



# City of Sunnyvale Waste Characterization Report 2010

November



Seattle | San Jose  
[www.cascadiaconsulting.com](http://www.cascadiaconsulting.com)





# Acknowledgments

The project team would like to thank the following people:

Karen Gissibl	City of Sunnyvale
Gail Bentley	City of Sunnyvale
Debi Sargent	City of Sunnyvale
Lori Topley	City of Mountain View
Pamela Martello	Recology
Rebecca Buldo	Bay Counties Waste Services
SMaRT Station Staff	Bay Counties Waste Services

# Table of Contents

<b>1. Introduction and Objectives</b> .....	<b>8</b>
Purpose and Approach of the Study .....	8
Summary of Findings .....	9
Key Opportunities.....	12
Organization of the Report.....	16
<b>2. Summary of Methodology</b> .....	<b>17</b>
Develop Plan.....	17
Collect Data .....	20
Analyze and Draft Report .....	21
<b>3. Findings</b> .....	<b>22</b>
Waste Quantities.....	22
Composition and Recoverability of Waste .....	22
Presence and Absence of Targeted Materials.....	52
<b>Appendix A: Material Type Definitions</b> .....	<b>56</b>
Paper .....	56
Glass .....	57
Metal .....	57
Electronics .....	58
Plastic.....	58
Other Organic .....	60
Construction and Demolition .....	61
Household Hazardous Waste .....	63
Special Waste .....	63
Mixed Residue .....	64
Presence vs. Absence Materials .....	64
<b>Appendix B: Study Plan</b> .....	<b>65</b>
Selection of Single-family Residential, Multifamily Residential, and Commercial loads .....	65
Selection of C&D Vehicles Loads .....	66
Sampling and Characterization of Hand-sorted Waste Samples.....	68
<b>Appendix C: Detailed Sampling Schedule</b> .....	<b>71</b>
<b>Appendix D: Data Collection Forms</b> .....	<b>73</b>

Daily Load Selection Sheet .....	74
Special Route Selection Sheet .....	75
Sample Placard .....	76
Hand-sort Data Entry Sheet.....	77
Visual Characterization Data Entry Sheet.....	78

## Tables and Figures

Table 1. Overview of Materials and Recoverability Categories .....	19
Table 2. Number of Samples Collected by Waste Sector .....	20
Figure 1. Waste Composition & Recoverability, City of Sunnyvale Overall, 2010 .....	24
Figure 2. Waste Composition, City of Sunnyvale Overall, 2010.....	24
Table 3. Ten Most Prevalent Disposed Materials, City of Sunnyvale Overall, 2010 .....	25
Table 4. Detailed Waste Composition, City of Sunnyvale Overall, 2010 .....	26
Figure 3. Waste Composition & Recoverability, City of Sunnyvale Single-family, 2010 .....	29
Figure 4. Waste Composition, City of Sunnyvale Single-family, 2010 .....	29
Table 5. Ten Most Prevalent Disposed Materials, City of Sunnyvale Single-family, 2010 .....	30
Table 6. Detailed Waste Composition, City of Sunnyvale Single-family, 2010 .....	31
Figure 5. Waste Composition & Recoverability, City of Sunnyvale Multifamily, 2010 .....	34
Figure 6. Waste Composition, City of Sunnyvale Multifamily, 2010 .....	34
Table 7. Ten Most Prevalent Disposed Materials, City of Sunnyvale Multifamily, 2010 .....	35
Table 8. Detailed Waste Composition, City of Sunnyvale Multifamily, 2010 .....	36
Figure 8. Waste Composition & Recoverability, City of Sunnyvale Commercial, 2010 .....	39
Figure 9. Waste Composition, City of Sunnyvale Commercial, 2010.....	39
Table 10. Ten Most Prevalent Disposed Materials, City of Sunnyvale Commercial, 2010 .....	40
Table 11. Detailed Waste Composition, City of Sunnyvale Commercial, 2010.....	41
Figure 10. Waste Composition & Recoverability, City of Sunnyvale C&D, 2010 .....	44
Figure 11. Waste Composition, City of Sunnyvale C&D, 2010.....	44
Table 12. Ten Most Prevalent Disposed Materials, City of Sunnyvale C&D, 2010 .....	45
Table 13. Detailed Waste Composition, City of Sunnyvale C&D, 2010.....	46
Figure 12. Waste Composition & Recoverability, SMaRT Station Residuals, 2010.....	49
Figure 13. Waste Composition, SMaRT Station Residuals, 2010 .....	49
Table 14. Ten Most Prevalent Materials, SMaRT Station Residuals, 2010 .....	50
Table 15. Detailed Waste Composition, SMaRT Station Residuals, 2010.....	51
Figure 14. Presence vs. Absence, City of Sunnyvale Overall, 2010.....	52
Figure 15. Presence vs. Absence, City of Sunnyvale Single-family, 2010.....	53
Figure 16. Presence vs. Absence, City of Sunnyvale Multifamily, 2010.....	53
Figure 17. Presence vs. Absence, City of Sunnyvale Commercial, 2010.....	54
Figure 18. Presence vs. Absence, SMaRT Station Residuals, 2010 .....	55
Figure 19. Visual Overlay Showing “Cells” of Material .....	69

## 1. Introduction and Objectives

The following section outlines the purpose and approach of the study, presents a summary of findings, identifies key opportunities for future diversion, and provides an overview of the report.

