

Attachment A

**STANFORD UNIVERSITY
SOLID WASTE
GENERATION STUDY**

DRAFT REPORT

August 1991

Prepared for

Stanford University
Operations and Maintenance
315 Bonair Siding
Stanford, CA 94305

Prepared by

Brown Vence & Associates
120 Montgomery Street, Suite 680
San Francisco, CA 94104
(415) 434-0900

TABLE OF CONTENTS

Section	Page
1 INTRODUCTION TO SOLID WASTE GENERATION STUDY	1-1
1.1 Purpose	1-1
1.2 General Approach	1-3
2 SOLID WASTE DISPOSAL CHARACTERIZATION	2-1
2.1 Quantities of Waste Disposed	2-1
2.1.1 Waste Disposed by Peninsula Sanitary Service	2-2
2.1.2 Waste Disposed by Self-haul Vehicles	2-2
2.1.3 Waste Disposal Summary	2-5
2.1.4 Waste Disposal Locations	2-5
2.1.5 Seasonality	2-7
2.2 Waste Disposal Characterization Study	2-7
2.2.1 Study Approach	2-8
2.2.2 Survey Procedures	2-8
Scheduled Accounts	
Unscheduled Accounts	
2.2.3 General Field Observations	2-12
2.2.4 Results	2-13
2.2.5 Data Analysis	2-13
2.2.6 Findings	2-17
3 SOLID WASTE DIVERSION CHARACTERIZATION	3-1
3.1 General Study Design and Methods	3-1
3.2 Source Reduction/Reuse Activities	3-2
3.2.1 Source Reduction	3-2
Cafeterias	
University Hospital	

TABLE OF CONTENTS

DRAFT REPORT

Section	Page
3.2.2 Materials Reuse	3-3
Pallet Reuse at Stanford University Hospital	
Surplus Sales	
3.3 Recycling Activities	3-3
3.3.1 Peninsula Sanitary Service	3-4
Curbside Recycling	
Cardboard Collection	
Scrap Metal Recovery	
3.3.2 Stanford Recycling Center	3-6
3.3.3 Special Waste Recycling Programs	3-9
Asphalt Recycling	
Construction/Demolition Recycling	
3.4 Composting Activities	3-10
3.4.1 Peninsula Sanitary Service	3-10
Pilot Composting Program	
Golf Course and Horse Stables Composting Operation	
Faculty Housing	
Boething Tree Land	
Christmas Tree Recycling	
3.4.2 Stanford University Operations and Maintenance Department	3-11
3.5 Waste Diversion Quantities	3-13
4 CURRENT SOLID WASTE GENERATION AND PROJECTIONS	4-1
4.1 Current Waste Quantities and Characteristics	4-1
4.2 Projected Waste Quantities	4-2
4.2.1 Influences on Waste Generation Quantities at Stanford University	4-2
4.2.2 University Waste Stream Projection	4-5

TABLES		Page
1-1	Waste Sources	1-2
2-1	1990 PSS Disposal Tonnage Data	2-3
2-2	Distribution of PSS Disposal Tonnage by Source	2-4
2-3	1990 Total University Waste Disposal Tonnage Data	2-6
2-4	Cubic Yardage Collected/Disposed by Truck Type	2-9
2-5	Solid Waste Categories	2-11
2-6	1990 Total PSS Waste Disposal Stream Composition	2-14
2-7	1990 Stanford University Waste Disposal Stream	2-16
3-1	Peninsula Sanitary Services 1990 Diversion Tonnages	3-5
3-2	Stanford Recycling Center 1990 Diversion Tonnages	3-8
3-3	Operations and Maintenance Department 1990 Diversion Tonnages	3-12
3-4	Total Stanford University 1990 Diversion Tonnages	3-14
3-5	Total Stanford University 1990 Diversion Tonnages by Program Type	3-15
3-6	1990 Stanford University Waste Diversion Stream	3-17
4-1	1990 Stanford University Waste Generation Stream	4-3
4-2	Projected Waste Generation	4-6

FIGURES

1-1	Solid Waste Generation Study	1-4
-----	--	-----

APPENDIX

- A Waste Composition Study Sample Sources
- B Definitions of Waste Types
- C Quantitative Field Analyses Results
- D Debris Box Visual Survey Results

SECTION 1.0

INTRODUCTION TO SOLID WASTE GENERATION STUDY

1.1 PURPOSE

The Solid Waste Generation Study (SWGS) serves as a basic data collection and analysis tool necessary to develop an effective long term solid waste management system for Stanford University. It provides essential information to:

- Estimate current quantities of waste disposed by Stanford University (Section 2.0);
- Estimate current quantities of wastes diverted through existing diversion programs, including source reduction, recycling, and composting (Section 3.0); and
- Estimate current and future quantities of waste generated by the University (Section 4.0)

The SWGS looks at Stanford's waste stream in two basic ways, as detailed below:

1. **Source of Waste** -- AB 939 states that portions of the waste stream for a jurisdiction must be assigned to one of four sources, depending on who generated the waste:

- Residential
- Commercial
- Industrial
- Other

Regulations state that waste and recycled material generated by an institution such as Stanford is considered commercial waste. As such Stanford will be supplying Santa

Clara County with a single waste composition analysis for the overall commercial waste stream which the University generates.

In developing this single composition analysis, however, the Stanford waste stream was broken into the waste sources listed in Table 1-1. The composition of each of these waste streams was analyzed independently, and the composition of the University waste stream as a whole developed based on a weighted averaging of each of these individual waste streams. Although analysis of each of these waste sources as a distinct entity is not required by the County in order to develop their overall plan, it does provide a useful framework from which to select representative loads for sampling. In addition, this level of analysis will serve as a key tool in the further design and development of Stanford's solid waste management system. It will enable specific collection and storage systems and subsequent source separation and mixed materials recovery programs to be tailored to the specific waste generator types on campus.

Table 1-1
Stanford University Waste Sources

Scheduled Accounts	
	Campus
	Housing
	Staff & Faculty
	Food Service
	Auxiliary
	Daper
	SLAC
	Non University
Unscheduled Accounts	
	University Funds
	Staff & Faculty
	Construction

2. **Type of Waste** -- The regulations require each jurisdiction to determine the characteristics of the waste stream by specified waste categories and by additional subsets of waste types, as determined by the local jurisdiction. The waste types chosen for analysis by the University are discussed in Section 2.0.

This level of detail allows Stanford to focus their future diversion programs on a specific waste type from a particular waste source.

1.2 GENERAL APPROACH

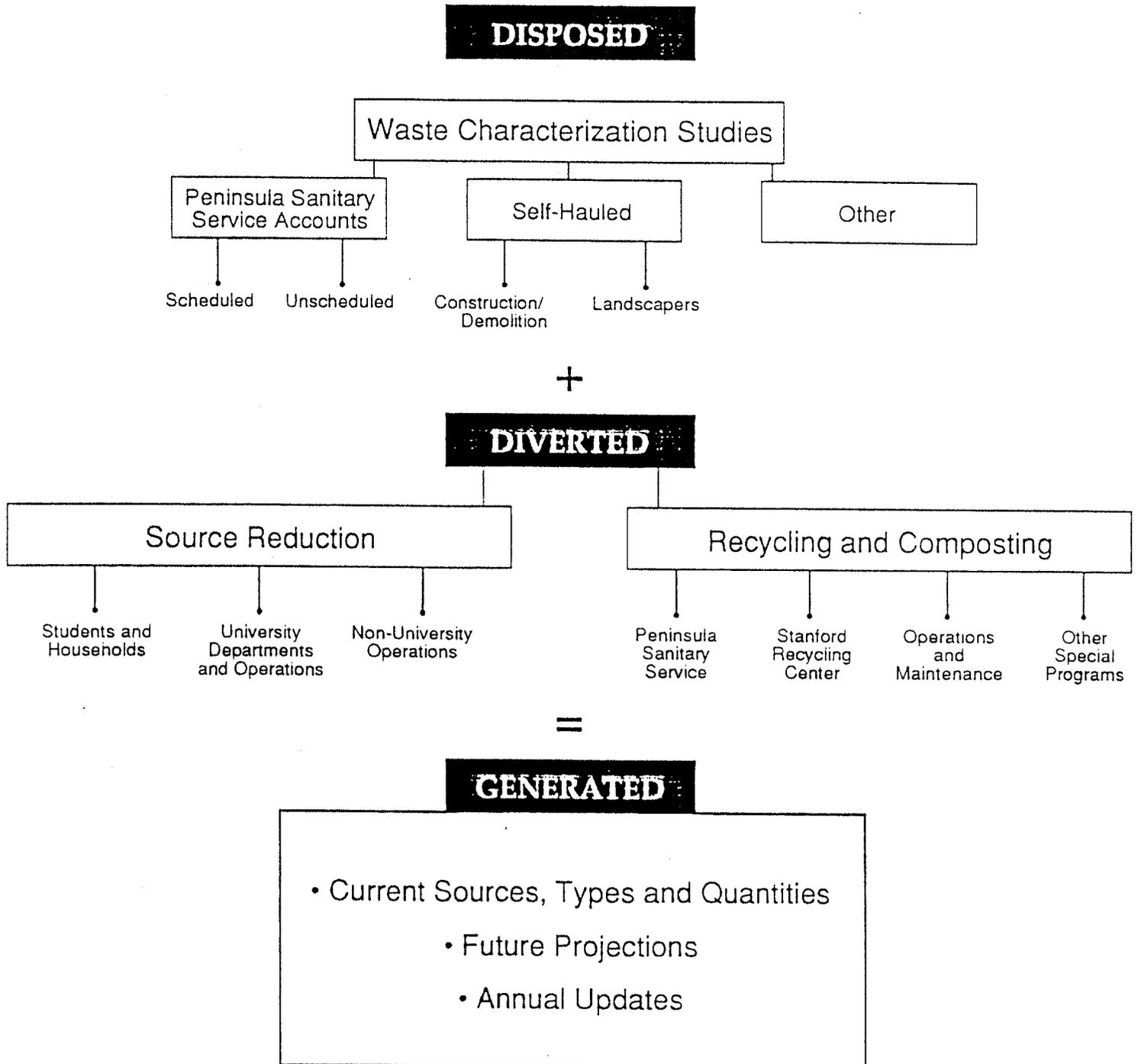
The basic approach for a jurisdictional SWGS can be envisioned as a simple formula (see Figure 1-1). Data is collected with respect to the quantities of waste disposed of and waste diverted; then the waste generated is calculated as a total of these two. The SWGS development process for Stanford University follows this same approach with adjustments made to account for the institutional nature of the University.

For waste disposed of, the primary method selected for data collection was a waste sorting study conducted at the University on February 18 - 24 1991, combined with existing data on overall quantities of waste disposed of by the University. This process and the results are discussed in Section

2.0. For waste diverted, the primary data collection method involved discussions with Peninsula Sanitary Service (PSS), the Stanford Recycling Center (SRC), and Operations and Maintenance Department representatives. This process and the results are discussed in Section 3.0. Section 4.0 describes the process of combining University student, staff, and faculty projections with an overall University per-capita waste generation rate to project waste generation for Stanford for a 10-year planning period. The year 1990 is being used as the base year for the solid waste generation analysis.

FIGURE 1-1

STANFORD UNIVERSITY SOLID WASTE GENERATION STUDY



It should be noted that the Solid Waste Generation Study includes all waste generated by the University as well as waste generated by those entities which lease land from the University. The study does not consider waste generated by University activities located off campus or waste generated by the University Hospital and Medical Center. This waste is collected by Palo Alto Sanitation Company and is assumed to be included in the Solid Waste Generation Study for the City of Palo Alto.

SECTION 2.0

SOLID WASTE DISPOSAL CHARACTERIZATION

This section estimates the existing quantities and characteristics of the portions of Stanford University's waste stream that go to permitted waste disposal facilities.

Disposal quantities were determined using landfill disposal records provided by Peninsula Sanitary Service (PSS) and estimates as to the quantity of yard waste and construction/demolition debris which is self-hauled to disposal facilities by entities other than PSS. Characterization of the solid waste disposed by the University involved a quantitative field analysis of all scheduled rear and front-loader account types. Scheduled debris box loads and all unscheduled loads were characterized using the results of the quantitative field analysis along with empirical data supplied by PSS, visual surveys of debris boxes, and information obtained from a representative jurisdiction.

The information contained in this section on waste disposal quantities and characteristics, along with the information on the quantities and characteristics of material currently diverted from disposal (Section 3.0), serves as the basis for projecting future waste generation quantities for the University (Section 4.0).

2.1 QUANTITIES OF WASTE DISPOSED

All collection services for solid waste at Stanford University are supplied by Peninsula Sanitary Service (PSS) under contract to the University. PSS has roughly 1,200 accounts on campus currently, including single family residences, student housing, academic, administrative, and residential buildings.

In addition to the material handled by PSS, small quantities of yard wastes are also assumed to be self-hauled to disposal sites by landscapers operating within the staff and faculty housing area of the campus. Portions of the construction/demolition debris generated on campus are also self-hauled by various contractors hired to perform work at the University. PSS, however, provides all drop box service on campus and they estimate that they handle roughly 95 percent of the construction/demolition material which is generated by the University.

2.1.1 Waste Disposed by Peninsula Sanitary Service

Prior to January 19, 1990 all waste disposed by the University was delivered to the Palo Alto Landfill. Tipping fees at that landfill were based on volume and tonnage figures for this period are not available. Following the closing of the Palo Alto Landfill, however, the University began to dispose of its waste at BFI's Newby Island Landfill which does maintain weight records. Monthly disposal tonnage figures for the University for the period from February 1990 through January 1991 are provided in Table 2-1. This tonnage figure is used to represent the total tonnage disposed by PSS during base year 1990.

In addition to these tonnage figures, PSS maintains records of the volume of waste collected from each area of the University listed in Table 1-1. The estimated cubic yards for each area, and the corresponding percent of the total volume of the waste disposal stream collected by PSS which is attributed to each area is provided in Table 2-2. The distribution of the tonnage figure cited in Table 2-1 among the various areas of the University is also shown in Table 2-2. This distribution of tonnages assumes that the density of materials from each area are equal and, therefore, equivalent to the volume distribution shown.

2.1.2 Waste Disposed by Self-Haul Vehicles

Yard Waste - Gardeners and landscapers serving the faculty staff housing area are permitted to self-haul material which they generate as part of their operations off-campus. PSS estimates that roughly 12 ton per year (1 ton/month) of yard waste is self-hauled by these private landscapers.

