commercial sector. Wood will be collected and brought to DWR's compost facility. This material will then be chipped and incinerated as boiler fuel.

The City Parks Department will oversee the placement and promotion of source-separated recycling bins to be placed adjacent to existing waste disposal cans at selected locations in the downtown area and City parks. They will be serviced by the Parks Department.

Table 5-14. Implementation Schedule for a Expanded Commercial Recycling Program

Task	Responsible Entity	Start Date	Completion Date	Cost (Impl)	Cost Annual	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Develop waste evaluations program for businesses	Recycling Coordinator/DWR	3rd Qtr 92	3rd Qtr 93 or ongoing	See Source Reduction Component	See Source Reduction Component	See Source Reduction Component	See Source Reduction Component	See Source Reduction Component
Purchase, place and promote recycling bins	Recycling Coordinator/City Parks Dept.	3rd Qtr 92	3rd Qtr 92	$12,500*	$500	City Parks Dept.	40 to 60	20 to 40
Develop information packages	Recycling Coordinator	1st Qtr 93	2nd Qtr 93	Refer to Education Component	Refer to Education Component	See Source Reduction Component	See Education Component	See Education Component
Distribute information, advise businesses on recycling alternatives	Recycling Coordinator	2nd Qtr 93	ongoing	See Source Reduction Component	See Source Reduction Component	See Source Reduction Component	See Source Reduction Component	See Source Reduction Component
Further promote source-separated wood bins	Recycling Coordinator/DWR	3rd Qtr 93	ongoing	$1,000	$250	Refuse Rate Structure	40 to 60	20 to 40
Monitor and evaluate program effectiveness	Recycling Coordinator/DWR	4th Qtr 93	quarterly	$0	$500	Refuse Rate Structure	40 to 80	40 to 60
Compile annual diversion report and present to city council	Recycling Coordinator	4th Qtr 93	1st Qtr 94 annually	$0	$0	Refuse Rate Structure	20 to 40	20 to 40
Total Implementation Cost	---	---	FY 92/93 FY 93/94	$12,500 $ 1,000	---	---	140 to 240	---
Average Annual Cost	---	---	---	---	$1,250	---	---	100 to 180

*Includes one-time cost of $10,000 for the bins.

5.6 MONITORING AND EVALUATION

This section explains the methods that will be used by the City to monitor and evaluate the effectiveness of the selected programs relative to the stated diversion goals and objectives.

In general, the goals established at the beginning of the component will be used as yardsticks to measure effectiveness. A secondary emphasis will be placed on the forecast diversion levels set forth in tables 5-9 and 5-10 of this component. Other consideration will be given to participation, capture rates, quality of material received, and weight per household or business.

Methods to quantify program effectiveness include:

- Gate monitoring for changes in gross volumes and tonnage at YCCL
- Weighing recyclable quantities entering the DWR processing facilities and separating them by curbside, multi-family, commercial, and by material type
- Surveys of the Commercial Waste Evaluations (refer Source Reduction - Section 4)

DWR will be responsible for the monitoring and evaluation of all authorized recycling programs within the City. The individual to whom DWR will report is the Recycling Coordinator from the Department of Public Works. The Recycling Coordinator will verify the validity of the reports and keep City Staff (the Assistant Director of Public Works), the Natural Resources Commission, and the City Council informed as requested and/or required. In addition, buy-backs and drop-off program operators will be requested to report annually to the Recycling Coordinator as well. This information will be compared against records kept by the DOC regarding CA Redemption items. Reporting will be annually to the Recycling Coordinator, the Natural Resources Commission, and to the City Council.

An annual review of the entire SRRE shall occur to determine if the objectives of the element are being met. At this time, an analysis of present waste generation numbers and the percent diverted versus disposed shall be compared to that prior to implementation of the SRRE. If it is found that the SRRE is not achieving the stated goals and objectives, amendments to the element will be considered to correct the shortfall.

5.6.1 Methods to Monitor and Quantify Program Results

<u>Alternative 1:</u> <u>Increased Promotion of Residential Curbside Recycling</u>

Objective
To increase participation and capture rates in order to achieve the targeted total diversion rates as presented Table 5-3.

Responsible Entities
DWR and the City Recycling Coordinator.

Criteria/Method of Evaluation
DWR will continue to provide information in the form of tonnages, participation level estimates, and recycled quantities to the City. City Staff will then use this information to evaluate overall program effectiveness.

Contingency Plan if Shortfall
Should diversion levels fall short, education efforts will be investigated to increase overall effectiveness. Focused efforts will be directed towards sectors of the City population which may not be participating. Also, focused efforts will be directed towards specific materials which are not meeting targeted diversion levels.

Alternative 2: Increased Promotion of Multi-Unit Residential Recycling

Objective
To increase participation and capture rates in order to achieve the targeted total diversion rates as presented Table 5-4.

Responsible Entity
DWR and the City Recycling Coordinator.

Criteria/Method of Evaluation
DWR will continue to provide information in the form of tonnages, participation level estimates, and recycled quantities from the multi-family sector to the City. City Staff will then use this information to evaluate overall program effectiveness.

Contingency Plan if Shortfall
Should diversion levels fall short, increased educational efforts will be directed towards apartment complexes not attaining desired results. In addition, targeted Waste Evaluations may be offered to apartment owners or managers to determine if increased efficiencies may be attained. As a last resort, should the County MRF be built, multi-family generated wastes may be directed to this facility for processing.

Alternative 3: Expansion and Increased Promotion of Commercial, Industrial and Government Recycling Programs

Objective

To achieve diversion rates as presented in Table 5-5. Also, another goal will be to have an awareness of recycling alternatives by 90 percent of the commercial businesses in the City during the short term planning period, with an increase to 100 percent during the medium term planning period.

Responsible Entity

DWR shall be the responsible agency for implementation and monitoring of this program at the direction of the Recycling Coordinator, and the City Council.

Criteria/Methods of Evaluation

To determine if the percent diversion is accomplished, DWR shall maintain quarterly logs recording, by material types and volume, material collected from commercial accounts. Also, DWR shall report the addition of commercial accounts requesting they be provided recycling services. These reports shall be provided to the Recycling Coordinator for review and approval on a quarterly basis. In addition to the data recorded above, the City shall survey existing commercial businesses annually to determine their level of awareness of ongoing recycling programs implemented for the City.

Contingency Plan if Shortfall

In the event of a failure to obtain the stated objectives, DWR, City Staff and the Recycling Coordinator shall review their public information and education materials targeted at the commercial sector and determine what improvements can be made. If it is found that collected materials lack markets and are therefore being landfilled, the collected materials shall be changed to reflect current market conditions. Another factor influencing the effectiveness of this program is the rate charged for refuse collection. If the rate does not encourage participation in recycling programs by commercial businesses, a review of current rates will be completed and adjusted accordingly. As a last resort, should diversion levels continue to fall short and the County builds the proposed MRF, commercial and industrial waste may be directed to that facility for processing.

5.6.2 Funding

The quarterly DWR reports will be summarized into an annual report each year in March by the Recycling Coordinator. This information will be presented to the City Council and the Natural Resource Commission for review. Assembling the annual report will take between 40 and 80 hours. Funding for these activities will come from the Refuse Rate Structure.

SECTION 6

COMPOSTING COMPONENT

This component establishes the City's composting objectives, summarizes existing conditions, describes materials available to be composted, evaluates collection options and composting processes, and establishes a short- and medium-term program implementation schedule. In addition, this component estimates cost, and describes a method for monitoring and evaluating the effectiveness of the programs to be implemented.

Background

Composting is a method of solid waste treatment by which organic solid wastes are biologically degraded under controlled aerobic or anaerobic conditions. The result is a stable, decomposed material which can be sold or distributed as a soil amendment that improves the moisture retention capacity of soil, adding nutrients and erosion control. At the same time that it produces a potentially valuable resource, composting fulfills AB 939 goals by diverting a substantial volume of yard wastes and other organic materials from landfills.

Yard waste is the ideal material for composting because of its ease of separation and collection at the source. Wood waste can also be used, but it takes several years to decompose, making it more appropriate as a bulking agent in the composting of sewage sludge. Wood can be chipped and sold as mulch, soil amendment, and animal bedding which would qualify as recycling diversion credit. Wood wastes sold as boiler fuel are regarded as "transformation" and at this time according to the current regulations do not count in the short-term planning period towards the City's diversion goals. After 1995, transformation can provide a maximum diversion credit of 10 percent towards the 50 percent requirement.

Yard wastes are easily collected at the source. This collection method produces relatively contaminant-free materials which minimizes the processing cost and produces a high quality end-product that is more easily marketed. Residential yard waste can be collected loosely at the curb, in separate containers such as paper or plastic bags, in rigid plastic containers (30-, 60-, or 90-gallon) by a standard refuse truck, or a combination of these methods. Even though curbside yard waste collection is expensive, it has a relatively high rate of participation.

A variety of processing alternatives are available to the City, including windrows, aerated static piles, and in-vessel systems. Windrows and aerated static piles are the least expensive methods, require more land, and take longer to produce a finished product. In-vessel systems require more capital for equipment, but process material faster and require less acreage.

Composting of municipal solid waste (MSW), also referred to as mixed municipal solid waste (MMSW), involves composting the entire organic portion of the waste stream (food waste, yard waste, wood waste, and paper). Although this technology has been in use in Europe, it is not widely used in the United States. Domestic markets for MSW compost are severely limited due to its high contamination levels.

MSW can also be co-composted with sewage sludge. This would restrict the market for the finished composting product to a higher degree than just MSW compost since sewage sludge may contain heavy metals that can end up in the final composting product. The EPA will release regulations in 1992 that may impact the use of sewage sludge composting products. It may be in the best interest of the City of Davis to avoid the use of sewage sludge in any composting operation until these regulations are released.

6.1 GOALS AND OBJECTIVES

A variety of organic materials in the waste stream can be composted. Major types of potentially compostable materials and their contribution to the City's solid waste stream are given in Table 6-1.

Table 6-1. Organic Wastes Disposed by the City of Davis in 1990

Material	Amount (TPY)	Percent of Total Generated MSW
Paper	5,897	9.7
Yard Waste	3,572	5.9
Agricultural Crop Residue	20	0.0
Wood	2,327	3.8
Wood (Pressed Board, etc.)	2,020	3.3
Food	4,456	7.3
Manure	98	0.2
Totals	18,390	30.2

6.1.1 Targeted Materials

Yard waste is currently collected and processed into compost by Davis Waste Removal (DWR). Nevertheless, yard waste originating in Davis is still found in significant volumes at the landfill. This disposed yard waste, which constitutes approximately 5.9 percent of the total generated waste stream, includes the following materials:

- Leaves
- Grass clippings
- Garden waste (weeds, plants, discarded fruits and vegetables)
- Brush and branches

Wood waste is also currently collected and processed both at the YCCL and at DWR's Westlane composting facility into fines for soil amendment and as fuel for incineration. As shown in the Waste Generation Study, significant amounts of these materials representing 3.8 percent of the total generated waste stream are deposited at the YCCL.

Materials Not Currently Targeted

Food is also readily compostable, but it is harder to separate from the waste stream. Food waste separation is not commonly practiced in the United States and may require local ordinances to ensure that separation occurs. However, this material can often be composted and is addressed in the Backyard Composting Alternative in the Source Reduction Component.

Manure can easily be added to a composting process and will add nutrients to the final product. All source-separated manure loads from the City could be sent directly to a composting facility. However, source-separating manure would prove difficult at this time and should be left as a contingency plan, should diversion levels fall short in the medium term.

Paper is also compostable. However, primary diversion for this material will come through recycling alternatives. Also, many types of paper have plastic and or glossy coatings which are often difficult to break down making them difficult to handle in a composting operation. Therefore, the composting of paper products will only be investigated if diversion levels fall short. Many paper products can potentially be backyard composted, however.

Wood - (Pressed Board, etc.) consist of materials that are not acceptable for composting. These wood types include: plywood, particle board, pressure-treated wood, and any additional materials containing creosote, glues, resins, paints, glass, plastic, industrial chemicals, and metals other than nails. These materials are unacceptable because the resulting product may be environmentally unsafe if used as a horticultural product, and because processing them may

damage the machinery. In addition, the local biomass plant in Woodland has been experiencing difficulties with contaminants in their ash. Therefore, these materials will not be accepted.

Ag Crop Residue was found in the Waste Generation Study. However, this material type is often contaminated with pesticides or other detrimental materials which would adversely affect the final compost product.

6.1.2 Objectives

The following objectives for the short term (present to 1995) and medium term (1996 to 2000) planning periods have been established for the selected composting programs.

Short-Term Objectives

The short-term objectives of the composting program will be to:

- Identify additional potential end-users and their anticipated product quality and quantity requirements.
- Secure favorable agreements with end users of compost to accept all compost materials generated in the City.
- Identify particular sub-groups of potential end-users and their anticipated product quality and quantity demands, focusing on uses within the City, in neighboring jurisdictions, and in agricultural areas.
- Including diversion through backyard composting, raise the participation and capture rates to 90 percent thus diverting 81 percent (90 percent * 90 percent = 81 percent) of yard waste generated in the City of Davis. This would increase total diversion through composting and wood waste incineration to 10.9 percent of total waste generated.
- Further educate residents about the yard waste collection program.
- Overcome the quality issues associated with the sorting of plastic bags from incoming yard waste at the DWR processing facility.
- Gain approval from the State for the use of City-generated compost for use as alternate daily cover at the YCCL.
- Evaluate the feasibility of collecting food waste for composting.

- Require municipal departments to give preferential consideration to the use of compost in maintenance of public lands (if supply of compost exceeds demand).

- Evaluate the potential for cooperative composting with neighboring jurisdictions.

Medium-Term Objectives

In the medium term, diversion levels may be expected to rise due to increased efficiency in collection and higher participation. Also, additional biodegradable materials such as food, paper and manure may be considered for composting or co-composting with the yard waste should diversion levels fall short.

Including existing diversion, the objectives for the medium term are:

- Continue to assure a steady, favorable aftermarket for all City-generated compost.

- Maintain the 81 percent total diversion rate of yard wastes generated in the City.

- Continue to refine and optimize the wood and yard waste collection systems primarily through focused education programs.

6.2 EXISTING CONDITIONS

6.2.1 Summary of Existing Conditions

The City of Davis has access to two local facilities which process yard waste and wood. One The first is owned by Valley By-Products and is located at YCCL. The activities at this site are discussed in further detail in the Special Waste Component (Section 7) of this SRRE. The second is owned and operated by DWR and is described in Section 6.2.2.

A total of 4,632 TPY were received at the DWR facility in 1990. Of this material, 2,836.1 TPY (4.7 percent of the total generated waste stream) were diverted to compost and 1,796.2 TPY (3.0 percent) were transformed into boiler fuel. The following table presents the diversion activity in 1990.

Table 6-2. Summary of Yard Waste and Wood Generation and Diversion - City of Davis 1990

Material	Total Generated (TPY)	Composted	%	Transformed	%	Disposed	%
Yard Waste	8,203.8	2,836.1	34.6	1,796.2	21.9	3,571.5	43.5

* Non-treated or pressed wood

6.2.2 Yard Waste Collection in the City

Davis Waste Removal (DWR) currently provides to all residential, multi-unit residential, and commercial generators in The City of Davis weekly yard waste collection and composting. Materials collected include leaves and brush (up to 8" in diameter), christmas trees, and grass clippings (which must be bagged). Piles may be placed in the street along the curb but are not to block bicycle paths, or are to be larger than 5 feet in any direction. A "claw"-equipped front end loader and packer truck work together to collect the waste followed by a street sweeper that removes any material left by the collection crew. The yard wastes are taken to the DWR composting facility located at the site of the former Westlane Drive-in in unincorporated Yolo County, near El Macero. The facility site is owned and operated by DWR. The facility is currently in the permitting process with the CIWMB.

Currently, DWR is experiencing difficulties finding adequate end markets for City-generated compost. One problem locating markets is the presence of plastic film in the compost. This plastic film generally comes from plastic bags required for curbside collection of grass which, by City ordinance, is not allowed to be placed loose at the curb. DWR is currently attempting to address the plastic film problem and has presented to the City a proposal for new equipment which will sort out the film. Should the plastic film issue be resolved, the marketability of Davis' yard waste should increase. However, there are no current contracts secured for the disposal of compost. The outlook in the near future is not favorable due to the large increase in the supply of compost State-wide as other jurisdictions' compost operators come on line.

Another potential use for compost materials processed by DWR is alternate daily cover (ADC) at the Yolo County Central Landfill (YCCL). YCCL has the need for a steady supply of ADC and would represent a potentially reliable, economically feasible after-market. The use of compost as ADC is still under review by the State, however.

Compost is available for free pick-up by residents next to the Davis Community Gardens on Fifth Street across from the DWR yard. Annually, this represents approximately 280 tons of the estimated 2,800 tons processed and available.

6.2.3 General Description of Composting Operations

The existing DWR facility grinds incoming yard waste and wood, classifies the material by size, and composts all material that is chipped to under one inch in diameter. The oversized chips are sold as fuel.

A total of 4,632 TPY of yard waste was received at the composting facility (22.3 tons per day, based on a four day week) in 1990. The incoming material consists of leaves, brush, tree and yard trimmings and grass. No special wastes, slurries, or liquids are accepted.

The facility is located on a 15-acre parcel of which 13 acres are fenced. Two acres are used for receiving and handling and six acres are used for windrows. The site is sufficiently large to process and compost to full term all yard wastes generated in the City of Davis, approximately 8,700 TPY.

The material is delivered to the site by one rear-loading packer truck with a capacity of ten tons, making three to four loads per day. The facility receives material four days per week (Monday through Thursday) from 8:00 a.m. to 5:00 p.m.

The material is tipped from the incoming truck, loaded in the tub grinder, then separated with a classifier. Pieces under one inch in diameter are composted; chips over one inch in diameter are conveyed into a trailer for shipment to a wood burning facility for use as fuel. The trailer is generally filled twice per week.

The compostable material is watered to bring the initial water content to about 50 percent. The material is then placed in windrows that are approximately 20 feet wide at the base, 100 to 300 feet long, and 8 to 10 feet high. The windrows are aerated by turning with a front-end loader. The amount and time of turnings are determined by the windrows' internal temperature. When the internal temperature of the windrows begins to drop (indicating microbial die-off) the piles are turned. Approximately three to four months is needed to compost the material in the windrows.

Equipment Description

The following equipment is on site:

- 1 - W20 CASE Front-end loader
- 1 - W11 CASE Front-end loader
- 1 - WHO Tub grinder
- 1 - Fuel harvester material classifier
- Moisture probes
- Thermometers
- 1 - 4000 Gallon water tank

An existing well serves as the water supply. The well is used to fill the 4000 gallon water tank and supply water for the sanitary facilities. A septic system is on site and power is supplied by PG&E. No chemical additives are used in the compost.

The leachate is expected to be permitted to percolate into the soil, as is allowed at the composting facility in Berkeley, California. Alternatively, the leachate will be disposed of in an evaporation pond.

This program is intended to continue for the foreseeable future, with no significant reductions in operations planned.

Landfill Disposal

Despite the current composting program, a substantial amount of compostable organic wastes continue to go to the landfill. The amounts of disposed materials are presented in Table 6-2.

6.3 EVALUATION OF ALTERNATIVES

As mentioned, the City of Davis has a very successful residential yard waste collection and composting program in place. However, a number of alternatives are available to the City to enhance the existing program. These alternatives can be broadly classified into three categories - collection, processing, and siting. Presented below is a list of the alternatives considered within this section, followed by a thorough evaluation of each alternative.

Collection Alternatives

*Alternative 1. Expand Existing Curbside Collection (selected)
Alternative 2. Establish a Drop-off Service (not selected)
*Alternative 3. Mandate Source-Separation of Yard Waste (selected)
Alternative 4. Establish Materials Recovery Facility (not selected)

Composting Process Alternatives

*Alternative 1. Continue Existing Windrow Process (selected)
Alternative 2. Change To Aerated Static Piles (not selected)
Alternative 3. Change To In-vessel Composting (not selected)
Alternative 4. Change To Anaerobic Composting (not selected)

Siting Alternatives

*Alternative 1. Continue to Use Private Site (selected)
Alternative 2. Change to Centralized Regional Site (not selected)

6.3.1 Collection Alternatives

Collection Alternative 1. Expand Existing Curbside Collection

Curbside collection of yard waste (leaves, tree and shrub prunings) in the City of Davis involves the source separation of this material by participants into piles on the street. The number of piles that may be set out for any given collection is unlimited, but grass clippings must be bagged. The yard waste is then collected weekly by Davis Waste Removal using a claw-equipped front loader and a packer truck with follow-up street sweeping done by a street sweeper. The material collected is delivered directly to the composting facility where it is processed into a useful soil amendment or chipped and sold for fuel.

The City of Davis' curbside collection program currently collects for diversion 56.5 percent of all the yard waste generated in the City. The amount of composted waste which is diverted (4,632.3 TPY) equals 7.6 percent of the total waste generated by the City of Davis.

This alternative has the City and Davis Waste Removal increasing the capture rate of yard waste through extensive education and promotion. Target participation rates are 90 percent. Target capture rates are also 90 percent. The following formula may be used to determine actual diversion:

(Participation Rate) * (Capture Rate) = Diversion Rate

Based upon this formula, the City may expect to divert:

90 percent Participation * 90 percent Capture = 81 percent Diversion

Effectiveness

The Waste Generation Study identified 3,572 tons of yard waste, 5.9 percent of Davis' total waste generated, as a having originated in Davis and ultimately been disposed of in the YCCL. Some of this material (38.6 TPY in the short term) will be diverted through backyard composting (reference Section 4, page 4-24). Therefore, the total amount available will be 3,533.4 TPY. An expansion of the education programs for the existing yard waste collection program to increase participation and capture rates will likely increase the total yard waste diversion to 6,614.0 TPY, or 81 percent of the total yard waste generated (8,203.8 TPY in 1990). Therefore, an increase in diversion rate of yard waste from 56.5 percent to 81 percent will increase countable short-term diversion from 7.6 percent of total waste generated to 10.9 percent of total waste generated.

Hazards

Common hazards of loose curbside collection are:

- Blowing yard waste
- Cars driving over yard waste and scattering it in the streets
- Blocked bicycle paths
- Automobile catalytic converters igniting leaves on fire
- Sewer drain blockages
- Contamination of yard waste by gravel, glass, and oil
- Interferences with on-street parking

Ability to Accommodate Change

Any change in quantity and/or quality of source separated collection of yard wastes can be accommodated by changing collection patterns and frequency, and/or increased educational activities.

Consequences on Waste Stream Composition

Composting reduces the total amount of waste destined for landfill, thereby helping the City to achieve its AB 939 diversion goals. Composting may effect the net BTU content of the waste stream and methane production in the landfill.

Ability to be Implemented

Curbside collection of source-separated yard waste is already implemented in the City of Davis by Davis Waste Removal.

Need for Facilities

A program of this nature requires collection equipment, staffing, and a processing facility. The existing facility is sufficient in size to accommodate the processing of all the yard waste generated in the City of Davis. However, because grass clippings must be bagged and the anticipated increase in yard waste will be largely comprised of grass clippings, additional equipment or personnel will be required to cull bags from the incoming loads of yard waste prior to processing.

Consistency with Applicable Local Policies, Plans, and Ordinances

Expansion of the existing collection program does not conflict with local policies, plans, or ordinances. However, care must be taken to ensure that bicycle paths are not blocked as there is an existing City ordinance to keep bike paths clear.

Institutional Barriers to Implementation

Besides the lack of markets, there are no institutional barriers to expansion.

Market Availability

Compost produced from yard wastes collected curbside generally have no market constraints. DWR is currently marketing compost although markets have been difficult to identify due to the presence of plastic bag residue. The presence of plastic bag residue presents a significant problem which must be overcome. DWR currently is proposing a method of mechanically separating plastic bags from yard waste which the City is currently evaluating. This system requires a capital investment of approximately $100,000 and would increase the overall marketability of DWR's compost.

As a last resort, composted yard waste could be used at the YCCL for alternate daily cover, although its creditability towards diversion is still in question.

Costs

Operating costs for collection of yard waste vary greatly with the type of collection. General overall costs for separate collection, including labor, equipment, and depreciation run from $60 to $80 per ton of yard waste collected. With the collection rate of an additional 1,981.7 TPY (6,614 - 4,632.3) TPY, the costs associated with collection will be in the range of $118,900 to $158,500 per year.

Additional costs to the consumer may be for bags in which to place their grass clippings. Degradable, compostable kraft bags generally cost between $.32 and $.50 each. For a large percentage of participants, using small, grocery store kraft bags will be impractical and using large, special kraft bags will have to be evaluated carefully. The City will compare the viability of directing Davis Waste Removal to allocate additional personnel hours to cull plastic from the incoming yard waste prior to processing to the provision of degradable bags for public use. Another cost which should be considered is the processing equipment to sort out the plastic film contaminants. This equipment would cost approximately $100,000 the cost of which would be included into the rate structure. Another option would be additional manpower to manually screen out the plastics. Requirements might consist of between 2 and 4 workers.

Technical Reliability/Public Acceptance

Curbside collection of yard wastes has been a reliable and proven method of collection for the community and the existing collection programs have widespread support and participation.

Collection Alternative 2. Establish a Drop-off Collection Site

Drop-off sites achieve high participation rates from commercial and self-haul generators of yard waste. However, because Davis has a successful curbside program servicing commercial and residential customers, a drop-off facility for Davis would likely service only self-haulers. Drop-off collection sites vary from unattended containers to fully equipped and staffed facilities that receive and process recyclable and compostable materials. A drop-off collection program for the City of Davis would be best located at the existing composting facility. However, an

existing drop-off, operated by Valley Wood Products, is available for use by City residents at the YCCL.

Effectiveness

A drop-off collection site for self-haulers may net a very small percentage of the total waste stream, as self-haul yard waste represents less than one percent of the waste stream and the anticipated diversion rate will be very low. Because Davis has a curbside yard waste collection program, it is assumed that self-haulers taking yard waste to the landfill are hauling additional, probably non-compostable, wastes as well, and would therefore be going to the landfill regardless of the existence of a drop-off facility for yard wastes.

Hazards

Self-haulers may be tempted to dispose of contaminated yard wastes at a drop-off, particularly if the site were unattended.

Ability to Accommodate Change

Drop-off sites are highly adaptable to change. An increase in the number and type of materials acceptable for composting will allow the operators of the site to accept some or all of these materials without concern for developing collection programs. A significant increase in traffic beyond that which would be anticipated as a percentage of the self-haul may require modification of the facilities for traffic control and safety.

Consequences on the Waste Stream Composition

A drop-off center for yard waste and wood should result in a decrease in the percentage of organic waste landfilled.

Ability to be Implemented

Drop-off collection could be implemented in the short-term planning period.

Need for Facilities

A facility already exists.

Consistency with Local Policies, Plans, and Ordinances

There are no conflicting policies, plans, or ordinances that would affect a drop-off facility.

]Institutional Barriers to Implementation

There are no institutional barriers to prevent implementation of a drop-off site for yard waste.

Market Availability

Compost produced from yard wastes left at a drop-off site will be of equal quality as compost made of source separated yard waste and will share the same markets. Compost is currently being marketed by Davis Waste Removal. Nevertheless, markets have been difficult to identify. As a last resort, composted yard waste could be used at the YCCL for alternate daily cover,

although its creditability towards diversion is still in question. There is no foreseeable compromise of that marketability to be attributable to drop-off collection.

Costs

The costs associated with the implementation of this alternative are negligible as the facility already exists and the anticipated usage would be minimal. Promotion of the facility would be part of other, larger and more visible programs and would be absorbed by those programs.

Technical Reliability/Public Acceptance

This alternative is highly reliable as it will target a small percentage of the waste stream and will serve as a compliment to the existing curbside program.

Collection Alternative 3. Mandate Source Separation of Yard Waste

Under this alternative, all yard waste generators would be required to source-separate their yard waste. Generators of yard waste (residential, commercial, industrial and municipal) would be required to use either street collection or drop off their yard waste at the composting facility. The current yard waste collection system requires that grass clippings be bagged in the street or placed with garbage. To require all residents and businesses in the City to participate will greatly increase the number of bags being collected and will therefore likely increase the level of contamination in the end product from the plastic bags used by participants. Additional incremental expense will be incurred in processing as a larger percent of total waste disposed is compostable than of the material currently collected in the yard waste program.

A mandatory source-separation ordinance can be implemented relying on public education and promotion to gain compliance. An enforcement program that relies on fines, penalties and inspections, although guaranteeing high participation rates, may be expensive, unpopular and inconsistent with the prevailing attitudes in Davis city government.

Therefore, the target participation and capture rates will be 90 percent, respectively. Should the participation and capture rates fall below these levels, then the City would evaluate enforcement activities.

Effectiveness

This alternative will likely achieve participation rates as high as 100 percent with a capture rate of 90 percent. However, it is also likely that participation will be effected equally through intensive promotion and public education (see Public Education Component).

Hazards

There are no hazards directly attributable to the implementation of a mandatory source-separation ordinance.

Ability to Accommodate Change
Mandatory source-separation can be modified or repealed easily. Changes in the program would be accompanied by education of the public.

Consequences on Waste Stream Composition
Mandatory source-separation would result in a decrease in the amount of organic waste taken to the landfill, a possible loss of tipping fees and lower methane gas production at YCCL.

Ability to be Implemented
A mandatory source-separation ordinance can be implemented in the short term.

Need for Facilities
The existing composting facility operated by Davis Waste Removal has sufficient capacity to process and compost the increased tonnage of yard waste to be collected.

Consistency with Local Policies, Plans, and Ordinances
Implementation of mandatory source-separation of yard waste may conflict with local policies as the City has had very good results from voluntary programs with City emphasis placed on education and promotion. Nevertheless, should the City select this alternative, an ordinance or series of ordinances would need to be drafted and adopted.

Institutional Barriers to Implementation
The above-mentioned inconsistency with local policies, plans, and ordinances may create significant institutional barriers.