### Purpose and Approach of the Study

---

The City of Sunnyvale and the City of Mountain View (Cities) commissioned this study to achieve the following objectives:

- **Provide detailed waste composition and quantity information** for the Sunnyvale Materials Recovery and Transfer (SMaRT) Station®, including materials from residuals and four waste sectors: single-family residential, multifamily residential, commercial, and construction and demolition (C&D).
- **Identify key opportunities for diversion, recovery, or reuse** of specific material categories.
- **Determine the presence or absence of six unique material categories.**

To meet these goals, the consultant team applied a statistical sampling approach to the City's waste stream, using two characterization methods:

- **Hand-sorting** of single-family residential, multifamily residential, commercial, and SMaRT Station residual waste samples.
- **Visual characterization** of C&D waste samples.

This document presents a statistical analysis of the waste sampling results, with an emphasis on recyclable and compostable material categories. The consultant team expects the findings to help the Cities design and target their waste reduction, recycling, and composting programs for each waste sector.

In addition, results from this characterization were used to generate annual disposal estimates for each city.

Field collection occurred during the spring and summer of 2010. Representative samples from five substreams were selected and characterized according to 88 material categories and six presence versus absence categories. The five substreams are: single family, multi-family, commercial, construction and demolition, and SMaRT Station residuals. Materials from the single-family substream, multifamily substream, commercial substream, and SMaRT Station residuals were hand sorted and weighed. Materials from the construction and demolition substream were visually characterized. The four incoming substreams from single-family, multi-family, commercial, and construction and demolition consist of waste that is "disposed" by residents, businesses and contractors. This waste was sampled and characterized before being processed through the SMaRT Station materials recovery facility, which diverts an average of 25% of material from the landfill. The fifth substream, SMaRT Station residuals, is the remaining material that is sent to landfill.

This document presents a statistical analysis of the waste sampling results, with an emphasis on recyclable and compostable material categories. The consultant team expects the findings to be used in the development of a Zero Waste strategic plan for each City and to help the City's design and target their waste reduction, recycling, and composting programs for each waste sector.

## Summary of Findings

---

The consultant team successfully characterized 93 samples from the City of Sunnyvale and 30 residual samples from the SMaRT Station. Waste was sorted into a total of 88 standard material categories (described in detail in Appendix A). To help identify additional diversion opportunities, these 88 categories were classified into five recoverability groups: recyclable paper; other recyclables; compostable/potentially compostable; potentially recyclable; and problem materials. Detailed descriptions of these recoverability groups are provided in Chapter 2, and a discussion of the factors that affect recoverability efforts is provided in the Key Opportunities section below.

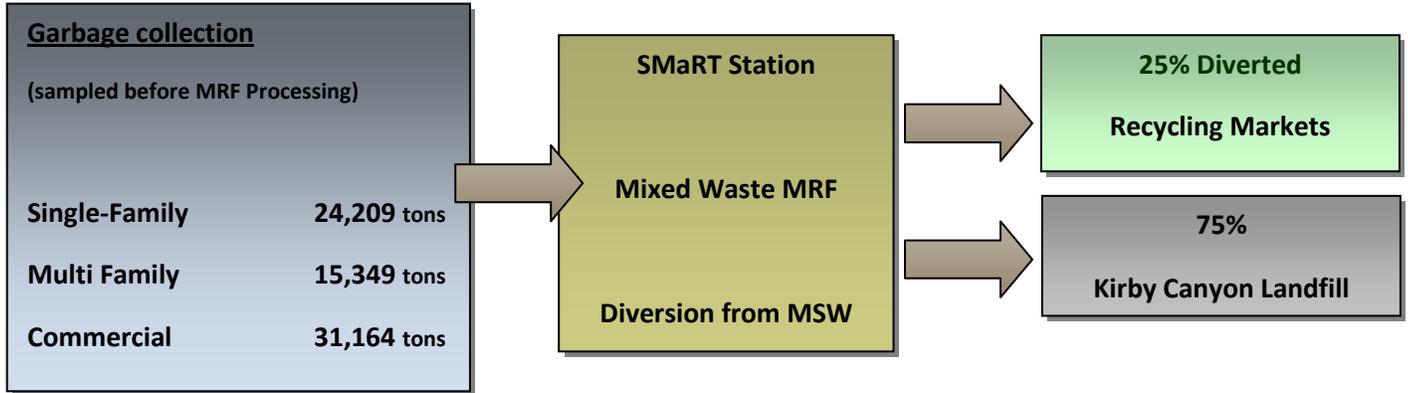
Waste collected from the four incoming substreams (single family [SF], multi-family[MF], commercial[C], construction and demolition[C&D]) totaled approximately 70,722 tons. This is waste collected by the City's hauler and brought to the SMaRT Station, but does not represent all the waste generated in Sunnyvale and delivered to the SMaRT Station. Additional waste from commercial and industrial sectors is delivered via self-haul (4,115 tons), roll-off/drop box, and compactors by Specialty Solid Waste and Recycling (Specialty) (13,341 tons).