TABLE 2-1
1990 PSS DISPOSAL TONNAGE DATA

MONTH	TONNAGE	Deviation from Avg.
Feb (1990)	1,104	10.1%
Mar	954	-4.9%
Apr	1,013	1.0%
May	1,061	5.8%
Jun	1,201	19.8%
Jul	990	-1.3%
Aug	1,022	1.9%
Sept	981	-2.2%
Oct	1,194	19.1%
Nov	964	-3.9%
Dec	687	-31.5%
Jan (1991)	863	-13.9%

ANNUAL TOTAL	12,034 Tons/Year
MONTHLY AVERAGE	1003 Tons/Month

Source: PSS

TABLE 2-2
DISTRIBUTION OF PSS DISPOSAL TONNAGE BY SOURCE

Source:	Estimated Cubic Yards (1989-1990)	Percent of Total Volume	Equivalent Tonnage*
Scheduled Accounts			
CAMPUS	72,678	27%	3,277
Public Trash Cans		33%	
Office Space		33%	
Lab Space		33%	
HOUSING	85,012	32%	3,834
Dormitory		42%	
Row House		12%	
Graduate Housing		46%	
STAFF & FACULTY	19,022	7%	858
FOOD SERVICE	12,740	5%	574
AUXILIARY	19,311	7%	871
DAPER	2,652	1%	120
SLAC	12,064	5%	544
NON UNIVERSITY	4,519	2%	204
Unscheduled Accounts			
UNIVERSITY FUNDS	22,296	8%	1,005
STAFF & FACULTY	1,152	0%	52
CONTRACTORS	15,420	6%	695
Total	266,866	100%	12,034

* Assumes materials generated by each area are equal in density and, therefore, the distribution of tonnage is equivalent to the volume distribution shown.

Construction/Demolition Debris - There is nothing which restricts contractors from self-hauling construction/demolition debris off campus, and a small portion of this waste stream is self-hauled. No one other than PSS, however, is allowed to set a debris box on campus. PSS estimates that they handle roughly 95 percent of the construction/demolition debris which is generated on campus. Based on a figure of 722 tons of construction/demolition debris hauled by PSS the quantity of this material which is self-hauled by contractors is equivalent to roughly 38 tons/year.

Other Waste - Various quantities of waste generated on campus may also be self-hauled off campus by students, staff, faculty and their families. Any such activity is, however, assumed to be minor relative to the total waste disposed, and no attempt has been made to quantify this disposal practice in the SWGS.

2.1.3 Waste Disposal Summary

Using the disposal tonnage information supplied by PSS and the assumptions presented for self-hauled construction/demolition debris and yard waste, it is estimated that a total of 12,084 tons of waste from Stanford University was disposed during 1990; Table 2-3.

2.1.4 Waste Disposal Locations

As has been discussed, prior to January 19, 1990 PSS hauled all solid waste which they collected at the University to the Palo Alto Landfill, roughly four miles from the campus quadrangle. This landfill, however, has closed and PSS currently disposes of the University's waste at BFI's Newby Island Landfill in Santa Clara.

TABLE 2-3
1990 TOTAL UNIVERSITY WASTE DISPOSAL TONNAGE DATA

	Tonnage	Percent of Total Tonnage
PENINSULA SANITARY SERVICE	12,034	99.6%
Self-Hauled Waste:		
CONSTRUCTION/DEMOLITION (1)	38	0.3%
YARD WASTE (2)	12	0.1%
TOTAL	12,084	100.0%

(1) Assumes 5% of Constuction Demolition waste is self-hauled.

(2) Assumes 1 ton/month is self-hauled.

2.1.5 Seasonality

PSS representatives indicated that historically waste volumes tend to remain fairly consistent year round, even during the summer months. The main surge in waste disposal tends to occur when students move out of the dorms at the end of the school year. The deviation of monthly tonnages from the monthly average expressed in Table 2-2 tends to confirm this observation, although there are some notable exceptions. The most notable exception occurred during December when tonnage decreased by over 30 percent. This decrease is assumed to be caused by the holiday season and a corresponding decrease in the University population. A decrease of almost 14 percent was also experienced in January, while increases of over 10 and 19 percent occurred during February and October respectively. Additional historical tonnage data will be needed in order to firmly establish any seasonal trends which may exist.

PSS has also noted that during the rainy season, prior to the drought, waste tended to be very wet. This wasn't due simply to the increase in rain fall, but the fact that many dumpsters tend to be left wide open. It is estimated that the average truck contains an additional 400 to 500 pounds of water when it rains.

2.2 WASTE DISPOSAL CHARACTERIZATION STUDY

The purpose of this portion of the SWGS is to estimate the composition of the solid waste generated by the University which is ultimately disposed. The AB 939 guidelines stipulate that the waste characterization study for a jurisdiction "identify solid waste generation by volume and weight, and by waste category and waste type from residential, commercial, industrial, and other sources of generation." For County planning purposes material generated by an institution such as Stanford is considered to be commercial waste.

2.2.1 Study Approach

The approach for the waste characterization study was developed based on an analysis of the existing solid waste disposal system for the University. This approach provided for a representative sampling of front and rear loader accounts from each of the scheduled account areas listed in Table 1-1. This portion of the waste characterization study was performed in accordance with the following:

- AB 939, the California Integrated Solid Waste Management Act of 1989 (California Code of regulations Title 14, Division 7, Chapter 9).
- Guidelines for implementation of the AB 939, as published by the California Integrated Waste Management board (CIWMB).

In addition to the quantitative field analysis of scheduled front and rear loader accounts, scheduled debris boxes and all unscheduled loads were characterized using the results of the quantitative field analysis along with empirical data supplied by PSS, visual surveys of debris boxes, and construction/demolition waste composition data obtained from a representative jurisdiction. A summary of the study procedures and results is provided below.

2.2.2 Survey Procedures

Scheduled Accounts

Scheduled accounts at the University are serviced mainly by front and rear loading vehicles, Table 2-4. Representative accounts serviced by these vehicle types were selected for sampling by PSS and Stanford Recycling Center representatives based upon their knowledge of the University waste stream. Loads were selected from each of the scheduled account areas shown in Table 1-1.

TABLE 2-4
CUBIC YARDAGE COLLECTED/DISPOSED BY TRUCK TYPE

	(1989-1990)				(1988-1989)			
	Scheduled Accounts (yd3)	Percent of Scheduled	Unscheduled Accounts (yd3)	Percent of Unscheduled	Total	Percent of Total	Total	Percent of Total
Front Loader	185328	81%	2529	7%	187857	70%	185788	71%
Rear Loader	29043	13%	468	1%	29511	11%	30520	12%
Debris Box	13618	6%	35880	92%	49498	19%	45736	17%
TOTAL	227989	100%	38877	100%	266866	100%	262044	100%

Source: Peninsula Sanitary Service

In all cases, except for Staff & Faculty, specific dumpsters were targeted for sampling. A special route was organized and each targeted dumpster was collected individually and delivered uncompacted to the sorting area. In the case of Staff & Faculty housing an entire load was delivered to the sorting area. A longitudinal section was removed from the load, thoroughly mixed, and a representative sample selected for sorting. A listing of the sources sampled during the quantitative field analysis is provided in Appendix A.

Field sampling activities were performed over a four-day period from February 18 to February 21, 1991. During this period, a total of 24 samples were sorted. Under the direction of the supervisor, a five-person crew manually segregated each sample by placing like waste components in 32-gallon containers, according to the appropriate material category. A listing of the material categories used in the study are provided in Table 2-5. These material (waste) categories are further defined in Appendix B. After the entire sample was sorted, containers were weighed, and weights of the various waste components recorded.

Due to the operational constraints of the study it was not possible to include scheduled debris boxes as part of the quantitative field analysis. These accounts constitute roughly 6 percent of the volume of waste disposed by scheduled accounts. For planning purposes these accounts were assumed to be similar in composition to the front and rear loader samples which were sorted for each specific area. The visual survey of debris boxes tended to verify the validity of this assumption. As part of ongoing planning efforts, however, the University and PSS may wish to further analyze the composition of the scheduled debris box accounts in order to more accurately document their composition.

Unscheduled Accounts

Unscheduled accounts at the University are serviced mainly by debris boxes (92 percent). As was the case with scheduled debris box accounts it was not possible to incorporate these unscheduled debris box accounts, or unscheduled front and rear loader accounts, into the quantitative field analysis due to the constraints of the study. The composition of these unscheduled accounts was estimated using the results of the quantitative field analysis along with

TABLE 2-5
SOLID WASTE CATEGORIES

PAPER CATEGORY:	Computer Paper White Ledger Newspaper Magazines Corrugated Cardboard Mixed Paper Other Paper
PLASTICS CATEGORY:	HDPE PET Containers Film Plastics Polystyrene Other Plastics
GLASS CATEGORY:	CA Redemption Value Containers Other Recyclable Glass Other Glass
METALS CATEGORY:	Aluminum Cans Tin and Bimetal Cans Tin and Ferrous Metals Non Ferrous Metals White Goods
YARD WASTE CATEGORY:	Grass/Leaves Prunings
OTHER ORGANICS CATEGORY:	Food Waste Tires and Rubber Products Wood Waste Textiles and Leather Manure Other Organics
OTHER WASTES CATEGORY:	Inert Solids Household Hazardous Waste Special Waste Disposable Diapers Fines

empirical data supplied by PSS representatives, information obtained from the visual survey of debris box loads, and data from a representative community. The specific guidelines which were used to make these composition estimates are provided below.

- The waste composition of University Funds was estimated to be equivalent to a mix of 40 percent Campus accounts and 60 percent Housing accounts.
- The waste composition of unscheduled Staff & Faculty accounts was assumed to be similar to the waste composition which was determined for the scheduled Staff & Faculty accounts.
- The waste composition for construction/demolition accounts was based upon an analysis of construction/demolition loads which was conducted for the City of San Francisco, with adjustments made based on the results of the visual debris box survey.

As part of ongoing planning efforts the University and PSS may wish to further analyze the composition of these unscheduled accounts in order to more accurately document their composition.

2.2.3 General Field Observations

During the course of the field study, the following general observations were made:

- There was measurable precipitation on one day of the study, however, loads were covered and sorting was conducted in a sheltered area. As a result we do not believe that the average waste composition of those loads sampled during this day was significantly affected.

Sorting of uncompacted samples was much easier than load sampling of compacted waste. This approach also minimized the spread of contamination and likely

contributed to the ability to measure the percent composition of certain materials more accurately than with load samples.

- The selection of specific dumpsters for sampling provides an accurate means of measuring seasonal variation since the same accounts can be analyzed season after season. The effectiveness of diversion programs can also be accurately tracked.

2.2.4 Results

Results of the quantitative field analysis for each of the loads sampled are included in Appendix C. These data have been grouped according to the specific waste sources sampled. For each sample load the individual weights of the various sample components are presented, along with the composition (percent by weight) for each component, as calculated from the field data. Data sheets from the visual survey of debris box loads are provided in Appendix D.

2.2.5 Data Analysis

Using the results from the quantitative field analysis provided in Appendix C, and the various waste disposal composition assumptions which have been presented, the composition of the scheduled and unscheduled accounts handled by PSS for each area of the University were determined. This information is shown in Table 2-6 along with an overall waste disposal composition analysis for all PSS accounts. This data was then combined with the assumptions which were made regarding the quantities and characteristics of self-hauled yard waste and construction/demolition debris to derive an estimate of the overall composition of waste currently disposed by the University. This information is provided in Table 2-7. The values shown in this table are weighted averages that take into account both the composition and quantities of the waste generated by the specific sources studies.

TABLE 2-6
1990 TOTAL PSS WASTE DISPOSAL STREAM COMPOSITION

Percent of Total Waste Disposal Stream:	Scheduled Accounts:										NON UNIVERSITY	TOTAL SCHEDULE ACCOUNTS 85.4%	
	Area:	CAMPUS	HOUSING	STAFF & FACILITY	FOOD SERVICE	AUXILIARY	DAPIR	SIAC	UNIVERSITY				
PAPER													
Computer Printout	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	51.4%
White Ledger	3.2%	1.2%	7.4%	3.1%	0.2%	1.9%	6.2%	0.4%	0.0%	0.4%	0.0%	2.7%	
Newspaper	8.1%	6.8%	5.5%	5.5%	0.2%	3.6%	10.8%	1.4%	0.0%	0.0%	0.0%	6.6%	
Magazines	6.3%	2.4%	9.1%	1.5%	0.0%	1.5%	2.6%	0.0%	0.0%	0.0%	0.0%	3.9%	
Corrupted Containers	5.2%	8.5%	6.8%	0.0%	12.0%	14.5%	4.2%	4.0%	0.0%	0.0%	0.0%	7.7%	
Mixed Paper	14.1%	8.8%	13.1%	11.7%	5.1%	11.7%	19.9%	2.8%	0.0%	0.0%	0.0%	10.6%	
Other Paper	21.3%	23.1%	12.9%	0.0%	8.5%	15.9%	35.1%	17.7%	0.0%	0.0%	0.0%	19.9%	
PLASTICS													
HDPE	0.4%	1.5%	0.0%	0.0%	0.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	8.6%
PET	0.2%	0.3%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	
Film Plastics	3.8%	3.7%	4.3%	6.9%	0.0%	1.6%	10.4%	1.7%	0.0%	0.0%	0.0%	4.1%	
Polyurethene	1.0%	0.5%	0.0%	0.0%	0.0%	0.1%	0.7%	0.1%	0.0%	0.0%	0.0%	0.6%	
Other Plastics	3.0%	3.6%	0.0%	0.0%	0.4%	0.7%	8.8%	3.6%	0.0%	0.0%	0.0%	3.0%	
GLASS													
CA Recursion Value	3.9%	1.6%	0.1%	0.0%	0.0%	0.2%	0.7%	0.3%	0.0%	0.0%	0.0%	1.9%	5.3%
Other Recyclable	4.3%	3.0%	1.6%	0.2%	0.2%	0.6%	0.4%	0.4%	0.0%	0.0%	0.0%	2.8%	
Other Glass	0.1%	1.2%	0.4%	0.0%	0.0%	0.1%	2.9%	11.2%	0.0%	0.0%	0.0%	0.8%	
METALS													
Aluminum Cans	0.8%	0.5%	0.3%	0.0%	0.0%	0.1%	0.3%	0.1%	0.0%	0.0%	0.0%	0.5%	4.3%
Tin/BI-metal Cans	0.3%	1.2%	2.6%	6.2%	0.0%	0.4%	1.0%	0.6%	0.0%	0.0%	0.0%	1.2%	
Tin & Ferrous Metals	0.8%	1.8%	1.7%	0.0%	0.0%	0.1%	0.3%	0.4%	0.0%	0.0%	0.0%	1.4%	
Non-Ferrous Metals	1.2%	0.3%	0.0%	0.1%	0.0%	0.1%	0.0%	14.3%	0.0%	0.0%	0.0%	1.3%	
White Goods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
YARD WASTE													
Grass/Leaves	0.4%	0.4%	11.2%	1.3%	1.3%	0.0%	7.5%	12.6%	0.0%	0.0%	0.0%	2.0%	2.3%
Prunings	0.1%	0.0%	0.0%	0.0%	0.0%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	22.3%
OTHER ORGANICS													
Food Waste	10.7%	17.7%	21.0%	57.1%	33.2%	4.5%	1.0%	13.5%	0.0%	0.0%	0.0%	18.1%	
Tires & Rubber Products	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.8%	6.2%	0.0%	0.0%	0.0%	0.2%	
Wood Waste	6.1%	0.3%	1.4%	3.4%	0.0%	0.0%	1.6%	4.2%	0.0%	0.0%	0.0%	2.7%	
Textiles and Leather	0.3%	2.1%	1.5%	0.0%	0.0%	3.1%	0.2%	1.2%	0.0%	0.0%	0.0%	1.1%	
Manure	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Other Organics	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	0.1%	
OTHER WASTES													
Inert Solids	2.0%	2.2%	1.1%	0.1%	0.1%	0.7%	2.3%	0.8%	0.0%	0.0%	0.0%	1.8%	5.6%
Household Hazardous Waste	0.5%	0.2%	0.3%	0.0%	0.0%	0.2%	1.9%	0.3%	0.0%	0.0%	0.0%	0.4%	
Special Wastes	1.1%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	
Disposable Diapers	0.3%	2.1%	1.9%	0.0%	0.0%	0.0%	0.9%	0.1%	0.0%	0.0%	0.0%	1.0%	
TOTAL*	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* Numbers may not add exactly due to rounding.