Costs
The costs of implementing the program depend on whether fines or penalties are imposed, the staff needed for enforcement and/or the level of education, and promotion to accompany implementation. If this policy were to be enforced, the City would need to develop staffing and an infrastructure for code enforcement.

Additionally, expense to the participant may rise as they will be required to bag their grass and will therefore have to use either paper or plastic bags. Kraft paper bags of sufficient tensile strength for use with grass clippings range in price from 32 cents to 50 cents each. It is estimated that medium sized residential generators of grass clippings could easily fill one bag per week, six months per year for a cost of approximately $15 - $26 per year for bags. Plastic garbage bags generally range from 20 cents each to 45 cents each for a total cost of $10 -$23 per year for bags, per household.

Market Availability
Compost is currently being marketed by Davis Waste Removal; however, buyers are difficult to find. A further compromise of that marketability is foreseeable if grass clippings collection

increases and the commensurate plastic contamination to be attributed to greater use of plastic bags. This can partially be mitigated by adding additional equipment or labor to the process of sorting material as it enters the composting facility. A more complete discussion is offered under Marketing, Collection Alternative One.

Collection Alternative 4. Establish Material Recovery Facility

A material recovery facility (MRF) to sort the entire municipal waste stream may be an effective method of removing compostable material from the waste stream if the organic waste to be composted is source-separated (bagged separately from the general waste at pick-up time). The yard waste would be collected at the same time as the regular waste, but would be bagged separately in colored, clear or paper bags. Branches and wood would be trimmed to approximately 4 feet in length and bundled. When the waste is sorted at the MRF, the bags would be manually culled from the waste and diverted to a composting facility.

Alternatively, the yard waste could be left in the general waste stream and picked unbagged. The recoverable portion of the yard waste would be only approximately 20 percent. The remaining 80 percent would be too contaminated to market after composting. It is estimated that approximately 80 percent of the wood waste could be recovered for mulching or transformation.

Effectiveness

Pulling yard waste out of the general waste stream at a MRF would remove part of this fraction from the waste stream. If the waste is collected commingled then approximately 20 percent of the disposed yard waste could be removed from the waste stream. Of this 714 TPY, 70 percent is compostable and would represent a 0.8 percent diversion of the total waste generated by the of the City of Davis. If the yard waste is bagged so as to be more easily culled from the waste as it travels the conveyor belts of the MRF, then approximately 60 percent of the incoming yard waste should be recovered. This 2,143 TPY would be a 2.4 percent diversion of the total waste generated by the City of Davis.

Because the City of Davis is not predisposed towards abandoning its effective source-separated yard waste collection, separate processing of the waste stream at a MRF would not yield a high percentage of waste and would be in direct conflict with the existing program. In both the loose and bagged collection systems discussed for use with a MRF, projections for recovery are lower than for the current source-separated curbside yard waste system operated by Davis Waste Removal.

Hazards

Hazards from separating yard waste at a MRF are similar to those which are present at a drop-off facility. The primary hazards are odors, contamination, and vector control. Odor can be controlled by regularly transferring the yard waste to a composting facility. This is very important during the seasons when grass clippings are generated. Biodegradable paper bags would be the optimum choice for collecting the yard waste (no bag openers would be necessary). The use of biodegradable bags may lead to high contamination rates if there is an economic incentive to separate the yard waste (people may place regular refuse in the yard waste for cheaper disposal). The yard waste may be collected in clear plastic bags so that the amount of contamination can be checked during collection. Vectors can be mitigated through proper facility design and operation.

Ability to Accommodate Change

A MRF can readily adapt to changes in processing techniques and material markets. However, compostable material culled from the general waste stream in a MRF is likely to contain a higher contamination level than source separated compostable material collected at curbside and will therefore be less marketable.

Consequences on the Waste Stream Composition

Processing of municipal waste at a MRF will result in a decrease in the amount of organic waste received at the local landfill. Ultimately, this would result in less revenues to the County from tipping fees and a reduced amount of methane production at the landfill.

Ability to be Implemented

A MRF would take, at a minimum, approximately 18 months to permit and build. If it is determined that an environmental impact report (EIR) is needed to conform with the California Environmental Quality Act (CEQA), the process will may take at least two years to permit and build a MRF.

Need for Facilities

A MRF will need to be built. A composting facility is already in operation.

Consistency with Local Policies, Plans, and Ordinances

Construction of a MRF either alone or in conjunction with other jurisdictions may be in conflict with local policies as the City already has successful programs that will conflict with the implementation of MRF-oriented programs.

Institutional Barriers to Implementation

See Consistency with Local Policies, Plans, and Ordinances.

Costs
The capital costs associated with the design, permitting, construction and operation of a MRF are considerable. Processing costs typically range between $40 to $80 per diverted ton.

Market Availability
The separated yard waste will be brought to the composting facility to be processed. Please refer to Market Availability in Processing Alternative 1 for a discussion of the market availability for compost.

Technical Reliability/Public Acceptance
MRF's have proven reliable across the nation. However, because the City has successful curbside recycling and composting programs, public acceptance of the costs associated with and changes necessary for the implementation of a MRF-related collection programs may be low.

6.3.2 Composting Process Alternatives

There are three composting methods in common use. They are windrows, static piles, and in-vessel. While static piles and in-vessel composting are complex procedures, the windrow option can be operated with low or high technology. Windrow processing is the method now being used at the composting facility. Another process that is not in common use is anaerobic composting. Anaerobic composting provides energy as well as compost, but requires a large input stream. Independent of the composting method chosen, the five essential factors that control the composting process are:

- Microbial population
- Aeration
- Temperature
- Moisture content
- Carbon availability

Processing Alternative 1. Continue Existing Windrow Process

The existing system received 4,632 TPY of yard waste in 1990. The facility has a maximum capacity of 10,000+ TPY with single shift operation. At an 81 percent diversion rate the yard waste received will be increased to 6,614 TPY of compost. The use of this composting facility can be continued as a waste diversion process.

Effectiveness
The windrows method is a very effective way to process yard waste. Depending on the energy input to the system, the time it takes to develop the final product can vary from three months

to three years. Windrows can be used with a variety of technological levels and can be modified to work in any climate. This technique will be able to compost all of the yard waste that is delivered to the facility (see collection alternatives for specific quantities).

Hazards

The common hazards associated with composting facilities are odors, contaminants, leachate and wind-blown debris. There is also a potential for vector problems. There can be hazards associated with equipment operation, but these will be minimized by properly training the equipment operators.

The most common complaints directed at windrow processes are odor complaints. This can be overcome by treatment, proper site and process management. A buffer zone of approximately 1/2 mile surrounds the existing facility. Some process techniques to control odors are:

- Reduce compost activities during high odor periods
- Turn windrows during low wind conditions
- Turn windrows frequently to prevent anaerobic conditions
- Use odor amendments

The highest correlation for odor generation is the exposed surface area to volume ratio of the windrow. To a certain extent, large windrows emit less odors than small windrows. If a windrow becomes anaerobic, it could potentially be very odorous.

The presence of contaminants in the final compost product can be detrimental to marketing efforts. This hazard can be avoided by visually screening the input waste stream for contaminants and removing them before the material is placed in windrows.

Excess leachate that is generated from the windrow process will be disposed of in a evaporation pond. The facility, originally a drive-in theater, was designed to remove any standing water.

Vectors can be controlled by revising certain aspects of the windrow process. Improved turning techniques, moisture adjustments, temperature adjustments, and trapping are effective methods for vector control.

Wind-blown litter is controlled by a chain-link fence surrounding the property. Dust is controlled by misting the material as it is received.

Ability to Accommodate Change

Windrow composting is adaptable to many economic, technological, and social changes. The process can be performed for any economic condition that is warranted. The process can adapt to social changes. For example, if the public does not want to see the facility, it can be enclosed.

Consequences on Waste Stream Composition

A composting facility will result in a decrease in the amount of organic waste received at the local landfill. Ultimately, this would result in less revenue to the County from tipping fees, and a reduced amount of methane production at the landfill.

Ability to be Implemented

The facility is in place and currently in the permitting process with the CIWMB.

Need for Facilities

The facility already exists.

Consistency with Local Policies, Plans, and Ordinances

There are no conflicting local policies, plans, or ordinances that would affect the continued use of the existing facility. A permit from the State Regional Water Quality Board may be required for disposal of the leachate that is generated. The California Integrated Waste Management Board (CIWMB) requires a solid waste facility permit.

Institutional Barriers to Implementation

There are no institutional barriers to composting yard waste. If the City decides to move into sewage sludge composting in the future, there may be institutional barriers to the use of the final product. Sewage sludge composting is currently under review by the EPA. Municipal solid waste composting may limit public acceptance.

Costs

Typical costs for a composting facility are in processing, storage, marketing, program administration, public education, and technical assistance. These costs are offset by the benefits which include: revenues received from selling the finished compost, avoided costs from using the finished compost instead of purchasing a similar product, and avoided landfill tipping fees.

Market Availability

The market for compost produced from Davis' yard waste will depend on several factors including: quality of product produced, demand by local government, demand by state government, and demand by local residents.

The compost product quality will depend on contaminants, process control, and screening of the final product. The higher the quality is of the compost produced will directly relate to the marketability of the compost.

Contaminants can be kept to a minimum by source-separated collection. The process must be monitored regularly so that the windrows reach an internal temperature of at least 160° F. for two days or the product will be nitrogen poor and may contain weed seeds, pathogens, non-degraded pesticide residue, and odors. The optimal temperature is 132° F. The compost must

be cured before marketing or it will burn out the roots of plants if used for horticultural or agricultural purposes. The end product should be tested for several parameters including pH and salt levels.

Once the product is cured it should be run through a screener to remove wood chips, plastic bags, and other contaminants that are visually unacceptable to the public.

The amount of compost screened will depend on the end-market availability. If the compost is marketed or given to the general public it must look and smell like high quality soil. If the compost is used for landfill cover then the wood chips and other large particles in the final product do not need to be screened out.

The compost can be used by both the public and private sectors. Different quality products (screened/unscreened) can be marketed to different sectors. The public will require a high quality product for horticultural use. It may be necessary to give the product away at first to build up confidence in the compost. The high quality compost can be marketed to nurseries, land developers, golf courses, and other private users.

If all the compost cannot be marketed locally then the City and Davis Waste Removal can explore the possibility of marketing the compost to State agencies. Senate Bill 1322 requires that the Department of General Services, the California Department of Transportation, and the Department of Forestry and Fire Protection use yard waste compost. As a last resort, compost may be used at the YCCL for alternate daily cover although this use may not be creditable towards diversion.

For additional discussion of markets, please refer to Market Availability in Collection Alternative One.

Technical Reliability/Public Acceptance

Windrow composting techniques are relatively simple and reliable. If a few parameters are controlled, such as temperature, aeration, and moisture content, then the system will operate on its own and be very reliable. Windrow composting is publicly acceptable if odors are controlled.

Processing Alternative 2. Change to Aerated Static Piles

With static pile composting, organic wastes are aerated by blowers, similar to the high technology operation of windrows. The piles can be much larger than standard windrow piles because they are not limited by the size of equipment used to turn the windrows. The blower can be controlled by timers or by a temperature feedback system. Aerated composting has less odor-forming potential than conventional windrow composting. This is because the conventional windrow composting operations have a tendency to operate under anaerobic conditions. Anaerobic composting releases more odors than aerobic composting. Composting of strictly yard waste or wood with static piles is rare, aerated static piles are commonly used to compost sewage sludge.

Effectiveness

This option is effective for co-composting yard waste with sewage sludge or other organic materials, but is not recommended for composting just yard waste. A manure/yard waste mix should be suitable for composting with an aerated static pile system. The compost process would be as effective as the collection system that feeds it (see collection alternatives for specific quantities).

Hazards

For a discussion on hazards, please refer to Hazards under Processing Alternative One.

Ability to Accommodate Changes

Aerated static pile composting is adaptable to many economic, technological, and social changes. It can easily be converted to a windrow composting facility.

Consequences on Waste Stream Composition

A composting facility will result in a decrease in the amount of organic waste received at the local landfill.

Ability to be Implemented

An aerated static pile composting facility can be implemented in the short term.

Need for Facilities

There will be no need for other facilities in the short term.

Consistency with Local Policies, Plans, and Ordinances

There are no conflicting policies, plans, or ordinances that would affect a composting facility. Depending on the location, a permit from the State Regional Water Quality Board may be required for disposal of the leachate that is generated. A conditional use permit may be required depending on the local zoning ordinances. A solid waste facility permit will be required by the CIWMB.

Institutional Barriers to Implementation

Other than permitting there are no institutional barriers to composting yard waste. If the jurisdictions decide to move into sewage sludge composting in the future, there may be institutional barriers to the use of the final product. Sewage sludge composting is currently under review by the EPA.

Costs

Capital costs for an aerated static pile composting facility are similar to those for windrow composting. While a windrow turner is not needed for this process, a ventilation system is. Operational costs are approximately $30 per ton of yard waste processed.

Market Availability

Please refer to Market Availability in Processing Alternative 1 and Collection Alternative 1.

Technical Reliability/Public Acceptance

Aerated static pile composting techniques are relatively simple and reliable. A temperature feedback system to control aeration may be used. By controlling the temperature, aeration, and moisture content, a system can be designed that is very reliable. Aerated static pile composting is acceptable to the public because of the ease of odor control. The facility can be enclosed if there are public objections to its appearance.

Processing Alternative 3. Change to In-Vessel Composting

This process entails the use of a fully- or partially-enclosed, often fully automated operation involving mechanical turning devices with feedback controls and/or forced aeration. Advantages of this method include rapid processing, avoidance of weather-related problems and inefficiencies, more complete process and odor control, and less space required.

If the City of Davis decides to compost all of the organic material in its municipal solid waste with an in-vessel system it would target the 48.5 percent of the waste stream that is currently going to the landfill. This option would make significant strides toward the State-mandated diversion levels, but might significantly affect the marketability of the compost due to the quantity of the compost produced. The compost may possibly be used as landfill cover material; but may be shut out of other markets because of the expected regional availability and quantity of compost in the near future.

Effectiveness

This option is also effective at removing compostable materials from the waste stream, but its expense and complexity will not make this a feasible option unless the input stream is large and other materials are composted with the yard waste. This compost process would be as effective as the collection system that feeds it (see collection alternatives for specific quantities).

Hazards

The common hazards associated with composting facilities are odors, contaminants and leachate. Vectors are not usually a problem with enclosed facilities. There can be hazards associated with equipment operation, but these will be minimized by properly training the equipment operators.

The most common complaint directed at composting facilities is the odor. In-vessel composting facilities offer better odor control than conventional windrow processes. Since the process is enclosed, the odors can be treated as they are released from the vessel.

The presence of contaminants in the final product can adversely affect marketing efforts. This hazard can be avoided by visually screening the input waste stream for contaminants and pulling them out before the material is placed in the vessel.

The leachate that is generated from the compost process can potentially contaminate local water sources. This can be controlled by collecting and treating or recycling the effluent.

Vectors are usually not a problem with in-vessel systems.

Ability to Accommodate Change

Once a system is designed, it is not particularly flexible in response to changing economic, technological, or social circumstances without economic penalties.

Consequences on Waste Stream Composition

A composting facility will result in a decrease in the amount of organic waste taken to the local landfill. It will also result in less revenue from tipping fees, and a reduced amount of methane production at the landfill.

Ability to be Implemented

An in-vessel composting facility may be implemented in the short term. This method of composting generally is used for composting municipal solid waste. There are many plants of this type in Europe, but experience in America is very limited. This technology has been proven effective for composting municipal solid waste and sewage sludge, but has not been applied to yard waste. A pilot program should be done before committing to this option.

Need for Facilities

A site will have to be found for the composting operation. Site improvement costs can be minimized if a site is chosen that meets the criteria for a composting facility, given in the siting section. A grinder will be needed to prepare the material for composting. Conveyors may be needed to move the material from the grinder to the vessel and from the vessel to the final product area. The facility size requirements are less than the requirements for the windrow or aerated static pile processes. Approximately one acre per 2,500 TPY would be needed for an in-vessel composting operation. Utility hookups will be needed.

Consistency with Local Policies, Plans, and Ordinances

There are no conflicting policies, plans, or ordinances that would affect a composting facility. Depending on the location, a permit from the State Regional Water Quality Board may be required for disposal of the leachate that is generated. The CIWMB will require a solid waste facility permit for the site.

Institutional Barriers to Implementation

Other than permitting, there are no institutional barriers to composting yard waste. If the jurisdictions decide to move into sewage sludge composting in the future, there may be institutional barriers to the use of the final product. Sewage sludge composting is currently under review by the EPA. Contaminants in MSW compost may limit public acceptance.

Costs

Capital costs for in-vessel systems can be four to seven times higher than those for windrow or aerated static pile systems. An in-vessel system will require an initial investment of approximately $2 million. Operation and maintenance costs run between $40 and $80 per ton of yard waste processed.

Market Availability

Please refer to Market Availability under Processing Alternative 1 and Collection Alternative 1.

Technical Reliability/Public Acceptance

Since this system is automated, there is a potential for system failure. There are many reliable technologies on the market for in-vessel compost facilities, but only a few have been built in the United States. This method is extremely acceptable to the public because the whole system is enclosed, creating minimal odor or visual problems.

Processing Alternative 4. Change to Anaerobic Composting

Anaerobic composting is the process of producing compost without air. This process produces two products: compost and biogas. Biogas is a mixture of approximately 50 percent carbon dioxide and 50 percent methane. The biogas can be burned to generate electricity or it can be upgraded to pipeline quality natural gas and sold to utilities. The compost product that is produced is similar to that which is produced in aerobic processes.

Effectiveness

This option is also effective at processing compostable materials, but its expense and complexity render it generally inapplicable to yard waste unless the input stream is at least 30 tons per day. This compost process would be as effective as the collection system that feeds it (see collection alternatives for specific quantities).

Hazards

There are hazards associated with equipment operation. Methane gas is explosive and must be properly controlled. Vectors are usually not a problem with enclosed systems. For a further discussion of hazards, please refer to Hazards under Processing Alternative 1.

Ability to Accommodate Change

An anaerobic composting facility can be adaptable to economic, technological, and social changes and can be converted to an aerobic composting facility, though this conversion would be very costly.

Consequences on Waste Stream Composition

Composting will result in a decrease in the amount of organic waste received at the local landfill. Ultimately, this may result in reduced tipping fees and a reduced amount of methane production at the landfill.

Ability to be Implemented

Approximately two to three years will be needed to permit, design, and build the anaerobic facility. The existing windrow composting operation could be used to bridge the gap until the facility is operational.

Need for Facilities

A new site for this facility would have to be located. A grinder will be needed to prepare the material for composting. Conveyors may be needed to move the material from the grinder to the composting location and from the composting location to the final product area. Anaerobic digesters and a methane gas control system are required. The site may be expanded in the future by increasing the energy available to the system and by the use of buffer areas which are used now for storage and curing.

Consistency with Local Policies, Plans, and Ordinances

There are no conflicting policies, plans, or ordinances that would affect a composting facility. Depending on the location, a permit from the State Regional Water Quality Board may be required for disposal of the leachate that is generated. The CIWMB will require a solid waste facility permit. A local use permit from the County may be required.

Institutional Barriers to Implementation

There are no institutional barriers to composting yard waste. If the City decides to move into sewage sludge composting in the future, there may be institutional barriers to the use of the final product. Sewage sludge composting is currently under review by the EPA.

Costs

Anaerobic composting is not widely practiced, thus no detailed costs are available. A rough estimate of processing costs is $40 to $60 per ton. At a rate of 25,220 TPY this process would

have an annual cost of approximately $1,009,000 to $1,513,000 per year. Capital costs will be higher than for a windrow process due to the equipment for control of the biogas that is generated.

Market Availability

The market for compost produced from the Davis waste stream will depend on several factors including: whether the facility is privately or publicly owned, demand by local government, demand by state government, demand by local residents, quantity and quality of product produced. The market for biogas is expected to climb as other fossil fuel costs increase. The biogas can be used on-site, sold to local industries, or upgraded and sold to utility companies. One use for this biogas is in an internal combustion engine to generate electrical power that can provide a revenue stream to provide support for the composting operation. For a more complete discussion of aftermarkets for compost products, please refer to Market Availability under Processing Alternatives 1. Windrows.

Technical Reliability/Public Acceptance

Anaerobic composting techniques, although not in common use, are relatively simple and reliable once the system has been designed and installed.

6.3.3 Siting Alternatives

Sites that may be appropriate as a composting facility include:

- Buffer areas around landfills
- Waste water treatment facilities
- Large, unused paved areas
- Buffer areas around industrial sites and institutions
- Utility rights-of-way
- Unused State or Federal lands in the area

While it may be possible to have a site to serve one jurisdiction, centralized regional sites are generally preferred on the basis of economies of scale, space availability, and administrative convenience.

The selection of a composting site requires careful consideration of, among other parameters:

- Proximity to the waste stream
- Proximity to potential markets
- Potential for using the land at no direct cost
- Distance from residential and other sensitive land uses
- Size (area)

- Accessibility
- Public acceptance
- Physical site conditions
- Need for permits
- Availability of utilities
- Current and adjacent land uses
- Need for improvements

The primary options for siting a composting facility are:

- A local municipal site
- A centralized county site

A new composting facility will have to go through a permitting process that may impact where the site is located. A summary of the permitting steps is as follows:

1a. If in the County

County planning department
- Use permit
- CEQA evaluation and determination
- EIR or Negative Declaration

1b. If in the City

Review agencies include:
- Natural Resources Commission
- Planning Commission
- City Council

2. Public Works Department and Waste Advisory Committee for AB 939
   - Concurrence of proposed project needed
   - No permit requirements

3. Department of Public Health
   - Solid Waste Facility Permit or exemption from permit required

4. California Integrated Waste Management Board
   - Solid Waste Facility Permit via Department of Public Health
   - Planners review for CEQA compliance

5. Regional Water Quality Control Board
   - Waste Discharge Permit: Required if there is leachate generation

6. Air Pollution Control District
   - PM-10 permit requirements: Permit required for equipment that generates dust particles of less than 10 microns

Siting Alternative 1. Continue to Use Private Site.

The City of Davis currently has its yard waste processed at a locally owned and operated facility outside the City limits. The facility is sufficient to accommodate all yard waste materials generated within Davis. The current program is successful and cost effective.

Effectiveness
The local site is very effective for composting the yard waste generated in Davis.

Hazards
Please refer to Hazards under the Processing Alternative 1. Windrows.

Ability to Accommodate Change
A local composting facility is more likely to adapt to specific local changes in a community than a regional site.

Consequences on Waste Stream Composition
A composting facility processes organic wastes otherwise sent to landfills.

Ability to be Implemented
A facility is already in operation.

Need for Facilities
No additional facility requirements are anticipated.

Consistency with Local Policies, Plans, and Ordinances
There are no conflicting local policies, plans, or ordinances that would affect continued use of the exiting facility. A permit from the State Regional Water Quality Board may be required for disposal of the leachate that is generated. The CIWMB will require a solid waste facility permit which is being pursued currently.

Institutional Barriers to Implementation
None applicable.

Costs
No additional site development costs are anticipated at this time.

Market Availability
Please refer to Market Availability under the Processing Alternative 1.

Technical Reliability/Public Acceptance
The existing facility is highly reliable and enjoys considerable public acceptance.

Siting Alternative 2. Change to Centralized Regional Site

A centralized County site has, among other advantages, economies of scale in processing and administrative continuity. A major disadvantage is the greater transport time and cost from collection point to processing location. The site could either be on County property or on other public property.

Composting sites are often located at unused portions of landfills or transfer stations. This tends to create a more efficient integrated waste management system. Permitting lags, if any, are usually minor, and equipment and personnel can be shifted relatively easily between the landfill and the composting sites as necessary.

Effectiveness
A centralized regional site will be effective at composting the yard waste generated in the City of Davis as well as the yard waste generated throughout the region. It will raise the cost of collection because of the increased distance the yard waste has to be hauled but will decrease the initial equipment costs as they will be shared by all jurisdictions using the facility. This compost process would be as effective as the collection system that feeds it (see collection alternatives for specific quantities). A regional facility would be more effective if the City were to decide to use another processing technology such as in-vessel or anaerobic systems.

Hazards
Please refer to Hazards on under Processing Alternative 1

Ability to Accommodate Change
A regional center may not adapt as readily to local changes as a local facility because of the influence of other jurisdictions.

Consequences on Waste Stream Composition
A composting facility will process organic wastes otherwise sent to landfills.

Ability to be Implemented
A regional facility may take longer to site than a local facility, but there may be more sites to choose from. A regional facility may be able to be implemented in the short-term planning period.

Need for Facilities
See 6.3.3 Siting Alternatives.

Consistency with Local Policies, Plans, and Ordinances
Use of a regional facility will require reduced or eliminated use of the local facility. This may directly conflict with City policies.

Institutional Barriers to Implementation
See Consistency with Local Policies, Plans, and Ordinances

Costs
The implementation costs will vary according to the amount of material that is to be processed and the distance it must be shipped.

Market Availability
Please refer to Market Availability under Processing Alternative 1.

Technical Reliability/Public Acceptance
Public acceptance may be low if use of a regional facility requires reduction in the use of the existing local facility. Also, residents may object if they are located down-wind from an odorous facility.

6.4 SELECTION OF PROGRAMS

This section will describe the programs selected by the City for implementation during the short and medium-term planning period. The selection of programs is based upon feedback obtained from two public workshops, input from the Davis Natural Resources Commission, and discussions with the City of Davis Public Works Department and Davis Waste Removal, and cost effectiveness.

6.4.1 Collection Alternatives Selected

The following collection programs have been selected by the City of Davis for implementation.

Collection Alternative 1. Continue Existing Curbside Collection

This alternative has been selected for implementation in the short term. No changes will made to the existing program. However, education and promotion activities will be increased. Because a large percentage of the yard waste disposed is grass clippings, the potential for plastic contamination from garbage bags will be higher. The City recognizes that the cost per unit

serviced will rise somewhat as additional equipment and/or labor will be needed to sort plastic from the incoming yard waste at the composting facility.

The overall goal will be to increase participation levels to 90 percent while simultaneously raising the capture rate to 90 percent. These two factors will increase the total diversion rate to approximately 81 percent (90 percent * 90 percent = 81 percent).

Collection Alternative 3. Mandate Source Separation of Yard Waste
This alternative has been selected for implementation in the short term. The City's Department of Public Works will write and introduce to the City Council an ordinance mandating source separation of residential yard waste. As with Collection Alternative One, the goal will be to increase participation and capture rates to 90 percent. Should these goals not be met, the City will investigate increased education efforts and enforcement of the ordinance.

6.4.2 Collection Alternatives Not Selected

The following collection programs were not selected by the City of Davis.

Collection Alternative 2. Drop-off Services
This alternative was not selected as it is deemed less effective than the existing collection service given that the entire City, in both residential and commercial/industrial, is currently adequately serviced.

Collection Alternative 4. Material Recovery Facility
This alternative was not selected as it is deemed less effective than the existing collection service given that the entire City, in both residential and commercial/industrial, is currently adequately serviced. Further, the City is committed to meeting its AB 939 diversion goals through source-separate collection programs.

6.4.3 Composting Process Alternatives

The City will choose to remain with the current Windrow Processing Alternative operated by Davis Waste Removal. The other alternatives (Aerated Static Piles, In-Vessel, and Anaerobic) were not selected as the existing privately operated windrow system is working and the City does not wish to extend control over the processing of materials.

6.4.4 Facility Siting Alternatives

The City will choose to remain with a Local Private Site as this facility is capable of handling all of the yard waste generated by the City during the planning period.

6.4.5 Anticipated Diversion Projection of Selected Alternatives

The City of Davis will seek to divert the quantities given in Tables 6-3 and 6-4.

Table 6-3. Expected Quantities of Material to be Diverted Through a Composting Facility in the Short Term

Material	Amount Generated in 1990 (TPY)	Currently Diverted (TPY)	To Be Backyard Composted (TPY)	Additional Amount To Be Diverted (TPY)	Total Amount To Be Diverted (TPY)	Percent of Total Waste Stream (%)
Yard Waste to Compost	8,203.8	2,836.1	38.6	1,213.4	4,088.1	6.7
Incinerated*	---	0.0	0.0	0.0	0.0	0.0
Total		2,836.1	38.6	1,213.4	4,088.1	6.7

* incineration does not count as diversion until the medium term

Table 6-4. Expected Quantities of Material to be Diverted Through a Composting Facility in the Medium Term*

Material	Amount Generated in 2000 (TPY)	Current Diversion in Year 2000 Tons (TPY)	To Be Backyard Composted (TPY)	Additional Amount To Be Diverted (TPY)	Total Amount To Be Diverted (TPY)	Percent of Total Waste Stream (%)
Yard Waste to Compost	8,955.4	3,095.9	102.0	1,324.6	4,522.5	6.8
Incinerated	---	1,960.7	0.0	839.3	2,800.0	4.2
Total	---	5,823.8	102.0	2,163.9	7,322.5	11.0

* As measured in year 2000 tons.

The diversion is anticipated to increase steadily throughout the short-term planning period due to increased awareness brought about by education programs. The diversion levels are anticipated to be maintained throughout the medium term.

6.5 PROGRAM IMPLEMENTATION

This section will include a schedule of implementation for tasks, costs, responsible entities, and funding sources for each selected program. The entity responsible for overseeing the development of these programs from the City is the Recycling Coordinator from the Department of Public Works. The individual from Davis Waste Removal (DWR) is DWR's Recycling Coordinator.

Primary responsibility for the implementation of the selected collection alternatives will be with the City Recycling Coordinator and DWR. Processing and marketing of compost rests with the owner/operator of the composting facility, DWR. The City Recycling Coordinator and DWR share the responsibility to determine program effectiveness and to make changes to increase program effectiveness. Primary responsibilities are shown below.