The 70,722 tons of waste from the four incoming waste streams (SF, MF, C and C&D) was sampled and characterized for this study prior to going through the material processing facility (MRF) to be further sorted and diverted. The additional waste stream of 17,456 tons (commercial/industrial roll-off/drop boxes and self-haul) was not sampled prior to going through the MRF, but the residue was included (represented) in the sampling of the MRF residual. The MRF uses mechanical equipment and human labor to sort and separate the incoming waste to capture marketable recyclable and compostable materials. The incoming waste is dropped on the floor of the SMaRT Station. Heavy materials are removed and the remainder of the waste is placed on a conveyor to be processed through the sorting facility. The waste remaining at the end of the sorting process is the "SMaRT Station Residual\*."

The following chart illustrates the flow of the four incoming (SF, MF, C, and C&D) and the residual waste streams.

\*It should be noted that residual samples collected and characterized for this study did not include minus 2" fines separated by the MRF trommels. It is estimated that these fines represent approximately 18% of the incoming waste stream.

## City of Sunnyvale Solid Waste Stream Flow



### Characterization Incoming Substreams

The study found that approximately 76% (53,476 tons) of wastes (excluding C&D waste), prior to sorting at the MRF, fall into the recoverability categories of: recyclable paper, other recyclables, and compostable/potentially compostable. The recoverability categories above do not take into account the condition of materials or marketability. Of this amount:

- Nearly 42% (29,613 tons), is categorized as Compostable/Potentially Compostable, including food, compostable paper, leaves and grass, and other compostable organics;
- Recyclable Paper comprised about 13.8% (9,780 tons), including cardboard, office paper, newspaper, and other miscellaneous paper;
- Approximately 19.9% (14,082 tons), is categorized as Other Recyclables. This is a broad category that includes bulky items like: furniture or mattresses, other ferrous metal such as: structural steel beams or metal coat hangers, durable plastic items including: plastic outdoor furniture or plastic pipes and fittings, and wood pallets and crates.

The remaining 24% (17,246 tons) of waste disposed by residents and businesses is categorized as Potentially Recyclable (e.g., textiles, carpet, food service plastic) or Problem Materials (e.g., diapers, trash bags, kitty litter).

After these materials are processed at the MRF, approximately 25% are recovered and diverted from the landfill. The study then examined the composition of the residual waste remaining after going through the MRF.

### Characterization MRF Residues

After incoming waste is processed to remove the marketable Compostable/Potentially Compostable, Recyclable Paper, and Other Recyclables materials, approximately 85,599 tons of residuals is actually sent to landfill.

Approximately 84% of SMaRT Station residuals are categorized as Compostable/Potentially Compostable, Recyclable Paper, or Other Recyclables. Again, the recoverability categories do not take into account the material condition and market availability. Of this amount:

- The majority, 57%, is categorized as Compostable/Potentially Compostable;
- Recyclable Paper comprised 14%;
- Other Recyclables comprised 18%.

The remaining 17% of SMaRT Station residuals is categorized as Potentially Recyclable or Problem Materials.

## Key Opportunities

The purpose of this section is to review the disposal findings from the waste characterization study and identify key opportunities for reduction or diversion in each of four substreams: single family, multifamily, commercial, and C&D. This section also identifies potential opportunities for the SMaRT Station's current MRF residual stream and identifies potential new technologies for addressing residual waste. This information can help the City target its efforts to increase waste reduction, reuse, and recycling. The City plans to explore these opportunities in detail in a Zero Waste Plan to be developed in 2011. The plan will assess the viability of new programs based on such factors as cost and availability of markets.