TABLE 2-6 (continued)
1990 TOTAL PSS WASTE DISPOSAL STREAM COMPOSITION

Area: Source of Total Waste Disposal Stream:	Unscheduled Accounts:				TOTAL PSS ACCOUNT COMPOSITION 100%	TOTAL PSS TONNAGE
	UNIVERSITY FUNDS (1)	STAFF & FACULTY (2)	CONSTRUCTION (3)			
	8.4%	0.4%	5.8%		49.3%	5933
PAPER						
Computer Printout	0.1%	0.0%	0.0%		0.1%	12
White Lodge	2.0%	3.1%	0.2%		2.5%	302
Newspaper	7.3%	5.5%	0.0%		6.3%	752
Magazines	3.9%	9.1%	0.0%		3.7%	447
Corrugated Containers	7.2%	6.8%	9.1%		7.7%	931
Mixed Paper	10.9%	13.1%	1.1%		10.1%	1210
Other Paper	22.4%	12.9%	0.5%		18.9%	2279
PLASTICS					8.3%	999
HDPE	1.0%	0.0%	0.0%		0.7%	85
PET	0.2%	0.0%	0.0%		0.2%	23
Film Plastics	3.7%	4.3%	0.0%		3.9%	466
Polystyrene	0.7%	0.0%	0.0%		0.5%	64
Other Plastics	3.4%	0.0%	3.4%		3.0%	362
GLASS					5.3%	636
CA Redemption Value	2.6%	0.1%	0.0%		1.9%	226
Other Recyclable	3.5%	1.6%	0.0%		2.7%	323
Other Glass	0.8%	0.4%	0.0%		0.7%	88
METALS					4.7%	572
Aluminum Cans	0.6%	0.3%	0.0%		0.5%	54
Tin/Bi-metal Cans	0.9%	2.6%	0.0%		1.1%	133
Tin & Ferrous Metals	1.4%	1.7%	11.8%		2.0%	238
Non-Ferrous Metals	0.6%	0.0%	1.0%		1.2%	144
White Goods	0.0%	0.0%	0.3%		0.0%	2
YARD WASTE					2.1%	256
Grass/Leaves	0.4%	11.2%	1.7%		1.9%	223
Prunings	0.0%	0.0%	0.0%		0.3%	32
OTHER ORGANICS					23.7%	2834
Food Waste	14.9%	21.0%	0.0%		16.8%	2026
Tires & Rubber Products	0.1%	0.0%	0.5%		0.2%	30
Wood Wastes	2.6%	1.4%	50.8%		5.4%	654
Textiles and Leather	1.4%	1.5%	0.0%		1.1%	129
Manure	0.0%	0.0%	0.0%		0.0%	0
Other Organics	0.2%	0.0%	0.0%		0.1%	14
OTHER WASTES					6.5%	784
Inert Solids	2.1%	1.1%	18.8%		2.8%	333
Household Hazardous Wastes	0.3%	0.3%	0.7%		0.4%	45
Special Wastes	3.2%	0.0%	0.0%		2.4%	285
Disposable Diapers	1.4%	1.9%	0.0%		1.0%	121
TOTAL*	100.0%	100.0%	100.0%		100.0%	12034

* Numbers may not add exactly due to rounding
 (1) Waste composition assumed to be equivalent to 40% Campus, 60% Housing mix.
 (2) Waste composition assumed to be similar to scheduled Staff & Faculty composition.
 (3) Based on 1990 San Francisco analysis with wood, cardboard, and plastic percentages adjusted according to visual construction debris box survey results.

TABLE 2-7
1990 STANFORD UNIVERSITY WASTE DISPOSAL STREAM

Waste Category	Total PSS Account Tonnage		Total PSS Account Composition		Total Self-Hauled Yard Waste Tonnage	Total Self-Hauled Yard Waste Composition		Total Self-Hauled Construction Tonnage	Total Self-Hauled Construction Composition		Total Disposal Tonnage	Total Disposal Composition
	PSS	Other	%	%		%	%		%	%		
Percent of Total Waste Disposed:												
PAPER	5933	0	49.3%	0.1%	0	0.0%	0.0%	4	0	10.6%	5937	49.1%
Computer Printout	12	0	0.1%	0.0%	0	0.0%	0	0	0.0%	12	0.1%	
White Ledger	302	0	2.5%	0.0%	0	0.0%	0	0	0.2%	302	2.5%	
Newspaper	752	0	6.3%	0.0%	0	0.0%	0	0	0.0%	752	6.2%	
Magazines	447	0	3.7%	0.0%	0	0.0%	0	0	0.0%	447	3.7%	
Corrugated Containers	931	0	7.7%	0.0%	0	0.0%	3	0	8.9%	934	7.7%	
Mixed Paper	1210	0	10.1%	0.0%	0	0.0%	0	0	1.1%	1211	10.0%	
Other Paper	2279	0	18.9%	0.0%	0	0.0%	0	0	0.5%	2279	18.9%	
PLASTICS	999	0	8.3%	0.0%	0	0.0%	0	1	3.3%	1001	8.3%	
HDPE	85	0	0.7%	0.0%	0	0.0%	0	0	0.0%	85	0.7%	
PET	23	0	0.2%	0.0%	0	0.0%	0	0	0.0%	23	0.2%	
Film Plastics	466	0	3.9%	0.0%	0	0.0%	0	0	0.0%	466	3.9%	
Polyethylene	64	0	0.5%	0.0%	0	0.0%	0	0	0.0%	64	0.5%	
Other Plastics	362	0	3.0%	0.0%	0	0.0%	0	1	3.3%	363	3.0%	
GLASS	636	0	5.3%	0.0%	0	0.0%	0	0	0.0%	636	5.3%	
CA Redemption Value	226	0	1.9%	0.0%	0	0.0%	0	0	0.0%	226	1.9%	
Other Recyclable	323	0	2.7%	0.0%	0	0.0%	0	0	0.0%	323	2.7%	
Other Glass	88	0	0.7%	0.0%	0	0.0%	0	0	0.0%	88	0.7%	
METALS	572	0	4.7%	0.0%	0	0.0%	0	5	12.8%	576	4.8%	
Aluminum Cans	54	0	0.5%	0.0%	0	0.0%	0	0	0.0%	54	0.4%	
Tin/Bi-metal Cans	133	0	1.1%	0.0%	0	0.0%	0	0	0.0%	133	1.1%	
Tin & Ferrous Metals	238	0	2.0%	0.0%	0	0.0%	4	0	11.5%	242	2.0%	
Non-Ferrous Metals	144	0	1.2%	0.0%	0	0.0%	0	0	1.0%	145	1.2%	
White Goods	2	0	0.0%	0.0%	0	0.0%	0	0	0.3%	2	0.0%	
YARD WASTE	256	12	2.1%	100.0%	12	100.0%	0	1	1.7%	268	2.2%	
Grass/Leaves	223	0	1.9%	100.0%	12	100.0%	0	0	1.7%	236	2.0%	
Prunings	32	0	0.3%	0.0%	0	0.0%	0	19	50.0%	32	0.3%	
OTHER ORGANICS	2854	0	23.7%	16.8%	0	0.0%	0	0	0.0%	2873	23.8%	
Food Waste	2026	0	16.8%	0.0%	0	0.0%	0	0	0.0%	2026	16.8%	
Tires & Rubber Products	30	0	0.2%	0.0%	0	0.0%	0	0	0.5%	30	0.2%	
Wood Waste	654	0	5.4%	0.0%	0	0.0%	19	0	49.5%	673	5.6%	
Textiles and Leather	129	0	1.1%	0.0%	0	0.0%	0	0	0.0%	129	1.1%	
Manure	0	0	0.0%	0.0%	0	0.0%	0	0	0.0%	0	0.0%	
Other Organics	14	0	0.1%	0.0%	0	0.0%	0	0	0.0%	14	0.1%	
OTHER WASTES	784	0	6.5%	2.8%	0	0.0%	0	7	19.0%	792	6.6%	
Inert Solids	333	0	2.8%	0.0%	0	0.0%	0	7	18.3%	340	2.8%	
Household Hazardous Wastes	45	0	0.4%	0.0%	0	0.0%	0	0	0.7%	45	0.4%	
Special Wastes	285	0	2.4%	0.0%	0	0.0%	0	0	0.0%	285	2.4%	
Disposable Diapers	121	0	1.0%	0.0%	0	0.0%	0	0	0.0%	121	1.0%	
TOTAL	12034	12	100.0%	0.1%	12	100.0%	38	12084	100.0%	12084	100%	

* Numbers may not add exactly due to rounding

2.2.6 Findings

The following findings are presented based upon an analysis of the Solid Waste Disposal Characterization Study results.

- The percentage of high grade paper (computer paper and white ledger) in the waste disposal stream of the scheduled accounts was less than 3 percent. This seems to indicate that the existing high grade paper diversion programs are relatively effective. There were some exceptions, however, most notably SLAC and Auxiliary which had significant quantities of white ledger in the waste disposal stream.
- The percentage of low grade paper (newspaper, magazines, and mixed paper) constitutes over 20 percent of the waste disposed from scheduled accounts. Although there are programs in place which target these waste streams, and in fact low grade paper is the largest single component recycled by the University (see Table 3-4), there is still considerable opportunity for additional diversion of low grade paper.
- Cardboard constitutes over 7 percent of the waste disposed from scheduled accounts. The percentage of cardboard was particularly high in the Auxiliary (14.5 percent) and Food Service (12.0 percent) waste streams. Additional opportunities for recovery of cardboard appear to exist.
- The single largest component of the waste disposal stream from scheduled accounts is 'other paper' (19.9 percent). This suggests that opportunities for segregation and recovery of this material (e.g., composting, transformation) should be investigated in planning to reach the 50 percent diversion goal.

Overall plastics account for 8.6 percent of the total waste disposed from scheduled accounts. HDPE and PET constitute less than 1 percent of this total. Film plastics on the other hand comprise over 4 percent of the waste disposed and opportunities for

recovery of this waste type may warrant consideration if reliable markets can be identified.

- Glass represents 5.5 percent of the waste disposed from scheduled accounts. Roughly half of the recyclable glass currently generated by the University is recycled (refer to Table 4-1), however, opportunities for increased glass recycling levels appear to exist, particularly among the Campus and Housing waste streams.
- Metals constitute roughly 4.4 percent of the material disposed by scheduled accounts. Aluminum cans, which constituting less than 1 percent of the waste disposed by scheduled accounts, are currently recycled at a rate of less than 20 percent (refer to Table 4-1). Recovery rates for the other metal material types are even less.
- Yard waste constitutes over 11 percent of the Staff & Faculty waste stream. This seems to indicate that further education and/or incentives to encourage residents to participate in the existing yard waste collection program should be pursued.
- The percentage of food waste in the waste disposal stream is significant, (18.1 percent). This suggests that food waste diversion (composting) should be considered in planning to reach the 50 percent diversion goal.
- Certain material types, although not a large fraction of the overall waste stream, constitute significant percentages of the waste disposed from specific individual areas of the University. Wood waste (6.1 percent) in the Campus waste stream, tin/bimetal cans (6.2 percent) in the Food Service waste stream, and non-ferrous metals from SLAC (14.3 percent) are just a few examples. This suggests that opportunities for developing targeted recovery programs for specific materials within specific areas of the University should be investigated.

- The visual survey of debris box loads indicated that additional potential appears to exist for recovery of wood waste from construction and demolition loads.

SECTION 3.0

SOLID WASTE DIVERSION CHARACTERIZATION

This section describes and quantifies the current waste diversion activities at Stanford University. Based on the data presented in this section, documented waste diversion at Stanford University during 1990 accounted for roughly 4,100 tons of material or slightly over 25 percent of the total solid waste generated.

3.1 GENERAL STUDY DESIGN AND METHODS

Information provided by Peninsula Sanitary Service (PSS), the Stanford Recycling Center (SRC), and the Operations and Maintenance Department was used to document existing recycling and composting activities at Stanford University. Source reduction activities have not typically been documented or quantified in any consistent manner. Existing source reduction activities at the University may include computerized record keeping, double sided copying, backyard composting in the staff & faculty housing development and other practices. While data obtained for recycling and composting activities is generally readily converted to quantitative results for waste diversion credit, source reduction data tends to be more qualitative by nature and more difficult to convert to hard tonnage figures. Surveys of waste generators would normally be conducted to quantify source reduction activities. Due to study constraints, however, no attempt was made to quantify source reduction activities at the University at this point in time.

The following sections describe and quantify the existing diversion programs at the University.

3.2.2 Materials Reuse

Pallet Reuse at Stanford University Hospital: All pallets coming into the hospital receiving area are reused. Pallets meeting the specifications of one particular recycler, are collected and removed at no charge to the hospital. All remaining pallets are removed by Peninsula Sanitary Service (PSS) and taken to their wood waste processing area.

Surplus Sales: Surplus Sales will accept appliances, office furniture and equipment from within the University system which are still useable or acceptable for resale. Anything which cannot be sold is given away. If no one wants them, these items are stripped for scrap metal recovery and then hauled to the landfill.

3.3 RECYCLING ACTIVITIES

Recycling refers to the recovery of materials from the waste stream and the processing and reuse of these materials as feed stock in the production of new products.

Recycling programs can be classified as either source separation or mixed waste recycling programs depending upon the means of recovery. Source separation recycling refers to the separation of recyclables from nonrecyclables at the place where the waste is generated, whether the location is a residence or a business. Mixed waste recycling refers to the recovery of materials after they have entered the waste disposal stream. All recycling programs currently operating at the University are source separation recycling programs. There are no mixed waste recycling programs currently on campus, or at the Newby Island Landfill which process material generated by the University.