6.5.1 Composting Program Responsibilities in Davis

DWR Responsibilities

- If required, purchase needed equipment (bins, bags, extra trucks)
- Ensure flow of materials to the composting facility
- Supply the City with quarterly records of quantities collected from the City
- Develop and implement public education programs
- Permit facility
- Expand program if necessary
- Supply the City with quarterly records of quantities processed from the City, including materials which could not be processed due to contamination or other factors
- Market compost materials

City Responsibilities (Public Works)

- Encourage to participation in composting program
- Distribute public education and publicity materials
- Monitor and evaluate program
- Expansion of programs and services
- Coordinate municipal and county activities
- Develop, monitor, and enforce mandatory yard waste source

Table 6-5. Implementation Schedule for Expansion of Existing Yard Waste Collection Program

Task	Responsible Party	Start Date	Completion Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Develop promotional material	Recycling Coordinator	4th Qtr 92	4th Qtr 92	See Education Component	See Education Component	See Education Component	See Education Component	See Education Component
Disseminate material	Recycling Coordinator	4th Qtr 92	ongoing	See Education Component	See Education Component	See Education Component	See Education Component	See Education Component
Promote program	Recycling Coordinator	4th Qtr 92	ongoing	See Education Component	See Education Component	See Education Component	See Education Component	See Education Component
Identify and contact specific large generators	Recycling Coordinator /DWR	4th Qtr 92	ongoing	See Education Component	See Education Component	See Education Component	See Education Component	See Education Component
Monitor and evaluate program effectiveness	Recycling Coordinator /DWR	4th Qtr 93	ongoing, quarterly	$500	$500	Refuse Rate Structure	20 to 40	20 to 40
Total Implementation Cost	---	---	FY 92/93	$500	---	---	20 to 40	---
Average Annual Cost	---	---	---	---	$500	---	---	20 to 40

Table 6-6. Implementation Schedule for Mandatory Source-Separation of Yard Waste*

Task	Responsible Party	Start Date	Completion Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Research and write ordinance	Department of Public Works	4th Qtr 93	1st Qtr 94	$ 0	to be determined	Refuse Rate Structure	20 to 40	to be determined
Introduce ordinance	Department of Public Works	4th Qtr 93	1st Qtr 94	$ 0	to be determined	Refuse Rate Structure	10 to 20	to be determined
Public hearing	City Council	4th Qtr 93	1st Qtr 94	$ 0	to be determined	Refuse Rate Structure	20 to 40	to be determined
Enforcement (optional)	Department of Public Works	open	ongoing	to be determined	to be determined	Refuse Rate Structure	to be determined	to be determined
Monitoring and evaluation	Recycling Coordinator/ DWR	2nd Qtr 94	ongoing, quarterly	to be determined	to be determined	Refuse Rate Structure	20 to 40	to be determined
Total Implementation Costs	---	---	FY 93/94	---	to be determined	---	70 to 140	---
Average Annual Costs	---	---	---	to be determined	---	---	---	to be determined

* to be implemented if necessary

6.6 MONITORING AND EVALUATION

The following is a discussion of how each of the selected collection alternatives will be monitored and evaluated. To ensure that the composting program is meeting its goals and objectives, the program will be monitored and evaluated on a quarterly basis. Monitoring will include the following measures:

- Recording by DWR of the estimated cubic yards and tons of materials accepted for processing at the composting site, on a weekly basis.
- Recording by DWR of the estimated cubic yards or tons of reject materials that require disposal after pre- or post-processing, on an as applicable basis.
- Recording by DWR of the amounts of compost sold on a quarterly basis.
- Quarterly monitoring of effectiveness of the yard waste source-separation ordinance by the Recycling Coordinator in conjunction with DWR.

The effectiveness of the composting program (including on-site composting and other organic waste reduction techniques) should be gauged in the medium term (by year 2000) as follows, subject to modification in accordance with State guidelines:

- Zero to 50 percent diversion of targeted waste, unsatisfactory
- 50 to 75 percent diversion of targeted waste, needs improvement
- 75 to 90 percent diversion of targeted waste, effective
- Greater than 90 percent of targeted waste or greater than 16 percent diversion (attributable to yard and wood waste) of all solid waste by the City, highly effective

6.6.1 Methods to Monitor and Quantify Program Results

Collection Alternative 1: Separate Curbside Collection from Residential Sources

Objective

The objective of this alternative is to achieve an increase in the overall diversion rate to 10.9 percent by the end of the short-term planning period in a yard waste composting and to maintain this level throughout the planning period. These diversion rates assume a 90 percent participation level and a 90 percent capture rate for a total diversion rate of 81 percent of all yard waste generated.

Responsible Entities

Davis Waste Removal and the City Recycling Coordinator shall be the entities responsible for implementation and monitoring of this program.

Criteria/Methods of Evaluation

The City shall require DWR to maintain logs recording the amount of yard waste material collected through this program, and the estimated participation rate. These logs reports will be summarized and submitted to the Recycling Coordinator for review and approval on a quarterly basis. A summary report will be presented to the City Council annually.

The reports shall also describe the amount of yard waste collected that was usable for composting versus that which was rejected due to contamination.

Contingency Plan if Shortfall

In the event that the stated objective is not achieved, the Recycling Coordinator and DWR shall review the program and determine if shortfalls are because participation levels are not being achieved, the amount of materials collected being less than anticipated, or lack of understanding by the residents resulting in contamination of yard waste loads making them unusable.

If it is found that participation levels are lower than anticipated, public information and education efforts directed at the curbside collection program shall be modified and intensified.

If the amount of material collected is lower than anticipated due to backyard composting, the diversion goals shall be adjusted in the Source Reduction Component to reflect residents' apparent choice of how to divert residential yard waste.

If the amount of material converted to compost is lower than anticipated due to contamination, the Recycling Coordinator and DWR shall review both the public information and education materials targeted at the program, along with collection methods currently used, to determine how to correct the problem.

Collection Alternative 3: Mandatory Source-Separation of Yard Wastes

Objective

To achieve a 90 percent capture rate and a 90 percent participation rate of the total generated yard waste by the end of short-term planning period, and maintain these rates throughout the planning period.

Responsible Entity

The City Council, the City DPW and the City Recycling Coordinator shall be responsible for development and implementation of this program. DWR and the City Recycling Coordinator shall be responsible for the subsequent monitoring and evaluation.

Criteria/Method of Evaluation

DWR shall maintain records of recording the estimated amount of participation and capture rates in the community. The Recycling Coordinator shall review these records and make periodic surveys of residential areas for participation. Surveying and monitoring will take place at least quarterly during the short term, and on an as-needed basis during the medium term. Results will be reported to the City Council at least annually.

Contingency Plan if Shortfall

If the amount of material received falls short of the objective, an analysis shall be done to determine why. If necessary, public information and education materials supporting this program shall be revised to correct the identified problems causing the shortfall. If all else fails, a final measure to increase participation and capture will be the enforcement of the ordinance.

Processing Alternative 1: Windrow Processing

Objectives

There are two primary objectives to this alternative:

1) Minimize rejects from contamination to keep them below 5 percent
2) Find and maintain viable after-markets

Responsible Entity

DWR shall be the entity responsible for implementation and monitoring of this program.

Criteria/Method of Evaluation

DWR shall maintain records describing the amount of yard waste collected and subsequently disposed for contamination reasons. Also, DWR shall keep the City advised as to the marketability of the compost.

Contingency Plan if Shortfall

If contamination levels rise above 5 percent, then DWR shall review operations at the processing facility for imperfections and address these problems. Should no problems be discovered in operations, then the materials arriving at the facility will be scrutinized for contaminants. If it is found that the rejects are due to inadequate source-separation, then education efforts will be increased to train participants regarding proper materials for composting.

Should difficulties in the markets occur for finished compost products, the DWR will take the following measures:

- Internal operations will be reviewed and corrected where deficient
- Education programs will be evaluated to ensure that proper, source-separated materials are placed at the curb for collection.
- Alternate markets including alternate daily cover at YCCL will be investigated.

6.6.1 Funding Requirements

Funding requirements for the monitoring program will include those for recordkeeping to document quantities of yard waste diverted and quantities of solid waste disposed. Funding requirements are estimated to be approximately $1,000 annually. Staffing by City personnel may be expected to be in the 40 to 60 hour range annually.

SECTION 7

SPECIAL WASTE COMPONENT

Special wastes are any solid wastes that present a hazard to human health or the environment if not properly handled or wastes that require unique handling or disposal methods because of physical characteristics. Handling and disposal of special wastes may also require permits from one or more state agencies. It is pointed out that hazardous wastes are not included in the definition of special wastes. Household Hazardous Wastes are addressed in the Household Hazardous Waste Element. Commercial/Industrial Hazardous Wastes are addressed under different State and Federal regulations.

Definitions

The California Integrated Waste Management Board defines special wastes as the following:

- Ash
- Nonhazardous sewage sludge
- Nonhazardous industrial sludge
- Asbestos
- Auto shredder waste
- Automobile bodies
- Other special wastes

Other special wastes can include bulky and hard-to-handle wastes such as furniture, refrigerators, and tires as well as potentially hazardous materials such as biomedical wastes generated by medical facilities. Special wastes generated in the City of Davis and addressed in this component are the following:

a) Sewage sludge
b) Industrial sludge
c) Tire waste
d) Infectious (biomedical) wastes
e) White goods
f) Inert solids
g) Wood waste
h) Bulky wastes
i) Construction and demolition waste

a) Sewage sludge is the waste derived from the treatment of wastewater by water pollution control plants. Depending on its content, sewage sludge may be classified as hazardous or nonhazardous. If dewatered sewage sludge meets the nonhazardous criteria of the State Water Resources Control Board, it may be disposed of in a municipal landfill. If the sewage sludge contains significant levels of heavy metals (i.e., copper, cadmium, chromium, lead, nickel, mercury, or zinc), it is considered hazardous and must be disposed of accordingly.

b) Industrial sludge is generated by industries that operate pretreatment programs for industrial wastewater. Such pretreatment is usually required when the wastewater contains materials that can pose a hazard to the safe and effective operation of publicly-owned treatment plants. Industrial sludge may contain constituents that require it to be classified as a hazardous waste, thus requiring disposal at a Class I landfill.

c) Tire waste consists of used tires, an inert waste that may legally be disposed of in any type of landfill. Landfilling tires presents some special difficulties because tires are resilient and have a tendency to "float" to the landfill surface where they can serve as vector habitats for rats and mosquitos.

d) Infectious wastes or biomedical wastes are classified as hazardous wastes and include:

- Wastes from biological laboratories and medical clinics
- Pathological specimens such as human and animal tissues
- Contaminated medical equipment such as syringes, needles, bags, bottles, etc.
- Human dialysis waste
- Infected animal carcasses
- Any other contaminated material which presents a significant danger of infection

e) White goods are large household and industrial appliances, such as stoves, refrigerators, and clothes washers and dryers. These items cannot be compacted and present a space problem at landfills. In addition, refrigeration units contain freon, a material that is hazardous when vaporized.

f) Inert solids consist of a variety of materials including asphalt, concrete, rock, and sand.

g) Wood waste refers to pallets, wood crates, and scrap wood.

h) Bulky waste generally are bulky household items such as furniture and mattresses.

i) Construction and Demolition Waste consists of debris brought to the landfill by self-haulers. Construction and Demolition Waste (C/D) was classified in the Waste Generation Study and consists of ferrous metals, wood, and other materials.

7.1 GOALS AND OBJECTIVES

Diversion alternatives selected to target special wastes involve participation by the City in the County's integrated waste management programs to target self-haul waste generators and construction and demolition contractors. Through these programs, the City will increase the promotion of the source-separation of asphalt and concrete at construction sites and promote the use of the County's "self-haul bin transfer" program to all waste generators in the City.

Specific goals and objectives for the City of Davis include:

Short-Term Goals

- Promote the use of the YCCL self-haul bin transfer program and encourage residents of Davis to divert white goods and other wastes not targeted through current diversion programs to this recovery operation.
- Promote the source-separation of inert wastes through public education efforts.
- Divert bulky wastes including tires, white goods, and construction and demolition debris from the landfill.
- Divert inert solids, including concrete and asphalt from the landfill.
- Divert through the selected programs an additional 2.2 percent of the waste stream in the short-term planning period.
- Assist the County in regional market development efforts and consider revising current City construction specifications requiring percentages of recovered inert materials (including asphalt and concrete) for new construction.

Medium-Term Goals

The objectives for the medium term are:

- Continue to divert through the selected programs an additional 2.2 percent of the waste stream in the medium-term planning period..

7.1.1 Targeted Materials

Table 7-1 lists the types of materials targeted for diversion in this component. In summary, targeted materials include:

- White Goods
- Tires
- Self-Haul Debris (including construction and demolition)
- Inert Materials (including dirt, rock, asphalt and concrete)

Material types which will not be targeted are:

- Ash
- Infectious Wastes
- Sewage and Industrial Sludges

These items are further discussed in Section 7.2.2.

7.2 EXISTING CONDITIONS

This section provides a description of the current practices within the City of Davis for each waste type generated. Applicable regulatory requirements are also included.

7.2.1 Summary of Existing Conditions

Table 7-1 summarizes the current diversion and disposal activity for special wastes in Davis. The quantity of construction and demolition materials available through self-haul sources which can be targeted through diversion programs is also broken out separately by waste type.

As depicted in the table, current diversion in Davis is approximately 7,766.5 TPY which represents 12.8 percent of the total generated waste stream. However, it should be kept in mind that a large percentage of this diversion is represented by the Inert Materials waste type. The diversion of Inert Materials is currently under consideration by the State and may not be allowed to count as diversion.

Table 7-1. Summary of Special Wastes and Other Materials Available Through Self-Haul and Commercial/Industrial Sources

Waste Type	Amount Currently Generated (TPY)	Amount Currently Diverted (TPY)	Amount Available Short Term (TPY)
Ferrous Metals**	192.4	0.0	192.4
White Goods	61.0	0.0	61.0
Ash	64.6	0.0	64.6
Ag Waste	20.0	0.0	20.0
Tires	68.7	58.7	10.0
Wood**	1,264.5	702.8	561.7
Inert Solids	8,297.5	7,005.0	1,292.5
Totals	10,214.1	7,766.5	2,447.6

* As measured in Year 2000 tons
** Generated through Construction & Demolition activities

A summary of the individual, targeted material types follows.

Construction and Demolition

Based upon the waste generation study, approximately 2,420 TPY of self-haul construction and demolition debris was deposited at YCCL in 1990. This debris consisted of 52.3 percent wood, 8.0 percent ferrous metals, and 39.2 percent other materials.

White Goods

The Yolo County Landfill accepts white goods. DWR does not collect white goods as part of routine residential collection; however, the City of Davis and DWR cooperatively conduct an annual cleanup during which time bulky items, including white goods, are picked up on the routine residential pickup days. The white goods are disposed of at the Yolo County Landfill. The Waste Generation Study indicates that 61 TPY of white goods were landfilled in 1990.

Ash

Some ash was found in the waste stream. This ash came from the residential sector and consists primarily of fireplace ashes.

Ag Waste

This material was generated by local farms in 1990.

Tire Waste

Based on the waste generation analysis, 10 TPY of discarded tires generated by the commercial sector are disposed at the Yolo County Landfill. Current tire disposal fees are $2 to $4 per tire/$60 per ton. The landfill operates an effective salvaging program whereby tires are placed in a designated area and periodically transported for shredding and temporary landfilling. These landfilled tire shreds will potentially be recovered and incinerated.[6]

Waste tires generated by commercial dealers in the City are diverted from disposal by contracting with a tire recycling company for regular tire pickup service. Commercial tire dealers in the City currently divert approximately 58.7 TPY of used tires.[7]

Inert Solids

The Waste Generation Study identified 1,292.5 TPY of inert solids (including dirt, rock asphalt and concrete) disposed at the YCCL as having originated in Davis. An additional 7,005.0 TPY are recycled as road base for use at the YCCL as a wet weather pad. In addition, the City currently mandates the source-separation of inert materials in some City contracts.

Wood Waste

Wood waste is also currently collected and processed both at the YCCL and at DWR's Westlane composting facility into fines for soil amendment and as fuel for incineration. As shown in the Waste Generation Study, significant amounts of these materials are arriving at YCCL from self-haulers. The amounts disposed represented approximately 1 percent of the total generated waste stream.

There is a drop-off program available to all County residents (including Davis) at the YCCL. This drop-off is operated by Valley By-Products, Inc. and is located one mile from the gate of the YCCL entrance. The center collects clean wood for biomass power plants. In addition, yard waste and grass clippings are collected for compost which is then used as daily cover at the landfill. Acceptable materials include:

- tree and brush prunings
- wooden boxes and pallets
- clean construction and demolition wood waste
- wood with nails and/or paint
- grass clippings
- leaves

Materials not acceptable include:

- pressure treated wood
- telephone poles and railroad ties
- palm fronds and palm trunks

Estimated diversion was 702.8 TPY of wood waste in 1990. However, since all of this material was destined for incineration, none of this diversion will be creditable to the City until 1995. This operation is expected to continue throughout the planning period with no significant reductions in operations.

This drop-off will be replaced by the self-haul bin transfer program at the landfill 4th quarter of 1992. This program is described in greater detail in this component.

7.2.2 Summary of Existing Conditions for Other Special Wastes Which Are Not Targeted for Diversion in This Component

Sewage Sludge

The City of Davis Water Pollution Control Plant is located on County Road 28H. The wastewater receives treatment utilizing an oxidation pond and overland flow system. Septage is not accepted. The sludge, following treatment in anaerobic digesters, is dewatered in sludge lagoons, and used as a soil conditioner on City-owned property adjacent to the treatment plant. Approximately 100 dry tons of sludge per year are disced into the soil.[8]

The City of Davis Water Pollution Control Plant is under the jurisdiction of the Central Valley Regional Water Quality Control Board (CVRWQCB). The permit to operate is current under CVRWQCB Order No. 90-002.[9] The treatment plant is also under the jurisdiction of the Yolo County Air Pollution Control District. No permits are currently required or issued by this agency.[10]

Industrial Sludge

The City of Davis Pretreatment Ordinance prohibits the disposal of sludges through the wastewater collection system. Nonhazardous industrial sludges are collected through an interceptor/clarifier system. The nonhazardous industrial sludge, including grease, is pumped by interceptor pumper trucks.[11] The greases may potentially be recycled. The Yolo County landfill does not accept these sludges. They must be transported out of the County for disposal.[12]

Infectious Waste

Infectious (biomedical) wastes are generated by the medical facilities located in the City of Davis. Current disposal practices include pick up by licensed haulers for treatment and disposal outside of the area, and incineration with the ash removed as a hazardous waste by a licensed hauler for disposal outside of the area.[13]

7.3 EVALUATION OF ALTERNATIVES

The following types of waste materials generated in the City of Davis make up a significant portion of the special wastes being landfilled: white goods, tires, inert materials (including concrete and asphalt), and self-haul construction and demolition debris. The following alternatives to landfilling these materials are described and evaluated in this section:

Alternative 1.	Self-Haul Bin Transfer Operation (selected)
Alternative 2.	Inert Materials Recycling (selected)
Alternative 3.	Expansion and Increased Promotion of Bulky Items Collection Days (not selected)

Alternative 1. Self-Haul Bin Transfer Operations

"Self-haul bin transfer operations" (landfill salvaging) involves the manual sorting of refuse to recover reusable materials from the mixed waste stream. The County Department of Public Works is currently developing a "self-haul bin transfer operation" at YCCL to target wastes generated from self-haul sources - waste generators hauling their own waste to the landfill. Through this alternative the City would participate in this regional County waste management program by promoting the use of this facility by City residents and other Davis waste generators.

The self-haul bin transfer waste recovery operations are scheduled to commence at YCCL during the 4th quarter of 1992.

Materials targeted from self-haul sources would include but are not limited to:

- White Goods
- Self-Haul Construction and Demolition Debris
- Tires

Construction and demolition debris generated from self-haul sources consists of a variety of waste types such as wood waste (52.3 percent), ferrous metals (8.0 percent), asphalt and concrete, and other materials (39.2 percent). This waste category amounted to approximately 2,420 TPY in 1990. Table 7-2 summarizes the targetable waste types available in self-haul debris.

Effectiveness

Targeting special wastes and other materials through the County's self-haul bin transfer program will result in a material recovery rate of 672.0 TPY or 1.1 percent of waste generated. Estimated of waste diversion through this program is summarized in Table 7-2.

Table 7-2. Projected Amounts Diverted by Self-Haul Bin Transfer for Each Waste Type

Waste Type	1990 Tonnage Available (TPY)	Diversion Rate (%)	Amount Diverted (TPY)
Ferrous Metals *	192.4	80	153.9
White Goods	61.0	100	61.0
Wood *	561.4	80	449.1
Tires	10.0	80	8.0
Total	824.8	---	672.0

* Available through self-haul construction and demolition debris.

Hazards

Health and safety hazards associated with salvaging are similar to those inherent in all landfill operations, such as the dangers of working in close proximity to large equipment and machinery.

This alternative poses hazards related to handling and transporting bulky items. Personnel must be trained in proper lifting and moving techniques and forklift operation, if applicable. Special care must be exercised when handling refrigerators, freezers, and air conditioners that contain freon, which is hazardous if inhaled. A program to collect, treat and recycle PCB's and CFC's will have to be implemented. In addition, tires must be properly stored and transported, since stockpiled tires can be a potential fire hazard.

Ability to Accommodate Change

Salvaging in this type of program is very adaptable to changing economic and technological conditions. Targeted material types can be changed based on market availability.

Consequences on Waste Stream Composition

This program will reduce the volume of white goods, yard waste, wood, and construction and demolition debris in the waste stream, leaving a greater amount of non-recyclable materials to be landfilled.

Ability to be Implemented

This program can be implemented at the landfill in less than six months, within the short-term planning period.

Need for Facilities

This alternative uses existing facilities at the landfill. Some minor modifications of those facilities may be required.

Consistency with Local Policies, Plans, and Ordinances
This program does not conflict with local policies, plans, or ordinances.

Institutional Barriers to Implementation
There are no institutional barriers preventing implementation of this alternative.

Costs
This program would use equipment already available at the landfill; however, additional equipment may be necessary. The program may also require additional staff/management to sort and prepare recovered materials to market specifications.

According to the Yolo County SRRE, the estimated implementation costs for the self-haul bin transfer operation is approximately $280,000. Annual operations and maintenance costs are estimated to be $125,000. Funding for this program will be the County's Sanitation Enterprise Fund.

Market Availability
Markets are available for the materials recovered in this collection program. Specific buyers are provided in Appendix A. Additional markets may be available.

Alternative 2. Inert Materials Recycling

Separating inert materials (asphalt and concrete) generated from construction and demolition activities from other refuse at the point of generation can provide an effective means of diverting these materials from the waste stream. This source-separation effort can be facilitated through City promotion efforts and landfill tipping fees set to encourage source-separation. Source-separated inert materials can easily be diverted at YCCL for use as wet weather pads and road base materials as well as other road base uses in the region. The County will be exploring processing options for these materials in the short-term planning period.

Through this alternative the City could encourage source-separation of inert wastes through program promotion and also assist in regional marketing efforts to divert these materials. The City could also work with the County, if only to lend support, in the development of a County ordinance mandating the source-separation of inert wastes.

Effectiveness
As indicated in Table 7-4, this alternative may result in additional diversion of up to 646.3 TPY in the short-term planning period or approximately 1.1 percent of the total waste stream.

Table 7-4. Effectiveness of Inert Materials Recycling

Waste Type	1990 Tonnage Available (TPY)	Diversion Rate (%)	Amount Diverted (TPY)
Inert Materials	1,292.5	50	646.3

Hazards

The primary hazards of this alternative are related to moving heavy items. Personnel must be trained in proper lifting and moving techniques. Health and safety codes should be enforced.

Ability to Accommodate Change

This alternative is highly impacted by changing market and construction industry conditions.

Consequences on Waste Stream Composition

This alternative reduces the quantity of inert waste currently disposed.

Ability to be Implemented

This alternative can be implemented within 4 to 8 months - the short-term planning period.

Need for Facilities

Implementation of this alternative at YCCL will require available space for the receipt of wastes and material processing operations. Construction and demolition contractors would require additional containers for the source-separation of materials.

Consistency with Local Policies, Plans, and Ordinances

This type of program does not conflict with local policies, plans, or ordinances. The City currently specifies source-separation of these materials in many City contracts.

Institutional Barriers to Implementation

There are no institutional barriers to the implementation of this alternative.

Costs

Cost to the City of Davis for this program would be limited to the development and distribution of public information materials to promoting the source-separation of inert materials. In addition, the City may incur costs with assistance in market development and in-person visits to contractors.

Market Availability

Recycled asphalt and concrete could be used by the County DPW as road base at the landfill or for public roadways. Additional markets could be facilitated by requiring a percentage of recovered inert wastes in City building and roadway construction specifications. Potential markets are listed in Appendix A.

Alternative 3. Expansion and Increased Promotion of Bulky Items Collection Days

Bulky Items Collection Days are set aside once a year during one spring week which residents may set out bulky items and/or all general refuse for no additional charge on the same day as their regular pickup. This program generally works well as it allows residents to dispose of extra wastes at no extra charge, thereby mitigating the incidence of illegal dumping.

Effectiveness

This alternative could target 667 TPY of bulky items for diversion. However, the increased effectiveness may not be that pronounced since there already is a collection day and most of the items collected have out-lived their usefulness.

Hazards

This alternative poses hazards related to handling and transporting bulky items. Personnel must be trained in proper lifting and moving techniques and forklift operation, if applicable. Special care must be exercised when handling refrigerators, freezers, and air conditioners that contain freon, which is hazardous if inhaled.

Ability to Accommodate Change

This alternative can easily accommodate change. Events can be held less or more often. The program can be expanded or decreased, and the items accepted can be changed as necessary. Holding the event more often may facilitate recycling of the white goods since there would be less to handle at one time.

Consequences on Waste Stream Composition

This alternative would have little effect on the waste stream. Most of the items collected will have out-lived their useful lives.

Ability to be Implemented

This alternative can be planned and implemented in three to six months.

Need for Facilities

This alternative does not require new facilities.

Consistency with Local Policies, Plans, and Ordinances

This alternative is consistent with existing local policies.

Institutional Barriers to Implementation
There are no institutional barriers to implementation of this program.

Costs
Estimated costs for the implementation of this alternative include personnel time, equipment, and vehicles, and transportation costs. Curbside collection is cost effective if DWR incorporates it into the regular collection routes. Costs will be higher if bulky items are collected separately from general refuse.

For costs associated with the development of education and public information brochures and flyers, see Section 8, Education and Public Information Component.

Market Availability
Local markets are listed in Appendix A. Other markets may be available.

7.4 SELECTION OF PROGRAMS

7.4.1 Programs Selected

The City has selected two alternatives described in this component. The selection of these two programs is based upon discussions resulting from two public workshops, the Davis Natural Resources Commission, the City Recycling Coordinator, cost-effectiveness and the overall applicability to the City.

Participation in these programs allows the City to take full advantage of economies of scale in the development of regional processing facilities and to provide consistent waste management programs throughout the County. This regional integrated approach will result in a commonality in waste management practices and will benefit the entire County waste management system.

The following alternatives have been selected for implementation by the City of Davis.

Alternative 1. Self-Haul Bin Transfer

The YCCL is currently in the process of developing a "self-haul bin transfer operation" recovering white goods, tires, wood waste, ferrous metals and other materials which are in sufficient quantity to target for diversion. The operation is scheduled to commence operations in the 4th quarter of 1992. Through this alternative the City will develop targeted education materials to promote the use of this facility and encourage residents of Davis to divert white goods and other wastes not targeted through current diversion programs to this recovery operation.

While the City of Davis will not be responsible for implementation, it has elected to avail itself of the Landfill Salvaging services offered as part of the tipping fees assessed every load passing the gate at YCCL.

Alternative 2. Inert Materials Recycling

Through this alternative the City will promote the source-separation of inert wastes through public education efforts. Promotion may be in the form of brochures or in-person contact with construction/demolition companies doing work in the City of Davis. The City will also support County efforts in the development of an ordinance to mandate source-separation of inert and other wastes.

7.4.2 Programs Not Selected

Alternative 3. Expansion and Increased Promotion of Bulky Item Collection Days

This alternative was not selected for further development as most of the materials collected have out-lived their useful lives and will be landfilled.

7.4.3 Cumulative Integrated Effect of Selected Alternatives in Special Waste

Tables 7-5 and 7-6 below summarize estimated diversion rates through programs selected in this component. These programs may result in a total diversion rate amounting to 14.9 percent of Davis's waste stream. This will equal an additional diversion rate of 2.2 percent in the short- and medium-term planning periods.

Table 7-5. Projected Amounts of Materials to be Diverted in the Short-Term Planning Period

Waste Type	Amount Currently Generated (TPY)	Amount Currently Diverted (TPY)	Total Currently Disposed (TPY)	Amount Diverted Through Selected Programs		Total Diverted (TPY)
				Estimated Self-Haul Diversion (TPY)	Estimated Inert Materials Diversion (TPY)	
Ferrous Metals*	192.4	0.0	192.4	153.9	---	153.9
White Goods	61.0	0.0	61.0	61.0	---	61.0
Wood*	1,264.5	702.8	561.4	449.1	---	1,151.9
Tires	68.7	58.7	10.0	8.0	---	66.7
Inert Materials	8,297.5	7,005.0	1,293.0	---	646.3	7,651.3
Total Diversion	---	7,766.5	---	672.0	646.3	9,084
Percent Diversion	---	12.8	---	1.1	1.1	14.9

* generated through self-haul construction and demolition

Table 7-6. Projected Amounts of Materials to be Diverted in the Medium-Term Planning Period

Waste Type	Total Generated in the Year 2000 (TPY)	Amount of Current Diversion in the Year 2000 (TPY)	Total Disposed in the Year 2000 (TPY)	Amount Diverted Through Selected Programs		Total Diverted (TPY)
				Estimated Self-Haul Diversion (TPY)	Estimated Inert Materials Diversion (TPY)	
Ferrous Metals*	210.0	0.0	210.0	168.0	---	168.0
White Goods	66.6	0.0	66.6	66.6	---	66.6
Wood*	1,380.4	767.2	612.9	490.3	---	1,257.5
Tires	75.0	64.1	10.9	8.7	---	72.8
Inert Materials	9,058.2	7,647.2	1,411.5	---	705.6	8,352.8
Total Diversion	---	8,478.5	---	733.6	705.6	9,917.7
Percent Diversion	---	12.8	---	1.1	1.1	14.9

* generated through self-haul construction and demolition

7.5 PROGRAM IMPLEMENTATION

The following tables outline the implementation schedules for the alternatives selected by the City of Davis. Projected costs, funding sources, and entities responsible for implementation are also summarized.