The following key opportunities for single-family, multi-family, and commercial waste were identified based on analyses of material categories with potential for additional diversion, as presented in the findings detailed in Chapter 3 and summarized by recoverability category in the table below.

Recoverability Category	Single Family		Multi-Family		Commercial	
	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons
<b>Compostable/ Potentially Compostable</b>	43.3%	10,476	39.6%	6,085	41.6%	12,966
<b>Recyclable Paper</b>	14.6%	3,531	15.9%	2,448	12.4%	3,876
<b>Other Recyclables</b>	18.4%	4,451	13.4%	2,060	23.6%	7,340
<b>Potentially Recyclable</b>	4.9%	1,196	3.7%	574	6.2%	1,940
<b>Problem Materials</b>	18.8%	4,556	27.2%	4,182	16.2%	5,042
<b>TOTAL</b>	100%	24,209	100%	15,349	100%	<b>31,164</b>

To gain the most additional diversion, the City should look first at the top materials disposed by residents and businesses and assess the viability of new programs based on such factors as cost and availability of markets. Viable markets for recovered materials are essential to the success of diversion programs. Reliance on mere separation and collection of materials is inadequate unless those materials can be effectively marketed over the long term at a minimal public subsidy. In addition, since all incoming waste shown in the table above, as well as C&D waste, is sorted to remove additional recyclable or compostable material prior to landfilling, choices that would result in additional "up-front" diversion could affect choices made for residual diversion later. This should be addressed in more detail in the Zero Waste Plan.

## Implement Organics Diversion

Food waste and compostable paper from single family, multi-family, and commercial sources totaled more than 23,000 tons, approximately 33% of the total. The generation of this waste is about evenly split between the residential and commercial sectors. Since these compostable materials represent 42% of the waste sampled for this study, capturing them for diversion, either through new collection programs or additional MRF residual processing through the SMaRT Station provides the greatest opportunity to enhance diversion.

For example, depending on markets for compostables, an up-front diversion program could recover more and better quality compostables than the current residual MRF process. A cost-efficient program might target the commercial sector during outreach to acquire the same volume of organics as the residential sector but at a lower cost, since there would be fewer collection stops. These considerations should be addressed in the Zero Waste Plan.

Yard waste (leaves, grass, prunings, trimmings) totaled a little over 5,000 tons. About 75% of this yard waste came from multi-family residential sources. The City could consider ways to capture these yard trimmings, perhaps by expanding yard trimming cart collection service to all multi-family residences as in the single family program. Currently, this service is offered only to a few multi-family residences that regularly produce a large volume of clean yard trimmings.

## Focus on Recyclable Paper

Recyclable papers, such as cardboard, kraft bags, newspaper, catalogs, magazines, and office paper, represent 14% of disposed materials at about 5,600 tons. This is a significant amount considering that the City accepts a wide range of paper types in both its curbside residential and office recycling programs. Since the recyclability of paper often diminishes once the paper runs through the MRF, refocusing on efforts to capture this material in curbside and commercial programs would be beneficial.

## MRF Residuals

Materials entering the SMaRT Station go through a MRF where a percentage of materials are diverted. The remainder is the MRF Residual. The SMaRT Station MRF residuals include a significant amount of compostable materials (57.1%), most of which is compostable paper (45.6%). Composition of MRF residuals is shown in the table below.

MRF RESIDUALS WASTE COMPOSITION		
Sunnyvale and Mountain View		
Material Class	Est. Percent	Est. Tons
Recyclable Paper	14.0%	19,580
Other Recyclables	12.8%	17,784
Compostable/ Potentially Compostable	57.1%	79,689
Potentially Recyclable	4.5%	6,256
Problem Materials	11.6%	16,170
<b>Total</b>	<b>100%</b>	<b>139,480</b>

The City has expressed interest in alternative markets for MRF residuals, including alternative technologies such as composting and anaerobic digestion.

### Composting

Among the options available for processing highly organic MRF residuals, the most proven technology is composting, which is the highest and best use of this material in the diversion hierarchy. While it has been demonstrated that MRF residuals can be co-composted with yard trimmings, food scraps, and other organics, there are only a small number of facilities that currently do so, and only one (with very limited capacity) in Santa Clara County. Although this process simplifies and reduces the costs of the collection process, combining food scraps with green materials results in having to process all of the materials as if they were food scraps, and the output is less marketable.

Since compostable paper is 45.6% of the residual, implementing a composting program could provide more diversion (and of what is otherwise a non-recyclable paper). Food is 9% of the residual and would be more marketable in an upstream composting program instead of the current practice of recovering it as “fines” from the MRF processing.