Beginning in April 1991, recycling programs at Stanford were operated by both PSS and the student-run Stanford Recycling Center (SRC). In April, the student-run recycling program was merged with the PSS operation. The University contracted PSS to manage all aspects of the Stanford

Recycling Program, including its student employees, in addition to providing recycling and disposal services to the University.

The identified recycling activities at the University are discussed in the following sections. Although PSS now manages all aspects of the Stanford Recycling Program, those recycling activities which are operated by the Stanford Recycling Center are listed separately from PSS's other recycling operations.

3.3.1 Peninsula Sanitary Service

In addition to managing the Stanford Recycling Center and its operations PSS also operates a variety of other recycling programs throughout the University. These programs are discussed below. A breakdown of the projected 1990 diversion tonnages for PSS operations are provided in Table 3-1. These figures, which were extrapolated from data provided by PSS for the period from 10/90 through 3/91, do not include diversion tonnages attributed specifically to Stanford Recycling Center operations.

Curbside Recycling: PSS has a separate curbside recycling collection contract with Stanford. Under the terms of the contract PSS services 613 single-family residences in faculty and staff housing. PSS is able to impose a surcharge on these accounts in order to pay for the program.

The program, which began in 1987, services 100 percent of the staff and faculty housing complex collecting glass, newspaper, and aluminum cans in stackable containers, which residents place at the curbside once per week. Materials are then delivered to the Stanford Recycling Center for further processing.

Other residential collection services include dormitories, and married and graduate-student housing. Recyclables are collected by PSS from two or three cubic-yard front loaded dumpsters or accounts are provided with two 96 gallon carts: one for newspaper, one for co-mingled glass, aluminum and plastic. The goal of PSS is to provide a recycling receptacle next to every

TABLE 3-1
 PENINSULA SANITARY SERVICES
 1990 DIVERSION TONNAGES*

Material Type:	Area of Campus:										TOTAL
	CAMPUS	HOUSING	STAFF & FACULTY	FOOD SERVICE	AUXILIARY	DAPER	SLAC	NON UNIVERSITY	OFF-CAMPUS	DROP-OFF	
PAPER	155	170	10	100	65	0	0	216	0	0	716
Cardboard	0	0	0	0	0	0	0	0	0	0	0
High Grade	0	181	422	0	0	0	0	0	0	0	603
Low Grade	0	0	0	0	0	0	0	0	0	0	0
PLASTICS	0	0	0	0	0	0	0	0	0	0	0
PET	0	0	0	0	0	0	0	0	0	0	0
GLASS	0	67	158	0	0	0	0	0	0	0	225
METALS	0	2	4	0	0	0	0	0	0	0	6
Aluminum Cans	0	0	0	0	0	0	0	0	0	0	0
Aluminum Foil	0	0	0	0	0	0	0	0	0	0	0
Tin Cans	0	0	0	0	0	0	0	0	0	0	0
Scrap Metal	0	0	0	0	0	0	0	0	0	64	64
YARD WASTE	0	0	0	0	0	0	0	0	0	190	190
Compost/Mulch	0	0	0	0	0	0	0	0	0	0	0
WOOD WASTE	0	0	0	0	0	0	0	0	0	156 **	156
Wood Waste	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0
Subtotal	155	420	594	100	65	0	0	216	0	410	1960

* Projected tonnages based on 10/90-3-91 records.

** Transformation

trash can in these areas. This goal is approximately 70 percent realized according to PSS officials.

Cardboard (OCC) Collection: PSS services roughly 100 cardboard-dedicated recycling containers on campus. These bins are generally located next to the refuse bins in service areas which generate significant quantities of cardboard. PSS officials indicate that the 100 existing collection sites represent between 85-90 percent of the total number of potential sites which can be cost-effectively incorporated into the program. In theory, all of the 300 PSS collection sites could be given containers but some do not justify the expense due to a limited production of OCC. In these cases PSS will pickup OCC if it is set to the side of the refuse bin. They will also provide a special collection service upon request.

The cardboard is collected and hauled by PSS to Youth Enterprises Recycling, a non-profit organization in Menlo Park, which buys the OCC for \$50 per ton. PSS has agreed to back-haul all contaminants which are removed by Youth Enterprises Recycling from Stanford University generated cardboard loads.

Scrap Metal Recovery: PSS will accept 'white goods' (refrigerators, washers, clothes dryers, etc.) which are not resalable in Surplus Sales. White goods can be dropped-off in the PSS processing yard or, if preferred, PSS will pick-up white goods for a labor fee. Once received, items are stripped for recyclable materials. Motors, condensers, insulation and plastic stripping are removed and copper, steel and other metals are segregated and stock piled before being sold to San Jose scrap dealers. Roughly 5 to 7 tons of scrap are recovered by this method per month.

3.3.2 Stanford Recycling Center

Student recycling began at Stanford in 1977 as a class project and has grown steadily since then. Until recently the recycling program was managed as a student project under the Associated

Students of Stanford University (ASSU). The Recycling Center and all student employees are now a part of the contracted service provided by PSS.

The Stanford Recycling Center is a drop-off center and processing facility for recyclables. Affiliated source-separation recycling programs consist of satellite collection receptacles which feed into the central drop-off center. Table 3-2 provides a listing of the type and quantity of material recycled by the Stanford Recycling Center.

Over 2,000 green fibre barrels situated throughout the academic, office, and student living areas collect a variety of materials, including: newspaper, mixed paper, magazines, cardboard, glass, plastic (PET and HDPE) and 'cans'. 'Can' collections include: aluminum - beer and other beverage containers, aluminum foil, aluminum packaging and tin cans. Barrels in dormitories and row houses serve as collection points for newspaper, aluminum cans, and glass. Barrels in office areas, copy rooms and academic areas collect white ledger paper, computer printout, tab cards, and some colored paper, in addition to the other materials listed above.

These barrels are picked up regularly by recycling center workers and taken to the SRC drop-off site for intermediate processing. Here, the barrel contents are sorted and pooled with recyclables brought to the drop-off center by campus residents and others, and then transfer to markets. The drop-off center also collects clothing, building materials, and other reusable items for free distribution at the Free Store.

Approximately thirty-nine percent of the costs of the recycling program have been paid for by recycled-material revenue. The remaining deficit is covered by the University in lump-sum payments. University funding is provided to PSS through garbage collection fees paid by all generators including academic departments, student housing, faculty housing, etc. The present accounting system does not calculate the cost benefits of diversion of material from the landfill.

TABLE 3-2
STANFORD RECYCLING CENTER
1990 DIVERSION TONNAGES*

Area of Campus:

Material Type:	CAMPUS	HOUSING	STAFF & FACULTY	FOOD SERVICE	AUXILIARY	DAPER	SLAC	NON UNIVERSITY	OFF-CAMPUS	DROP-OFF	TOTAL
PAPER											
Cardboard	0	0	0	0	0	0	0	0	0	0	0
High Grade	211	32	0	2	13	3	16	3	42	0	322
Low Grade	413	413	2	20	59	10	20	6	39	146	1128
PLASTICS											
PET	1	1	0	0	0	0	0	0	0	0	2
GLASS											
Glass	69	146	1	8	28	1	2	2	19	0	276
METALS											
Aluminum Cans	2	4	0	0	0	0	0	0	0	0	6
Aluminum Foil	1	1	0	0	0	0	0	0	0	0	2
Tin Cans	3	5	0	0	1	0	0	0	1	0	10
Scrap Metal	0	0	0	0	0	0	0	0	0	0	0
YARD WASTE											
Compost/Mulch	0	0	0	0	0	0	0	0	0	0	0
WOOD WASTE											
Wood Waste	0	0	0	0	0	0	0	0	0	0	0
OTHER											
Other	0	0	0	0	0	0	0	0	0	0	0
Subtotal	700	602	3	30	101	14	38	11	101	146	1746

* Projected tonnages based on 10/90-3-91 records.

3.3.3 Special Waste Recycling Programs

In addition to the more traditional recycling programs listed above, a number of special waste recycling programs also exist at the University. These programs are discussed below.

Asphalt Recycling: Major road construction projects on campus are contracted out to the private sector. PSS believes that all of the material generated by these activities is recycled. Small patch jobs are handled by the University's Operations and Maintenance Department. Material which is generated by these projects is currently landfilled. Operations and Maintenance representatives have indicated, however, that it may be possible to recycle this material, and they are currently investigating potential options. No attempt has been made to quantify either of these activities at this point in time, either from the point of view of waste disposal or diversion. The University may wish to implement some type of formalized accounting procedure for these activities to document associated diversion and disposal tonnages in the future.

Construction/Demolition Debris Recycling: PSS handles the majority of construction and demolition debris generated on-campus. Construction and demolition debris includes concrete, dirt and other inert material, wood waste, scrap metal, and cardboard. Only PSS is permitted to set a debris box on campus grounds. However, exceptions to this rule are allowed if debris boxes are brought to the construction work-site by contractors (e.g., roofers and drywall installers) who want to self-haul this material. Contractors using PSS debris box services are entitled to reduced rates if they sort out wood waste from other construction and demolition debris. Wood waste is collected and hauled to the PSS yard where it is crushed, transferred to a 100 cubic yard trailer and, eventually hauled to Zanker Road. Tonnages attributed to this recycling activity are include in those cited for PSS in Table 3-1.

3.4 COMPOSTING ACTIVITIES

Composting refers to the controlled biological decomposition of organic matter which converts it into a stabilized humus product. There are a number of composting operations currently in place at the University.

3.4.1 Peninsula Sanitary Service

PSS is involved with a number of composting related projects on Campus which are discussed below. Tonnages attributed to these programs are included in Table 3-1.

Pilot Composting Program: Since February of 1990, PSS has been operating a pilot composting program in a temporary site on campus called the 'Commissary'. This program will maintain "pilot" program status until a permanent processing site can be established. PSS is planning to upgrade this operation with additional processing activities to improve the quality and marketability of the compost which is produced.

Golf Course and Horse Stables Composting Operation:

The Stanford University Golf Course separates green waste for mulching. As part of their course management operations, PSS chips golf course green waste and places it in windrows. Waste from the horse stables, is mixed with golf course waste and reapplied to the course.

Faculty Housing: PSS currently operates a yard waste collection program within the faculty housing area of the campus. This program has been in place for roughly 4 years and has 15 customers. Since May 4, 1991, PSS has collected the green waste generated by these accounts and taken it to the commissary site where it is incorporated into the pilot composting program. Customers pay for the program and are given 96 gallon containers for storage of yard waste. PSS would like to structure the rates so that collection of yard waste is cheaper than garbage in order to provide an incentive to the residents to participate in the program.

Boething Tree Land: Boething Tree Land is a wholesale nursery which leases land from the University. PSS has developed a pricing structure for their debris box service which makes it advantageous for PSS customers, such as Boething Tree Land, to source-separate recyclable materials. Customers are supplied with separate debris boxes for green compostables, wood and plastics at a savings of roughly 25 percent over the debris-box rate for refuse. The green waste from Boething Tree Land is taken to the Commissary site where it is currently left to decompose in windrows.

Christmas Tree Recycling: In 1990, PSS provided Christmas-tree collection services to residents of faculty and staff housing. Trees placed at curbside, on the same day when curbside recycling services were scheduled, were picked-up by a separate truck designated exclusively for tree hauling.

Multi-family housing residents were provided with a centrally located debris box for tree collection. In addition, there were a number of Christmas tree drop-off sites in graduate student housing areas which could also be used by the local community.

3.4.2 Stanford University Operations and Maintenance Department

The Stanford University Operations and Maintenance staff diverts substantial quantities of leaves and wood waste from the landfill. Large tree-branches are cut and stacked in place; some are removed by passersby to use as firewood. All tree prunings are chipped and either spread out to decompose on land near Embarcadero Road or used as mulch on campus. Leaves are also spread out to decompose. This particular program has been in place for two years. Information supplied by the Operations and Maintenance Department indicated that roughly 255 tons of wood waste is chipped and used as mulch along with an additional 160 tons of leaves and other yard waste. Table 3-3.

TABLE 3-3
 OPERATIONS AND MAINTENANCE DEPARTMENT
 1990 DIVERSION TONNAGES

Material Type:	Area of Campus:										TOTAL
	CAMPUS	HOUSING	FACULTY	FOOD SERVICE	AUXILIARY	DAPER	SLAC	NON UNIVERSITY	OFF-CAMPUS	DROP-OFF	
PAPER	0	0	0	0	0	0	0	0	0	0	0
Cardboard	0	0	0	0	0	0	0	0	0	0	0
High Grade	0	0	0	0	0	0	0	0	0	0	0
Low Grade	0	0	0	0	0	0	0	0	0	0	0
PLASTICS	0	0	0	0	0	0	0	0	0	0	0
PET	0	0	0	0	0	0	0	0	0	0	0
GLASS	0	0	0	0	0	0	0	0	0	0	0
Glass	0	0	0	0	0	0	0	0	0	0	0
METALS	0	0	0	0	0	0	0	0	0	0	0
Aluminum Cans	0	0	0	0	0	0	0	0	0	0	0
Aluminum Foil	0	0	0	0	0	0	0	0	0	0	0
Tin Cans	0	0	0	0	0	0	0	0	0	0	0
Scrap Metal	0	0	0	0	0	0	0	0	0	0	0
YARD WASTE	0	0	0	0	0	0	0	0	0	415	415
Compost/Mulch*	0	0	0	0	0	0	0	0	0	0	0
WOOD WASTE	0	0	0	0	0	0	0	0	0	0	0
Wood Waste	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0
Subtotal	0	0	0	0	0	0	0	0	0	0	415

* Based on the following information supplied by the Grounds Department:

Mulch (wood chips) - 187.5 tons (9/1/90-6/1/91) = 255 tons/yr

Leaves - 268 (2) yd3 boxes (1/91-5/28/91) assumed density 250lbs/yd3 = 160 tons/yr

PSS also provides the Operations and Maintenance Department with two front-loaded refuse containers, which are currently used for landscape debris. These containers are unlocked and are used for general waste disposal in addition to green waste collection. If the containers were locked, pure loads of uncontaminated green waste could be collected and incorporated into the pilot composting program.

Some lawn clippings generated by the Operations and Maintenance Department are left in place. The University is considering expanding this practice and is considering purchasing mulching mowers for use throughout the University grounds. As a result of the drought there has also been some discussions about replacing some lawns with mulch.

3.5 WASTE DIVERSION QUANTITIES

Using the information cited in Tables 3-1 through 3-3 the total documented diversion for the University during 1990 was 4,121 tons. This is slightly over 25 percent of the total waste stream generated by University. A breakdown of this total by area of campus is provided in Table 3-4. Table 3-5 provides a distribution of this diversion total by program type.