Table 7-7. Program Implementation for the Self-Haul Bin Transfer Operation

Task	Responsible Entity	Start Date	Completion Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Time (Annual)
Prepare engineering design and specifications	County DPW	3rd Qtr 91	1st Qtr 92	$0	$0	CSEF*	0	0
Obtain required permits	County DPW	3rd Qtr 91	1st Qtr 92	$0	$0	CSEF	0	0
Construct Facility	County DPW	3rd Qtr 92	3rd Qtr 92	$0	$0	CSEF	0	0
Retain Contractor for operations	County DPW	3rd Qtr 92	3rd Qtr 92	$0	$0	CSEF	0	0
Develop and distribute education materials	Recycling Coordinator	3rd Qtr 92	4th Qtr 92	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component
Commence operations	Contractor/ County DPW	4th Qtr 92	Ongoing	$0	$0	CSEF	0	0
Monitor program effectiveness	County DPW/ Recycling Coordinator	4th Qtr 92	Quarterly	$250	$250	CSEF	20 to 40	20 to 40
Total Implementation Cost	—	—	FY 92/93	$250	—	—	20 to 40	—
Average Annual Cost	—	—	—	—	$250	—	—	20 to 40

* CSEF - County Sanitation Enterprise Fund.

Table 7-8. Implementation Schedule for Inert Materials Diversion

Task	Responsible Entity	Start Date	Compl. Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Time (Impl)	Staff Time (Annual)
Identify contractors in the City which generate inert materials including asphalt and concrete	Recycling Coordinator	3rd Qtr 92	Ongoing	$0	$0	Refuse Rate Structure	20 to 40	20 to 40
Develop and distribute education materials	Recycling Coordinator	3rd Qtr 92	4th Qtr 92, ongoing	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component	Refer to Education Component
Continue to promote source-separation of inert materials at construction sites	Recycling Coordinator	4th Qtr 92	Ongoing	$250	$250	Refuse Rate Structure	20 to 40	20 to 40
Assist County efforts in inert materials market development	Recycling Coordinator	1st Qtr 93	Ongoing	$0	Refuse Rate Structure	N/A	0	0
Support revised tipping fees to encourage source-separation	City DPW	1st Qtr 93	3rd Qtr 93	$0	$0	N/A	40 to 60	0
Monitor program effectiveness	Recycling Coordinator	4th Qtr 93	Quarterly, with annual update	$250	$250	Refuse Rate Structure	20 to 40	10 to 20
Total Implementation Costs	---	---	FY 93/94	$250	---	---	80 to 140	---
Total Annual Costs	---	---	---	---	$250	---	---	30 to 60

7.6 MONITORING AND EVALUATION

Summarized in this section are the methods to be utilized for monitoring and evaluating selected programs. Special waste programs will be individually monitored and evaluated relative to the targeted diversion goals as presented in Tables 7-5 and 7-6.

7.6.1 Methods to Monitor and Quantify Program Results

Alternative 1: Self-Haul Bin Transfer

Objective
The objective will be to divert the amounts of materials presented in Tables 7-5 and 7-6 for construction and demolition debris, tires, and white goods.

Responsible Entity
The landfill operator (the County) will keep records and report estimated diversion quarterly to the City of Davis Recycling Coordinator.

Criteria/Methods of Evaluation
White goods and tires will be individually counted and recorded by daily landfill gate tabulation. A specific fee is charged for these items. Construction and demolition debris will be directed to a special tipping area for separation and handling. Weights of materials will be recorded and compared against weigh tickets from recyclers.

Contingency Plan if Shortfall
Should diversion levels fall short, the City will encourage the County to verify the quantity of white goods, tires, yard wastes, and other materials in the self-haul waste stream to assure that available materials are being diverted. In addition, the City will encourage the County to remind gate attendants to direct self-haulers to the proper tipping areas. Should diversion levels fall short due to a lack of awareness, then the City will review and update its education materials.

Alternative 2: Inert Materials Recycling

Objective
To divert 50 percent of the Inert Materials (including concrete and asphalt) currently landfilled during the short-term and medium-term planning periods.

Responsible Entity
The Recycling Coordinator will be responsible for the development and implementation of this program. The County will be responsible to maintain current diversion activities at the YCCL.

Criteria/Methods of Evaluation
Gate attendants at the landfill will monitor activity by checking and tabulating debris boxes full of concrete and asphalt when they arrive at the gate. The County DPW will also keep records of inert materials re-used in road projects and at the landfill. These records will be tabulated on a cubic yard basis and reported to the Recycling Coordinator on a quarterly basis.

Contingency Plan if Shortfall

Should diversion levels fall short, the City will first investigate overall construction and road building activity in the City. Should the decrease be a direct result of a drop in building activity, then the goals for that year will be re-evaluated. If the decrease is a result of a lack of awareness or participation, levels of program promotion will be increased.

7.6.2 Funding

It is estimated that the primary expenditures for monitoring and evaluation will be additional time required by City Staff to evaluate and produce a summary report to the City Council annually. Total estimated staff hours are estimated to range between 20 and 40 hours annually for the programs outlined above. The source of funding will be the Count Sanitation Enterprise Fund (for the Self-Haul Bin Transfer Program) and the City refuse hauling rate structure.

FOOTNOTES

6. Yolo County Solid Waste Management Plan, November, 1989, Sections 4.2.1 and 8.6.2.

7. Advanced Auto Repair and Towing, 5/29/91, oral communication.
Bernard's Tire Brake and Alignment, 5/29/91, oral communication.
Big O Tire Stores, 5/29/91, oral communication.
George's Mobil Service, 5/30/91, oral communication.
Goodyear Tire Center, 5/30/91, oral communication.
Hoffman Union 76, 5/30/91, oral communication.
Johnny's Service, 5/30/91, oral communication.

8. Tom Hanzo, Superintendent Wastewater/Drainage Division, City of Davis Public Works Department, 5/28/91, oral communication.

9. Richard McHenry, Water Resources Control Engineer, Central Valley Regional Water Quality Control Board, 5/16/91, oral communication.

10. Dave Smith, Air Pollution Control Specialist, Yolo County Air Pollution Control District, 5/20/91, oral communication.

11. Tom Hanzo, Superintendent Wastewater/Drainage Division, City of Davis Public Works Department, 5/28/91, oral communication.

12. Tom Mohr, Yolo County Department of Public Works, 5/28/91, oral communication.

13. Marianna Muniz, Sierra Health Care Convalescent Hospital, 5/16/91, oral communication.
Gloria Hurd, Environmental Services Division, Sutter Davis Hospital, 5/15/91, oral communication.
Rosemarie Blake, Office Manager, Women's Health Associates/Davis Medical Center, 5/16/91, oral communication.
Joyce Styers, Driftwood Convalescent Hospital, 5/15/91, oral communication.

SECTION 8

EDUCATION AND PUBLIC INFORMATION COMPONENT

This section describes the various education and public information programs to be developed in support of the specific alternatives selected by the City of Davis to meet its waste diversion goals. The success of this component is necessary if the City is to succeed in achieving the objectives of the other, more technical, alternatives. Through education and public information, all participants (individuals, households, businesses and institutions) should gain the knowledge, understanding and the desire to actively contribute in meeting the City of Davis's environmental goals.

8.1 GOALS AND OBJECTIVES

Based upon data from the Waste Generation Study and in conjunction with the combined goals of the other components, the short term goal of this component is to provide the education and public information support necessary to maintain current diversion levels in order to continue meeting and exceeding the 25 percent diversion level by 1995. The medium term goals are to increase awareness and participation in waste diversion programs to meet and exceed the 50 percent diversion level by the year 2000. In order to accomplish this, the following objectives have been established.

- Continue to develop education and information programs which will increase participation in the waste reduction and diversion programs presented in the Source Reduction, Recycling, Composting, and Special Waste components of this plan.

- By year end 1992, create a Community 4R Committee or Recycling Task Force. Among its responsibilities will be to assist in the implementation of education and public information programs relative to recycling, source reduction, and composting for the City of Davis. Materials will be selected for targeted education campaigns based upon a failure to achieve targeted diversion rates or for new materials or programs.

- Create an awareness level of 80 percent by all Davis residents regarding the City's recycling, composting and waste reduction efforts by 1995 and a 90 percent awareness level by the year 2000.

- Have in place recycling, composting and source reduction educational curricula utilized by 50 percent of all local schools by 1995 and 100 percent by the year 2000.

- Establish with the Davis Chamber of Commerce a source reduction and recycling awards recognition program for local businesses.

- Develop programs directed towards the construction and road maintenance industries (i.e. to support source-separation of construction and demolition wood and the source-separation of inert materials such as dirt, rock, asphalt and concrete.)

- Work with the County to develop a program for self-haulers to increase participation via source inspection of waste in the self-haul bin transfer program scheduled to start at the landfill in 1992.

- Develop a set of "material-specific" diversion programs and events. These quarterly programs will focus on specific materials for targeted education programs.

- Continue the recycling column in The Davis Enterprise.

- Continue to work with the Yolo County Recycling Task Force to ensure that programs and materials are used cooperatively, efficiently, and cost effectively.

- Continue to work with State agencies to cost-effectively utilize State-developed education materials in the Davis region when applicable.

8.2 EXISTING CONDITIONS

In general, educational, promotional, and awareness activities are a joint City-DWR responsibility. The following provides a description of the existing education and public information programs and activities currently in place in Davis which promote source reduction, recycling, composting, and the safe handling and disposal of solid waste.

City Activities

At present, the City Department of Public Works (DPW) and Davis Waste Removal (DWR) develop information and produces brochures and other materials regarding local recycling programs. The City provides materials to schools and businesses that have established or want to establish recycling programs.

In FY 91/92, the City budgeted $25,000 for solid waste education and public information programs.

Recycling Coordinator

In 1990, the City established a full-time Recycling Coordinator position to coordinate the various education and public information efforts selected to meet diversion goals. This person serves as liaison between DWR, residents, businesses, school programs, and the media. In addition, the Recycling Coordinator develops and makes presentations to businesses and community groups, and will work with the Community 4R Committee to design and produce all collateral support materials for the source reduction and recycling programs, and to develop local workshops.

General Information Flyers, Brochures and Educational Materials

The City promotes recycling and environmental awareness programs through a periodic direct mailing and encourages public input on matters concerning recycling and other issues. A comprehensive piece titled, "Join the City's 4R Program", was mailed in April 1991. It outlines the programs and ways residents can recycle. This piece will be targeted to all apartment dwellers each September. Similar informational items are produced on a regular basis for broad community distribution.

Public Displays

A comprehensive "traveling" display is used by the City in making presentations to schools and community groups for special events. The display features sections on each of the City-sponsored programs and presents updated information about residential, apartment and business recycling; source reduction, composting, and household hazardous waste. The City also has display cases at City Hall and the Yolo County Library.

Media

Local media, in particular The Davis Enterprise, have been supportive of Davis recycling activities and run periodic feature stories in addition to City-supplied information including a weekly column written by the Recycling Coordinator and "Recycling Briefs" run daily on the front page. The UC Davis Aggie runs several feature stories each year.

Videos

Two Davis-specific videos on the 4R program and recycling in particular have been produced in coordination with the local cable public access channel and have run on Davis Community Television. In addition, other videos on specific topics such as glass recycling, composting, and landfill operations are available for reference.

Schools

All Davis Joint Unified School District (DJUSD) schools conduct their own recycling programs for mixed paper and for beverage containers. Education and information materials are developed by the City.

Tours

DWR and YCCL currently offer tour programs to local groups and individuals, visitors to the City, schools and youth groups.

University Programs

The City and the local student population benefit from recycling programs and information provided by various agencies on the UC Davis campus. These programs involve

- Displays at various events - Fall Orientation, the Spring Whole Earth Festival, and Environmental Awareness Week
- Ads in the Aggie
- Referrals from Project Recycle on the UCD campus

Other promotional activities provided by the Recycling Coordinator include an informational program for Memorial Union staff on City recycling, State mandates, and national efforts. The Recycling Coordinator periodically attends meetings of a campus recycling committee and has provided information to the group and responded to requests from the members. Information on the City's recycling programs were also provided to the Associated Students of UCD for inclusion in their annual Housing Viewpoint guide to rental housing in Davis.

The City and DWR also provide an increased emphasis on the apartment recycling program during the fall when new students arrive for the academic school year.

Business, Industry, Government

A number of Davis businesses, offices, and institutions have developed effective in-house recycling programs. As with the schools, education and information materials are given to them by the City, Davis Waste Removal (DWR), or the State.

Buy-Backs

The State-certified recycling redemption centers benefit from the promotion and media campaigns administered by the Division of Recycling, Department of Conservation. Local businesses promote the locations as part of the requirements of the law (AB-2020). The high visibility of the recycling domes also serve as a constant reminder to the citizens of Davis that recycling is available to them.

State and Regional Information

Davis makes effective use of existing materials produced by the State Department of Conservation/Division of Recycling and the Yolo County Recycling Coordinator.

8.3 PROGRAM ALTERNATIVES

The following alternatives for the Davis education and public information component were selected for three key purposes:

- To increase overall awareness regarding all source reduction, recycling, and composting efforts in the City of Davis.
- To develop specific programs targeted at critical generators.
- To support the programs selected in this plan and to ensure that the goals and objectives for these alternatives are met.

Based on data from the Waste Generation Study, targeted waste generators were selected for the design and development of the education and public information programs. Based on the type and quantity of waste generated, the following were selected:

- Single family residents
- Multi-family residents
- Commercial/Industrial generators
- Institutions (including schools)

The following is a description of educational and public information alternatives the City will investigate.

Community 4R Committee

As a valuable part of both the short and medium term planning periods, the City will assemble the Community 4R Committee to assist the City and its Recycling Coordinator on matters regarding the various selected alternatives. The group may take a direct and active role in such matters as speaking to civic groups or staffing displays at community events. They would also assist in the development and implementation of print and other educational materials as well as assist in media campaigns.

Quarterly Focus Campaigns

The Recycling Coordinator and the Community 4R Committee should work to develop quarterly focused information and public education campaigns focusing on specific materials or new programs as they come on line. A potential basis for selecting materials for each focus campaign might be whether or not the diversion rates for those materials were attained. Recycling reminders and tips could be placed on utility bills, public displays, or in the weekly recycling column in the Davis Enterprise.

City of Davis Source Reduction and Recycling Guide

The Recycling Coordinator is in the process of assembling this guide for city-wide distribution. This guide will describe in detail the various source reduction, recycling, composting, white goods recycling and household hazardous waste programs. This booklet will be distributed to all residents and be available for businesses.

Source Reduction Programs

Source reduction programs are a critical part of all integrated solid waste management techniques. Source Reduction is the phrase applied to those procedures which prevent goods and materials from entering the waste stream. Simply put, if there is no waste generated, then there is no waste to manage, thus eliminating the necessity of identifying recycling, reuse, or disposal options for materials. Source reduction is perhaps the component most directly dependent upon, and affected by, education and public information programs. However, source reduction requires long-term changes in consumer habits and product purchasing patterns; therefore, an immediate impact on waste generation may not be expected. Education and public information programs encouraging source reduction should continue to be implemented in the short term so the effect of source reduction on waste generated will be able to contribute to long-term diversion goals. Much of this information on source reduction will be included in the City of Davis Waste Reduction and Recycling Guide.

Nevertheless, tailored programs supporting these selected alternatives should be targeted to support the following source reduction options:

- Backyard composting
- Commercial Waste Evaluations
- Awards and Public Recognition

Residential Sector Promotional Campaign

Instructional/information brochures will continue to be developed. They will continue to be given to every resident, clearly explaining how to participate in the Davis residential recycling and curbside yard waste collection programs. These brochures will also serve as handouts at presentations to service clubs and civic organizations. The information these brochures should contain will depend upon the overall effectiveness of the given programs and the diversion rates attained.

Multi-Family Campaigns

The multi-family recycling programs should annually be evaluated for effectiveness. Should shortfalls in participation or material capture rates occur, then increased educational and public information campaigns should be developed and presented. These campaigns may take the form

of increased advertising and contacting condominium associations, apartment building owners, or managers. Due to high turnover rates at apartments and the transient student population, campaigns will target apartment dwellers at the beginning of each UC Davis academic year in late September.

Commercial/Industrial (Business) Recycling

As part of the recycling component, the Recycling Coordinator would continue to assist in the design, development, and implementation of the specific business recycling programs. As waste evaluations are made and individual programs are developed for businesses, the City will provide back-up support in the form of information materials and suggested implementation plans. The actual collection and processing of materials will be the responsibility of DWR.

School Curriculum and Tours

In cooperation with Davis Joint Unified School District, the City will select and assist in the implementation of specific educational programs for various grade levels. Although packaged programs are available from the CIWMB and other sources, it will be imperative that materials be adapted to focus on Davis's specific recycling programs. It is possible a co-sponsor would participate with the City and/or School District to purchase and offset some of the expenses associated with this program.

In cooperation with DWR and YCCL, the City will work to increase the promotion of tours to provide students the opportunity to visit the nearby Yolo County Landfill and Recycling Processing Facilities. Student understanding of the technical and operational aspects of the recycling and composting process is important.

Business Recognition (Awards) Program

The City, in cooperation with the Davis Chamber of Commerce or other business organizations, will establish recycling recognition events. A full spectrum of awards can be presented to those firms establishing recycling and source reduction programs, with special acknowledgements going to major diversion efforts or other significant achievements.

Self-Haul Bin Transfer Program

The County will take the lead in developing education programs for this County-operated salvaging-type program geared for self-haulers at the landfill. The City should ensure that this program and procedures for proper participation are outlined in its education programs.

Media Advertising and Releases

The City will produce and transmit appropriate releases to all media throughout the Davis area regarding the various aspects of the recycling and source reduction programs. In addition, the City may advertise in The Davis Enterprise and The UC Davis Aggie to show the progress and success of the various recycling and source reduction programs. "Thermometer" type ads, for example, provide an ongoing indication of a program's achievement, while maintaining the peer pressure awareness so important in obtaining citizen participation.

Community Events

The City, in cooperation with its 4R Committee will continue to take part in promoting recycling at community events and other local activities such as the Farmers Market, Earth Day, Campus Environmental Awareness Week, the Annual Davis Street Faire, and UC Davis Orientation Week. Promotional information will be made available at these events.

8.4 PROGRAM SELECTION

All alternatives described above are selected for implementation. They were selected due to cost effectiveness and the overall support each of these alternatives will provide to the City's waste diversion efforts.

The programs are:

- Community 4R Committee
- Quarterly Focused Advertising or Promotional Campaigns
- Source Reduction and Recycling Guide
- Source Reduction Programs
- Residential Sector Promotional Campaigns
- Multi-Family Campaigns
- Commercial/Industrial Business Recycling
- School Curriculum and Tours
- Business Recognition (Awards) Program
- Self-Haul Bin Transfer Program
- Media Advertising and Releases
- Community Events

8.5 PROGRAM IMPLEMENTATION

This section lists the program implementation schedules for each selected alternative.

8.5.1 Implementation of the Community 4R Committee and Quarterly Focus Campaigns

The City Recycling Coordinator will be responsible for promoting and recruiting volunteers for the 4R Committee. The Committee and the Recycling Coordinator will then work to develop educational information, brochures, evaluate diversion and program effectiveness, and then create quarterly focus campaigns targeting material types for increased source reduction and for promoting re-use and buying recycled.

Table 8-1. Implementation of the Community 4R Committee and Quarterly Focus Campaigns

Task	Responsible Entity	Start Date	End Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Develop program	Recycling Coordinator	3rd Qtr 92	4th Qtr 92	$0	$0	Refuse Rate Structure	80 to 120	0
Publicize the committee formation and recruit volunteers	Recycling Coordinator	4th Qtr 92	4th Qtr 92 annually	$250	$250	Refuse Rate Structure	80 to 120	40 to 60
Hold meetings, disseminate information	Recycling Coordinator	4th Qtr 92	ongoing, quarterly	$500	$500	Refuse Rate Structure	80 to 120	80 to 120
Develop and implement quarterly focus campaign	4R Committee, Recycling Coordinator	4th Qtr 92	ongoing, quarterly	$1,000	$1,000	Refuse Rate Structure	80 to 120	80 to 120
Monitor and evaluate waste diversion programs	4R Committee, Recycling Coordinator	4th Qtr 92	ongoing, quarterly	See Each Program	See Each Program	See Each Program	See Each Program	See Each Program
Total implementation costs	---	---	FY 92/93	$1,750	---	---	320 to 480	---
Average annual cost	---	---	---	---	$1,750	---	---	200 to 300

8.5.2 Implementation Schedule for the City of Davis Source Reduction and Recycling Guide

The Recycling Coordinator and City Staff will be responsible for developing this guide with the input of the 4R committee. The guide will provide detailed information regarding recycling and waste reduction and other 4R topics. It will be updated as needed and distributed to all residents and businesses.

Table 8-2. Source Reduction and Recycling Guide

Task	Responsible Entity	Start Date	End Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Develop guide*	Recycling Coordinator, City Staff	3rd Qtr 92	3rd Qtr 92	$0	$1,000	Refuse Rate Structure	80 to 120	0
Print and distribute Guide**	Recycling Coordinator	4th Qtr 92	4th Qtr 92	$0	$0	Refuse Rate Structure	40 to 80	20 to 40
Monitor & evaluate program effectiveness	Recycling Coordinator	4th Qtr 93	ongoing, annually	See Each Program	See Each Program	See Each Program	See Each Program	See Each Program
Update and distribute guide	Recycling Coordinator, City Staff	3rd Qtr 93	ongoing, annually	$0	$10,000	Refuse Rate Structure	40 to 80	40 to 80
Total implementation costs	---	---	FY 91/92	$0	---	---	160 to 280	---
Average annual cost	---	---	---	---	$11,000	---	---	60 to 120

* $25,000 currently budgeted in FY 91/92

** estimated printing of 24,000 guides @ $1.50 per guide less $25,000 currently budgeted

8.5.3 Implementation Schedule for Source Reduction Programs

The Recycling Coordinator will take the lead in the development and dissemination of source reduction information. Much of this information will be contained in the Source Reduction and Recycling Guide described above. Nevertheless, specific, targeted public information and education programs will be developed for individual source reduction programs.

Table 8-3. Implementation Schedule for Source Reduction Programs

Task	Responsible Entity	Start Date	End Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Develop educational information for the Backyard Composting Alternative	Recycling Coordinator	3rd Qtr 92	3rd Qtr 92	$2,500	$500	Refuse Rate Structure	40 to 80	20 to 40
Develop questionnaire and publicity for the Waste Evaluations Alternative	Recycling Coordinator/ DWR	3rd Qtr 92	1st Qtr 93	$1,000	$100	Refuse Rate Structure	80 to 120	20 to 40
Promote Awards and Public Recognition Program	Recycling Coordinator/ Local Civic Groups	2nd Qtr 93	ongoing, annually	$200	$200	Refuse Rate Structure	60 to 80	20 to 40
Total implementation cost	---	---	FY 92/93	$3,700	---	---	180 to 280	---
Average annual cost	---	---	---	---	$800	---	---	60 to 120

8.5.4 Implementation Schedule for the Development of Residential, Multi-Family, and Commercial/Industrial Recycling Information

All of these waste generators receive recycling and yard waste pick-up services. The education and public information programs are already developed. Any additional programs to be implemented will be based upon the monitoring and evaluation which is intended to identify effectiveness. Should capture or participation rates show a significant shortfall, then the education and information materials and procedures for those programs will be re-evaluated and a focused campaign will be directed (refer to 4R Committee and Quarterly Focus Campaigns above). Programs and their annual dates for development of new materials include:

- Residential Curbside Recycling (3rd QTR 92)
- Multi-Family Recycling (3rd QTR 92)
- Commercial/Industrial Recycling (3rd QTR 93)
- Yard Waste Collection Programs (3rd QTR 92)

Table 8-4. Implementation Schedule for Recycling and Yard Waste Collection Education Programs

Task	Responsible Entity	Start Date	End Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Monitor & evaluate program effectiveness	Recycling Coordinator/ DWR/4R Committee	1st Qtr 93	ongoing, quarterly	See Each Program	See Each Program	See Each Program	See Each Program	See Each Program
Determine where shortfalls are occurring	Recycling Coordinator/ DWR/4R Committee	1st Qtr 93	ongoing, quarterly	$0	$0	Refuse Rate Structure	40 to 80	40 to 80
Develop and distribute targeted informational brochures, campaigns	Recycling Coordinator/ DWR/4R Committee	as necessary	ongoing, as necessary	$10,000 as necessary	$10,000 as necessary	Refuse Rate Structure	40 to 80	40 to 80
Total implementation costs	---	---	FY 92/93	$10,000 as necessary	---	---	80 to 160	---
Average annual cost	---	---	---	---	$10,000 as necessary	---	---	80 to 160

8.5.5 Implementation of School Curriculum & Tours

The Recycling Coordinator will work with the Davis Joint Unified School District (DJUSD) to further enhance and implement school programs.

Table 8-5. Implementation of School Curriculum

Task	Responsible Entity	Start Date	End Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Meet with schools to develop needs list	Recycling Coordinator	3rd Qtr 92	1st Qtr 93	$0	$0	Refuse Rate Structure	40 to 60	40 to 60
Assist with the development and procurement of materials	Recycling Coordinator	2nd Qtr 93	3rd Qtr 93	$10,000	$5,000	Refuse Rate Structure	80 to 120	40 to 60
School Presentations	Recycling Coordinator	3rd Qtr 93	ongoing	$0	$0	Refuse Rate Structure	60 to 80	40 to 60
Total implementation cost				$10,000	---		180 to 260	---
Average annual cost	---	---	---	---	$5,000	---	---	120 to 180

8.5.6 Media Advertising and Releases

The Recycling Coordinator will take the lead in developing and disseminating information on waste diversion programs to the local media. Since the waste diversion programs are operational, these programs will be a function of focus campaigns and significant events and milestones.

8.5.7 Implementation of Education and Information Programs Directed to the Construction and Road Building Industries

The Recycling Coordinator will work with DWR to develop and distribute education programs to promote the source-separation of construction and demolition wood to the construction industry. In addition, the Recycling Coordinator will work with DWR to develop and implement a more effective inert material diversion education program.

Table 8-6. Implementation of Source-Separate Diversion Programs to the Construction Industry

Task	Responsible Entity	Start Date	End Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Develop and distribute wood program information	Recycling Coordinator/ DWR	3rd Qtr 92	1st Qtr 93	$500	$250	Rate Structure	40 to 80	20 to 40
Develop and distribute inert materials recycling information	Recycling Coordinator/ DWR	3rd Qtr 92	1st Qtr 93	$500	$250	Rate Structure	40 to 80	20 to 40
Monitor & Evaluate program effectiveness	Recycling Coordinator/ DWR	4th Qtr 93	ongoing annually	See Special Waste Component	See Special Waste Component	See Special Waste Component	See Special Waste Component	See Special Waste Component
Total implementation costs	---	---	FY 92/93	$1,000	---	---	80 to 160	---
Average annual cost	---	---	---	---	$500	---	---	40 to 80

8.5.8 Implementation Schedule for the Self-Haul Bin Transfer Program

The Recycling Coordinator will work with the County to implement and disseminate information regarding the Self-Haul Bin Transfer operation at YCCL.

Table 8-7. Implementation Schedule for Education and Public Information Programs for the Self-Haul Bin Transfer Program

Task	Responsible Entity	Start Date	End Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Impl)	Staff Hours (Annual)
Ensure program is properly advertised in the City	Recycling Coordinator/ County	4th Qtr 92	1st Qtr 93	$0	$0	CSEF	20 to 40	20 to 40
Develop and distribute education materials	Recycling Coordinator	3rd Qtr 92	4th Qtr 92	$500	$500	Refuse Rate Structure	40 to 60	20 to 40
Monitor & Evaluate program effectiveness	Recycling Coordinator/ County	4th Qtr 93	ongoing annually	See Special Waste Component	See Special Waste Component	See Special Waste Component	See Special Waste Component	See Special Waste Component
Evaluate need for additional promotion	Recycling Coordinator/ 4R Committee/ County	4th Qtr 93	ongoing annually	$0	$250	Refuse Rate Structure	10 to 20	20 to 40
Total implementation costs	---	---	FY 92/93 FY 93/94	$1,500	---	---	70 to 120	---
Average annual cost	---	---	---	---	$750	---	---	60 to 120

* CSEF - County Sanitation Enterprise Fund

8.5.9 Implementation Schedule for Community Events

The Recycling Coordinator, with the assistance of the 4R Committee will choose venues, arrange appearances, develop materials, and attend selected community events to promote waste diversion programs. Some of the specific events and their timing are listed below.

Table 8-8. Implementation Schedule of Community Events

Task	Responsible Entity	Start Date	End Date	Cost (Impl)	Cost (Annual)	Funding Source	Staff Hours (Annual)
U.C. Davis orientation week	Recycling Coordinator	3rd Qtr 92	ongoing, annually	$0	$0	N/A	20 to 40
Earth Day/week activities	Recycling Coordinator	2nd Qtr 92	ongoing, annually	$0	$0	N/A	20 to 40
Farmers Market	Recycling Coordinator	Ongoing	ongoing	$0	$0	N/A	20 to 40
Davis Street Faire	Recycling Coordinator	2nd Qtr 92	ongoing, annually	$0	$0	N/A	20 to 40
Other Displays/Events	Recycling Coordinator	2nd Qtr 92	ongoing, annually	$0	$0	N/A	20 to 40
Total implementation costs	---	---	---	$0	$0	---	---
Average annual cost	---	---	---	---	$0	---	100 to 200

* All programs listed are already budgeted

8.6 MONITORING AND EVALUATION

The City of Davis will be responsible for the monitoring and evaluation of all programs associated with achieving its desired diversion goals. In particular, the attainment of the education and public information objectives will be addressed in two basic methods:

- Surveys to assess the awareness level of the community regarding the various recycling and source reduction programs within the City of Davis.
- The gathering of specific data to determine the effectiveness of selected alternatives to meet their objectives.