Other options the City might explore include:

### Anaerobic Digestion

In this process, Compostable material is placed in a chamber where microbial activity occurs in the absence of oxygen, producing biogas that can be used for energy production. Anaerobic digestion of

solid waste is sometimes included in descriptions of “conversion technology” or “alternative technology”. Anaerobic digestion is regulated as composting under state law<sup>1</sup>.

There is active interest in developing biological treatment methods, such as anaerobic digestion, for organic materials and post-processing residual solid waste. The cities of San Jose and San Francisco are supporting private sector development of anaerobic digestion for treating organic materials. The City of Oakland and Stopwaste.org are supporting the development of anaerobic digestion at the East Bay Municipal Utility District, where excess biosolids digester capacity at the facility is being used for source-separated food scraps and other digestible materials. The cities of Palo Alto and San Jose are each exploring the use of a dry fermentation type digestion process which would process a mixture of yard waste, food scraps, and possibly biosolids.

### **“Non-Combustion Thermal Technologies” -- including Pyrolysis, Gasification, and Plasma Arc Gasification**

Pyrolysis, gasification, and plasma arc gasification are typically referred to as “conversion technologies” or “non-combustion thermal technologies.” These technologies treat waste to produce a synthesis gas, or “syngas,” that can produce electricity or be converted into a transportation fuel. Pyrolysis uses an indirect external source of heat in the absence of oxygen, gasification partially oxidizes the waste, and plasma arc uses a plasma torch to super-heat the waste to produce the synthesis gas. These technologies may be defined as renewable energy under the Renewable Portfolio Standard, but only if the facility meets specific environmental standards<sup>2</sup>. Under state law, “pyrolysis” is considered “transformation,” and jurisdictions may count up to 10 percent of their 50 percent diversion goal through transformation. “Gasification” is specifically not included in the definition of “transformation.”<sup>3</sup> State legislation<sup>4</sup> has been introduced to allow facilities that convert solid waste into energy or chemicals to count as a renewable energy generation facility under the State’s Renewable Portfolio Standard and allows local governments to count solid waste that is converted into energy toward their recycling diversion goals. However, siting of thermal conversion technology facilities in California is potentially controversial based on a number of environmental concerns.

Given the strict regulatory environment for air emissions in the Bay Area, it is unlikely that a thermal facility could be sited in the city or nearby. Therefore, while the conversion technologies are emerging, they do not appear to be viable for Sunnyvale at this time.

---

<sup>1</sup> Guidance Document: How Conversion Technologies Fit Current Board Regulatory Structure, December 2007, CIWMB, p. 5.

<sup>2</sup> California Public Resources Code Section 25741, Subdivision (b)(3)

<sup>3</sup> California Public Resources Code Section 40201.

<sup>4</sup> Assembly Bill 222 (State of California 2009-10 legislative session) introduced by Assembly Members Anthony Adams and Fiona Ma. This bill failed to pass out of the legislature.

## Organization of the Report

---

The remaining portions of the report describe the study methodology and findings, organized as follows:

- **Chapter 2, *Summary of Methodology***, defines the four waste sectors and SMaRT Station residuals and explains the methodology used to design and implement the data collection portion of this study. It also briefly describes the data analysis methods.
- **Chapter 3, *Findings***, presents key findings and waste composition results for each of the four waste sectors and SMaRT Station residuals.
- **Appendices** follow the main body of the report. They provide additional detail on the study, definitions of all waste-sorting categories, a complete explanation of the methodology, and copies of field forms.

## 2. Summary of Methodology

The following section summarizes the three steps of the methodology: 1) Develop Plan, 2) Collect Data, and 3) Analyze Data.

### Develop Plan

---

#### Step 1: Coordinate with Staff and Haulers

In advance of the scheduled fieldwork, the consultant team met with key staff at the SMaRT station to gain permission to sort waste on site and to coordinate sample traffic flow and other logistics of the field data collection effort.

The consultant team also coordinated with Recology Mountain View and Specialty Solid Waste and Recycling, the Cities' waste haulers, to learn anticipated vehicle traffic and to arrange special route coordination.

#### Step 2: Define Waste Sectors

This study included five primary waste sectors:

- **Single-family waste** was waste collected by a franchised waste-hauling company from single-family residences (including townhouses or buildings with up to four residential units). It typically arrived at the solid waste facility in packer trucks (e.g., side loaders or rear loaders). The geographic region that waste originated from was noted for this waste sector, and only results for materials from the City of Sunnyvale are presented in this report.
- **Multifamily waste** was waste collected by a franchised waste-hauling company from multifamily residences (apartment or condominiums with more than four residential units). It typically arrived at the solid waste facility in packer trucks (e.g., front loaders). The geographic region that waste originated from was noted for this waste sector, and only results for materials from the City of Sunnyvale are presented in this report.
- **Commercial waste** was waste collected by a franchised waste-hauling company from businesses, institutions, public venues, and industrial sources. It typically arrived at the solid waste facility in packer trucks (e.g., front loaders), drop boxes, or compactor units. This waste stream did not include C&D waste. The geographic region that waste originated from was noted for this waste sector, and only results for materials from the City of Sunnyvale are presented in this report.
- **SMaRT Station residuals** were waste produced as by products from the SMaRT Station's material recovery facility (MRF). Samples were collected at random intervals. Residual samples collected and characterized did not include minus 2" fines separated by the MRF trommels.
- **C&D waste** included all waste that was brought to solid waste facility from construction or demolition activities. It typically arrived at the solid waste facility in self-haul vehicles or in drop boxes. The geographic region that waste originated from was noted for this waste sector, and only results for materials from the City of Sunnyvale are presented in this report.

### Step 3: Classify Waste

This study assigned waste to one of ten material classes: **Paper, Plastic, Glass, Metal, Electronics, Organics, C&D, Household Hazardous Waste (HHW), Special Waste, and Mixed Residue**. Materials were further sorted into 88 standard material categories and six additional uncommon materials to determine their presence versus absence. These material categories are defined in Appendix A.

To identify additional diversion opportunities, the consultant team also classified material categories according to their recoverability using five recoverability groups, which were color-coded to make the viewing of the figures and tables clearer:

- Recyclable paper (blue) – all paper materials considered recyclable by the project team.
- Other recyclables (purple) – all plastic, metals, glass, and other recyclable materials considered recyclable by the project team.
- Compostable/potentially recyclable (green) – all materials considered compostable or potentially recyclable by the project team.
- Potentially recyclable (peach) – all materials where markets are emerging or being developed to process or recover materials.
- Problem materials (brown) –all materials for which there is no existing processing option.

The following table shows the 88 material categories arranged according to material class and recoverability group.

**Table 1. Overview of Materials and Recoverability Categories**

	Recyclable Paper	Other Recyclables	Compostables / Potentially Compostables	Potentially Recyclable	Problem Materials
Paper	OCC		Compostable Paper	Aseptic Packaging	R/C Paper
	Kraft Bag/Kraft Paper			Poly-coated Paperbrd Pack.	
	Kraft Grocer Bags				
	Newspaper				
	Other Office Paper				
	Catalogs, Directories, Mags., & Phonebooks				
	Other Misc. Paper				
Glass		Glass Bottles and Conts.		Flat Glass	R/C Glass
Metal		Aluminum Cans		R/C Metal	
		Tin/Steel Cans			
		Major Appliances			
		Used Oil Filters			
		Other Ferrous			
		Other Non-ferrous			
Electronics		Small Appliances			
		Brown Goods			
		Small Computer-related Electronics			
		Large Computer-related Electronics			
		Other Consumer Electronics			
		CRT Televisions & Monitors			
Plastic		PETE Bottles		PETE Food Packaging	Trash Bags
		HDPE Containers (<1gal.)		PETE Non-food Packaging	R/C Plastic
		HDPE Containers (>1gal.)		Misc. Food Service Plastic	
		Misc. Plastic Containers		Exp. Polystyrene Food Pack.	
		Other Film		Exp. Polystyrene Other	
		Durable Plastic Items		Plastic Grocery Bags	
				Other Merchandise Bags	
				Non-bag Com. & Ind. Pack. Film	
			Film Products		
Organics			Food	Textiles	Animal Feces
			Leaves & Grass		R/C Non-compostable Organic
			Prunings & Trimmings		
			Branches & Stumps		
			Agricultural Crop Residue		
		R/C Compostable Organics			
C & D		Concrete		Asph. Comp. Shingles	Roofing Tar Paper/Felt
		Asphalt Paving		Carpet	Roofing Mastic
		Untreated Dim. Lumber		Carpet Padding	Built-up Roofing
		Untreated Eng. Wood		Clean Gypsum Board	Other Asph. Roof Mat.
		Pallets and Crates			Treated Dim. Luber
		Other Untreated Wood Waste			Treated Eng. Wood
		Rock, Soil, and Fines			Other Treated Wood Waste
					Pnt./Demo. Gyp. Board
				R/C C&D	
Household Hazardous Waste		Paint		Veh. & Equip. Fluids	R/C Household Waste
		Used Oil			
		Lead-acid Batteries			
		Other Batteries			
Special Waste		Bulky Items			Ash
		Vehicle & Truck Tires			Kitty Litter
					Diapers
					Treated Medical Waste
					Other Tires
				R/C Special Waste	
Mixed Residue					Mixed Residue

## Step 4: Allocate Samples

This study was designed to provide composition estimates for each of the five waste sectors: single-family, multifamily, commercial, SMaRT residuals, and C&D. The number of samples allocated to each substream is summarized in the table below.