The categories used by PSS and the Stanford Recycling Center to account for diversion tonnages are somewhat different from those categories sampled as part of the Waste Disposal Characterization Study. In order to determine the overall waste generation stream for the University it is necessary to disaggregate the diversion tonnages according to the categories sampled during the disposal study. In order to do this it was necessary to carry out the following distributions:

- High Grade Paper diversion tonnages were distributed among the categories of Computer Printout and White Ledger.

TABLE 3-4
 TOTAL STANFORD UNIVERSITY
 1990 DIVERSION TONNAGES

Area of Campus:

Material Type:	CAMPUS	HOUSING	STAFF & FACULTY	FOOD SERVICE	AUXILIARY	DAPER	SLAC	NON UNIVERSITY	OFF-CAMPUS	DROP-OFF	TOTAL
PAPER											
Cardboard	155	170	10	100	65	0	0	216	0	0	716
High Grade	211	32	0	2	13	3	16	3	42	0	322
Low Grade	413	594	424	20	59	10	20	6	39	146	1731
PLASTICS											
PET	1	1	0	0	0	0	0	0	0	0	2
GLASS											
Glass	69	213	159	8	28	1	2	2	19	0	501
META											
Aluminum Cans	2	6	4	0	0	0	0	0	0	0	12
Aluminum Foil	1	1	0	0	0	0	0	0	0	0	2
Tin Cans	3	5	0	0	1	0	0	0	1	0	10
Scrap Metal	0	0	0	0	0	0	0	0	0	64	64
YARD WASTE											
Compost/Mulch	0	0	0	0	0	0	0	0	0	605	605
WOOD WASTE											
Wood Waste	0	0	0	0	0	0	0	0	0	156 *	156
OTHER											
Other	0	0	0	0	0	0	0	0	0	0	0
Subtotal	855	1022	597	130	166	14	38	227	101	971	4121

* Transformation

TABLE 3-5
 TOTAL STANFORD UNIVERSITY
 1990 DIVERSION TONNAGES
 BY PROGRAM TYPE

Material Type:	STANFORD RECYCLING CENTER		PENINSULA SANITARY SERVICE				OPERATIONS AND MAINTENANCE		TOTAL	
	Drop-off Center	Collection Programs	Curbside Recycling	Cardboard Collection	Scrap Metal Recovery	Construction/ Demolition	Composting Operations	Mulch (wood chips)		Mulch (leaves)
PAPER										
Cardboard	0	0	0	716	0	0	0	0	716	
High Grade	0	322	0	0	0	0	0	0	322	
Low Grade	146	982	603	0	0	0	0	0	1731	
PLASTICS										
PET	0	2	0	0	0	0	0	0	2	
GLASS										
Glass	0	276	225	0	0	0	0	0	501	
METALS										
Aluminum Cans	0	6	6	0	0	0	0	0	12	
Aluminum Foil	0	2	0	0	0	0	0	0	2	
Tin Cans	0	10	0	0	0	0	0	0	10	
Scrap Metal	0	0	0	0	64	0	0	0	64	
YARD WASTE										
Compost/Mulch	0	0	0	0	0	0	190	160	605	
WOOD WASTE										
Wood Waste	0	0	0	0	0	156 *	0	0	156	
OTHER										
Other	0	0	0	0	0	0	0	0	0	
Subtotal	146	1600	834	716	64	156	190	255	160	4121

* Transformation

- Low Grade Paper diversion tonnages were distributed among the categories of Newspaper, Magazines, and Mixed Paper.
- Glass diversion tonnages were distributed among the categories of CA Redemption Value and Other Recyclable Glass.
- Scrap Metal diversion tonnages were distributed among the categories of Tin & Ferrous Metals, Non-Ferrous Metals, and White Goods.
- PSS compost/mulch tonnages (yard waste) diversion tonnages were distributed among the categories of Grass and Leaves and Prunings.

All diversion tonnages were distributed in proportion to the relative composition of these materials in the waste disposal stream. This revised distribution of the University's diversion tonnages is provided in Table 3-6.

TABLE 3.6
1990 STANFORD UNIVERSITY WASTE DIVERSION STREAM

Area:	Scheduled Accounts:							TOTAL SCHEDULED ACCOUNTS
	CAMPUS	HOUSING	STAFF & FACILITY	FOOD SERVICE	AUXILIARY	PAPER	SLAC	
Percentage:	27.2%	31.9%	7.1%	4.8%	7.2%	1.0%	4.5%	TOTAL
Percentage:	20.7%	24.8%	14.5%	3.2%	4.0%	0.3%	0.9%	85.4%
Percentage:								74.0%
PAPER	8	1	0	0	0	0	1	10
Computer Printout(1)								270
White Envelopes(1)	203	31	0	2	13	3	15	483
Newspaper(2)	129	185	132	6	18	3	6	287
Magazines(2)	77	110	79	4	11	2	4	716
Corrugated Containers	155	170	10	100	65	0	0	777
Mixed Paper(2)	207	298	213	10	30	5	10	0
Other Paper	0	0	0	0	0	0	0	2
PLASTICS	0	0	0	0	0	0	0	0
HDPE	0	0	0	0	0	0	0	0
PET	1	1	0	0	0	0	0	2
Film Plastics	0	0	0	0	0	0	0	0
Polyethylene	0	0	0	0	0	0	0	0
Other Plastics	0	0	0	0	0	0	0	0
GLASS	28	88	65	3	12	0	1	198
CA Redemption Value(3)								284
Other Recyclable(3)	41	125	94	5	16	1	1	0
Other Glass	0	0	0	0	0	0	0	23
METALS	2	6	4	0	0	0	0	12
Aluminum Cans	3	5	0	0	1	0	0	9
Tin/Bi-metal Cans	1	1	0	0	0	0	0	2
Tin & Ferrous Metals(4)	0	0	0	0	0	0	0	0
Non-ferrous Metals(4)	0	0	0	0	0	0	0	0
White Goods	0	0	0	0	0	0	0	0
YARD WASTE	0	0	0	0	0	0	0	0
Grass/Leaves(5)	0	0	0	0	0	0	0	0
Prunings(5)	0	0	0	0	0	0	0	0
OTHER ORGANICS	0	0	0	0	0	0	0	0
Food Waste	0	0	0	0	0	0	0	0
Tire & Rubber Products	0	0	0	0	0	0	0	0
Wood Waste	0	0	0	0	0	0	0	0
Textiles and Leather	0	0	0	0	0	0	0	0
Manure	0	0	0	0	0	0	0	0
Other Organics	0	0	0	0	0	0	0	0
OTHER WASTES	0	0	0	0	0	0	0	0
Inert Solids	0	0	0	0	0	0	0	0
Household Hazardous Waste	0	0	0	0	0	0	0	0
Special Waste	0	0	0	0	0	0	0	0
Disposable Diapers	0	0	0	0	0	0	0	0
TOTAL*	855	1022	597	130	166	14	38	3049

* Numbers may not add exactly due to rounding.
 (1) Recycling tonnage reported as high grades, total distributed among computer and white paper proportional to percent disposed.
 (2) Recycling tonnage reported as low grades, total distributed among newspaper, magazines, and other paper proportional to percent disposed.
 (3) Recycling tonnage reported as glass, total distributed among CA redemption value and other recyclable proportional to percent disposed.
 (4) Recycling tonnage reported as scrap metals, total distributed among tin & ferrous and non-ferrous metal and white goods proportional to percent disposed; aluminum foil included in non-ferrous.
 (5) Recycling tonnage reported as yard waste, total distributed among grass/leaves and prunings proportional to percent disposed.

TABLE 3-6 (continued)
1990 STANFORD UNIVERSITY WASTE DIVERSION STREAM

Area:	TOTAL SCHEDULED ACCOUNTS	TOTAL OFF-CAMPUS	TOTAL DROP OFF	TOTAL DIVERSION TONNAGE	TOTAL DIVERSION COMPOSITION
Percent of Total Diversion Tonnage:	74.0%	7.5%	21.6%	100.0%	
PAPER				2769	67.2%
Computer Printout(1)	10	2	0	12	0.3%
White Ledger(1)	270	40	0	310	7.5%
Newspaper(2)	483	12	46	540	13.1%
Magazines(2)	287	7	27	321	7.8%
Corrugated Containers	716	0	0	716	17.4%
Mixed Paper(2)	777	20	73	870	21.1%
Other Paper	0	0	0	0	0.0%
PLASTICS				2	0.0%
HDPPE	0	0	0	0	0.0%
PET	2	0	0	2	0.0%
Film Plastics	0	0	0	0	0.0%
Polystyrene	0	0	0	0	0.0%
Other Plastics	0	0	0	0	0.0%
GLASS				501	12.2%
CA Redemption Value(3)	198	8	0	206	5.0%
Other Recyclable(3)	284	11	0	295	7.2%
Other Glass	0	0	0	0	0.0%
METALS				88	2.1%
Aluminum Cans	12	0	0	12	0.3%
Tin/Bi-metal Cans	9	1	0	10	0.2%
Tin & Ferrous Metals(4)	0	0	40	40	1.0%
Non-Ferrous Metals(4)	2	0	24	26	0.6%
White Goods	0	0	0	0	0.0%
YARD WASTE				605	14.7%
Grass/Leaves(5)	0	0	532	532	12.9%
Prunings(5)	0	0	73	73	1.8%
OTHER ORGANICS				156	3.8%
Food Waste	0	0	0	0	0.0%
Tires & Rubber Products	0	0	0	0	0.0%
Wood Wastes	0	0	156	156	3.8%
Textiles and Leather	0	0	0	0	0.0%
Manure	0	0	0	0	0.0%
Other Organics	0	0	0	0	0.0%
OTHER WASTES				0	0.0%
Inert Solids	0	0	0	0	0.0%
Household Hazardous Wastes	0	0	0	0	0.0%
Special Wastes	0	0	0	0	0.0%
Disposable Dispers	0	0	0	0	0.0%
TOTAL*	3049	101	971	4121	100.0%

* Numbers may not add exactly due to rounding.

(1) Recycling tonnages reported as high grades, total distributed among computer and white ledger proportional to percent disposed.

(2) Recycling tonnages reported as low grades, total distributed among newspaper, magazines, and other paper proportional to percent disposed.

(3) Recycling tonnages reported as glass, total distributed among CA redemption value and other recyclable proportional to percent disposed.

(4) Recycling tonnages reported as scrap metals, total distributed among tin & ferrous and non-ferrous metals and white goods proportional to percent disposed; aluminum foil included in non-ferrous.

(5) Recycling tonnages reported as yard waste, total distributed among grass/leaves and prunings proportional to percent disposed.

SECTION 4.0

CURRENT WASTE GENERATION AND PROJECTIONS

This section provides estimates of the total 1990 waste generation quantities and composition for Stanford University. A per-capita waste generation rate is also determined for the University and used to project future waste generation tonnages for 1991 through 2005. These waste projections include estimates of those quantities of material generated which will be diverted from disposal, as well as the quantities which will require disposal based upon the current level of diversion.

4.1 CURRENT WASTE QUANTITIES AND CHARACTERISTICS

The total solid waste generated by Stanford University is equal to the sum of the total solid waste disposed (Section 2.0) plus the total solid waste diverted from solid waste disposal facilities through source reduction, recycling and composting programs which are quantified in Section 3.0. The total quantity of solid waste disposed includes only solid waste disposed in permitted solid waste disposal facilities. Expressed as an equation, the total solid waste generated by the University is computed as follows:

$$\text{GENERATION} = \text{DISPOSED} + \text{DIVERTED}$$

Where:

GENERATION = The solid waste generated within the University Community

DISPOSAL = The total quantity of solid waste generated within the University Community which is disposed in permitted solid waste facilities.

DIVERTED = The total quantity of solid waste generated within the University Community which is diverted from permitted solid waste disposal facilities through existing source reduction, recycling and composting programs.

Using the results of the Waste Disposal (section 2), and Waste Diversion (section 3) Characterization Studies, the composition and quantity of the waste generated at the University was determined.

Waste generation at Stanford University during base year 1990 was estimated to be 16,205 tons. A breakdown of the generation, diversion, and disposal of material by waste type is provided in Table 4-1.

4.2 PROJECTED WASTE QUANTITIES

One of the most important solid waste planning tools available to the University is the projection of future waste quantities. Waste projections can be used to determine how much waste will be generated at the University and can serve as a guideline for the development of appropriate waste management options. Waste projections can also be used to estimate how long available landfill capacity or disposal contract agreements will last. Furthermore, when combined with information about waste composition and targeted materials in recycling programs, waste projections can be used to determine the probable success of new recycling programs in reducing the waste stream.

Such projections should be credible, but a number of factors -- some of them difficult or impossible to predict or measure -- influence the generation of material waste. This section explains the principal factors that may influence those quantities at the University and concludes with a general projection through the year 2005.