Telephone sample surveys will be conducted annually to determine the awareness level of Davis citizens regarding community recycling and source reduction activities. When the selected alternatives are in place, the surveys will attempt to relate citizen awareness to actual participation in the programs. It is important for the City to have a true picture of the relationship between simple awareness and actual participation. For example, the random telephone samplings will indicate awareness as follows:

Awareness/Effectiveness	
0 percent - 25 percent	Not effective
26 percent - 50 percent	Somewhat effective
51 percent - 75 percent	Effective
76 percent - 100 percent	Very effective

Similarly, data gathered from actual citizen participation information should signify certain relationships between the programs and citizen awareness. As a guide, participation will be evaluated as follows:

Participation/Effectiveness	
0 percent - 25 percent	Not effective
26 percent - 50 percent	Somewhat effective
51 percent - 75 percent	Effective
76 percent - 100 percent	Very effective

It is important to assess the relationship between the two areas of awareness and participation. A high awareness and low participation would indicate a weakness in the operational structure of a program. Low awareness and low participation indicates an ineffective education and/or informational program.

From the survey, inferences can be made about the overall effectiveness of the individual programs. The monitoring and evaluation of each specific program (i.e. Source Reduction, Recycling, Composting, Special Waste) and the estimated diversion rates will indicate the effectiveness of the education and public information programs.

8.6.1 Contingency Measures

Should diversion levels fall short for given programs or materials, the following contingency plans will be utilized on an annual basis to fine tune each of the specific education and public information programs:

4R Recycling Committee and Focused Advertising or Promotional Campaigns

- Was program established according to time line?
- Re-evaluate the activities of Committee. Were goals and objectives realistic and practical?
- Are focused advertising and publicity campaigns attaining goals?

Source Reduction and Recycling Guide

- Are all residents receiving the guide?
- Is the guide effectively presented?
- Is the information contained clear and up to date?

Source Reduction Programs

- Refer to Source Reduction Component for monitoring and evaluation criteria for each selected program.

Residential and Multi-Family Sector Promotional Campaigns

- Are the overall goals of the residential programs being attained?
- Do focused efforts increase participation and capture for targeted materials?
- What other incentives or techniques to spark interest and participation are available?
- If one method of recycling is not convenient, should alternate methods be promoted?

Business Commercial/Industrial Recycling

As part of the City's overall diversion goals and objectives Commercial/Industrial Recycling is a major factor. Should the efforts of this program fall short, a variety of plans will take effect.

- Organization of a volunteer group of business leaders will be sought to work directly with the City's Recycling Coordinator and the 4R Committee to develop and expand programs.

- Evaluation of rate structures to encourage recycling.
- Evaluation of business licensing and fee structures.
- Ongoing advertising campaign to recognize leading business recycling programs.
- Awards presented (results of achievements).
- Plans for ongoing events, activities.

School Curriculum & Tours

- Name and number of schools utilizing materials
- Number of classes within each school (Grade Levels)
- Number of students in each class
- Total number of students exposed to program
- Total number of students taking field trips

Through informal surveys and from data provided by the California Division of Recycling, it appears there is high level of interest by schools materials for classroom use. Should the City's objectives fall short, meetings will be set with teachers and school administrators to evaluate and redesign the program and/or materials in order to reach desired objectives.

If desired objectives fall short, meetings will be set with school teachers and administrators to determine reasons why site tours are not meeting objectives. If transportation costs become a factor, the City will seek funding from available resources or possibly business/community support.

Self-Haul Bin Transfer Program

This is a County program. While Davis residents may participate, the City can only suggest means of improving operations or convenience. Nevertheless, the City may promote the program.

- Is the County effectively promoting this activity?
- Provide suggestions for improving the facility.
- Are there different methods of promoting the facility the City is overlooking?

Media Advertising and Releases

- If awareness surveys fall short of goals, are effective media channels being utilized?
- Is the timing of media releases effective?
- Have the tastes and preferences of the target audiences changed?

Community Events

- Are the proper events selected?
- What other events would be more suitable?
- Due to repetition of appearance, has the audience become de-sensitized?
- Is the City maximizing visibility at the events?

Table 8-9. Monitoring and Evaluation Program

Measurement Method	Responsible Entity	Annual Funding Requirements	Revenue Source
Telephone Surveys	Recycling Coordinator	60 to 80 hours	Refuse Rate Structure
Data Gathering	Recycling Coordinator	60 to 80 hours	Refuse Rate Structure
Compilation and report production	Recycling Coordinator	20 to 40 hours	Refuse Rate Structure
Totals	---	140 to 200 hours	---

8.7 SUMMARY OF EDUCATION AND PUBLIC INFORMATION COMPONENT

Through the direction of the City's Recycling Coordinator, the efforts of Education and Public Information will be critical in meeting the objectives of each alternative, as well as the City's overall diversion goals. In order to be effective, the education and public information activities must be flexible. Programs must respond quickly to a particular need. Activities must address specific shortfalls or desired expansion of a plan. Cost-efficiency is vital. Care must be taken to not spend unnecessary dollars where efforts are successful and meeting goals. Similarly, critical monitoring must be done to pinpoint program areas that need additional support of education and public information. The administration of this component will be a key factor in the success of the City of Davis Source Reduction and Recycling Plan.

SECTION 9

FACILITY CAPACITY COMPONENT

The Facility Capacity Component describes the waste disposal facilities utilized by the City of Davis, projects the future waste capacity needs of the City, and identifies what Yolo County will do to meet future capacity demands. In addition, a description of solid waste facilities that will be closed, expanded, or established in the 15-year planning period is included. At the outset of this component it is important to note that there are no waste disposal facilities within the City; all waste is exported to the County landfill located in the Unincorporated Area of the County.

9.1 EXISTING CONDITIONS OF DISPOSAL FACILITIES

There are no permitted solid waste facilities located within the City of Davis. All waste generated from the City which is not recycled, composted, or otherwise diverted is currently landfilled at the Yolo County Central Landfill (YCCL) located off County Road 28H, near the intersection with County Road 104. The landfill is owned and operated by the Yolo County Department of Public Works and Transportation. Earthco provides the daily refuse placement and cover through a contract with the County. The quantities and types of waste disposed of at the landfill from the City of Davis are given in Table 9-1.

The disposal fees at the landfill, as of July 1, 1991, are as follows:

Commercial loads	$17.75 per ton
Commercial loads (imported)	$21.25 per ton
Noncommercial autos	$ 2.00 each
Noncommercial pickups and small trailers (8 feet or less)	$ 4.00 each
Noncommercial small trailers or pickups (8 feet or less) with loads greater than three feet above the bed	$ 6.00 each
Bulky wastes	$63.75 per ton
Auto tires	$ 2.00 each
Truck tires (16 to 22 inch)	$ 3.00
Tractor tires (24 inch and larger)	$ 4.00
Bulk tires	
(whole)	$78.00 per ton
(split)	$53.00 per ton
(Shredded)	$28.00 per ton
Household appliances	$ 3.00 each
Clean soil, unmixed concrete or asphalt chunks two feet or less in greatest dimension	$ .0

Mixtures with soil, gravel, and asphalt or large chunks of concrete or asphalt	$ 9.00 per ton
Septic, cannery, and similar liquid wastes	$34.00 per ton
Truck wash-out	$50.00 each
Minimum cash fee for weighed materials	$ 7.00
Separated recoverable materials	$ 0

The landfill hours of operation are:

Monday through Saturday	6:00 am to 5:00 pm
Sunday	7:00 am to 6:00 pm

The facility is open to the public from 6:30 am to 4:00 pm Monday through Saturday and 9:00 am to 5:00 pm on Sundays. The facility is closed on New Years Day, Easter Sunday, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

The landfill had a remaining capacity of 11,250,000 tons of waste as of January, 1991 and is expected to reach 100 percent capacity in 2025 with no diversion of the future waste stream. The Recycling, Composting, Source Reduction, and other programs that will satisfy the goals of AB 939 will prolong the life expectancy of the landfill.

The landfill is located on a 722.37 acre parcel of which 640 acres are permitted by the California Integrated Waste Management Board (CIWMB) under Solid Waste Facility Permit 57-AA-001. Under the existing permit, the facility is allowed to receive 1,500 tons per day of refuse for 360 days per year. The landfill currently receives approximately 750 tons per day of refuse of which approximately 35 percent is imported from Sacramento County.

Table 9-1. Total Waste Generation Summary. City of Davis, 1990

WASTE TYPE	WASTE DISPOSED (TPY)
PAPER	
Newspaper	642
Corrugated	2,166
High-Grade	585
Mixed	2,485
Cont. Paper	3,871
PLASTIC	
PET	41
HDPE	108
Pigmented HDPE	85
PS	180
Film	737
Other Plastic	924
GLASS	
CA redemption	294
Other recyclable	592
Non-recyclable	55
METAL	
Aluminum cans	68
Bi-metal/tin	678
Ferrous metal	559
Non-ferrous metal	311
White goods	61
YARD WASTE	
Grass, leaves	2,571
Prunings	960
Mixed yard waste	41
OTHER ORGANIC	
Food	4,456
Tires	10
Rubber	102
Wood waste	2,327
Wood (press board, etc.)	2,020
Ag crop residue	20
Manure	98
Disposable diapers	492
Textiles, leather	511
OTHER WASTE	
Inert solids	1,293
Composite materials	679
HHW mat'l/container	82
Misc.	2,220
SPECIAL WASTE	
Ash	65
Medical waste	10
Auto Shredder	0
Auto bodies	0
Bulky waste	667
Other special	917
Construction/Demolition	2,420
TOTAL	36,406.0

9.2 ADDITIONAL CAPACITY REQUIREMENTS

Additional capacity requirements for a 15-year planning period are calculated using the following formula from the CIWMB planning guidelines and procedures for preparing, revising, and amending county-wide integrated waste management plans:

$$AC_n = [(G+I) - (D+TC+LF+E)]_n$$

where:

AC = Additional capacity required in year n.

G = The amount of solid waste projected to be generated in the jurisdiction (from Waste Generation Study).

I = The amount of solid waste expected to be imported to the jurisdiction for disposal in permitted solid waste disposal facilities through interjurisdictional agreement(s) with other cities or counties, or through agreements with solid waste enterprises, as defined in Section 40193 of the Public Resources Code.

D = The amount diverted through successful implementation of proposed source reduction, recycling, and composting programs (from the Waste Generation Study and the Integration Component).

TC = The amount of volume reduction occurring through available, permitted transformation facilities.

LF = The amount of permitted solid waste disposal capacity which is available for disposal in the jurisdiction.

E = The amount of solid waste generated in the jurisdiction which is exported to solid waste disposal facilities through interjurisdictional agreement(s) with other cities or counties, or through agreements with solid waste enterprises, as defined in Section 40193 of the Public Resources Code.

n = Each year of a 15-year period commencing in 1991 (iterative in one-year increments).

The results of these calculations (Table 9-2) indicate that the City needs additional waste disposal capacity. This is misleading because the CIWMB will not allow waste that is exported for disposal to be shown as such unless the exporting jurisdiction has an official export agreement with the jurisdiction in which the disposal facility exists. Therefore, waste from Davis that is currently disposed of at YCCL cannot be counted as exported (column E).

Table 9-2. Additional Capacity Requirements for the City of Davis

Year	AC (yd)[1]	AC (TPY)	G[2] (TPY)	I (TPY)	D (%)	D[3] (TPY)	TC (TPY)	LF TPY	E TPY
1990	79,507	38,164	60,771	0	37.2	22,607	0	0	0
1991	80,284	38,537	61,364	0	37.2	22,827	0	0	0
1992	78,359	37,613	61,966	0	39.3	24,353	0	0	0
1993	76,388	36,667	62,572	0	41.4	25,905	0	0	0
1994	74,770	35,890	63,186	0	43.2	27,296	0	0	0
1995	74,836	35,922	63,805	0	43.7	27,883	0	0	0
1996	68,993	33,117	64,304	0	48.5	31,187	0	0	0
1997	66,561	31,950	64,807	0	50.6	32,792	0	0	0
1998	64,495	30,958	65,313	0	52.4	34,224	0	0	0
1999	65,001	31,201	65,824	0	52.4	34,492	0	0	0
2000	65,509	31,445	66,339	0	52.4	34,762	0	0	0
2001	66,022	31,691	66,858	0	52.4	35,034	0	0	0
2002	66,539	31,939	67,381	0	52.4	35,308	0	0	0
2003	67,057	32,188	67,907	0	52.4	35,583	0	0	0
2004	67,582	32,440	68,439	0	52.4	35,862	0	0	0
2005	68,111	32,694	68,974	0	52.4	36,142	0	0	0
Total	1,130,014	542,416	1,039,810	0	---	496,257	0	0	0

9.3 PLANS FOR FACILITY EXPANSIONS AND NEW SOLID WASTE FACILITIES

A wood processing facility is located adjacent to the YCCL. This facility is proposed to expand to wood and yard waste processing. The wood waste will be processed into fuel, mulch, and wood. The green waste will be processed into compost, possibly for use as an alternate daily cover at the landfill.

In addition, anaerobic composting in a landfill cell has been proposed for the generation of methane and for volume reduction of the waste.

No facilities are proposed for the City of Davis.

FOOTNOTES

1. In-place volume calculation based on in-place density of 1200 pounds per cubic yards and cover ratio of 4:1.

2. See Footnote #1.

3. Ibid.

SECTION 10

FUNDING COMPONENT

The programs outlined in this SRRE will result in the City of Davis meeting the diversion goals of AB 939, while providing a responsible, practical plan to manage its waste stream. To meet these goals, the City will need to devise a method of financing the selected programs. The Funding Component of the SRRE summarizes the programs, the implementation costs, annual operating expenses, timing, available funding alternatives, and revenue sources which will be required to meet the short-term waste diversion goals.

The majority of funding for selected alternatives will be incorporated into the Refuse Rate Structure which is charged residential, commercial, and industrial customers within the City. In addition, support funding will be sought from the County (tipping fees), and grant funding from State and Federal sources. Descriptions of grant funding alternatives are provided in this component. Should changes in the rate structure and grant funding prove unacceptable or inadequate, then contingency funding alternatives are presented which would cover the additional program costs.

10.1 EXISTING CONDITIONS

All waste generators in the City (residents, institutions, commercial and industrial) are serviced by DWR, the terms of which are described under the franchise agreement. This franchise agreement provides for exclusive waste pick-up in the City by DWR. This agreement is due to be renegotiated in 1999.

Garbage service to residences is mandatory. For Financial Year (FY) 91/92 the total monthly solid waste bill charged to residents is $16.52 for unlimited service. This rate includes garbage pick-up, curbside recycling, yard waste collection and processing, street sweeping, funding for the City's Recycling Program, Spring Clean-Up and Household Hazardous Waste round-ups. Commercial rates vary with the type and frequency of service. Drop-box rates are negotiated by DWR and the City. DWR performs the billing directly, however. At present, no other funding is received by the City for waste management services.

The City Finance Department oversees billing. The City Department of Public Works recommends changes in rates. Rates are reviewed annually by DWR and the Department of Public Works. An intensive rate review is performed every three years. The next such review will take place the second quarter of 1992. In addition, these rates will need to be reviewed as new programs identified in this SRRE are implemented.

10.2 SHORT-TERM PROGRAM COSTS

Listed in the following tables are the forecasted staffing requirements and the annual program expenses to be expected after implementation of the programs described in this SRRE.

10.2.1 Anticipated Capital Costs

The only extraordinary capital expenditure foreseen by the City is for the source-separated recycling bins which are to be placed adjacent to several designated existing garbage cans in the downtown area and in City parks. These bins are anticipated to cost $10,000 during the 1991/92 fiscal year. The cost is to be absorbed by the City Parks Department.

10.2.2 Hours Required to Monitor and Evaluate the Programs

Table 10-1 breaks out the estimated number of hours required to implement and maintain the programs within the various components. "Staff Hours to Implement" includes forecasts of hours required to implement the programs during the short-term planning period. The majority of these hours are in FY 92/93 and FY 93/94. "Staff Hours to Maintain" includes program maintenance, monitoring, and evaluation on an annual basis, once the programs are implemented. The majority of these hours are allocated to the Recycling Coordinator and staff.

Table 10-1. Estimated Number of Staff Hours Required to Implement and Maintain the Programs

Program	Staff Hours to Implement	Staff Hours to Maintain
Source Reduction	1,090 to 1,810	270 to 480
Recycling	340 to 600	240 to 440
Composting	90 to 180	20 to 40
Special Wastes	100 to 180	50 to 100
Education	1,070 to 1,740	720 to 1,280
Total	2,690 to 4,510	1,300 to 2,340

The Public Works Department has allocated approximately 2,600 hours annually to recycling and waste diversion activities. Since the implementation will be staggered over a 2 year period, and the time to maintain the programs begins after implementation, it appears that current staffing levels should be adequate to implement the programs outlined in this plan.

10.2.2 Additional Program Costs

Table 10-2 outlines the total costs for each of the selected programs during the short-term. General assumptions used in Table 10-2 are the following:

- The number of households is assumed to be 24,000.
- Commercial accounts include businesses and multi-family dwellings. These are assumed to be 780 in 1991.
- All costs are expressed in 1991 dollars.

Table 10-2. Projected Additional Expenses During the Short-Term

Program	FY 91/92	FY 92/93	FY 93/94	FY 94/95	FY 95/96
Source Reduction	$ 0	$ 12,750	$3,450	$3,450	$3,450
Recycling	$ 0	$ 3,500	$1,250	$1,250	$1,250
Composting	$ 0	$ 0	$ 0	$ 0	$ 0
Special Waste	$ 0	$ 500	$ 500	$ 500	$ 500
Public Education	$ 0	$30,700	$24,800	$24,800	$24,800
Monitoring and Evaluation	$ 0	$ 2,750	$ 2,750	$ 2,750	$ 2,750
Totals	$ 0	$50,200	$32,750	$32,750	$32,750

10.2.3 Cost Projections Per Household or Commercial Accounts

Should the Residential sector be forced to absorb the higher costs presented in Table 10-1, the additional charges per month per household (based on 24,000 households) would be highest in the 1992/93 fiscal year, averaging $0.18 over the present monthly rates. If the higher costs were to be spread among the 780 commercial accounts, the additional monthly increase would be $5.36 in FY 92/93 over FY 91/92 rates.

10.3 CONTINGENCY FUNDING ALTERNATIVES

Should the City find itself forced to provide capital funding for large projects such as a MRF or a regional composting facility, the following funding alternatives will be investigated:

10.3.1 Traditional Alternative Funding Sources

Tipping Fees

Tipping fees charged at the landfill by the County may be sought by the City to assist in financing of local source reduction or recycling projects. These fees are currently allocated in the County Sanitation Enterprise Fund.

Special Fees

The City may investigate the possibility of adding as a business licensing requirement a waste evaluation or waste diversion plan for businesses of a certain size or SIC category who operate in the City. Firms who do not fill out the form will be assessed a higher business license fee than those who do not fill out the form. However, it is anticipated that the probability of passage for such a funding alternative is low due to expected resistance from the business community in Davis.

Property Taxes

The property tax fund or a special tax may be assessed should additional financing be required for solid waste or recycling projects. However, competing local government agencies or a lack of voter support may rule out this possibility.

10.3.2 Tax-Exempt Financing

In general, program funding through debt issuance is not considered a viable alternative due to the current fiscal climate the City is experiencing. However, the alternatives are presented in case the current financial conditions improve.

General Obligation Bonds

These types of bonds may be used for any type of local government related projects. They are secured by the local government issuer. These bonds tend to have a low interest rate but are more difficult to issue since they are limited to 3.75 percent of the City's net value and must have two-thirds voter approval prior to issuance.

Revenue Bonds

Revenue bonds are limited security financing instruments which tie bond payments to the revenue generated through the operations of the project which they finance. Solid waste and recycling projects are eligible for such financing.

Community Facilities Projects

A Community Facilities District (CFD) is a special financing entity through which a local government may levy special taxes and issue bonds, if authorized by a two-thirds vote of the citizens in such a district. Facilities which are typically financed are limited to: police protection and court services; fire protection, ambulance and paramedic services; recreation programs; libraries; and parks. A recent amendment to the Mello-Roos Act (upon which CFD's are based), is AB 2610 from 1990. AB 2610 extends the programs which may be financed through CFD's to include solid and hazardous waste projects. Under this act, the CFD may finance the purchase, construction, expansion, improvement, or rehabilitation of any real or tangible solid waste related project or remediation with a expected life of at least five years.

Private Activity Bonds

These types of bonds are available to private businesses to finance projects including solid waste and or recycling related projects. The obligation to service debt from the bond is passed through to the private business. The City or local government guarantor would offer security to debt holders. Examples of this type of financing include bonds issued by the California Pollution Control Financing Authority (CPCFA).

Certificates of Participation

A certificate of participation (COP) is a financing lease instrument where one governmental entity leases the facility to another public entity or nonprofit corporation. Under the terms of typical COP's, the lease payments are set at a level which will service the debt payments associated with the project. Title generally remains with second or third parties who may retain ownership of the facility at the end of the lease term. This type of bond financing has been used extensively in California for many years. A lease-secured debt obligation does not count as indebtedness in California and therefore does not require voter approval unless petitioned for by voters.

Special Assessment Bonds

These bonds can be issued by sanitary districts where assessment charges are levied upon land that receives a benefit from the solid waste management program. The City would have to establish a special assessment district to use this approach.

10.3.3 Private Industry Financing Alternatives

Financing alternatives available to private businesses to develop solid waste or recycling facilities or projects include:

- Commercial Bank Loans
- Private Placements
- Medium-Term Notes
- Long-Term Bonds
- Business Partnerships

In the case of Davis, these types of financing instruments may be sought by the franchised waste hauler to develop solid waste-related projects.

10.3.4 Grants and Financial Assistance

California Department of Conservation
This state agency has established a $2 million annual fund to finance litter abatement and or recycling projects including curbside and public education materials. In general, most projects are only available for financing up to $50,000. Applications are due to the Department by January 31 annually.

California Resources Agency
The funding which this agency provides is derived from the Environmental License Plate Fund. Grants are provided mainly for education and public information purposes.

California Integrated Waste Management Board (Recycling Market Development Zones)
The CIWMB is currently promoting the establishment of 8 Market Development Zones each year to provide funding and other incentives to businesses operating in cities and regions for recycling-related projects. Davis, in conjunction with the other cities of Yolo County, plans to apply for such designation during the short-term planning period.

Federal Environmental Protection Agency (EPA)
The EPA provides funding to state and local governments or nonprofit enterprises which increase solid waste recycling, composting, source reduction, planning (by local governments), and education and public information. Details of this grant program may be found in the EPA publication: "The Solid Waste Dilemma: An Agenda for Action".

10.4 SELECTED FUNDING ALTERNATIVES

The primary selected alternative the City will use to fund the programs outline in this plan is:

- Changes in the refuse hauling rate structure

10.4.1 Contingency Funding

In addition, the City will continue to seek contingency funding from:

- State and Federal grant sources. These sources are described in the previous section, 10.3.

SECTION 11

INTEGRATION COMPONENT

The integration component summarizes the Source Reduction and Recycling Element (SRRE) and demonstrates how the various source reduction, recycling, composting, and special waste, and education programs will be implemented to achieve the state mandated goals of 25 percent diversion by 1995 and 50 percent diversion by the year 2000. In addition, the component provides an overall implementation schedule which illustrates when each of the selected programs will be developed and brought into operation.

The following table summarizes the expected diversion by percentage in 1995 and 2000 by program.

Table 11-1. Program Diversion by Percentage

Program	Current Diversion Percentage	Diversion Percentage by 1995	Diversion Percentage by 2000
Source Reduction	9.0	9.1	9.3
Recycling	10.7	13.0	17.2
Composting	4.7	6.7	11.0
Special Waste	12.8	14.9	14.9
Totals:	37.2	43.7	52.4

11.1 PLANNED SOLID WASTE MANAGEMENT PRACTICES

The City of Davis has a distinguished history of recycling. The waste diversion programs the City and the franchised hauler, Davis Waste Removal (DWR), have developed are well established and cover a wide range of services. The more well developed services include:

- Residential Curbside Recycling
- Multi-Family (Apartment) Recycling
- Commercial/Industrial and Municipal Government Recycling Programs
- Buy-Back Facilities
- Drop-Offs (at the DWR yard and YCCL)
- Curbside Yard Waste Pick-up and Processing

Through these programs, Davis has achieved a great deal of momentum. The City has already exceeded the mandated 25 percent diversion levels for the short term. The primary focus during the planning period will be to improve the existing programs in order to increase public awareness, participation, and capture rates for recyclable materials. This will be accomplished through targeted education and public information programs designed to support the existing programs.

In addition to the programs listed above, the City will develop several other alternatives described in this SRRE. These waste diversion alternatives include:

- Developing a Davis "4R Committee" to assist in raising public awareness and developing education programs for the City
- Further developing and promoting reduced debris box rates for source-separated wood, asphalt and concrete
- Promoting a backyard composting program in the City
- Promoting and participating in the County "Self-Haul Bin Transfer" program designed to separate self-haul wastes and divert recyclables from the landfill
- Placing recycling bins in the downtown area and in City parks
- Increasing the participation of businesses in source reduction and recycling

The decision criteria for program selection are based primarily upon cost-effectiveness, the overall applicability to the circumstances in the City, and the ability to meet the State-mandated diversion requirements. These criteria were developed in two public workshops held by the City, the advisement of the Davis Natural Resources Commission who reports to the City Council, and discussions with City personnel.

Through the City's management and guidance and in cooperation with Davis Waste Removal (DWR), the City should achieve the 50 percent diversion goal mandated for the year 2000 by 1997. The Recycling Coordinator (from the Department of Public Works) will work in conjunction with the Davis Natural Resources Commission, the County Local Recycling Task Force, DWR and the Davis City Council to develop programs designed to address each portion (residential, commercial, industrial, and self-haul) of the waste stream.

11.1.1 Source Reduction

Source reduction programs involve efforts which are designed to prevent waste from being generated in the first place. These types of programs are of the highest priority in the waste diversion hierarchy, according to the California Integrated Waste Management Board (CIWMB), since they prevent material from entering the waste stream and thus eliminate the need for disposal or recycling of the material altogether. Furthermore, these programs are designed to conserve valuable natural resources.

It is very difficult to quantify the amount of diverted material associated with source reduction programs since the quantity reduced is a theoretical value that would have occurred had the program not been in place. Consequently, the cumulative contribution that source reduction programs will make towards the State mandated diversion goals is not expected to be large due to the difficulty associated with changing the waste generation behavior of individuals as well as businesses (which is what these programs are designed to do). However, it may be assumed that education, civic awards, and the leadership of providing source reduction programs within City government, should have a cumulative effect upon promoting source reduction activity throughout the planning period. These types of programs are very important in the overall waste management plan.

Summarized below are the programs that have been selected for implementation by the City.

Waste Evaluations/Waste Minimization

This program is selected for implementation in the short-term planning period due to its anticipated effectiveness in diversion, comparative ease of implementation, and potential effect on the commercial waste stream. The City, business owners/managers and DWR will work together to develop this program. The City will provide education and advice regarding source reduction techniques and practices. Also, they will provide guidance to the business managers on how to quantify the diversion from source reduction. The policy of the City will be to encourage, but not to enforce waste evaluations.

Backyard Composting

Backyard composting has been selected as a source reduction program because it is a cost effective method for removing yard waste from the residential waste stream. Furthermore, it can be easily implemented by single-family residents. The program involves an education program encouraging residents to place organic waste such as food, leaves, grass clippings and prunings into a "bin" or pile located somewhere on their property. The material is then periodically turned to allow the composting process to occur. The compost can then be used as a soil amendment on the property or for landscaping purposes.

Educational Efforts

Educational programs regarding recycling and source reduction benefitting the community will be provided by the City in the short-term planning period. These programs will target all waste producers in the City. For more details, refer to Section 8, Education and Public Information Component.

Awards and Public Recognition

The City, in conjunction with the 4R Committee and the Chamber of Commerce, will develop an awards program and present the awards at local functions.

11.1.2 Recycling

Recycling programs involve the removal and collection of certain types of materials from the waste stream. These materials are then processed and reused in the manufacture of new products. The actual process of removing the material from the waste stream and separating it by waste type can be done at the source by residents and businesses.

The City already has a well-developed recycling infrastructure. The majority of efforts will be directed towards education programs to increase awareness of recycling programs, participation levels, and material capture rates. Summarized below are the recycling programs that have been selected for implementation by the City.

Increased Promotion of Residential Curbside Recycling

Under this alternative, the City will undertake focused education efforts to increase awareness and participation in the existing curbside program. Awareness and participation will be sought through general information brochures. As a basis for evaluating program effectiveness, specific goals will be set for the program. These goals will be based upon attaining a given "diversion rate" for each material type. Should diversion levels fall short for a given material, then a focused education effort will be directed at that material type.

Increased Promotion of Multi-Unit Recycling

This selected alternative will be similar in nature to the residential program outlined above. General information guides and flyers will be distributed to residents regarding recycling programs. Should diversion goals fall short for participation or capture rates, then focused campaigns will be developed and implemented.

Expansion and Increased Promotion of Commercial/Industrial Recycling Programs

The Commercial/Industrial program will be expanded to include a source-separated bin program for commercial/industrial wood generators. Also, the Recycling Coordinator will work with the City Parks Department to install and promote a series of recycling bins to be located adjacent to existing waste receptacles in City parks and in the downtown area.

As with the curbside recycling program, education materials will be distributed to all businesses and institutions in the City. Target participation and capture rates will be developed. Should diversion levels fall short, a focused education campaign will be developed and implemented.

11.1.3 Composting

Composting is an aerobic or anaerobic degradation process by which plant and other organic wastes decompose under controlled conditions. Typically, composting programs involve the collection of yard wastes which are then processed at a composting facility and turned into a useable soil amendment for residential and commercial landscaping, and agricultural purposes.