**Table 2. Number of Samples Collected by Waste Sector**

WASTE SECTOR	TARGET NUMBER OF SAMPLES	ACTUAL NUMBER OF SAMPLES
<b>Single-family Waste</b>	<b>30</b>	<b>30</b>
City of Mountain View	15	13
City of Sunnyvale	15	17
<b>Multifamily Waste</b>	<b>26</b>	<b>23</b>
City of Mountain View	13	15
City of Sunnyvale	13	8
<b>Commercial</b>	<b>40</b>	<b>42</b>
City of Mountain View	20	21
City of Sunnyvale	20	21
<b>SMaRT Station Residuals</b>	<b>30</b>	<b>30</b>
<b>C&amp;D (visual characterization)</b>	<b>80</b>	<b>91</b>
City of Mountain View	40	44
City of Sunnyvale	40	47
<b>Total</b>	<b>206</b>	<b>216</b>

The sampling plan was designed to obtain samples from each waste sector at the SMaRT Station to meet the targets shown in the table above.

## Step 5: Coordinate Sampling Activities

Load selection and sample characterization occurred between March 1 and March 5, 2010, for the first sampling season and between June 14 and June 18, 2010, for the second sampling season.

### Collect Data

---

#### Determine Waste Quantities

To determine the quantity of waste from each waste sector and from the SMaRT Station, the consultant team requested data from the City of Sunnyvale and from Specialty. According to the data, the City of Sunnyvale collected 74, 838 tons of waste in 2009 from the four incoming substreams sampled for this study. This does not represent all the waste delivered to the SMaRT Station from Sunnyvale residents and businesses. Residuals from the SMaRT Station totaled approximately 139,480 tons. Residuals

attributed to Sunnyvale from the SMaRT Station after this waste is processed through the MRF totaled approximately 85,599 tons.

## Hand-sort Municipal Solid Waste

For this study, the consultant team hand-sorted single-family residential waste, multifamily residential waste, commercial waste, and SMaRT Station residuals. Material was sorted into 88 material categories and then weighed. Materials smaller than ½ inch were considered mixed residues. The crew leader recorded the weight for each sorted material category on the sampling form, reviewed the form, and later entered the data into a custom database for analysis. Separately, the crew leader also assessed the presence or absence of six additional materials in each sample. A full description of the hand-sort procedures is included in Appendix B.

## Visually Characterize C&D

The consultant team visually characterized 47 samples of C&D waste from Sunnyvale. In conjunction with the California Integrated Waste Management Board (CIWMB), now CalRecycle, the consultant team developed a reliable method of visually characterizing waste from the C&D sector. The method is especially useful for identifying recoverable materials that may be present in large quantities, characterizing waste loads that contain bulky items, and characterizing waste streams that tend to have substantial composition variation within individual loads (for example, loads that are half dirt and half lumber, separated at opposite ends of the load).

The first step of visually estimating the composition of selected loads was to measure the volume of the waste. The visual estimator then recorded the estimated percentage of the load corresponding to each of the 10 major material classes and subsequently recorded the estimated percentages for each of the 88 more specific material categories within the material classes. The step-by-step procedure that the consultant team used in this study is described fully in Appendix B.

## Analyze and Draft Report

---

### Data Analysis

Following on-site data collection, the consultant team entered all data recorded on field forms into a customized database and reviewed it for data entry errors. The team calculated waste composition estimates using the methods described in Appendix B.

### 3. Findings

#### Waste Quantities

Based on data received from the SMaRT Station and Specialty, a summary of Sunnyvale waste quantities by waste stream for fiscal year 2009 as listed below:

- Single-family                      24,209 tons
- Multifamily                        15,349 tons
- Commercial                        31,164 tons
- C&D                                 4,116 tons
- SMaRT Station Residuals\*    85,599 tons (Sunnyvale only)

\*Minus 2" fines are included in the 2009 SMaRT Station residual tonnage

#### Composition and Recoverability of Waste

This section describes the composition and recoverability of the City of Sunnyvale’s overall waste stream; of its single-family, multifamily, commercial, and C&D waste sectors prior to MRFin; and of SMaRT Station residuals from both the Cities of Mountain View and Sunnyvale following MRFin.

#### Overall Waste Stream – City of Sunnyvale

The overall waste composition of The City of Sunnyvale’s waste includes waste from three sectors:

- Single-family
- Multifamily
- Commercial

Waste from the C&D sector and the SMaRT residual substream were excluded from the overall analysis because the C&D substream was assessed through visual characterization and SMaRT Station residuals cannot be separated by municipality after processing.