4.2.1 Influences on Waste Generation Quantities at Stanford University

There are a number of factors and events that can influence the quantity of waste generated and then managed by the University. Some of these factors were taken into account in the

TABLE 4-1
1990 STANFORD UNIVERSITY WASTE GENERATION STREAM

	TOTAL DISPOSAL TONNAGE	TOTAL DISPOSAL COMPOSITION	TOTAL DIVERSION TONNAGE	TOTAL DIVERSION COMPOSITION	TOTAL GENERATED TONNAGE	TOTAL GENERATED COMPOSITION	PERCENT DISPOSED	PERCENT DIVERTED
PAPER	5937	49.1%	2769	67.2%	8706	53.7%	49.4%	50.6%
Computer Printout	12	0.1%	12	0.3%	24	0.1%	49.4%	50.6%
White Lodge	302	2.5%	310	7.5%	612	3.8%	49.4%	50.6%
Newspaper	752	6.2%	540	13.1%	1293	8.0%	58.2%	41.8%
Magazines	447	3.7%	321	7.8%	768	4.7%	58.2%	41.8%
Corrugated Containers	934	7.7%	716	17.4%	1650	10.2%	56.6%	43.4%
Mixed Paper	1211	10.0%	870	21.1%	2080	12.8%	58.2%	41.8%
Other Paper	2279	18.9%	0	0.0%	2279	14.1%	100.0%	0.0%
PLASTICS	1001	8.3%	2	0.0%	1003	6.2%	100.0%	0.0%
HDPE	85	0.7%	0	0.0%	85	0.5%	100.0%	0.0%
PET	23	0.2%	2	0.0%	25	0.2%	91.9%	8.1%
Film Plastics	466	3.9%	0	0.0%	466	2.9%	100.0%	0.0%
Polystyrene	64	0.5%	0	0.0%	64	0.4%	100.0%	0.0%
Other Plastics	363	3.0%	0	0.0%	363	2.2%	100.0%	0.0%
GLASS	636	5.3%	501	12.2%	1137	7.0%	52.3%	47.7%
CA Reclamation Value	226	1.9%	206	5.0%	432	2.7%	52.3%	47.7%
Other Recyclable	323	2.7%	295	7.2%	618	3.8%	52.3%	47.7%
Other Glass	88	0.7%	0	0.0%	88	0.5%	100.0%	0.0%
METALS	576	4.8%	88	2.1%	664	4.1%	81.9%	18.1%
Aluminum Cans	54	0.4%	12	0.3%	66	0.4%	93.0%	7.0%
Tin/Bi-metal Cans	133	1.1%	10	0.2%	143	0.9%	83.8%	14.2%
Tin & Ferrous Metals	242	2.0%	40	1.0%	282	1.7%	84.8%	15.2%
Non-Ferrous Metals	145	1.2%	26	0.6%	171	1.1%	100.0%	0.0%
White Goods	2	0.0%	0	0.0%	2	0.0%	100.0%	0.0%
YARD WASTE	268	2.2%	605	14.7%	873	5.4%	30.7%	69.3%
Grass/Leaves	236	2.0%	532	12.9%	768	4.7%	30.7%	69.3%
Prunings	32	0.3%	73	1.8%	106	0.7%	100.0%	0.0%
OTHER ORGANICS	2873	23.8%	156	3.8%	3029	18.7%	100.0%	0.0%
Food Waste	2026	16.8%	0	0.0%	2026	12.5%	100.0%	0.0%
Tires & Rubber Products	30	0.2%	0	0.0%	30	0.2%	81.2%	18.8%
Wood Waste	673	5.6%	156	3.8%	829	5.1%	100.0%	0.0%
Textiles and Leather	129	1.1%	0	0.0%	129	0.8%	100.0%	0.0%
Manure	0	0.0%	0	0.0%	0	0.0%	100.0%	0.0%
Other Organics	14	0.1%	0	0.0%	14	0.1%	100.0%	0.0%
OTHER WASTES	792	6.6%	0	0.0%	792	4.9%	100.0%	0.0%
Inert Solids	340	2.8%	0	0.0%	340	2.1%	100.0%	0.0%
Household Hazardous Wastes	45	0.4%	0	0.0%	45	0.3%	100.0%	0.0%
Special Wastes	285	2.4%	0	0.0%	285	1.8%	100.0%	0.0%
Disposable Diapers	121	1.0%	0	0.0%	121	0.7%	100.0%	0.0%
TOTAL	12084	100%	4121	100%	16205	100.0%	74.6%	25.4%

* Numbers may not add exactly due to rounding

projections described below; others are one-time events whose occurrence cannot be predicted, but which are bound to occur. These influences include:

- The current University student, staff and faculty generation rates: the average amount of waste, produced per student, staff and faculty member each day;
- The number of students, staff and faculty.
- Changes in the current generation rates;
- The economic cycle (i.e., periodic swings in the amount of business and construction activity at the University);
- The extent of recycling: influenced by changes in waste composition (e.g., the trend away from glass containers), but more sudden effects are also possible, such as market price fluctuations, returnable-container legislation or new large-scale University recycling programs;
- Large development projects at the University that could create anomalies in the tonnage trend;
- New limitations on growth; and
- Increased disposal fees and other factors which could positively affect recovery economics and lift diversion levels higher than the AB 939 mandated levels.

Given the number and diversity of the influences on the tonnage generated, diverted, and disposed of, and the likelihood that other unanticipated influences may also occur, the task of accurately projecting future generation, diversion, and disposal quantities is difficult.

4.2.2 University Waste Stream Projection

In order to project future waste generation for the University a per-capita waste generation rate was developed for the University using the existing waste generation estimate and the current population of the University community, as supplied by the Management and Financial Planning Department. This waste generation rate was then applied to population projections for the University to project future waste generation quantities through the year 2005; Table 4-2.

Using these projected waste quantities, the impact of the various existing and planned waste reduction and recycling activities over the 15-year planning period can be determined, enabling the waste diversion rates to be projected, with the remaining waste requiring disposal.

It should be noted that in projecting future waste quantities for the University, the per-capita waste generation rate was assumed to remain constant. Therefore, any projected increases in the annual quantity of waste generated at the University are due solely to projected increases in population.

Assuming a constant per-capita waste generation rate the University's waste stream is projected to reach over 18,700 tons per year by the year 2005, the last year of the current 15-year planning period. This is a growth rate of slight more than one (1) percent per year, attributed entirely to increased University population. As can be seen from the table, at current diversion rates, roughly 4,765 tons will be recovered from the waste stream by the year 2005, with 13,974 tons requiring disposal.

TABLE 4-2
PROJECTED WASTE GENERATION

YEAR	POPULATION*	PROJECTED WASTE GENERATION (tons/year)	Projected Waste Diversion (tons/year)	Projected Waste Disposal (tons/year)
1990	30,704	16,205	4,121	12,084
1991	31,024	16,374	4,164	12,210
1992	31,344	16,543	4,207	12,336
1993	31,664	16,712	4,250	12,462
1994	31,984	16,881	4,293	12,588
1995	32,304	17,050	4,336	12,714
1996	32,625	17,219	4,379	12,840
1997	32,945	17,388	4,422	12,966
1998	33,265	17,557	4,465	13,092
1999	33,585	17,725	4,508	13,218
2000	33,905	17,894	4,551	13,344
2001	34,225	18,063	4,594	13,470
2002	34,545	18,232	4,637	13,596
2003	34,865	18,401	4,680	13,722
2004	35,185	18,570	4,722	13,848
2005	35,506	18,739	4,765	13,974

Waste Generation Rate - 16,205 tons/30,704 people
 - 0.53 tons/person/year
 - 2.9 lbs/person/day

* Source: "Stanford University Daytime Population Trend Forecast",
 Management and Financial Planning Department.
 Based on 1989-90 actual population and 1999-2000 projected
 population assuming constant annual increase in population.

APPENDIX A

WASTE COMPOSITION STUDY SOURCES

**APPENDIX A
WASTE COMPOSITION STUDY SAMPLE SOURCES**

AREA	ACCOUNT TYPE	SOURCE
Campus	Public Trash Cans:	Public Trash Cans
	Office Space:	History Corner
		Cubberly
		Green Library
		Serra Buildings
	Lab Space:	Varian
		Keck
Housing	Dormitories:	Stern/Donner
		Toyon
	Row Houses:	Storey
		Hammar skjold
	Graduate Housing:	Raines
		EV Highrise
		EV Lowrise
	Mirrieless	
Staff & Faculty	N/A	Staff & Faculty (load Sample)
Food Service	N/A	Branner
Auxiliary	N/A	Ford Foundation
		Faculty Club
		Bowman Alumni
Daper	N/A	Encina Gym
SLAC	N/A	SLAC
North University	N/A	Nixon Elementary
		Stables

APPENDIX B

DEFINITIONS OF WASTE TYPES

APPENDIX B
DEFINITIONS OF WASTE TYPES

PAPER CATEGORY

- 1 **Computer Printout** - Computer Paper.
- 2 **White Ledger** - High quality white office paper.
- 3 **Newspaper** - Newspapers or other similar publications which may include supplemental inserts of various paper grades.
- 4 **Magazines** - Magazines or other similar publications.
- 5 **Corrugated Containers** - Paperboard containers fabricated from two layers of kraft linerboard sandwiched around a corrugating medium. Kraft paper (shopping bags) is also include in this category.
- 6 **Mixed Paper** - Colored ledger, junk mail.
- 7 **Other Paper** - Tissue paper, napkins, packing material.

PLASTIC CATEGORY

- 8 **HDPE** - Clear high-density polyethylene containers. Mainly consists of milk and bottled water containers.
- 9 **PET containers** - Polyethylene terephthalate beverage containers. Mainly consists of plastic soda containers including 16 ounce containers and 1- and 2-liter beverage containers.
- 10 **Film Plastics** - Light plastics such as food wrappings and trash bags.
- 11 **Polystyrene** - Usually associated with things like plastic plates and cups, egg cartons and food trays fast food clam shells and packaging materials such as styrofoam peanuts.
- 12 **Other Plastics** - All other plastics not listed above, including hard plastics.

GLASS CATEGORY

- 13 **CA Redemption Value Containers** - Beverage containers, such as bottled beer and soda, with labels indicating California redemption value.
- 14 **Other Recyclable Glass** - All food, beverage and product containers other than redemption containers.
- 15 **Other Glass** - Glass products that are not containers, such as plate glass, mirrors, light bulbs, and other glass products.

METALS CATEGORY

- 16 **Aluminum Cans** - Redemption and nonredemption all-aluminum cans.
- 17 **Tin and Bi-metal cans** - Any food or beverage container that is composed of steel with a tin coating. Bimetal containers are also included in this category.
- 18 **Tin and Ferrous Metals** - Any iron or steel scrap which has an iron content sufficient for magnetic separation.
- 19 **Non-Ferrous Metals** - Any metals 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.
- 20 **White Goods** - Major appliances such as refrigerators, stoves washing machines, clothes dryers, hot water heaters and other large appliances.

YARD WASTE CATEGORY

- 21 **Grass/Leaves** - Grass clippings, leaves and other organic waste resulting from gardening and landscaping activities.
- 22 **Prunings** - Tree limbs, branches, shrubs, and other bulky items resulting from gardening and other landscaping activities.

OTHER ORGANICS CATEGORY

- 23 **Food Waste** - Animal, fruit or vegetable wastes resulting from the storage, preparation, cooking or handling of food.
- 24 **Tires & Rubber Products** - Tires from automobiles, trucks and bicycles: other rubber products such as belts, hoses, tubing, mats etc.
- 25 **Wood Waste** - Wood pieces or particles which are generated from the manufacturing of wood products, harvesting, processing or storage of raw wood materials, or construction and demolition activities.
- 26 **Textiles and Leather** - Any textile product including clothing, rags, and carpet, and leather products.
- 27 **Manure** - Animal excrement suitable as fertilizer or compost material.
- 28 **Other Organics** - Miscellaneous organic solid waste not categorized above.

OTHER WASTES CATEGORY

- 29 **Inert solids** - Inert waste including sand, rock, asphalt, concrete, soil, ceramics, porcelain, brick and similar materials.
- 30 **Household Hazardous Waste** - 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. Examples of household hazardous waste include batteries, abrasive and chemical cleaners, bleaches, shoe polish, drain openers, automotive products, paint products, pesticides and fertilizers, sealants, and chemicals and their containers.
- 31 **Special Wastes** - Any hazardous waste listed in section 66740 of Title 22 of the California Code of Regulations, or any waste that 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. AB 939 requires that ash, sewage sludge, industrial

sludge, asbestos, shredder waste auto bodies, and other special wastes be include in the list of special wastes examined.

- 32 **Disposable Diapers** - Diapers and their contents
- 33 **Fines** - Organic and inorganic materials less than 1/2 inch in diameter.

APPENDIX C

QUANTITATIVE FIELD ANALYSES RESULTS

CAMPUS WASTE COMPOSITION FIELD DATA
TOTAL

	Account Type: Percent of Total:	Public Trash Cans 33%	Office Space Total 33%	Lab Space Total 33%	CAMPUS TOTAL PERCENTAGE
PAPER					
Computer Printouts	0.0%	0.0%	0.1%	0.4%	0.2%
White Lodge	6.3%	0.0%	0.3%	3.2%	3.2%
Newspaper	13.0%	13.0%	7.8%	3.5%	8.1%
Magazines	7.6%	7.6%	7.5%	3.7%	6.3%
Corrugated Containers	2.1%	2.1%	8.1%	5.4%	5.2%
Mixed Paper	17.6%	17.6%	17.1%	7.5%	14.1%
Other Paper	25.9%	25.9%	16.9%	21.2%	21.3%
PLASTICS					
HDPE	0.7%	0.7%	0.3%	0.0%	0.4%
PET	0.0%	0.0%	0.2%	0.2%	0.2%
Film Plastics	1.9%	1.9%	4.5%	4.8%	3.8%
Polystyrene	1.1%	1.1%	0.6%	1.3%	1.0%
Other Plastics	2.2%	2.2%	2.6%	4.4%	3.0%
GLASS					
CA Redemption Value	4.2%	4.2%	6.3%	1.3%	3.9%
Other Recyclable	8.9%	8.9%	1.4%	2.7%	4.3%
Other Glass	0.0%	0.0%	0.2%	0.0%	0.1%
METALS					
Aluminum Cans	0.8%	0.8%	0.5%	0.9%	0.8%
Tin/Bi-metal Cans	0.6%	0.6%	0.4%	0.0%	0.3%
Tin & Ferrous Metals	0.0%	0.0%	0.2%	2.3%	0.8%
Non-Ferrous Metals	0.1%	0.1%	0.1%	3.5%	1.2%
White Goods	0.0%	0.0%	0.0%	0.0%	0.0%
YARD WASTE					
Grass/Leaves	0.0%	0.0%	1.3%	0.0%	0.4%
Prunings	0.0%	0.0%	0.2%	0.0%	0.1%
OTHER ORGANICS					
Food Waste	11.4%	11.4%	12.0%	8.8%	10.7%
Tires & Rubber Products	0.1%	0.1%	0.2%	0.0%	0.1%
Wood Waste	0.0%	0.0%	1.7%	16.7%	6.1%
Textiles and Leather	0.1%	0.1%	0.9%	0.1%	0.3%
Manure	0.0%	0.0%	0.0%	0.0%	0.0%
Other Organics	0.5%	0.5%	0.3%	0.0%	0.3%
OTHER WASTES					
Inert Solids	0.4%	0.4%	0.4%	5.1%	2.0%
Household Hazardous Waste	0.0%	0.0%	0.3%	1.2%	0.5%
Special Wastes	0.0%	0.0%	1.5%	1.9%	1.1%
Disposable Dispers	0.8%	0.8%	0.0%	0.0%	0.3%
TOTAL		100.0%	100.0%	100.0%	100.0%

CAMPUS WASTE COMPOSITION FIELD DATA
PUBLIC TRASH CANS

Area:	Account Type:	Source:	CAMPUS		PUBLIC TRASH CANS TOTAL WEIGHT	PUBLIC TRASH CANS PERCENTAGE
			Public Trash Cans	Public Trash Can		
			Net Weight			
PAPER						
Computer Printout			0.0		0.0	0.0%
White Lodge			0.0		0.0	0.0%
Newspaper			24.7		24.7	13.0%
Magazines			14.4		14.4	7.6%
Corrugated Containers			3.9		3.9	2.1%
Mixed Paper			33.4		33.4	17.6%
Other Paper			49.2		49.2	25.9%
PLASTICS						
HDPE			1.3		1.3	0.7%
PET			0.0		0.0	0.0%
Film Plastics			3.6		3.6	1.9%
Polystyrene			2.1		2.1	1.1%
Other Plastics			4.1		4.1	2.2%
GLASS						
CA Redemption Value			8.0		8.0	4.2%
Other Recyclable			16.9		16.9	8.9%
Other Glass			0.0		0.0	0.0%
METALS						
Aluminum Cans			1.6		1.6	0.8%
Tin/Bi-metal Cans			1.1		1.1	0.6%
Tin & Ferrous Metals			0.0		0.0	0.0%
Non-Ferrous Metals			0.1		0.1	0.1%
White Goods			0.0		0.0	0.0%
YARD WASTE						
Grass/Leaves			0.0		0.0	0.0%
Prunings			0.0		0.0	0.0%
OTHER ORGANICS						
Food Waste			21.6		21.6	11.4%
Tires & Rubber Products			0.2		0.2	0.1%
Wood Waste			0.0		0.0	0.0%
Textiles and Leather			0.1		0.1	0.1%
Manure			0.0		0.0	0.0%
Other Organics			0.9		0.9	0.5%
OTHER WASTES						
Inert Solids			0.8		0.8	0.4%
Household Hazardous Waste			0.0		0.0	0.0%
Special Waste			0.0		0.0	0.0%
Disposable Diapers			1.6		1.6	0.8%
TOTAL			189.6		189.6	100.0%