The existing program in the City will remain in operation. Materials will continue to be delivered to the existing facility for processing. Fine tuning of the existing composting program will be a key element for the City to meet its mandated diversion goals. Summarized below are the composting programs that have been selected for implementation by the City.

Increased Promotion of the Residential Curbside Collection Program

The City and DWR will increase awareness and participation in the existing curbside collection of yard waste currently offered residents. Education programs will be offered in order to increase awareness, participation and capture. As targets, the City has selected a target participation rate of 90 percent with a capture rate from these participants of 90 percent. This translates to an overall diversion rate of 81 percent (90 percent * 90 percent) of all yard waste generated in the City.

Should these targets not be met, the City will investigate a mandatory participation ordinance for yard waste.

Processing

DWR will seek reliable aftermarkets for compost. In addition, DWR will examine the operations at the compost facility to determine and implement methods of increasing the quality of processed materials.

11.1.4 Special Wastes

Special wastes are wastes that require special handling practices and consequently are not normally collected with other municipal solid wastes. Typically, these types of wastes present unique diversion opportunities that are outside the scope of normal recycling and composting programs. In Davis, the special wastes that are present in the waste stream in significant amounts are tires, white goods, and construction and demolition debris including inert wastes such as asphalt and concrete.

Summarized below are the special waste programs that have been selected for implementation by the City:

Self-Haul Bin Transfer Program

This program will be implemented by the County at the YCCL. It will target self-haulers of construction and demolition wastes which will be tipped in specific areas near the landfill gate. Targeted materials will be sorted by YCCL personnel and include non-contaminated wood and ferrous metals. Though this is a County program, City residents will be encouraged to participate.

Concrete and Asphalt Recycling

This program will be offered in conjunction with the Commercial Recycling discussed in the Recycling Component. Debris boxes and loads rich in concrete and asphalt will be set aside at the landfill or delivered directly to processors in the Yolo County area. These materials will then be processed into aggregate suitable for road base or other applications.

11.1.5 Public Information and Education

The implementation of effective and consistent education and public information programs will be a key step in successfully meeting the State-mandated diversion goals. The majority of these services will be provided by the Recycling Coordinator (DPW).

The programs selected have been designed to increase levels of awareness and participation for all waste generators in the City. By raising these levels, the City expects to increase capture for all targeted materials. The following alternatives for the Davis education and public information component were selected for *three* key purposes:

- To increase overall awareness regarding all source reduction, recycling, and composting efforts in the City of Davis.

- To develop specific programs targeted at critical generators.

- To support the programs selected in this plan and to ensure that the goals and objectives for these alternatives are met.

Based on data from the Waste Generation Study, targeted waste generators were selected for the design and development of the education and public information programs. Based on the type and quantity of waste generated, the following were selected:

- Single family residents
- Multi-family residents
- Commercial/Industrial generators
- Institutions (including schools)

The following is a description of educational and public information alternatives the City has selected.

Community 4R Committee

As a valuable part of both the short- and medium-term planning periods, the City will assemble the Community 4R Committee to assist the City and its Recycling Coordinator on matters regarding the various selected alternatives. The group may take a direct and active role in such matters as speaking to civic groups or staffing displays at community events. They would also assist in the development and implementation of print and other educational materials as well as assist in media campaigns.

Quarterly Focus Campaigns

The Recycling Coordinator and the Community 4R Committee could work to develop quarterly focused information and public education campaigns focusing on specific materials or new programs as they come on line. A potential basis for selecting materials for each focus campaign might be whether or not the diversion rates for those materials were attained. Recycling reminders and tips could be placed on utility bills, public displays, or in the weekly recycling column in the Davis Enterprise.

City of Davis Source Reduction and Recycling Guide

The Recycling Coordinator is in the process of assembling this guide for city-wide distribution. This guide will describe in detail the various source reduction, recycling, composting, white goods recycling and household hazardous waste programs. This guide will be distributed to all City residents and will be available for businesses.

Source Reduction Programs

Source reduction programs are a critical part of all integrated solid waste management techniques. Source Reduction is the phrase applied to those procedures which prevent goods and materials from entering the waste stream. Simply put, if there is no waste generated, then there is no waste to manage, thus eliminating the necessity of identifying recycling, reuse, or disposal options for materials. Source reduction is perhaps the component most directly dependent upon and effected by, education and public information programs. However, source reduction requires long-term changes in consumer habits and product purchasing patterns; therefore, an immediate impact on waste generation may not be expected. Education and public information programs encouraging source reduction should continue to be implemented in the short term so the effect of source reduction on waste generated will be able to contribute to long-term diversion goals. Much of this information on source reduction will be included in the City of Davis Waste Reduction and Recycling Guide.

Nevertheless, tailored programs supporting these selected alternatives should be targeted to support the following source reduction options:

- Backyard composting
- Commercial Waste Evaluations
- Awards and Public Recognition

Residential Sector Promotional Campaign

Instructional/information brochures will continue to be developed. They will continue to be given to every resident, clearly explaining how to participate in the Davis residential recycling and curbside yard waste collection programs. These brochures will also serve as handouts at presentations to service clubs and civic organizations. The information these brochures should contain will depend upon the overall effectiveness of the given programs and the diversion rates attained.

Multi-Family Campaigns

The multi-family recycling programs should annually be evaluated for effectiveness. Should shortfalls in participation or material capture rates occur, then increased educational and public information campaigns should be developed and presented. These campaigns may take the form of increased advertising, contacting condominium associations, apartment building owners, or managers. These campaigns will be offered at the beginning of the UC Davis academic year in late September due to high turnover rates at apartments and the generally transient student population.

Commercial/Industrial (Business) Recycling

As part of the recycling component, the Recycling Coordinator would continue to assist in the design, development, and implementation of the specific business recycling programs. As audits are made and individual programs are developed for businesses, the City will provide back-up support in the form of information materials and suggested implementation plans. The actual collection and processing of materials will be the responsibility of DWR.

School Programs

In cooperation with Davis Joint Unified School District, the City will select and assist in the implementation of educational programs for various grades levels. Although packaged programs are available from the CIWMB and other sources, it will be imperative that materials be adapted to focus on Davis's specific recycling programs. It is possible a co-sponsor would participate with the City and/or School District to purchase and offset some of the expenses associated with this program.

Business Recognition (Awards) Program

The City, in cooperation with the Davis Chamber of Commerce or other business organizations, will establish recycling recognition programs. A full spectrum of awards can be presented to those firms establishing recycling and source reduction programs, with special acknowledgements going to major diversion efforts or other significant achievements.

Self-Haul Bin Transfer Program

The County will take the lead in developing education programs for this County-operated salvaging-type program geared to self-haulers at YCCL. This program will be available to residents of Davis. The City should ensure that this program and procedures for proper participation are outlined in its education programs.

Media Advertising and Press Releases

The City will produce and transmit appropriate releases to all media throughout the Davis area regarding the various aspects of the recycling and source reduction programs. In addition, the City may advertise in *The Davis Enterprise* and *The UC Davis Aggie* to show the progress and success of the various recycling and source reduction programs. "Thermometer" type ads provide an ongoing indication of a program's achievement, while maintaining the peer pressure awareness so important in obtaining citizen participation.

Community Events

The City, in cooperation with the 4R Committee, will continue to take part in promoting recycling at community events and other local activities such as the Farmers Market, Earth Day, Campus Environmental Awareness Week, the Annual Davis Street Faire, and UC Davis Orientation Week. Promotional information will be made available at these events. In addition, regular displays at City Hall and the Davis Branch of the Yolo County Library will continue.

11.1.6 Landfill Disposal

One hundred percent of the municipal solid waste from the City is presently disposed of in the Yolo County Central Landfill (YCCL), located approximately two miles northeast of the City. The landfill is owned and operated by the County. It has an estimated capacity to serve the disposal needs of the City and the County through 2025.

11.1.7 Funding

All of the selected programs will be implemented during the planning period in the most cost-effective manner possible. In addition, programs will be implemented to ensure that the City is in compliance with the State-mandated diversion goals. Programs already in operation will continue in their present form.

Existing Conditions

All waste generators in the City (residents, institutions, commercial and industrial) are serviced by DWR, the terms of which are described under the franchise agreement. This franchise agreement provides for exclusive waste pick-up in the City by DWR. This agreement is due to be renegotiated in 1999. The City Finance Department handles the billing for sanitation services.

Garbage service to residences is mandatory. The total monthly solid waste bill charged to residents is $16.52 for unlimited service. This rate includes garbage pick-up, curbside recycling, yard waste collection and processing, street sweeping, funding for the City's Recycling Program, Spring Clean-Up and Household Hazardous Waste round-ups. Commercial rates vary with the type and frequency of service. Drop-box rates are negotiated by DWR and the City. DWR does this billing directly. At present, no other funding is received by the City for waste management services.

Additional Program Costs

The only extraordinary capital expenditure foreseen by the City is for the source-separated recycling bins which are to be placed adjacent to several designated existing garbage cans in the downtown area and in City parks. These bins are anticipated to cost $10,000 during the 1992/93 fiscal year. The cost will be absorbed by the City Parks Department.

Table 11-2 outlines the total costs for each of the selected programs during the short-term. General assumptions used in Table 11-2 are the following:

- Additional expenditures will be realized in 1992 for the new source-separated recycling bins in the downtown area and City parks ($10,000).
- The number of households is assumed to be 24,000 in 1991.
- All costs are expressed in 1991 dollars.
- Commercial accounts include businesses and multi-family dwellings. These are assumed to be 780 in 1991.

Table 11-2. Projected Additional Expenses During the Short-Term

Program	FY 91/92	FY 92/93	FY 93/94	FY 94/95	FY 95/96
Source Reduction	$ 0	$12,750	$ 3,450	$ 3,450	$ 3,450
Recycling	$ 0	$ 3,500	$ 1,250	$ 1,250	$ 1,250
Composting	$ 0	$ 0	$ 0	$ 0	$ 0
Special Waste	$ 0	$ 500	$ 500	$ 500	$ 500
Public Education	$ 0	$30,700	$24,800	$24,800	$24,800
Monitoring and Evaluation	$ 0	$ 2,750	$ 2,750	$ 2,750	$ 2,750
Totals	$ 0	$50,200	$32,750	$32,750	$32,750

Cost Projections Per Household or Commercial Accounts

Should the Residential sector be forced to absorb the higher costs presented in Table 11-2, the additional charges per month per household (based on 24,000 households) would be highest in FY 92/93, averaging $0.18 over present monthly rates. If the higher costs were to be spread among the 780 commercial accounts, the additional monthly increase would be $5.36 in FY 92/93 over FY 91/92 rates.

Selected Funding Alternative

The primary selected alternative the City will use to fund the programs outline in this plan is:

- Changes in the refuse hauling rate structure

In addition, the City will continue to seek contingency funding from:

- State and Federal grant sources. These sources are described in Section 10.3.

11.2 PROGRAM IMPLEMENTATION

The following section provides details regarding the agencies that will be responsible for program development and implementation. In addition, the associated implementation schedule is presented in Section 11.2.3.

11.2.1 Responsible Agency

The City Recycling Coordinator, in conjunction with the City of Davis Department of Public Works, and Davis Waste Removal (DWR) will assume the lead role in the development and

implementation of the waste diversion programs involving facilities that will serve the City. As to the development of Self-Haul Bin Transfer program, the County will take the lead.

Presented in Table 11-3 is a summary of all of the programs that have been selected and the designated lead agency responsible for program development and implementation.

Table 11-3. Agency Responsible For Program Development and Implementation

Program	Responsible Party
Source Reduction	
Waste Evaluations/Waste Minimization	Recycling Coordinator
Backyard Composting	Recycling Coordinator
Educational Efforts	Recycling Coordinator
Awards and Public Recognition	Recycling Coordinator/4R Committee
Recycling	
Increased Promotion of Curbside Recycling	Recycling Coordinator
Increased Promotion of Multi-Unit Recycling	Recycling Coordinator
Increased Promotion and Expansion of Commercial/Industrial Recycling Program	Recycling Coordinator
Composting	
Increased Promotion of Residential Curbside Collection	Recycling Coordinator
Refinement of Processing and Marketing of Materials	DWR
Special Waste	
Self-Haul Bin Transfer	Yolo County
Concrete and Asphalt Recycling	Recycling Coordinator/DWR
Public Education	Recycling Coordinator

11.2.2 Schedule

In Table 11-4, an integrated implementation schedule for the SRRE is presented for review. For a more complete summary of implementation including revenues, expenses, and funding sources, please refer to the implementation section of each component.

Table 11-4. Integrated Implementation Plan

Task	Responsible Entity	Start Date	Completion Date	Component
1) County begins development of Self-Haul Bin Transfer program at YCCL	County	3rd Qtr 91	4th Qtr 92	Recycling
2) Develop Pilot Waste Evaluations program, create initial database	Recycling Coordinator	3rd Qtr 92	4th Qtr 92	Source Reduction
3) Develop Backyard Composting program information	Recycling Coordinator	3rd Qtr 92	3rd Qtr 92	Source Reduction
4) Publicize introductory Backyard Composting workshops	Recycling Coordinator	3rd Qtr 92	4th Qtr 92	Source Reduction
5) Begin developing Awards program	Recycling Coordinator	3rd Qtr 92	4th Qtr 92	Source Reduction
6) Expand Residential Curbside and Multi-Family recycling information	Recycling Coordinator	3rd Qtr 92	4th Qtr 92, ongoing, annually	Recycling, Education
7) Identify contractors in the City which generate large amounts of inerts, develop and distribute educational materials	Recycling Coordinator	3rd Qtr 92	4th Qtr, ongoing	Special Waste
8) Design and develop 4R program	Recycling Coordinator	3rd Qtr 92	4th Qtr 92	Education
9) Develop Source Reduction and Recycling Guide	Recycling Coordinator	3rd Qtr 92	3rd Qtr 92	Education
10) Evaluate effectiveness of Residential, Multi-Family, and Commercial/Industrial recycling programs	Recycling Coordinator	3rd Qtr 92	ongoing, quarterly	Recycling, Education
11) Meet with schools to analyze existing programs and to develop needs list	Recycling Coordinator	3rd Qtr 92	1st Qtr 93	Education
12) Develop and distribute source-separated wood recycling bin information	Recycling Coordinator/DWR	3rd Qtr 92	1st Qtr 93	Education, Recycling
13) UC Davis Orientation Week	Recycling Coordinator	3rd Qtr 92	ongoing, annually	Education
14) Promote and begin accepting pigmented HDPE, PET	Recycling Coordinator/DWR	3rd Qtr 92	ongoing	Recycling
15) Publicize, promote and recruit 4R Committee	Recycling Coordinator	4th Qtr 92	4th Qtr 92	Education
16) Hold first 4R Committee meeting	Recycling Coordinator	4th Qtr 92	4th Qtr 92, ongoing, monthly	Education
17) Develop targeted Residential Curbside and Multi-Family recycling education programs	Recycling Coordinator/4R Committee	4th Qtr 92	ongoing, quarterly	Recycling, Education
18) Develop focus campaigns	Recycling Coordinator/4R Committee	4th Qtr 92	ongoing, quarterly	Education
19) Identify and target large generators of yard waste	Recycling Coordinator/DWR	4th Qtr 92	4th Qtr 92	Composting
20) Develop and distribute promotional materials of yard waste collection	Recycling Coordinator/4R Committee	4th Qtr 92	4th Qtr 92	Composting, Education

Table 11-4. Integrated Implementation Plan (continued)

Task	Responsible Entity	Start Date	End Date	Component
21) Print and distribute Source Reduction and Recycling Guide	Recycling Coordinator	4th Qtr 92	4th Qtr 92	Education
22) Ensure Self-Haul Bin Transfer operation at YCCL is effectively promoted in Davis	Recycling Coordinator	4th Qtr 92	1st Qtr 93, ongoing, annually	Education
23) Annual monitoring and evaluation and Update Report to City Council	Recycling Coordinator/City Council	4th Qtr 92	1st Qtr 93	All components
24) Distribute questionnaire and instructions on how to conduct waste evaluations	Recycling Coordinator/Business Owners and Managers	1st Qtr 93	3rd Qtr 93	Source Reduction
25) Develop and promote a more formal Recycling and Source Reduction Awards program	Recycling Coordinator/4R Committee	1st Qtr 93	2nd Qtr 93	Source Reduction
26) Develop Commercial/Industrial Recycling information packages	Recycling Coordinator	1st Qtr 92	2nd Qtr 93	Recycling, Education
27) Assist County in inert materials market development	Recycling Coordinator	1st Qtr 93	ongoing, as necessary	Special Waste
28) Develop and support revised debris box rates to encourage	City DPW	1st Qtr 93	3rd Qtr 93	Special Waste
29) Create commercial Waste Evaluation database	Recycling Coordinator	2nd Qtr 93	2nd Qtr 93	Source Reduction
30) Coordinate Waste Evaluations and advise businesses on source reduction and recycling methods	Recycling Coordinator/Business Owners and Managers	2nd Qtr 93	ongoing	Source Reduction, Recycling
31) Develop public demonstration project for Backyard Composting	Recycling Coordinator	2nd Qtr 93	ongoing	Source Reduction
32) Publicize and conduct backyard composting workshops	Recycling Coordinator	2nd Qtr 93	ongoing, bi-annually	Source Reduction
33) Select recipients and award certificates for Awards program	Recycling Coordinator	2nd Qtr 93	ongoing, annually	Source Reduction, Education
34) Assist with the development and procurement of educational materials for schools	Recycling Coordinator/School Representatives	2nd Qtr 93	3rd Qtr 93	Education
35) Earth Day activities	Recycling Coordinator	2nd Qtr 93	ongoing, annually	Education
36) Davis Street Faire	Recycling Coordinator	2nd Qtr 93	ongoing, annually	Education
37) Farmers Market	Recycling Coordinator	2nd Qtr 93	ongoing	Education
38) Purchase, promote, and place recycling bins in the downtown area and in certain City parks	Recycling Coordinator/Parks Department	3rd Qtr 93	3rd Qtr 93, ongoing	Recycling
39) Further promote source-separated wood recycling bins	Recycling Coordinator/DWR	3rd Qtr 93	3rd Qtr 93, ongoing	Recycling, Education

Table 11-4. Integrated Implementation Plan (continued)

Task	Responsible Entity	Start Date	Completion Date	Component
40) Update and distribute Source Reduction and Recycling Guide	Recycling Coordinator	3rd Qtr 93	ongoing, annually	Education
41) School presentations	Recycling Coordinator	3rd Qtr 93	ongoing	Education
42) Research, write, and publicize ordinance for mandatory source-separation of yard waste*	Department of Public Works	4th Qtr 93	1st Qtr 94	Composting
43) Monitor, evaluate, and develop Annual Update report to City Council	Recycling Coordinator/City Council	4th Qtr 93	1st Qtr 94	All components
44) Public Hearing and adopt ordinance*	City Council	1st Qtr 94	1st Qtr 94	Composting
45) Monitor, evaluate, and develop Annual Update report to City Council	Recycling Coordinator/City Council	4th Qtr 94	1st Qtr 95	All components

* if necessary

11.3 DIVERSION RATE PROJECTIONS AND REVISED 15 YEAR WASTE GENERATION FORECAST

Summarized in Table 11-5 is the diversion rate projections for the City. Each of the programs selected for implementation during the planning period are designed to reduce the amount of solid waste that must be landfilled. The cumulative impact of these programs will achieve a net diversion rate of 43.7 percent or greater by 1995, and 50 percent or greater by 1997. Individual diversion rates for some source reduction programs have not been provided due to the difficulty in quantifying each individual program.

On the pages following Table 11-5 are the 15 year waste generation projections for the City of Davis, after all programs have been accounted for.

Table 11-5. Diversion Rate Projections for the City of Davis (percent)

Program	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Source Reduction										
Existing Diversion	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Waste Evaluations/Waste Minimization										
Backyard Composting		0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3
Education Efforts										
Awards and Public Recognition										
Total Source Reduction	9.0	9.1	9.1	9.1	9.1	9.2	9.3	9.3	9.3	9.3
Recycling										
Existing Diversion	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7	10.7
Increased Promotion of Curbside Recycling		0.2	0.4	0.6	0.6	0.9	1.2	1.6	1.6	1.6
Increased Promotion of Multi-Unit Recycling		0.2	0.3	0.4	0.4	0.6	0.8	0.9	0.9	0.9
Commercial/Industrial Recycling		0.5	0.8	1.3	1.3	2.5	3.5	4.1	4.1	4.1
Total Recycling	10.7	11.6	12.2	13.0	13.0	14.7	16.2	17.2	17.2	17.2
Composting										
Existing Diversion	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
Composting		0.5	1.0	1.5	2.0	5.0	5.5	6.3	6.3	6.3
Total Composting	4.7	5.2	5.7	6.2	6.7	9.7	10.2	11.0	11.0	11.0
Special Waste										
Existing Diversion	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8	12.8
Self-Haul Bin Transfer		0.3	0.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Concrete and Asphalt Recycling		0.3	0.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total Special Waste	12.8	13.4	14.4	14.9	14.9	14.9	14.9	14.9	14.9	14.9
TOTAL DIVERSION	37.2	39.3	41.4	43.2	43.7	48.5	50.6	52.4	52.4	52.4

Table 11-6. 15-Year Waste Disposal Projections - City of Davis as Measured in Tons Per Year

Material	1990			1991			1992		
	Total	Diverted	Disposed	Total	Diverted	Disposed	Total	Diverted	Disposed
Newspaper	3,862	2,093	1,769	3,988	2,114	1,874	3,940	2,178	1,762
Corrugated Cardboard	4,147	1,980	2,167	4,283	1,999	2,284	4,230	2,188	2,042
High-Grade Paper	585	161	424	604	163	441	597	193	404
Mixed Paper	2,485	966	1,519	2,566	975	1,591	2,535	1,088	1,447
Contaminated Paper	3,871	0	3,871	3,998	0	3,998	3,949	0	3,949
PET	41	24	17	41	24	17	41	26	15
HDPE	190	22	168	192	22	170	194	32	162
Polystyrene	180	0	180	182	0	182	184	0	184
Film Plastic	737	0	737	744	0	744	751	15	736
Other Plastics	970	0	970	980	0	980	990	0	990
CA Redemption Glass	447	153	294	451	154	297	456	172	284
Other Recyclable Glass	1,579	987	592	1,594	997	597	1,611	1,044	567
Non-Recyclable Glass	55	0	55	56	0	56	57	0	57
Aluminum Cans	179	111	68	181	112	69	183	116	67
Bi-Metal/Tin Cans	678	0	678	685	0	685	692	50	642
Ferrous Metals	559	0	559	564	0	564	571	0	571
Non-Ferrous Metals	311	0	311	314	0	314	317	0	317
White Goods	61	0	61	62	0	62	63	62	1
Yard Wastes	8,204	2,836	5,368	8,284	2,864	5,420	8,369	3,265	5,104
Food Waste	4,495	39	4,456	4,539	39	4,500	4,585	59	4,526
Tires & Rubber	171	0	171	173	0	173	175	0	175
Wood Waste	5,050	0	5,050	5,099	0	5,099	5,152	0	5,152
Ag Crop Residue	5,226	5,206	20	5,277	5,257	20	5,331	5,310	21
Manure	98	0	98	99	0	99	100	0	100
Disposable Diapers	715	223	492	722	225	497	729	227	502
Textiles, Leather	511	0	511	516	0	516	521	0	521
Inert Solids	8,298	7,005	1,293	8,379	7,074	1,305	8,465	7,325	1,140
Miscellaneous Other Waste	2,899	0	2,899	2,927	0	2,927	2,957	0	2,957
HHW	82	0	82	83	0	83	84	0	84
Ash	65	0	65	66	0	66	67	0	67
Medical Waste	10	0	10	10	0	10	10	0	10
Bulky Waste	667	0	667	674	0	674	681	0	681
Other Special Waste	917	0	917	926	0	926	935	0	935
Construction/Demolition Waste	2,420	0	2,420	2,444	0	2,444	2,468	380	2,088
Totals	60,768	21,806	38,962	61,703	22,019	39,684	61,990	23,730	38,260

Table 11-6 (continued). 15-Year Waste Disposal Projections - City of Davis as Measured in Tons Per Year

Material	1993			1994			1995		
	Total	Diverted	Disposed	Total	Diverted	Disposed	Total	Diverted	Disposed
Newspaper	3,977	2,241	1,736	4,107	2,310	1,797	4,055	2,334	1,721
Corrugated Cardboard	4,270	2,375	1,895	4,410	2,580	1,830	4,354	2,607	1,747
High-Grade Paper	603	223	380	623	255	368	615	256	359
Mixed Paper	2,559	1,201	1,358	2,643	1,324	1,319	2,609	1,338	1,271
Contaminated Paper	3,986	0	3,986	4,116	0	4,116	4,064	0	4,064
PET	41	28	13	41	30	11	41	32	9
HDPE	196	41	155	198	52	146	200	53	147
Polystyrene	186	0	186	188	0	188	190	0	190
Film Plastic	758	29	729	765	45	720	772	46	726
Other Plastics	999	0	999	1,009	0	1,009	1,019	0	1,019
CA Redemption Glass	460	190	270	465	209	256	470	211	259
Other Recyclable Glass	1,626	1,090	536	1,642	1,141	501	1,658	1,153	505
Non-Recyclable Glass	58	0	58	59	0	59	60	0	60
Aluminum Cans	185	119	66	187	123	64	189	125	64
Bi-Metal/Tin Cans	699	99	600	706	153	553	713	156	557
Ferrous Metals	576	0	576	582	0	582	588	0	588
Non-Ferrous Metals	320	0	320	323	0	323	326	0	326
White Goods	64	63	1	65	63	2	66	64	2
Yard Wastes	8,448	3,014	5,434	8,531	3,960	4,571	8,615	4,335	4,280
Food Waste	4,628	69	4,559	4,673	70	4,603	4,719	70	4,649
Tires & Rubber	177	0	177	179	0	179	181	0	181
Wood Waste	5,200	0	5,200	5,251	0	5,251	5,302	0	5,302
Ag Crop Residue	5,381	5,360	21	5,434	5,413	21	5,487	5,466	21
Manure	101	0	101	102	0	102	103	0	103
Disposable Diapers	736	229	507	743	231	512	750	233	517
Textiles, Leather	526	0	526	531	0	531	536	0	536
Inert Solids	8,545	7,696	849	8,629	7,955	674	8,714	8,038	676
Miscellaneous Other Waste	2,985	0	2,985	3,014	0	3,014	3,044	0	3,044
HHW	85	0	85	86	0	86	87	0	87
Ash	68	0	68	69	0	69	70	0	70
Medical Waste	10	0	10	10	0	10	10	0	10
Bulky Waste	687	0	687	694	0	694	701	0	701
Other Special Waste	944	0	944	953	0	953	962	0	962
Construction/Demolition Waste	2,491	1,024	1,467	2,515	1,359	1,156	2,540	1,372	1,168
Totals	62,573	25,091	37,482	63,543	27,273	36,270	63,810	27,889	35,921

Table 11-6 (continued). 15-Year Waste Disposal Projections - City of Davis as Measured in Tons Per Year

Material	1996			1997			1998		
	Total	Diverted	Disposed	Total	Diverted	Disposed	Total	Diverted	Disposed
Newspaper	4,087	2,396	1,691	4,119	2,538	1,581	4,151	2,626	1,525
Corrugated Cardboard	4,388	2,893	1,495	4,422	3,317	1,105	4,456	3,474	982
High-Grade Paper	620	278	342	625	369	256	630	374	256
Mixed Paper	2,629	1,414	1,215	2,650	1,573	1,077	2,670	1,699	971
Contaminated Paper	4,096	0	4,096	4,128	0	4,128	4,160	0	4,160
PET	41	32	9	41	35	6	41	39	2
HDPE	202	58	144	204	75	129	206	84	122
Polystyrene	191	0	191	192	0	192	193	0	193
Film Plastic	778	55	723	784	76	708	790	92	698
Other Plastics	1,027	0	1,027	1,035	0	1,035	1,043	0	1,043
CA Redemption Glass	474	224	250	478	252	226	482	267	215
Other Recyclable Glass	1,671	1,185	486	1,684	1,247	437	1,697	1,291	406
Non-Recyclable Glass	60	0	60	60	0	60	60	0	60
Aluminum Cans	190	127	63	191	131	60	192	135	57
Bi-Metal/Tin Cans	719	188	531	725	261	464	731	315	416
Ferrous Metals	593	0	593	598	0	598	603	0	603
Non-Ferrous Metals	329	0	329	332	0	332	335	0	335
White Goods	67	65	2	68	65	3	69	65	4
Yard Wastes	8,682	5,958	2,724	8,750	6,466	2,284	8,817	7,208	1,609
Food Waste	4,756	103	4,653	4,793	108	4,685	4,830	131	4,699
Tires & Rubber	182	71	111	183	76	107	184	71	113
Wood Waste	5,343	741	4,602	5,385	752	4,633	5,426	755	4,671
Ag Crop Residue	5,530	5,509	21	5,573	5,552	21	5,616	5,595	21
Manure	104	0	104	105	0	105	106	0	106
Disposable Diapers	756	235	521	762	237	525	768	239	529
Textiles, Leather	540	0	540	544	0	544	548	0	548
Inert Solids	8,782	8,117	665	8,850	8,173	677	8,918	8,182	736
Miscellaneous Other Waste	3,068	0	3,068	3,092	0	3,092	3,116	0	3,116
HHW	88	0	88	89	0	89	90	0	90
Ash	71	0	71	72	0	72	73	0	73
Medical Waste	10	0	10	10	0	10	10	0	10
Bulky Waste	706	0	706	712	0	712	717	0	717
Other Special Waste	970	0	970	978	0	978	986	0	986
Construction/Demolition Waste	2,560	1,382	1,178	2,580	1,391	1,189	2,600	1,401	1,199
Totals	64,303	31,031	33,272	64,805	32,694	32,111	65,304	34,043	31,261

Table 11-6 (continued). 15-Year Waste Disposal Projections - City of Davis as Measured in Tons Per Year

Material	1999 Total	1999 Diverted	1999 Disposed	2000 Total	2000 Diverted	2000 Disposed	2001 Total	2001 Diverted	2001 Disposed
Newspaper	4,183	2,546	1,637	4,215	2,566	1,649	4,247	2,586	1,661
Corrugated Cardboard	4,491	3,501	990	4,526	3,529	997	4,561	3,556	1,005
High-Grade Paper	635	354	281	640	357	283	645	360	285
Mixed Paper	2,692	1,712	980	2,713	1,725	988	2,734	1,738	996
Contaminated Paper	4,192	0	4,192	4,224	0	4,224	4,257	0	4,257
PET	41	40	1	41	40	1	41	40	1
HDPE	208	85	123	210	86	124	212	87	125
Polystyrene	195	0	195	197	0	197	199	0	199
Film Plastic	796	93	703	802	94	708	808	95	713
Other Plastics	1,051	0	1,051	1,059	0	1,059	1,067	0	1,067
CA Redemption Glass	486	270	216	490	272	218	494	274	220
Other Recyclable Glass	1,710	1,308	402	1,723	1,318	405	1,736	1,328	408
Non-Recyclable Glass	60	0	60	60	0	60	60	0	60
Aluminum Cans	193	137	56	194	138	56	195	139	56
Bi-Metal/Tin Cans	737	319	418	743	322	421	749	324	425
Ferrous Metals	608	0	608	613	0	613	618	0	618
Non-Ferrous Metals	338	0	338	341	0	341	344	0	344
White Goods	70	66	4	71	67	4	72	68	4
Yard Wastes	8,887	7,265	1,622	8,955	7,322	1,633	9,024	7,379	1,645
Food Waste	4,868	132	4,736	4,905	133	4,772	4,943	134	4,809
Tires & Rubber	185	72	113	186	73	113	187	74	113
Wood Waste	5,469	761	4,708	5,511	767	4,744	5,553	773	4,780
Ag Crop Residue	5,660	5,639	21	5,704	5,683	21	5,748	5,727	21
Manure	107	0	107	108	0	108	109	0	109
Disposable Diapers	774	239	535	780	243	537	786	245	541
Textiles, Leather	552	0	552	556	0	556	560	0	560
Inert Solids	8,989	8,288	701	9,058	8,353	705	9,128	8,418	710
Miscellaneous Other Waste	3,140	0	3,140	3,164	0	3,164	3,188	0	3,188
HHW	91	0	91	92	0	92	93	0	93
Ash	74	0	74	75	0	75	76	0	76
Medical Waste	10	0	10	10	0	10	10	0	10
Bulky Waste	724	0	724	730	0	730	736	0	736
Other Special Waste	994	0	994	1,002	0	1,002	1,010	0	1,010
Construction/Demolition Waste	2,620	1,410	1,210	2,640	1,425	1,215	2,660	1,435	1,225
Totals	65,819	34,237	31,582	66,332	34,513	31,819	66,843	34,780	32,063

Table 11-6 (continued). 15-Year Waste Disposal Projections - City of Davis as Measured in Tons Per Year

Material	2002			2003			2004		
	Total	Diverted	Disposed	Total	Diverted	Disposed	Total	Diverted	Disposed
Newspaper	4,282	2,606	1,676	4,315	2,626	1,689	4,348	2,646	1,702
Corrugated Cardboard	4,597	3,584	1,013	4,632	3,612	1,020	4,668	3,640	1,028
High-Grade Paper	650	363	287	655	366	289	660	369	291
Mixed Paper	2,755	1,752	1,003	2,776	1,765	1,011	2,797	1,779	1,018
Contaminated Paper	4,291	0	4,291	4,324	0	4,324	4,357	0	4,357
PET	41	40	1	41	40	1	41	40	1
HDPE	214	88	126	216	89	127	218	90	128
Polystyrene	201	0	201	203	0	203	205	0	205
Film Plastic	814	96	718	820	97	723	826	98	728
Other Plastics	1,075	0	1,075	1,083	0	1,083	1,091	0	1,091
CA Redemption Glass	498	276	222	502	278	224	506	280	226
Other Recyclable Glass	1,750	1,338	412	1,763	1,348	415	1,777	1,358	419
Non-Recyclable Glass	60	0	60	60	0	60	60	0	60
Aluminum Cans	199	140	59	201	141	60	203	142	61
Bi-Metal/Tin Cans	755	327	428	761	330	431	767	333	434
Ferrous Metals	623	0	623	628	0	628	633	0	633
Non-Ferrous Metals	347	0	347	350	0	350	353	0	353
White Goods	73	69	4	74	70	4	75	71	4
Yard Wastes	9,096	7,437	1,659	9,166	7,494	1,672	9,237	7,552	1,685
Food Waste	4,983	135	4,848	5,021	136	4,885	5,060	137	4,923
Tires & Rubber	188	75	113	189	76	113	190	77	113
Wood Waste	5,598	779	4,819	5,641	785	4,856	5,684	791	4,893
Ag Crop Residue	5,793	5,772	21	5,838	5,816	22	5,883	5,861	22
Manure	110	0	110	111	0	111	112	0	112
Disposable Diapers	792	247	545	798	249	549	804	251	553
Textiles, Leather	564	0	564	568	0	568	572	0	572
Inert Solids	9,201	8,484	717	9,272	8,549	723	9,343	8,615	728
Miscellaneous Other Waste	3,214	0	3,214	3,239	0	3,239	3,264	0	3,264
HHW	94	0	94	95	0	95	96	0	96
Ash	77	0	77	78	0	78	79	0	79
Medical Waste	10	0	10	10	0	10	10	0	10
Bulky Waste	742	0	742	748	0	748	754	0	754
Other Special Waste	1,018	0	1,018	1,026	0	1,026	1,034	0	1,034
Construction/Demolition Waste	2,682	1,448	1,234	2,703	1,459	1,244	2,724	1,470	1,254
Totals	67,370	35,056	32,331	67,889	35,326	32,581	68,431	35,600	32,831

Table 11-6 (continued). 15-Year Waste Disposal Projections - City of Davis as Measured in Tons Per Year
2005

Material	Total	Diverted	Disposed
Newspaper	4,383	2,667	1,716
Corrugated Cardboard	4,705	3,669	1,036
High-Grade Paper	665	372	293
Mixed Paper	2,820	1,793	1,027
Contaminated Paper	4,392	0	4,392
PET	41	41	0
HDPE	220	90	130
Polystyrene	207	0	207
Film Plastic	832	98	734
Other Plastics	1,100	0	1,100
CA Redemption Glass	510	282	228
Other Recyclable Glass	1,792	1,370	422
Non-Recyclable Glass	60	0	60
Aluminum Cans	205	143	62
Bi-Metal/Tin Cans	773	335	438
Ferrous Metals	638	0	638
Non-Ferrous Metals	356	0	356
White Goods	76	71	5
Yard Wastes	9,311	7,612	1,699
Food Waste	5,100	138	4,962
Tires & Rubber	191	77	114
Wood Waste	5,730	757	4,973
Ag Crop Residue	5,930	5,908	22
Manure	113	0	113
Disposable Diapers	810	253	557
Textiles, Leather	576	0	576
Inert Solids	9,418	8,684	734
Miscellaneous Other Waste	3,289	0	3,289
HHW	97	0	97
Ash	80	0	80
Medical Waste	10	0	10
Bulky Waste	760	0	760
Other Special Waste	1,042	0	1,042
Construction/Demolition Waste	2,745	1,482	1,263
Totals	68,959	35,842	33,117

APPENDIX A

MATERIALS MARKETS

Paper Markets

Independent Paper Stock 4800 Florin-Perkins Road Sacramento, California	Accepts newspaper, cardboard, high-grade paper and other mixed grades. Aluminum and metal cans, sorted glass, and PET is also accepted.
Weyerhaeuser Company 50 South River Road West Sacramento, California	Accepts 14 different grades of waste paper.
Keyes Fiber Company 8450 Gerber Road Sacramento, Calfornia	Accepts newspaper as a raw material in the manufacturing of packaging materials.
Gold Bond Building Products 800 West Church Street Stockton, California	Accepts cardboard, high-grade paper, and mixed paper for product manufactor.

Metals Markets

Proler International 15332 South McKinley Avenue Lathrop, California	Accepts tin and ferrous materials only.
Reynolds Aluminum 777 Arden Way Sacramento, California	Accepts CA Redemption containers, copper, and scrap aluminum.

C & C Metals 11320 Dismantle Court Rancho Cordova, California	Accepts CA Redemption containers, copper, scrap aluminum, ferrous metals, and white goods.
Schnitzer Steel 12000 Folsom Blvd. Rancho Cordova, California	Accepts ferrous metals, white goods, non-ferrous metals, and tin cans.
Altas Metals 30 Arden Way Sacramento, California	Accepts scrap aluminum.
Barbary Coast Steel 4300 E. Shore Hwy. Emeryville, California	Accepts ferrous metals.

Glass Markets

Anchor Glass Container 1400 W. 4th St. Antioch, California	Accepts flint cullet only.
Anchor Glass Container P.O. Box 3427 22302 Hathaway Ave. Hayward, California	Accepts green and flint cullet only.

Plastics Markets

Bags Again, Inc. 1300 South El Camino Real, Suite 300 San Mateo, California	Accepts post consumer Low Density Polyethylene (LDPE)

Bay Polymer Corporation 44530 Grimmer Blvd. Fremont, California	Accepts post consumer HDPE, LDPE, PS, PVC, and PP.
Certified Polymer Processors, Inc. 540 Stone Road, Unit J Benicia, California	Accepts post consumer HDPE.
Deer Polymer Corporation 3410 Geary Blvd. San Francisco, California	Accepts post consumer LDPE, PET, PP, PS, PVC, and other plastics (Resin Broker)
Engineered Resource Recovery Inc. P.O. Box 1226 Lafayette, California	Accepts post consumer LDPE and PET.
Joe's Plastics, Inc. 7065 Paramount Blvd. Pico Rivera, California	Accepts HDPE, LDPE, PP, and PS.
Marketing Associates Inc. 1818 N. Orangethorpe Park Anahiem, California	Accepts all post consumer plastics.
Talco Plastics Inc. 11550 Burke St. Whittier, California	Accepts post consumer HDPE, LDPE, PET, PP, PS.
Tech Polymers P.O. Box 4429 Berkeley, California	Accepts all post consumer plastics. (Resin Broker)

White Goods

C&C Metals 11320 Dismantle Court Rancho Cordova	Accepts delivery of white goods; compressors must be removed; no freezers. No minimum required.
Schnitzer Steel 12000 Folsom Blvd. Rancho Cordova	Accepts delivery of all white goods, as-is. No minimum required.
LMC Metals 130 North 12th Sacramento	Accepts delivery of white goods; motors and compressors must be removed. 200 lb. minimum.

Wood Waste

Wood Fuel Processing Company 5079 South Township Road Yuba City	Processes olive pits, olive oil, and prune pits. Uses almond, walnut and prune brush to produce barbecue briquets. Processes mill-in waste less than 2 feet, trip ends from molding plants, and 2x4s any length.
Thermo Electron Company Woodland Biomass East Kentucky Street between Road 101 and 102 Woodland	Processes hogged or chipped brush chips, almond hulls, olive pits, peach pits, walnut shells and rice hulls.
Wheelbrator Shasta Energy Company, Inc. 20811 Industry Road Anderson	Processes almond and walnut shells, and orchard prunings. Equipment on site available to chip branch es. Processes trim ends from molding plants, 3-inch (minus bark) sawmill waste, cull logs up to 72 inches in diameter, whole tree chips, chipped logging slash, and processed log yard waste.

Concrete and Asphalt

Harbor Sand and Gravel North End 28th Street/American River Levee/across from Sacramento River	Takes materials free of charge. Recycles clean concrete, concrete with small amount of rebar (sheared off), and asphalt. Size limit 2 feet x 2 feet x 6 inches. Produces roadbase from recycled product.

APPENDIX B

GLOSSARY

The following terms and definitions are derived from TITLE 14, PLANNING GUIDELINES AND PROCEDURES FOR PREPARING AND REVISING COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLANS, Article 7, Procedures for Preparing and Revising City and County Source Reduction and Recycling Elements, Section 18720, Definitions.

Additional terms and definitions are denoted by an asterisk preceding the term.

Agricultural Wastes
"Agricultural wastes" means solid wastes of plant and animal origin, which result from the production and processing of farm or agricultural products, including manures, orchard and vineyard prunings, and crop residues, which are removed from the site of generation for solid waste management. Agricultural refers to SIC Codes 011 through 0291.

Aluminum can or aluminum container
"Aluminum can" or "aluminum container" means any food or beverage container that is composed of at least 94 percent aluminum.

Asbestos
"Asbestos" means fibrous forms of various hydrated minerals, including chrysotile (fibrous serpentine), crocidolite (fibrous reibecktite), amosite (fibrous cummingtonite-grunerite), fibrous tremolite, fibrous actinolite, and fibrous anthophyllite.

Ash
"Ash" of "ashes" means the residue from the combustion of any solid or liquid material.

Bi-metal container
"Bi-metal container" means any metal container composed of at least two different types of metals, such as a steel container with an aluminum top.

Best readily available and applicable data or representative data
"Best readily available and applicable data" or "representative data" means information that is available to a jurisdiction from published sources, field sampling, the Board, or other identifiable entities which is the most current data and which addresses the situation being examined.

Buy-back center
"Buy-back center" means a facility which pays a fee for the delivery and transfer of ownership to the facility of source separated materials, for the purpose of recycling or composting.

Capital Costs
"Capital costs" means those direct costs incurred in order to acquire real property assets such as land, buildings and building additions; site improvements; machinery; and equipment

Capture Rate
"Capture Rate" is defined as the percentage to materials diverted from the waste stream. An example would be if Residential generators generated 100 TPY of newspaper and diverted 80 TPY, the Capture Rate would be 80 percent.

Commercial solid wastes
"Commercial solid wastes" means solid waste originating from stores, business offices, commercial warehouses, hospitals, educational, health care, military, and correctional institutions, non-profit research organizations, and government offices. Commercial solid waste refers to SIC Codes 401 through 4939, 4961, and 4971 (transportation, communications and certain utilities), 501 through 5999 (wholesale and retail trade), 601 through 6799 (finance, insurance and real estate), 701 through 8748 (public and private service industries such as hospitals and hotels), and 911 through 9721 (public administration). Commercial solid wastes do not include construction and demolition waste.

Commercial Unit
"Commercial Unit" means a site zoned for a commercial business and which generates commercial solid wastes.

Composition
"Composition" means a set of identified solid waste materials, categorized into waste categories and waste types pursuant to sections 18722(i) and (j) of Article 6.1 of this Chapter.

Composting
"Composting' means a method of waste treatment which produced a product meeting the definition of "compost" in Public Resources Code section 40116.

Composting facility
"Composting facility" means a permitted solid waste facility at which composting is conducted and which produced a product meeting the definition of "compost" in Public Resources Code section 40116.

Construction and demolition waste
"Construction and demolition waste" includes solid wastes, such as building materials; and packaging and rubble resulting from construction, remodeling, repair and demolition operations on pavements, houses, commercial buildings, and other structures. Construction refers to SIC Codes 152 through 1794, 1796, and 1799. Demolition refers to SIC Code 1795.

Corrugated Container
"Corrugated container" means a paperboard container fabricated from two layers of kraft linerboard sandwiched around a corrugating medium. Kraft linerboard means paperboard made from wood pulp produced by a modified sulfate pulping process, with basis weight ranging from 18 to 200 pounds, manufactured for use as facing material for corrugated or solid fiber containers. Linerboard also may mean that material which is made from reclaimed paper stock. Corrugating medium means paperboard made from chemical or semichemical wood pulps, straw or reclaimed paper stock, and folded to form permanent corrugations. Corrugated container refers to SIC Code 2653.

Cost-effective
"Cost-effective" means a measurement of cost compared to an unvalued output (e.g., the cost per ton of solid waste collected) such that the lower the cost, the more cost-effective the action.

Countywide Integrated Waste Management Plan
"Plan" or "Countywide Integrated Waste Management Plan" means the Countywide Integrated Waste Management Plan as defined in section 41750 of the Public Resources Code.

Disposal
"Disposal" means the management of solid waste through landfilling or transformation at permitted solid waste facilities.

Disposal capacity
"Disposal capacity" means the capacity, expressed in either weight in tons or its volumetric equivalent in cubic yards, which is either currently available at a permitted solid waste landfill, or will be needed for the disposal of solid waste generated within the jurisdiction over a specified period of time.

Diversion Alternative
"Diversion alternative" means any activity, existing or occurring in the future, which has been, is, or will be implemented by a jurisdiction which could result in or promote the diversion of solid waste, through source reduction, recycling or composting, from solid waste landfills and transformation facilities.

Drop-off recycling center
"Drop-off recycling center" means a facility which accepts delivery or transfer of ownership of source separated materials for the purpose of recycling or composting, without paying a fee. Donation of materials to organizations, such as charitable groups, is included in this definition.

Durability
"Durability" means the ability of a product to be used for its intended purpose for a period greater than the mean useful product lifespan of similar products.

End market or end use
"End market" or "end use" means the use or uses of a diverted material or product which has been returned to the economic mainstream, whether or not this return is through sale of the material or product. The material or product can have a value which is less than the solid waste disposal cost.

Feasible
"Feasible" means that a specified program, method, or other activity can, on the basis of cost, technical requirements and time frame for accomplishment, be undertaken to achieve the objectives and tasks identified by a jurisdiction in a Countywide Integrated Waste Management Plan.

Ferrous metals
"Ferrous metals" means any iron or steel scrap which has an iron content sufficient for magnetic separation.

Food waste
"Food waste" means all animal and vegetable solid wastes generated by food facilities, as defined in California Health and Safety Code section 27521, or from residences, that results from the storage, preparation, cooking, or handling of food.

Hazard
"Hazard" means having one or more of the characteristics that cause a substance or combination of substances to qualify as a hazardous material, as defined by section 66084 of Title 22 of the California Code of Regulations.

Household hazardous waste
"Household hazardous wastes" are those wastes resulting from products purchased by the general public for household use which, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may pose a substantial known or potential hazard to human health or the environment when improperly treated, disposed, or otherwise managed.

Household hazardous waste collection
"Household hazardous waste collection" means a program activity in which household hazardous wastes are brought to a designated collection point where the household hazardous wastes are separated for temporary storage and ultimate recycling, treatment, or disposal.

Implementation
"Implementation" means the accomplishment of the program tasks as identified in each component required by section 18733 of this Chapter.

Industrial solid waste
"Industrial solid waste" means solid waste originating from mechanized manufacturing facilities, factories, refineries, construction and demolition projects, and publicly operated treatment works, and/or solid wastes placed in debris boxes. In the case of Lake County, industrial wastes result primarily from food processing and mining which occur in the County.

Industrial unit
"Industrial unit" means a site zoned for an industrial business and which generates industrial solid wastes.

Inert solids or inert waste
"Inert solids" or "inert waste" means a non-liquid solid waste including, but not limited to, soil and concrete, that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board pursuant to Division 7 (commencing with section 13000) of the California Water Code and does not contain significant quantities of decomposable solid waste,

Jurisdiction
"Jurisdiction" means the city or county responsible for preparing any one or all of the following: the Countywide Integrated Waste Management Plan, or the Countywide Siting Element, or the SRRE Element.

Manual Materials Recovery Facility (Manual MRF's)
Manual MRF's typically receive source separated wastes collected in curbside, commercial/industrial, drop-off, or buy-back programs and prepare these materials for transport to manufacturers for re-use.

Marine wastes
"Marine wastes" means solid wastes generated form marine vessels and ocean work platforms, solid wastes washed onto beaches, and litter discarded on the lakeside or ocean beaches.

Market development
"Market development" means a method of increasing the demand for recovered materials so that end markets for the materials are established, improved or stabilized and thereby become more reliable.

Medium-term planning period
"Medium-term planning period" means a period beginning in the year 1996 and ending in the year 2000.

Mixed paper
"Mixed paper" means a waste type which is 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 wastes.

Mixed waste materials recovery facility (MRF)
"Mixed waste materials recovery facility" means a permitted solid waste facility where solid wastes or recyclable materials are sorted or separated, by hand or by use of machinery, for the purposes of recycling or composting.

Model component format
"Model component format" means that format described in section 18733.1 through 18733.6 of Article 6.2 of this Chapter which shall be used for preparation of several of the individual components of a SRRE Element.

Municipal solid waste or MSW
"Municipal solid waste" or "MSW" means all solid wastes generated by residential, commercial, and industrial sources, and all solid waste generated at construction and demolition sites, at food processing facilities, and at treatment works for water and waste water, which are collected and transported under the authorization of a jurisdiction or are self-hauled. Municipal solid waste does not include agricultural crop residues (SIC Codes 071 through 0724, 0751, animal manures (SIC Code 0751), mining waste and fuel extraction waste (SIC Codes 101 through 1499), forestry wastes (SIC Codes 081 through 0851, 2411 and 2421), and ash from industrial boilers, furnaces and incinerators.

Newspaper
"Newspaper" means any newsprint which is separated from other types of solid waste or collected separately from other types of solid waste and made available for reuse and which may be used as a raw material in the manufacture of a new paper product.

Non-ferrous metals
"Non-ferrous metals" means any metal scraps that have value, and that are derived from metals other than iron and its alloys in steel, such as aluminum, copper, brass, bronze, lead, zinc and other metals, and to which a magnet will not adhere.

Non-renewable resource
"Non-renewable resource" means a resource which cannot be replenished, such as those resources derived form fossil fuels.

Normally disposed of
"Normally disposed of" refers to those waste categories and/or waste types which: have been demonstrated by the Solid Waste Generation Study, conducted pursuant to section 18722 of this Chapter, to constitute at least 0.001 percent of the total weight of solid wastes disposed in a

solid waste stream attributed to the jurisdiction as of January 1, 1990; which are deposited at permitted solid waste landfills or transformation facilities subsequent to any recycling or composting activities at those solid waste facilities; and which are allowed to be considered in the establishment of the base amount of solid waste from which source reduction, recycling, and composting levels shall be calculated, pursuant to the limitations listed in Public Resources Code section 41781(b).

Operational Costs
"Operational costs" means those direct costs incurred in maintaining the ongoing operation of a program or facility. Operational costs do not include capital costs.

Organic waste
"Organic waste" means solid wastes originated from living organisms and their metabolic waste products, and form petroleum, which contain naturally produced organic compounds, and which are biologically decomposable by microbial and final action into the constituent compounds of water, carbon dioxide, and other simpler organic compounds.

Other paper
"Non-recyclable paper" means discarded paper which has no market value because of its physical or chemical or biological characteristics or properties.

Other plastics
"Other plastics' means all waste plastics except polyethylene terephthalate (PET) containers, film plastics, polystyrene, and high density polyethylene (HDPE) containers.

Participation Rate
"Participation Rate" is defined as the percentage of generators participating in a given program. As an example, if 55 homes out of 100 placed yard waste in the street for collection, the participation rate would be 55 percent. The State is currently developing a uniform definition of "participation" as some jurisdictions in the State define participation as weekly, whereas others define it on a monthly basis.

Permitted capacity
"Permitted capacity" means that volume in cubic yards or weight in tons which a solid waste facility is allowed to receive, on a periodic basis, under the terms and conditions of that solid waste facility's current Solid Waste Facilities Permit issued by the local enforcement agency and concurred in by the California Integrated Waste Management Board.

Permitted landfill
"Permitted landfill" means a solid waste landfill for which there exists a current Solid Waste Facilities Permit issued by the local enforcement agency and concurred in by the California Integrated Waste Management Board, or which is permitted under the regulatory scheme of another state.

Permitted solid waste facility
"Permitted solid waste facility" means a solid waste facility for which there exists a Solid Waste Facilities Permit issued by the local enforcement agency and concurred in by the California Integrated Waste Management Board, or which is permitted under the regulatory scheme of another state.

Program
"Program" means the full range of source reduction, recycling, composting, special waste, or household hazardous waste activities undertaken by or in the jurisdiction or relating to management of the jurisdiction's waste stream to achieve the objectives identified in the Source Reduction, Recycling, Composting, Special Waste, and Household Hazardous Waste components, respectively.

Purchase preference
"Purchase preference' means a preference provided to a wholesale or retail commodity dealer which is based upon the percentage amount that the costs of products made from recycled materials may exceed that of similar non-recycled products and still be deemed the lowest bid.

Rate structure
"Rate structure" means that set of prices established by a jurisdiction, special district (as defined in Government Code section 56036), or other rate setting authority to compensate the jurisdiction, special district or rate setting authority for the partial or full costs of the collection, processing, recycling, composting, and/or transformation or landfill disposal of solid wastes.

Recovered material
"Recovered material" means material which has been retrieved or diverted from disposal or transformation for the purpose of recycling, reuse or composting. "Recovered material" does not include those materials generated from and reused on site for manufacturing purposes.

Region
"Region" means the combined geographic area of two or more incorporated areas; two or more unincorporated areas; or any combination of incorporated and unincorporated ares.

***Refuse Derived Fuel (RDF)**
Refuse derived fuel is a product composed of the residual waste from a materials recovery facility. The common components of RDF are mixed and contaminated paper and plastics.

Repairability
"Repairability" means the ability of a product or package to be restored to a working or usable state at a cost which is less than the replacement cost of the product or package.

Residential solid waste
"Residential solid waste" means solid waste originating from single-family or multiple family dwellings.

Residential unit
"Residential unit" means a site occupied by a building which is zoned for residential occupation and whose occupants generate residential solid wastes.

Reusability
"Reusability" means the ability of a product or package to be used more than once in its same form.

Re-use
"Re-use" means the use, in the same form as it was produced, of a material which might otherwise be discarded.

Rubber
"Rubber" means an amorphous polymer of isoprene derived from natural latex of certain tropical plants or from petroleum.

Salvage
"Salvage" means the controlled removal of solid waste materials at a permitted solid waste facility for recycling, reuse, composting, or transformation.

Seasonal
"Seasonal" means those periods of time during the calendar year which are identifiable by distinct cyclical patterns of local climate, demography, trade or commerce.

Sewage sludge
"Sewage sludge" means residual solids and semi-solids resulting from the treatment of waste water, but does not include waste water effluent discharged from such treatment processes.

Short-term planning period
"Short-term planning period" means a period beginning in the year 1991 and ending in the 1995.

SIC Code (Standard Industrial Classification)
"SIC Code" means the standards published in the U.S. Standard Industrial Classification Manual (1987), which is herein incorporated by reference.

Sludge
"Sludge" means residual solids and semi-solids resulting from the treatment of water, waste water, and/or other liquids. Sludge includes sewage sludge and sludge derived from industrial processes, but does not include effluent discharged from such treatment processes.

Solid Waste Generation Study
"Solid Waste Generation Study" means the study undertaken by a jurisdiction to characterize its solid waste stream and comply with all the requirements of section 18722 of this Chapter.

Source Reduction and Recycling Element or SRRE Element
"Source Reduction and Recycling Element" or "SRRE Element" means the source reduction and recycling element required pursuant to Public Resources Code sections 41000 and 41300.

Source separated
"Source separated' describes the segregation, by the generator, of materials designated for separate collection for some form of materials recovery or special handling.

Special waste
"Special waste" means any hazardous waste listed in section 66740 of Title 22 of the California Code of Regulations, or any waste which has been classified as a special waste pursuant to section 66744 of Title 22 of the California Code of Regulations, or which has been granted a variance for the purpose of storage, transportation, treatment, or disposal by the Department of Health Services pursuant to section 66310 of Title 22 of the California Code of Regulations. Special waste also includes any solid waste which, because of its source of generation, physical, chemical or biological characteristics or unique disposal practices, is specifically conditioned in a solid waste facilities permit for handling and/or disposal.

Statistically representative
"Statistically representative" means representative and random samples of units that are taken from a population sample, pursuant to the procedures given in Appendix 1 of Article 6.1 of this Chapter. For the purposes of this definition, population sample includes, but is not limited to, a sample from a population of solid waste generation sites, solid waste facilities and recycling facilities, or a population of items or materials and solid wastes in a refuse vehicle load of solid waste.

Tin can
"Tin can" means any food or beverage container that is composed of steel with a tin coating.

Ton
"Ton" means a unit of weight in the U.S. Customary System of Measurement, an avoirdupois unit equal to 2,000 pounds. Also called short ton or net ton.

Total Capture Rate
"Total Capture Rate" may be defined by the equation:

(Participation Rate) * (Capture Rate) = Total Diversion Rate

As an example, if the participation rate in a curbside recycling program was 80 percent, and the capture rate for newspaper was 80 percent, then the total capture rate would be 64 percent.

Transformation facility
"Transformation facility" means a facility whose principal function is to convert, combust, or otherwise process solid waste by incineration, pyrolysis, destructive distillation, or gasification, or to chemically or biologically process solid wastes, for the purpose of volume reduction, synthetic fuel production, or energy recovery. Transformation facility does not include a composting facility.

Volume
"Volume" means a three dimensional measurement of the capacity of a region of space or a container. Volume is commonly expressed in terms of cubic yards or cubic meters. volume is not expressed in terms of mass or weight.

Waste categories
"Waste categories" means the grouping of solid wastes with similar properties into major solid waste classes, such as grouping together office, corrugated and newspaper as a paper waste category, as identified by the solid waste classification system contained in section 18722 of Article 6.1 of this Chapter, except where a component-specific requirement provides alternative means of classification.

Waste diversion
"Waste diversion" means to divert solid waste, in accordance with all applicable federal, state and local requirements, from disposal at solid waste landfills or transformation facilities through source reduction, recycling or transformation facilities through source reduction, recycling or composting.

Waste generator
"Waste generator" means any person, as defined by section 40170 of the Public Resources Code, whose act or process produces solid waste as defined in Public Resources Code section 40191, or whose act first causes solid waste to become subject to regulation.

Waste type
"Waste type" means identified wastes having the features of a group or class of wastes which are distinguishable from any other waste type, as identified by the waste classification system contained in section 18722 of Article 6.1 of this Chapter, except where a component-specific requirement provides alternative means of classification.