**HOUSING WASTE COMPOSITION FIELD DATA
TOTAL**

Account Type: Percent of Total:	Dormitories 42%	Row Houses 12%	Graduate Housing 46%	G TOTAL PERCENTAGE (Weighted Average)
PAPER				
Computer Printout	0.0%	0.0%	0.0%	0.0%
White Ledger	0.3%	6.2%	0.7%	1.2%
Newspaper	8.4%	5.8%	5.6%	6.8%
Magazines	2.4%	2.4%	2.3%	2.4%
Corrugated Containers	7.5%	3.3%	10.8%	8.5%
Mixed Paper	6.5%	22.1%	7.4%	8.8%
Other Paper	27.0%	25.9%	18.8%	23.1%
PLASTICS				
HDPE	1.0%	1.0%	2.0%	1.5%
PET	0.0%	0.0%	0.6%	0.3%
Film Plastics	3.3%	4.4%	3.9%	3.7%
Polyethylene	0.2%	0.9%	0.7%	0.5%
Other Plastics	5.2%	1.8%	2.6%	3.6%
GLASS				
CA Reclamation Value	0.7%	2.9%	2.2%	1.6%
Other Recyclable	2.3%	2.5%	3.8%	3.0%
Other Glass	1.0%	0.3%	1.7%	1.2%
METALS				
Aluminum Cans	0.6%	0.6%	0.4%	0.5%
Tin/Al-metal Cans	0.1%	2.1%	2.0%	1.2%
Tin & Ferrous Metals	4.2%	0.0%	0.1%	1.8%
Non-Ferrous Metals	0.4%	0.1%	0.2%	0.3%
White Goods	0.0%	0.0%	0.0%	0.0%
YARD WASTE				
Grass/Lowes	0.4%	0.0%	0.6%	0.4%
Prunings	0.0%	0.1%	0.1%	0.0%
OTHER ORGANICS				
Food Waste	8.2%	16.9%	26.6%	17.7%
Tires & Rubber Products	0.3%	0.1%	0.0%	0.1%
Wood Waste	0.4%	0.0%	0.2%	0.3%
Textiles and Leather	3.4%	0.5%	1.4%	2.1%
Mature	0.0%	0.0%	0.0%	0.0%
Other Organics	0.0%	0.0%	0.2%	0.1%
OTHER WASTES				
Inert Solids	4.8%	0.0%	0.4%	2.2%
Household Hazardous Waste	0.3%	0.0%	0.1%	0.2%
Special Waste	11.0%	0.0%	0.0%	4.6%
Disposable Diapers	0.0%	0.0%	4.5%	2.1%
TOTAL*	100.0%	100.0%	100.0%	100.0%

* Numbers may not be exact due to rounding.

**CAMPUS WASTE COMPOSITION FIELD DATA
LAB SPACE**

Area: ANNUAL SOURCE:	CAMPUS Lab Space		CAMPUS Lab Space		LAB SPACE PERCENTAGE
	Variant	Net Weight	Lab Space	Keck	
	Net Weight	Net Weight	TOTAL WEIGHT		
PAPER					
Computer Printout	0.3	0.8	1.1		0.4%
White Ledger	3.6	4.2	7.8		3.2%
Newspaper	3.9	4.7	8.6		3.5%
Magazines	7.8	1.3	9.1		3.7%
Corrugated Containers	4.9	8.4	13.3		5.4%
Mixed Paper	8.6	10.0	18.6		7.5%
Other Paper	21.1	31.4	52.5		21.2%
PLASTICS					
HIDPE	0.0	0.1	0.1		0.0%
PET	0.0	0.5	0.5		0.2%
Film Plastics	8.2	3.8	12.0		4.8%
Polystyrene	0.3	2.9	3.2		1.3%
Other Plastics	1.9	8.9	10.8		4.4%
GLASS					
CA Redemption Value	0.0	3.1	3.1		1.3%
Other Recyclable	1.4	5.2	6.6		2.7%
Other Glass	0.0	0.0	0.0		0.0%
METALS					
Aluminum Cans	0.9	1.4	2.3		0.9%
Tin/Bi-metal Cans	0.1	0.0	0.1		0.0%
Tin & Ferrous Metals	0.0	5.8	5.8		2.3%
Non-Ferrous Metals	8.3	0.3	8.6		3.5%
White Goods	0.0	0.0	0.0		0.0%
YARD WASTE:					
Grass/Leaves	0.0	0.0	0.0		0.0%
Prunings	0.0	0.0	0.0		0.0%
OTHER ORGANICS					
Food Waste	13.3	8.4	21.7		8.8%
Tires & Rubber Products	0.0	0.0	0.0		0.0%
Wood Waste	0.8	40.5	41.3		16.7%
Textiles and Leather	0.1	0.2	0.3		0.1%
Manure	0.0	0.0	0.0		0.0%
Other Organics	0.0	0.0	0.0		0.0%
OTHER WASTES					
Inert Solids	1.5	11.1	12.6		5.1%
Household Hazardous Wastes	2.0	0.9	2.9		1.2%
Special Wastes	0.0	4.7	4.7		1.9%
Disposable Diapers	0.0	0.0	0.0		0.0%
TOTAL	89.0	158.6	247.6		100.0%

HOUSING WASTE COMPOSITION FIELD DATA ROW HOUSES

Area: State

Type: Row House

Source: Hammerfield

[Weighted Average = 12%]

	HOUSING Row House Storey	HOUSING Row House Hammerfield	Net Weight	Net Weight	ROW HOUSE TOTAL WEIGHT	ROW HOUSE PERCENTAGE
PAPER						
Computer Printout	0.0	0.0	0.0	0.0	0.0	0.0%
White Lodge	0.2	19.9	19.9	20.1	6.2%	6.2%
Newspaper	0.6	18.0	18.0	18.6	5.8%	5.8%
Magazine	0.0	7.9	7.9	7.9	2.4%	2.4%
Corrugated Containers	0.9	9.8	9.8	10.7	3.3%	3.3%
Mixed Paper	1.3	70.3	70.3	71.6	22.1%	22.1%
Other Paper	34.9	49.0	49.0	81.9	25.9%	25.9%
PLASTICS						
HDPPE	1.0	2.1	2.1	3.1	1.0%	1.0%
PET	0.0	0.0	0.0	0.0	0.0%	0.0%
Film Plastics	5.5	8.8	8.8	14.3	4.4%	4.4%
Polystyrene	0.7	2.3	2.3	3.0	0.9%	0.9%
Other Plastics	1.5	4.4	4.4	5.9	1.8%	1.8%
GLASS						
CA Redemption Value	0.8	8.5	8.5	9.3	2.9%	2.9%
Other Recyclable	3.7	4.4	4.4	8.1	2.5%	2.5%
Other Glass	0.0	1.1	1.1	1.1	0.3%	0.3%
METALS						
Aluminum Cans	1.0	1.0	1.0	2.0	0.6%	0.6%
Tin/Bi-metal Cans	6.3	0.5	0.5	6.8	2.1%	2.1%
Tin & Ferrous Metals	0.0	0.0	0.0	0.0	0.0%	0.0%
Non-Ferrous Metals	0.0	0.4	0.4	0.4	0.1%	0.1%
White Goods	0.0	0.0	0.0	0.0	0.0%	0.0%
YARD WASTE						
Grass/Leaves	0.0	0.0	0.0	0.0	0.0%	0.0%
Prunings	0.0	0.2	0.2	0.2	0.1%	0.1%
OTHER ORGANICS						
Food Waste	38.2	16.3	16.3	34.5	16.9%	16.9%
Tires & Rubber Products	0.3	0.0	0.0	0.3	0.1%	0.1%
Wood Waste	0.0	0.0	0.0	0.0	0.0%	0.0%
Textiles and Leather	0.0	1.6	1.6	1.6	0.5%	0.5%
Manure	0.0	0.0	0.0	0.0	0.0%	0.0%
Other Organics	0.0	0.0	0.0	0.0	0.0%	0.0%
OTHER WASTES						
Inert Solids	0.0	0.0	0.0	0.0	0.0%	0.0%
Household Hazardous Waste	0.0	0.0	0.0	0.0	0.0%	0.0%
Special Wastes	0.0	0.0	0.0	0.0	0.0%	0.0%
Disposable Diapers	0.0	0.0	0.0	0.0	0.0%	0.0%
TOTAL	96.9	226.5	226.5	323.4	100.0%	100.0%

HOUSING WASTE COMPOSITION FIELD DATA
TOTAL

Account Type: Percent of Total:	Domestics 42%	Row Housing 12%	Graduate Housing 46%	G TOTAL PERCENTAGE (Weighted Average)
PAPER				
Computer Printout	0.0%	0.0%	0.0%	0.0%
White Lodge	0.3%	6.2%	0.7%	1.2%
Newspaper	8.4%	5.8%	5.6%	6.8%
Magazines	2.4%	2.4%	2.3%	2.4%
Corrugated Containers	7.5%	3.3%	10.8%	8.5%
Mixed Paper	6.5%	22.1%	7.4%	8.8%
Other Paper	27.0%	25.9%	18.8%	23.1%
PLASTICS				
HDPE	1.0%	1.0%	2.0%	1.5%
PET	0.0%	0.0%	0.6%	0.3%
Film Plastics	3.3%	4.4%	3.9%	3.7%
Polystyrene	0.2%	0.9%	0.7%	0.5%
Other Plastics	5.2%	1.8%	2.6%	3.6%
GLASS				
CA Redemption Value	0.7%	2.9%	2.2%	1.6%
Other Recyclable	2.3%	2.5%	3.8%	3.0%
Other Glass	1.0%	0.3%	1.7%	1.2%
METALS				
Aluminum Cans	0.6%	0.6%	0.4%	0.5%
Tin/Al-metal Cans	0.1%	2.1%	2.0%	1.2%
Tin & Ferrous Metals	4.2%	0.0%	0.1%	1.8%
Non-Ferrous Metals	0.4%	0.1%	0.2%	0.3%
White Goods	0.0%	0.0%	0.0%	0.0%
YARD WASTE				
Grass/Leaves	0.4%	0.0%	0.6%	0.4%
Prunings	0.0%	0.1%	0.1%	0.0%
OTHER ORGANICS				
Food Waste	8.2%	16.9%	26.6%	17.7%
Tires & Rubber Products	0.3%	0.1%	0.0%	0.1%
Wood Waste	0.4%	0.0%	0.2%	0.3%
Textiles and Leather	3.4%	0.5%	1.4%	2.1%
Manure	0.0%	0.0%	0.0%	0.0%
Other Organics	0.0%	0.0%	0.2%	0.1%
OTHER WASTES				
Inert Solids	4.8%	0.0%	0.4%	2.2%
Household Hazardous Wastes	0.3%	0.0%	0.1%	0.2%
Special Wastes	11.0%	0.0%	0.0%	4.6%
Disposable Diapers	0.0%	0.0%	4.5%	2.1%
TOTAL*	100.0%	100.0%	100.0%	100.0%

* Numbers may not be exact due to rounding.

STAFF & FACULTY WASTE COMPOSITION FIELD DATA

Area: STAFF & FACULTY
 Account Type: n/a
 Source: Load Sample

	Net Weight	STAFF & FACULTY TOTAL WEIGHT	STAFF & FACULTY PERCENTAGE
PAPER			
Computer Printout	0.0	0.0	0.0%
White Ledgers	10.8	10.8	3.1%
Newspaper	19.4	19.4	5.5%
Magazines	32.1	32.1	9.1%
Corrugated Containers	23.7	23.7	6.8%
Mixed Paper	45.9	45.9	13.1%
Other Paper	45.1	45.1	12.9%
PLASTICS			
HDPE	0.0	0.0	0.0%
PET	0.0	0.0	0.0%
Film Plastics	15.1	15.1	4.3%
Polystyrene	0.0	0.0	0.0%
Other Plastics	0.0	0.0	0.0%
GLASS			
CA Redemption Value	0.3	0.3	0.1%
Other Recyclable	5.7	5.7	1.6%
Other Glass	1.5	1.5	0.4%
METALS			
Aluminum Cans	1.1	1.1	0.3%
Tin/BI-metal Cans	9.1	9.1	2.6%
Tin & Ferrous Metals	5.9	5.9	1.7%
Non-Ferrous Metals	0.1	0.1	0.0%
White Goods	0.0	0.0	0.0%
YARD WASTE			
Grass/Leaves	39.2	39.2	11.2%
Prunings	0.0	0.0	0.0%
OTHER ORGANICS			
Food Waste	73.8	73.8	21.0%
Tires & Rubber Products	0.1	0.1	0.0%
Wood Waste	4.8	4.8	1.4%
Textiles and Leather	5.4	5.4	1.5%
Manure	0.0	0.0	0.0%
Other Organics	0.0	0.0	0.0%
OTHER WASTES			
Inert Solids	4.0	4.0	1.1%
Household Hazardous Waste	1.0	1.0	0.3%
Special Wastes	0.0	0.0	0.0%
Disposable Dispers	6.8	6.8	1.9%
TOTAL	330.9	330.9	100.0%

HOUSING WASTE COMPOSITION FIELD DATA GRADUATE HOUSING

Area: Stock
 Area:
 Type:
 Source:

[Weighted Average = 46%]