White goods
"White goods" means discarded, enamel-coated major appliances, such as washing machines, clothes dryers, hot water heaters, stoves and refrigerators.

Wood waste
"Wood waste" means solid waste consisting of wood pieces of particles which are generated form the manufacturing or production of wood products, harvesting, processing or storage of raw wood materials, or construction and demolition activities.

Yard waste
"Yard waste" means any wastes generated from the maintenance or alteration of public, commercial or residential landscapes including, but not limited to, yard clippings, leaves, tree trimmings, prunings, brush, and weeds.

APPENDIX C

RESPONSE TO COMMENTS

1) CIWMB

Page 3-4, Single-Family Dwellings Waste Composition

The first paragraph identifies a total of "147 residential samples...obtained from single-family dwellings from the study jurisdiction." The final SWGS should identify the number of samples taken in each of the Cities and the unincorporated portion of the County. The final SWGS should also include the weight of each of the samples taken.

The second paragraph states: "residential samples collected from the Cities of West Sacramento, Winters, and Woodland were combined for statistical analysis...of household hazardous waste generated on a regional basis." This statement appears to imply that the data collected from these three cities was considered representative of the entire County and was, therefore, used to estimate HHW generated in the County. The final SWGS should include an explanation of the method used to determine that the samples taken were representative of the waste stream for the entire County [14 CCR Section 18722(h)]. Please note: Household hazardous waste which is diverted from disposal cannot be counted toward meeting waste diversion goals [14 CCR Section 18720(a)44].

City of Davis
The number of samples taken and average weight per sample for the City of Davis are summarized in the Waste Characterization Component. 3-11, 3-12

2) CIWMB

Page 3-4, Multi-Family Dwelling Waste Composition

The first paragraph states: "A total of 6 samples, averaging 218 pounds, were obtained...from the Cities of Winters and Woodland. These samples were combined for statistical analysis and...considered as being representative for multi-family dwellings in the Cities of Winters, Woodland, West Sacramento, and the Unincorporated Area." The final SWGS should include an explanation of the method used to determine that the samples taken were representative of the waste stream for the entire County [14 CCR Section [14 CCR Section 18722(h)].

City of Davis
The number of samples taken was largely based on the availability of samples which were strictly MFD in origin over the duration of the sampling period.

These samples were not considered to be representative of the entire County, but representative of the cities of Winters, Woodland, and West Sacramento and the Unincorporated Area. Separate samples were obtained from the City of Davis due to the fact that recycling services are offered to MFD communities.

These samples were considered to be representative largely due to the fact that recycling services were not being offered to MFD's in the sampled jurisdictions. Vehicles selected for sampling were specifically targeted (based on communications with contract haulers) to obtain samples of waste which were MFD in origin.

Analysis of the Yolo County regional waste composition data for MFD's indicates that the waste composition is very similar to other jurisdiction data. As an example, the waste composition for Yolo County compares well with the City of Culver City MFD data - though entirely different jurisdictions. The variation of percent composition for each waste category varies by as little as 0.1 percent to a maximum of 2.8 percent. Significant differences do occur with the waste types such as newsprint (4.4 percent less in Yolo County) and grass clippings (3 percent greater in Culver City); however, this is the extent of the divergence. At this stage of the planning process, the Yolo County MFD waste composition data was considered to be adequate for planning purposes.

3) CIWMB

Page 3-5, Commercial/Industrial/Institutional Waste Sources

The first paragraph includes the statement: "A total of 94 samples were obtained from commercial, industrial, and institutional sources." The final SWGS should identify the number of samples taken in each of the cities and the unincorporated portion of the County and how these samples were determined to be representative [14 CCR Section 18722(h)].

City of Davis

The number of samples taken and average sample weight from each jurisdiction and sources of generation (i.e, residential, commercial, and industrial) are summarized on each waste composition table in the Final SWGS.

Samples of waste from commercial and industrial sources were obtained from randomly selected vehicle loads at the point of disposal. Vehicle loads which were selected at random and found to contain mixed refuse from residential, commercial, or industrial sources were either discarded or sampled if representative samples of commercial or industrial waste could be obtained.

Samples were determined to be representative of commercial and industrial sources based on the types of wastes, generator addresses, or other information found in the sample which indicated the source of generation.

4) **CIWMB**

Page 3-5, Self-Haul Waste Sources

this item states: "125 self-haul vehicles were visually surveyed...for white goods, mixed yard waste, bulky wastes, and characterized as miscellaneous waste." The final SWGS should explain why only these solid waste categories were used as opposed to those required pursuant to 14 CCR Section 18722(j). This apparent limitation on waste type identification may make it difficult for the jurisdiction to accurately quantify disposal and anticipated diversion quantities for each of the required waste types without study data which disaggregates to the required solid waste categories.

This same item references "'loose' volume/weight conversion factors." The final SWGS should reference the source for said conversion factors (i.e., author, title, publisher, place of publication, page number and year published) [14 CCR Section 18722(f)(1)].

City of Davis
Visual observations of self-haul waste being disposed of indicated that the waste types identified above were the predominant materials observed in the self-haul waste stream. The predominant waste types indicated were white goods, mixed yard waste, bulky waste, construction and demolition debris, and miscellaneous waste. Categorization of waste into the waste type of "construction and demolition waste" was in error, however; a separate waste composition estimate for construction and demolition waste generated for the County has been included in the final SWGS.

Miscellaneous wastes consisted of various waste types which could not be easily quantified such as residential refuse. Bulky wastes consisted of waste items such as household furniture and mattresses.

Source: Wilson, David Gordan. Handbook of Solid Waste Management. Van Nostrand Rienhald Company. Pages 42-43. 1977.

5) **CIWMB**

Page 4-1, Waste Diversion Characterization

The second paragraph under this heading includes the statement: "the quantity of waste diverted through source reduction, recycling, composting, and transformation was estimated through...recycling surveys." The final SWGS should include the following information regarding the surveys conducted to determine quantity of waste diverted from disposal:

- Complete references for information taken from existing published date (Sections 18722(l)(3) and 18724(c)].
- Description of the sampling method used and how it was determined to be random and representative.
- All calculations and discussions thereof explaining how the number of units to be surveyed was determined.
- The number of people (or businesses) surveyed, the number of people (or businesses) that responded, and the survey procedure used.

It would also be helpful if copies of all survey forms used (with a discussion of how and for whom they were used) were included in the final SWGS.

City of Davis
Source: Wilson, David Gordan. Handbook of Solid Waste Management. Van Nostrand Rienhald Company. Pages 42-43. 1977.

Surveys were not distributed on a random basis. Companies which were identified as being "major employers" in the jurisdiction were sent a written survey to identify the quantity of waste diverted from waste disposal. Several companies which were targeted through the written survey were also telephoned to increase the level of response. Small grocery stores, tire retailers, and large tire users were also contacted by phone.

The quantity of waste diverted through certified recycling centers was based on information provided by the Department of Conservation - Division of Recycling.

The quantities of waste claimed for diversion were quantities of waste reported by those companies which responded to the survey.

6) CIWMB

The final SWGS should also describe and quantify all transformation which is being counted toward achievement of diversion goals. Please be aware that transformation quantities can only be applied toward the achievement of diversion goals after January 1, 1995 and said quantities may only be applied toward meeting 10 percent of the 50 percent diversion requirements [Public Resources Code (PRC) Section 41783]. In addition, transformation can only be counted toward meeting said diversion requirements if the transformation project meets certain standards as specified in PRC Section 41783.

City of Davis
The transformation of waste generated in the City of Davis is limited to wood and tire waste. Wood waste diversion is achieved through wood waste processing at the Central Landfill where wood is chipped and diverted as wood fuel to Woodland Biomass and Rockland Biomass

transformation facilities. Tires are largely diverted to Oxford Energy for transformation. Quantities of waste diverted are included in Section 4 of the SWGS.

Materials diverted for transformation are a fuel source and are processed or separated from other waste prior to transformation. Ash generated from the Woodland and Rockland biomass facilities is tested and ultimately used as soil amendment.

7) CIWMB

The final SWGS should also describe and quantify all source reduction which is being counted toward achievement of diversion goals (14 CCR Section 18734.2).

City of Davis
Source reduction activities counted towards waste diversion was limited to use of non-disposable diapers through the utilization of diaper services in the jurisdiction, food diverted to a charitable organization for re-distribution, and tomato processing waste which was diverted for re-use as animal food. Specific tonnages are identified in Table 3-13. 3-23

8) CIWMB

Page 5-7, Table 5-7, Waste Generation Projections

This table does not identify the units of measure used nor does it specify whether it is intended to project disposal under current conditions or under conditions set forth by the Source Reduction and Recycling Element (SRRE). The final SWGS should resolve these two discrepancies. In addition, pursuant to 14 CCR Section 18722(c), the final SWGS should include 15 year projections of waste disposed both under current conditions and under conditions set forth by the SRRE.

City of Davis
Table 5-7 projects the total quantity of waste generated in the jurisdiction under current conditions. Units are in tons per year. Fifteen year waste projections under current conditions and under conditions set forth in the SRRE are provided in Section 3 of the SRRE.

9) CIWMB

Units of Measure

The final SWGS should include the quantity of waste disposed and/or transformed in terms of volume. The volume measurement given for solid waste disposed should be expressed in terms

of in-place volume, after compaction, in the landfill [14 CCR Section 18722(f)(4)]. Volume measurements need only be reported for total quantities (instead of individual waste type) of waste disposed and/or transformed. Please be certain to reference (i.e., author, title, publisher, place of publication, page number and year published) all conversion factors used [14 CCR Section 18722(f)(1)].

City of Davis
The SWGS indicates the quantity of waste disposed in terms of volume (cubic yards) in Table 3-28; however, the materials currently diverted through transformation were not included. The volume of waste currently being disposed is estimated to be 111,948 cubic yards. The volume of waste disposed including waste transformed is estimated to be a total of 113,249 cubic yards. The conversion factor used to arrive at these estimates was 1,200 pounds per cubic yard. This conversion factor was based on Yolo County Central Landfill Contract Plans and Specifications - March 1991 through March 1998.

10) CIWMB

15-Year Waste Diversion Projections

The final SWGS should include 15-year projections of the quantity of wastes diverted and generated both under current conditions and under conditions set forth by the SRRE. Each projection should be listed on a year-by-year basis.

City of Davis
Fifteen year waste disposal and diversion projections under current conditions and under conditions set forth in the SRRE are provided in Section 3 of the SRRE.

11) CIWMB

Seasonal Variations for Solid Waste Diversion

The final SWGS should include a discussion of the effect of seasonal waste stream variation on the quantity of waste diverted [14 CCR Section 18722(i)(2)]. The discussion should also include any assumptions made about the presence or lack of seasonal impact on the quantity of wastes diverted.

City of Davis
Information is available as to seasonal variations for selected waste types diverted from the City of Davis during 1990. Data provided for newspaper, cardboard, and glass are summarized as follows:

Newspaper--

Peak levels of diversion for newspaper during 1990 occurred during the months of May, November, and December. Minimum diversion rates occurred during the months of February and October. Monthly diversion rates were relatively constant during the remainder of the year.

Cardboard--

Diversion rates for cardboard remained relatively constant during the period of January through May with diversion rates increasing from June through December.

Glass--

Peak diversion rates for glass occurred in May and November. Diversion rates for glass remained relatively constant throughout the year with the exception of April when the lowest diversion rate was recorded.

12) CIWMB

Diversion of Inert Wastes

Please recall that inert solids, scrap metals, white goods and agricultural wastes cannot be counted toward waste diversion goals unless the following conditions were met as of January 1, 1990 (Public Resources Code Section 41781):

- A waste diversion program was in place for this waste type; and,
- This waste type was normally disposed at a permitted solid waste disposal facility used by the City.

City of Davis
The inclusion of inert solids for waste diversion meet both of these criteria. An active waste diversion program is currently in place at Yolo County Central Landfill targeting inert solids for construction related purposes. The SWGS also indicated that inert solids are currently generated from the City of Davis and disposed of at the Yolo County Central Landfill.

13) CIWMB

Accuracy of Data

The final study should include a description of the procedures to be used to quantify future data on wastes disposed, transformed and diverted [14 CCR Section 18722(c)]. This discussion should include how often and from whom reports will be expected.

City of Davis
A description of procedures to be used to quantify wastes disposed, transformed, and diverted has been included in Section 5.6 - Monitoring and Evaluation.

14) CIWMB

Section 4 - Source Reduction Component

Selection of Alternatives - To support the selection of the preferred alternatives, Board Staff recommend that each alternative be cross-compared based on the evaluation criteria. This will allow for the cross comparison of the relative merit of each alternative. This comparison should then be used to justify the selection of preferred alternatives based on their relative merit as required by 14 CCR 18733.4(a).

City of Davis
As described in the component, selection of alternatives is based upon public input, the advisement of the Davis Natural Resources Commission, discussions with City personnel, and the overall applicability of the alternative to the City. 4-33.

15) CIWMB

Section 5 - Recycling Component

Objectives - Specific objectives for meeting the recycling goals identified in Table 5-1 are not identified. The final Element should include written objectives for meeting those goals (CCR Section 18731).

City of Davis
Written objectives included. 5-1, 5-2, 5-3, 5-4.

16) CIWMB

Market Development - CCR Section 18735.1 requires that the goals and objectives section of this component must discuss market development objectives to be achieved in the short-term and medium-term planning periods. The final SRRE should provide a more thorough discussion and identification of markets for the diverted materials being targeted in Davis. Recycling does not occur unless the recyclable materials collected and processed are sold and remanufactured into marketable new products. It is necessary for municipalities to establish recycling market development programs and policies to expand and create markets to complement their diversion programs. The City should established recycling market development objectives and commit to specific actions it will take to achieve the objectives. As part of the Element's stated market development strategies, Board Staff recommend that the City consider the possibility of participating in the Board's Market Development Zones program. For further information in regard to this program, please contact Shawn Pittard, Manager of the Board's Markets Development Branch, at 916-255-2396.

City of Davis
Comment noted. Reference to market development objectives, including the CALMAX Materials Exchange Program added. 5-4.

17) CIWMB

Selection of Alternatives - The selection of alternatives section should explain why each alternative was selected as required by 14 CCR 18733.4(a),provide an estimate of the types and quantities of waste that each alternative will divert [18733.4(b)], and a more thorough discussion of existing markets which demonstrates that they are adequate for absorbing the additional amounts of materials to be diverted from landfilling [18733.4(c)].

City of Davis
Additional criteria for selection of alternatives added 5-29, 5-30. Tables 5-9 and 5-10 added and discuss amounts of materials to be diverted. 5-33, 5-34. Discussion of markets added. 5-35, Appendix A.

18) CIWMB

Program Implementation - it does not appear that the alternatives under consideration have been discussed in enough detail to identify and schedule necessary implementation tasks. The tasks necessary for carrying out all preferred program alternatives should be identified in the schedule included in the Final Element (CCR Section 18733.5). In addition, Board Staff recommend that the schedule reflect the tasks necessary for program monitoring and evaluation.

City of Davis
Implementation tables revised according to suggestion. 5-36, 5-37, 5-38.

19) CIWMB

Monitoring Shortfalls - The monitoring program should identify contingency measures which could be implemented in the event that the preferred alternatives are not successfully implemented [CCR Section 18733.6(c)(4)]. Board Staff recommend that specific contingency measures, including expansion of new or existing diversion alternatives and the implementation of additional diversion alternatives, should be identified.

City of Davis
More detailed descriptions of contingency measures added. 5-40, 5-41.

20) CIWMB

Section 6 Composting Component

Objectives - The objectives are, for the most part, not time specific nor quantifiable as required by CCR Section 18731. Therefore, in the Final Element, objectives should be revised to be time specific and quantifiable.

City of Davis
Objectives modified according to suggestion. 6-4, 6-5.

21) CIWMB

Yard Waste Composting - Davis Waste Removal is currently in the process of permitting its composting facility. The City should be aware that it may not count any material composted at this site toward diversion requirements until the Board has concurred in the issuance of a solid waste facilities permit for the facility.

City of Davis
Comment noted.

22) CIWMB

Markets - CCR Section 18736.4(a) requires that this component identify the end markets or end use which will be secured during the short-term and medium-term planning periods. If markets

cannot be firmly identified, the component shall describe the methods by which the jurisdictions will secure markets. The Preliminary Draft SRRE makes only a vague reference to possible markets, and the final document will need to more thoroughly discuss and explore market development at the local level.

City of Davis
Additional discussion of markets and contingency measures added. 6-37, 6-38.

23) CIWMB

Section 7 Special Waste Component

Existing Conditions - This section does not discuss the handling, diversion and/or disposal procedures for ash and agricultural wastes which are identified as being generated by the City in the Waste Generation Study. Board staff recommend that the City discuss these procedures in the Final Element.

City of Davis
Reference to Ash and Agricultural Wastes added. 7-4, 7-5.

24) CIWMB

Section 8 - Education and Public Information Component

This section adequately complies with statutory and regulatory requirements.

City of Davis
Comment noted.

25) CIWMB

Section 9 - Facility Capacity Component

This section adequately complies with statutory and regulatory requirements.

City of Davis
Comment noted.

26) CIWMB

Section 10 - Funding Component

This section does not provide a thorough breakdown of program costs and revenue sources to cover those costs. To meet the requirements of CCR Section 18746, please address the following comments in the Final SRRE:

Program Costs - It does not appear that the funding component includes cost estimates for program planning and development as required by CCR Section 18746(a). In addition, a discussion of how cost estimates were derived for other programs is not provided. The above information should be included in the Final Element and revenue sources needed to cover this cost should also be identified.

City of Davis
More detailed cost estimates provided. They are presented and based upon projections developed in the components. 10-2.

27) CIWMB

Revenue Sources - This section does not adequately demonstrate that there are sufficient funds available to cover the cost of program planning, development and implementation. Specifically, it is not clear what current per capita fees are charged by the City nor the amount this fee may have to go up in order to pay for the cost of AB 939 programs. In summary, the Final Element will need to clearly demonstrate that there are adequate funding sources available to cover the cost of program planning, development and implementation [CCR Section 18746(a)].

City of Davis
Additional reference to costs per generator added. Costs will be absorbed by the rate structure. 10-2.

28) CIWMB

Section 11 - Integration Component

Summary of Diversion - Pursuant to the requirements of CCR Section 18748(a)(3), the integration component should summarize the types and quantities of waste to be diverted by the preferred diversion alternatives. The sum total of these amounts should meet the requirements of PRC Section 41780. In addition, CCR Section 18748(a) requires that this component explain and explore how all the diversion alternatives selected complement one another and combine to

achieve the 25 percent and 50 percent mandates specified in Public Resource Code Section 41780.

City of Davis

Summary table (Table 11-5) added. 11-17. Revised 15 Year Projections added. 11-18 through 11-23.

Recycling Coordinator
Public Works Department
City of Davis
23 Russell Boulevard
Davis, CA 95616

ORDINANCE NO. 1565

AN ORDINANCE AMENDING CHAPTER 10, ARTICLE II OF THE DAVIS MUNICIPAL CODE, 1971, AS AMENDED, TO ADD PROVISIONS RELATING TO THE PURCHASE OF RECYCLED PRODUCTS BY THE CITY

WHEREAS, it is the policy of the City of Davis to conserve and protect resources for future citizens, as well as for current residents; and

WHEREAS, the City of Davis declares that the policy and intent of this ordinance is to protect the health and welfare of this and future generations by conserving resources and to encourage other governmental agencies and local businesses to recycle and purchase products utilizing recycled resources; and

WHEREAS, it is in the best interest of the City of Davis to take a role in developing alternatives to waste disposal to help reduce the amount of waste sent to landfills; and

WHEREAS, since one of the most cost-effective solid waste disposal alternatives is recycling, the City of Davis desires to encourage the use of recycled products to ensure that the state's industries have markets for products utilizing solid waste as a recycled resource; and

WHEREAS, it is the intent of the City Council that purchasing procedures be established in a manner which results in the maximum purchase of recycled products, as opposed to non-recycled products.

NOW, THEREFORE, THE DAVIS CITY COUNCIL DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1. Article II of Chapter 10 of the Davis Municipal Code is hereby amended to add the following:

Section 10-14.2 Purchase of Recycled Products.

(a) Definitions.

(1) Recycled Product. Any product which is at least partially composed of recovered materials.

(2) Recovered Material. Material and byproducts which have been recovered or diverted from solid waste, but such term does not include those materials and byproducts generated from, and commonly reused within, an original process (such as mill broke. This term includes material defined as postconsumer material.

(3) Postconsumer Material. Postconsumer materials are those recovered materials which have served their intended uses and have been separated and diverted from the solid waste stream for the purposes of collection and recycling. These do not include manufacturing wastes.

(4) Mill Broke. Trimmings of paper machine rolls.

(b) Procurement Program for Purchase of Recycled Products.

(1) Preference. The City shall purchase recycled products whenever sufficient quantities are readily available and meet the City's specifications. The City shall purchase recycled products that contain the highest percentage of recovered materials, and are produced to the greatest extent with postconsumer materials.

All City departments shall establish purchasing practices which maximize the purchase of materials, goods and supplies, that are produced from recovered materials, and/or may be recycled or reused when discarded.

(2) Promotion. To promote the use of products made from recovered materials, the City, to the extent practicable, shall label applicable products to indicate that they are recycled products.

The City shall cooperate with neighboring agencies in an effort to develop a comprehensive, consistent and effective procurement effort intended to stimulate the market for recycled products.

(3) Certification of Recovered Material Content. The City shall require the seller to certify in writing on a form prescribed by the City, that the recycled product sold to the City contains the minimum percentage of recovered materials set forth in the City's product specification and shall also specify the percentage of postconsumer materials contained in the product.

(4) Annual Status Report. City staff shall prepare and deliver to the City Council an annual status report documenting the types, quantities, and dollar amounts of recycled products purchased in the previous year, any additions or revisions to the previous year's specifications, and document those instances whereby an exemption, as listed in Section (e), was used to purchase something other than the specified recycled product. The report shall also contain the status of the City's efforts to develop markets for recycled products including efforts to establish cooperative procurement programs with other agencies.

(c) Product Specifications.

(1) The City shall review and revise product specifications so as to conform to the following guidelines:

(a) Specifications shall not require the use of products made from virgin materials.

(b) Specifications shall not exclude the use of recycled products.

(c) Specifications shall, whenever possible, clearly identify both the expected performance standard(s) for each particular product, and the specific intended use.

(d) Performance standards must be reasonable and not so stringent as to purposely exclude recycled products.

(e) A minimum percentage of recovered material content shall be incorporated into each specification when it is known that there are sufficient, and readily available supplies of a particular recycled product able to meet the City's specifications.

(f) A minimum percentage of postconsumer material content shall be incorporated in each specification when it is known that there are sufficient, and readily available supplies of a particular recycled product able to meet the City's specifications.

(2) Monitoring and Revising Specifications. City staff shall continually monitor the availability of recycled products so as to create new specifications and revise existing product specifications to reflect the availability of newly marketed products and increases in recovered material content (specifically, increases in the postconsumer material content).

(d) Equipment and Machinery Purchases. The City shall purchase, whenever feasible, equipment and machinery that is compatible with the City's applicable recycled products specifications.

(e) Exemptions.

(1) If the City finds it is unable to purchase a sufficient supply of a particular specified recycled product, the City may purchase a non-recycled product until such time as a sufficient supply of the recycled product becomes available.

(2) No product shall be purchased that will negatively impact the health and safety of employees and citizens.

(3) A non-recycled product may be substituted for the specified recycled product whenever:

(a) A particular piece of equipment or operation is unable to function properly with the material specified. In these instances, the preferred substitute product shall be a recycled product containing the highest percentage of recovered material and postconsumer material that allows the particular piece of equipment or operation to function. The substitution of a non-recycled product shall be used as the last resort.

(b) In cases of operational emergency, the City may purchase products from the nearest capable vendor when the specified recycled product cannot be purchased by the time needed.

(4) If the purchase of a recycled product would significantly impact a department's adopted budget, the department shall document the impact and submit the issue to Council for policy direction.

(f) City Consultant Contracts. All City contracts for consultant work, requiring the submittal of paper document(s) to the City, shall specify that the submitted document must be produced on recycled paper, when practicable, conforming to the City's specifications. All such documents shall be required to have the front cover labeled in such a way as to identify that the document was produced on recycled paper. Where practicable, the pages of all such documents shall be produced double-sided.

(g) Public Works Contracts. This section shall not apply to public works contracts required to be awarded to the lowest responsible bidder under state law.

INTRODUCED on April 25, 1990, and PASSED AND ADOPTED on May 9, 1990, by the following vote:

AYES: CORBETT, EVANS, ROSENBERG, SKINNER.

NOES: ADLER.

ABSENT: NONE.

MICHAEL N. CORBETT
MAYOR

ATTEST:

ROBERT A. TRAVERSO
CITY MANAGER/CITY CLERK

CC0024.WS

Recycling Coordinator
Public Works Department
City of Davis
23 Russell Boulevard
Davis, CA 95616

ORDINANCE NO. 1543

AN ORDINANCE AMENDING CHAPTER 22, ARTICLE I OF THE DAVIS MUNICIPAL CODE, 1971, AS AMENDED, RELATING TO RECYCLING COLLECTION SITES FOR COMMUNALLY SERVED RESIDENCES

WHEREAS, it is the policy of the City of Davis to conserve and protect resources for future citizens and current residents;

WHEREAS, it is the policy and intent of this ordinance to protect the health and welfare of this and future generations by encouraging the conservation of resources through recycling;

WHEREAS, since one of the most cost-effective solid waste disposal alternatives is recycling, the City of Davis encourages greater utilization of the recycling program offered by the city;

WHEREAS, approximately half of the city's population lives in communally serviced residences such as apartments and condominium complexes and, therefore, any effort to promote greater participation in the city's recycling program must include communally serviced residences;

WHEREAS, participation by residents of communally serviced residences hinges upon easy access to recycling containers; and

WHEREAS, an educational program is needed to inform residents of the availability of recycling.

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF DAVIS DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Section 22-9.1 of Article I of Chapter 22 of the Davis Municipal Code is hereby enacted to read as follows:

Sec. 22-9.1. Recycling collection sites for existing communally serviced residences.

(a) Recycling collection sites required. As of the effective date of this ordinance, existing communally serviced residences, as defined in section 22-1 of this chapter, consisting of ten (10) or more units, shall make recycling carts available for use by tenants and shall be required to provide and maintain space onsite for recycling carts. The city's waste removal entity shall supply the recycling carts. Existing complexes with nine (9) or fewer units are exempt from the requirements of this section, but are required to designate curbside locations and instruct new tenants on the use of curbside recycling services.

(b) Recycling collection site plans. The owner or owner's agent of each communally serviced residence shall submit a recycling collection site plan (hereinafter "plan") to the public works department for providing space for recycling carts. To the extent possible, the plans must comply with the goal of siting three (3) recycling carts within, or next to, each trash enclosure. A minimum of three (3) carts must be sited at each complex. Existing trees or other significant landscaping features (grass is not considered a significant landscaping feature) and space currently designated for automobile or bicycle parking shall not be eliminated or reduced in size to accommodate recycling carts. Any plan that proposes to site fewer than three carts per trash enclosure shall submit written explanation as to the basis for requesting exemption from the goal. Such plan shall be submitted by July 1, 1990, and on a form prescribed by the city.

(c) Exemption from site plan and architectural approval. Recycling collection site plans conforming to section (b) shall not be subject to the requirements of Chapter 29, Article XXVIII of this Code: Site Plan and Architectural Approval, unless the plan indicates the elimination or relocation of any existing tree(s), or the elimination or reduction in size of any significant landscaping feature or space currently designated for automobile or bicycle parking.

(d) Action by public works director. The city recognizes the existence of hardships based upon the unique features inherent in each applicant's complex that may interfere with the goal of siting three recycling carts at each trash enclosure. As such, the public works department will work with each applicant and the city's waste removal entity to formulate an acceptable plan that allows for flexibility in the number of carts sited and their location(s). The city's

primary goal is to institute an accessible recycling collection program at each complex while minimizing undue hardships for the owner(s). The public works director shall approve the plan if the director is satisfied that the plan conforms to the requirements and intent of this section and that any additional conditions or requirements stipulated by the director and deemed necessary in the public interest have been or will be met.

(e) Notification of action taken. The applicant shall be notified in writing of the action taken by the public works director. An approved plan must be fully implemented within six months after approval date. Applicants must resubmit revised plans within one month after a plan is denied.

(f) Building permits must be accompanied by recycling enclosure retrofit plans. Issuance of a building permit for an existing communally serviced residence shall be conditioned upon provision of a recycling enclosure(s) that conforms to the standards set by the city for new development or an approved plan to accommodate recycling carts.

(g) Appeals. Any determination of the public works director may be appealed to the planning commission. Appeals shall be initiated only upon written request for a hearing before the planning commission. Such appeal shall specify with reasonable certainty the portion or portions of the public works director's determinations which the applicant feels to be in error. Such appeal shall be accompanied by a fee set by resolution by the city council. In the absence of such request being filed within 15 days after the determination of the public works director, such determination is final.

(h) Education. At the time a lease or rental agreement is signed, the manager or homeowner's association representative, or other appropriate agent of the owner or owners of each communally serviced residence that is subject to this section shall (1) inform all new tenants of the availability of recycling, the location of the recycling collection site(s), and the materials that may be recycled, and (2) provide all new tenants with a flyer describing the city's recycling program. The flyers shall be provided to the managers and homeowners associations by the city's waste removal and recycling entity.

///

(i) Violations. Any violation of this section shall be deemed a nuisance and shall be punishable in accordance with chapter 16A of this Code.

INTRODUCED on November 15, 1989, and PASSED AND ADOPTED by the City Council of the City of Davis on this 6 day of December, 1989, by the following vote:

AYES: ADLER, CORBETT, EVANS, ROSENBERG, SKINNER.

NOES: NONE.

ABSENT: NONE.

Michael N. Corbett

ATTEST:

Robert A. Traverso
City Manager/City Clerk

100589mmn