	HOUSING Graduate Housing			HOUSING Graduate Housing			GRADUATE HOUSING TOTAL WEIGHT	GRADUATE HOUSING PERCENTAGE
	Residence	EV Highrise	EV Lowrise	Mirabelle	EV Lowrise	Mirabelle		
	Net Weight	Net Weight	Net Weight	Net Weight	Net Weight	Net Weight		
PAPER								
Computer Printout	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0%
White Ledge	0.1	2.0	0.6	1.2	0.6	3.9	3.9	0.7%
Newspaper	1.0	3.6	0.4	24.7	0.4	29.7	29.7	5.6%
Magazines	5.0	7.0	0.0	0.3	0.0	12.3	12.3	2.3%
Corrugated Containers	8.1	15.3	21.4	12.0	8.9	56.8	56.8	10.8%
Mixed Paper	7.3	13.8	9.2	8.9	25.2	39.2	39.2	7.4%
Other Paper	15.9	36.0	21.9	25.2		99.0	99.0	18.8%
PLASTICS								
HDPE	2.4	4.0	2.0	1.9	2.0	10.3	10.3	2.0%
PET	0.0	0.0	0.2	3.0	0.2	3.2	3.2	0.6%
Film Plastic	2.7	7.4	4.2	6.4	4.2	20.7	20.7	3.9%
Polystyrene	0.4	1.4	1.0	1.1	1.0	3.9	3.9	0.7%
Other Plastics	1.7	6.9	2.0	3.1	2.0	13.7	13.7	2.6%
GLASS								
CA Redemption Value	0.0	4.7	3.6	3.4	3.6	11.7	11.7	2.2%
Other Recyclable	0.6	9.0	0.3	10.1	0.3	20.0	20.0	3.8%
Other Glass	0.0	9.1	0.0	0.0	0.0	9.1	9.1	1.7%
METALS								
Aluminum Cans	0.3	0.1	0.1	1.4	0.1	1.9	1.9	0.4%
Tin/Bi-metal Cans	2.8	3.9	1.9	2.0	1.9	10.6	10.6	2.0%
Tin & Ferrous Metals	0.0	0.0	0.2	0.3	0.2	0.5	0.5	0.1%
Non-Ferrous Metals	0.0	0.7	0.1	0.2	0.1	1.0	1.0	0.2%
White Goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
YARD WASTE								
Grass/Leaves	0.0	0.0	2.3	0.7	2.3	3.0	3.0	0.6%
Prunings	0.0	0.4	0.0	0.0	0.0	0.4	0.4	0.1%
OTHER ORGANICS								
Food Waste	22.4	44.2	32.5	40.9	32.5	140.0	140.0	26.6%
Tires & Rubber Products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Wood Waste	0.0	0.2	1.0	0.0	1.0	1.2	1.2	0.2%
Textiles and Leather	0.3	0.6	0.0	6.3	0.0	7.2	7.2	1.4%
Manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Other Organics	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.2%
OTHER WASTES								
Inert Solids	0.0	0.0	2.3	0.0	2.3	2.3	2.3	0.4%
Household Hazardous Waste	0.0	0.0	0.1	0.2	0.1	0.3	0.3	0.1%
Special Waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Disposable Diapers	0.0	0.6	22.9	0.0	22.9	23.5	23.5	4.5%
TOTAL	71.0	170.9	130.2	154.4	130.2	526.5	526.5	100.0%

AUXILIARY WASTE COMPOSITION FIELD DATA

Area:	Account Type:	Source:	AUXILIARY		AUXILIARY		AUXILIARY		TOTAL WEIGHT	PERCENTAGE
			n/a	Fond Foundation	n/a	Faculty Club	n/a	Bowman Alumni		
			Net Weight	Net Weight	Net Weight	Net Weight	Net Weight	Net Weight		
PAPER										
	Computer Printout		1.5	0.0	0.0	0.0	0.0	1.5	0.2%	
	White Ledger		29.8	23.6	0.1	53.5	0.1	53.5	7.4%	
	Newspaper		12.4	11.6	2.3	26.3	2.3	26.3	3.6%	
	Magazines		9.6	0.5	0.5	10.6	0.5	10.6	1.5%	
	Corrugated Containers		41.0	58.0	5.2	104.2	5.2	104.2	14.5%	
	Mixed Paper		70.4	11.6	2.3	84.3	2.3	84.3	11.7%	
	Other Paper		45.7	47.7	21.3	114.7	21.3	114.7	15.9%	
PLASTICS										
	HDPE		0.7	0.7	0.4	1.8	0.4	1.8	0.2%	
	PET		0.0	0.0	0.4	0.4	0.4	0.4	0.1%	
	Film Plastics		4.2	3.3	4.2	11.7	4.2	11.7	1.6%	
	Polyethylene		0.4	0.0	0.3	0.7	0.3	0.7	0.1%	
	Other Plastics		1.7	2.2	1.2	5.1	1.2	5.1	0.7%	
GLASS										
	CA Redemption Value		0.0	1.3	0.0	1.3	0.0	1.3	0.2%	
	Other Recyclable		0.4	4.1	0.0	4.5	0.0	4.5	0.6%	
	Other Glass		0.4	0.0	0.0	0.4	0.0	0.4	0.1%	
METALS										
	Aluminum Cans		0.4	0.0	0.1	0.5	0.1	0.5	0.1%	
	Tin/BI-metal Cans		0.8	2.3	0.0	3.1	0.0	3.1	0.4%	
	Tin & Ferrous Metals		0.1	0.0	0.4	0.5	0.4	0.5	0.1%	
	Non-Ferrous Metals		0.0	0.7	0.2	0.9	0.2	0.9	0.1%	
	White Goods		0.0	0.0	0.0	0.0	0.0	0.0	0.0%	
YARD WASTE										
	Grass/Leaves		0.0	0.0	0.2	0.2	0.2	0.2	0.0%	
	Prunings		0.0	0.0	23.6	23.6	23.6	23.6	3.3%	
OTHER ORGANICS										
	Food Waste		94.8	111.1	33.6	239.5	33.6	239.5	33.2%	
	Tires & Rubber Products		0.0	0.0	0.0	0.0	0.0	0.0	0.0%	
	Wood Waste		5.7	14.7	3.9	24.3	3.9	24.3	3.4%	
	Textiles and Leather		0.4	0.4	0.3	1.1	0.3	1.1	0.2%	
	Manure		0.0	0.0	0.0	0.0	0.0	0.0	0.0%	
	Other Organics		0.0	0.0	0.0	0.0	0.0	0.0	0.0%	
OTHER WASTES										
	Inert Solids		0.0	4.1	0.7	4.8	0.7	4.8	0.7%	
	Household Hazardous Waste		0.0	0.0	1.5	1.5	1.5	1.5	0.2%	
	Special Waste		0.0	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	0.0%	
TOTAL			320.4	297.9	102.7	721.0	102.7	721.0	100.0%	

FOOD SERVICE WASTE COMPOSITION FIELD DATA

Area: FOOD SERVICE
 Account Type: n/a
 Source: Braner

	Net Weight	FOOD SERVICE TOTAL WEIGHT	FOOD SERVICE PERCENTAGE
PAPER			
Computer Printout	0.0	0.0	0.0%
White Lodge	0.6	0.6	0.2%
Newspaper	0.4	0.4	0.2%
Magazines	0.0	0.0	0.0%
Corrugated Containers	31.4	31.4	12.0%
Mixed Paper	13.2	13.2	5.1%
Other Paper	22.1	22.1	8.5%
PLASTICS			
HDPE	1.2	1.2	0.5%
PET	1.3	1.3	0.5%
Film Plastics	17.9	17.9	6.9%
Polystyrene	0.0	0.0	0.0%
Other Plastics	1.1	1.1	0.4%
GLASS			
CA Redemption Value	0.0	0.0	0.0%
Other Recyclable	0.6	0.6	0.2%
Other Glass	0.0	0.0	0.0%
METALS			
Aluminum Cans	0.1	0.1	0.0%
Tin/Bi-metal Cans	16.1	16.1	6.2%
Tin & Ferrous Metals	0.0	0.0	0.0%
Non-Ferrous Metals	0.2	0.2	0.1%
White Goods	0.0	0.0	0.0%
YARD WASTE			
Grass/Leaves	3.4	3.4	1.3%
Prunings	0.0	0.0	0.0%
OTHER ORGANICS			
Food Waste	149.1	149.1	57.1%
Tires & Rubber Products	0.0	0.0	0.0%
Wood Waste	2.2	2.2	0.8%
Textiles and Leather	0.0	0.0	0.0%
Manure	0.0	0.0	0.0%
Other Organics	0.0	0.0	0.0%
OTHER WASTES			
Inert Solids	0.2	0.2	0.1%
Household Hazardous Wastes	0.0	0.0	0.0%
Special Wastes	0.0	0.0	0.0%
Disposable Diapers	0.0	0.0	0.0%
TOTAL	261.1	261.1	100.0%

SLAC WASTE COMPOSITION FIELD DATA

Area: SLAC
 Account Type: n/a
 Source: SLAC

	Net Weight	TOTAL WEIGHT	PERCENTAGE
PAPER			
Computer Printout	0.5	0.5	0.4%
White Lodge	7.8	7.8	6.2%
Newspaper	13.6	13.6	10.8%
Magazines	3.2	3.2	2.6%
Corrugated Containers	5.3	5.3	4.2%
Mixed Paper	3.5	3.5	2.8%
Other Paper	19.0	19.0	15.2%
PLASTICS			
HDFE	0.0	0.0	0.0%
PET	0.0	0.0	0.0%
Film Plastics	13.1	13.1	10.4%
Polystyrene	0.3	0.3	0.2%
Other Plastics	11.0	11.0	8.8%
GLASS			
CA Redemption Value	0.9	0.9	0.7%
Other Recyclable	0.5	0.5	0.4%
Other Glass	0.0	0.0	0.0%
METALS			
Aluminum Cans	0.2	0.2	0.2%
Tin/Bi-metal Cans	0.1	0.1	0.1%
Tin & Ferrous Metals	0.5	0.5	0.4%
Non-Ferrous Metals	17.9	17.9	14.3%
White Goods	0.0	0.0	0.0%
YARD WASTE			
Grass/Leaves	9.4	9.4	7.5%
Prunings	0.0	0.0	0.0%
OTHER ORGANICS			
Food Waste	1.2	1.2	1.0%
Tires & Rubber Products	1.0	1.0	0.8%
Wood Waste	2.0	2.0	1.6%
Textiles and Leather	0.3	0.3	0.2%
Manure	0.0	0.0	0.0%
Other Organic	0.0	0.0	0.0%
OTHER WASTES			
Inert Solids	2.9	2.9	2.3%
Household Hazardous Wastes	2.4	2.4	1.9%
Special Wastes	8.8	8.8	7.0%
Disposable Diapers	0.0	0.0	0.0%
TOTAL	125.4	125.4	100.0%

DAPER WASTE COMPOSITION FIELD DATA

Area:	Account Type:	DAPER			
	Source:	n/a			
		Ensign Gym			
		Net Weight	TOTAL WEIGHT	PERCENTAGE	
PAPER					
Computer Printout		0.0	0.0	0.0%	
White Lodge		2.0	2.0	1.9%	
Newspaper		6.9	6.9	6.6%	
Magazines		1.4	1.4	1.3%	
Corrugated Containers		10.2	10.2	9.7%	
Mixed Paper		20.9	20.9	19.9%	
Other Paper		36.9	36.9	35.1%	
PLASTICS					
HDPE		1.5	1.5	1.4%	
PET		0.0	0.0	0.0%	
Film Plastics		8.1	8.1	7.7%	
Polystyrene		0.1	0.1	0.1%	
Other Plastics		2.2	2.2	2.1%	
GLASS					
CA Redemption Value		0.9	0.9	0.9%	
Other Recyclable		0.4	0.4	0.4%	
Other Glass		3.1	3.1	2.9%	
METALS					
Aluminum Cans		0.3	0.3	0.3%	
Tin/Bi-metal Cans		1.0	1.0	1.0%	
Tin & Ferrous Metals		0.3	0.3	0.3%	
Non-Ferrous Metals		0.0	0.0	0.0%	
White Goods		0.0	0.0	0.0%	
YARD WASTE					
Grass/Leaves		0.0	0.0	0.0%	
Prunings		0.0	0.0	0.0%	
OTHER ORGANICS					
Food Waste		4.7	4.7	4.5%	
Tires & Rubber Products		0.0	0.0	0.0%	
Wood Waste		0.0	0.0	0.0%	
Textiles and Leather		3.3	3.3	3.1%	
Manure		0.0	0.0	0.0%	
Other Organics		0.0	0.0	0.0%	
OTHER WASTES					
Inert Solids		0.0	0.0	0.0%	
Household Hazardous Wastes		0.0	0.0	0.0%	
Special Wastes		0.0	0.0	0.0%	
Disposable Diapers		0.9	0.9	0.9%	
TOTAL		105.1	105.1	100.0%	

NON-UNIVERSITY WASTE COMPOSITION FIELD DATA

Area: Account Type: Source:	NON-UNIVERSITY	NON-UNIVERSITY	NON-UNIVERSITY	NON-UNIVERSITY
	sp/a Nixon Elementary	sp/a Stables	Net Weight	Net Weight
	Net Weight		TOTAL WEIGHT	NON-UNIVERSITY PERCENTAGE
PAPER				
Computer Printout	0.0	0.0	0.0	0.0%
White Ledge	3.1	0.0	3.1	0.4%
Newspaper	8.8	1.0	9.8	1.4%
Magazines	0.0	0.3	0.3	0.0%
Corrugated Containers	21.4	7.6	29.0	4.0%
Mixed Paper	15.3	3.3	18.6	2.6%
Other Paper	62.8	65.1	127.9	17.7%
PLASTICS				
HIDPE	0.4	1.7	2.1	0.3%
PET	0.1	0.6	0.7	0.1%
Film Plastics	7.3	4.9	12.2	1.7%
Polystyrene	0.1	0.6	0.7	0.1%
Other Plastics	6.7	19.3	26.0	3.6%
GLASS				
CA Redemption Value	0.0	2.4	2.4	0.3%
Other Recyclable	7.6	12.3	19.9	2.8%
Other Glass	0.0	80.6	80.6	11.2%
METALS				
Aluminum Cans	0.0	0.6	0.6	0.1%
Tin/Bi-metal Cans	1.4	2.7	4.1	0.6%
Tin & Ferrous Metals	5.5	88.1	93.6	13.0%
Non-Ferrous Metals	3.2	2.0	5.2	0.7%
White Goods	0.0	0.0	0.0	0.0%
YARD WASTE				
Grass/Leaves	2.4	88.3	90.7	12.6%
Prunings	0.0	0.0	0.0	0.0%
OTHER ORGANICS				
Food Waste	96.6	0.9	97.5	13.5%
Tires & Rubber Products	1.0	44.0	45.0	6.2%
Wood Wastes	0.0	30.1	30.1	4.2%
Textiles and Leather	0.0	9.0	9.0	1.2%
Mannure	0.0	0.0	0.0	0.0%
Other Organics	3.7	0.0	3.7	0.5%
OTHER WASTES				
Inert Solids	0.0	5.9	5.9	0.8%
Household Hazardous Wastes	0.0	2.0	2.0	0.3%
Special Wastes	0.0	0.0	0.0	0.0%
Disposable Diapers	0.5	0.4	0.9	0.1%
TOTAL	247.9	473.7	721.6	100.0%