#### Key Findings

As shown in Figure 1, the sampling results suggest the following key findings about recovery potential for The City of Sunnyvale’s overall waste stream, prior to MRFin:

- **Approximately 76%** (53,476 tons) of The City of Sunnyvale’s waste examined in this study was **Recyclable** or **Compostable/Potentially Compostable**.
- **Approximately 42%** (29,613 tons) of The City of Sunnyvale’s overall waste was **Compostable/Potentially Compostable**, shown in green. The **Compostable/Potentially Compostable** fraction included the following material categories (see Table 4):

— *Food* (18,469 tons)

— *Branches & stumps* (561 tons)

- *Compostable paper* (4,983 tons)
  - *Leaves & grass* (3,139 tons)
  - *Prunings & trimmings* (2,080 tons)
  - *Remainder/composite compostable organics* (382 tons)
  - *Agricultural crop residue* (none)
- **Approximately 34%** (23,862 tons) of The City of Sunnyvale’s overall waste was **Recyclable**, including **Recyclable Paper** (13.8%; 9,780 tons), shown in blue, and **Other Recyclables** (19.9%; 14,082 tons), shown in purple.
- By weight, the five largest **Recyclable Paper** categories include
    - *Uncoated corrugated cardboard* (2,496 tons)
    - *Other miscellaneous paper* (2,463 tons)
    - *Other office paper* (1,622 tons)
    - *Newspaper* (1,468 tons)
    - *Catalogs, directories, magazines, and phonebooks* (1,372 tons)
  - By weight, the five largest recyclable **Other Recyclable** categories included these materials:
    - *Bulky items* (3,326 tons)
    - *Concrete* (1,492 tons)
    - *Other films* (1,223 tons)
    - *Durable plastic items* (1,132 tons)
    - *Other ferrous* (1,022 tons)
- **Approximately 5%** (3,766 tons) of The City of Sunnyvale’s overall waste was **Potentially Recyclable**, shown in peach. By weight, the five largest **Potentially Recyclable** categories included these materials:
- *Textiles* (1,459 tons)
  - *Remainder/composite metal* (1,198 tons)
  - *Carpet padding* (562 tons)
  - *Carpet* (480 tons)
  - *Food service plastic* (306 tons)
- **Approximately 19%** (13,480 tons) of The City of Sunnyvale’s overall waste was **Problem Materials**, shown in brown. By weight, the five largest **Problem Material** categories included these materials:
- *Remainder/composite construction and demolition* (2,878 tons)
  - *Diapers* (2,536 tons)
  - *Treated dimensional lumber* (1,699 tons)
  - *Remainder/composite paper* (947 tons)
  - *Other treated wood waste* (846 tons)
- Waste composition is broken down by class in Figure 2 and the ten most prevalent disposed materials can be found in Table 3.

Figures and Tables: Overall

Figure 1. Waste Composition & Recoverability, City of Sunnyvale Overall, 2010

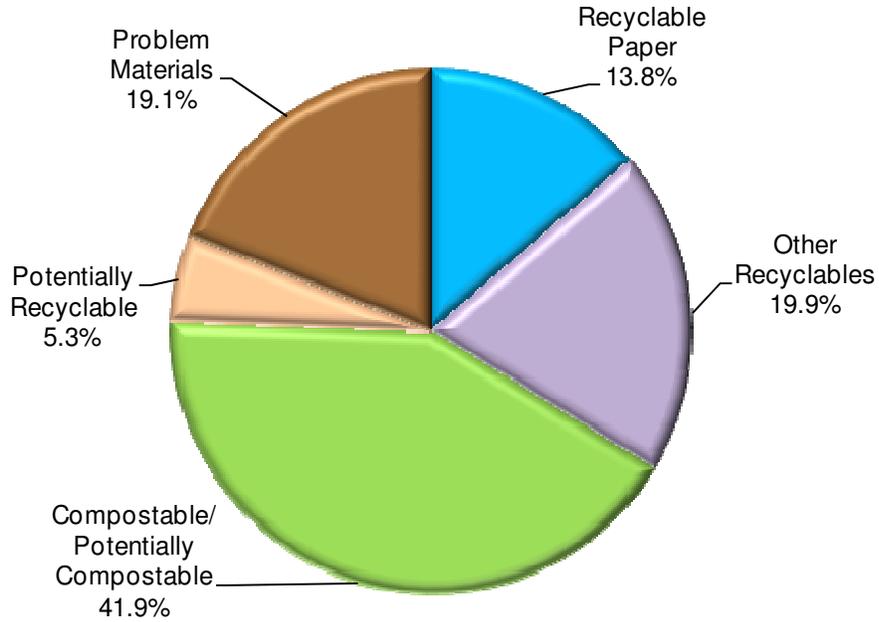
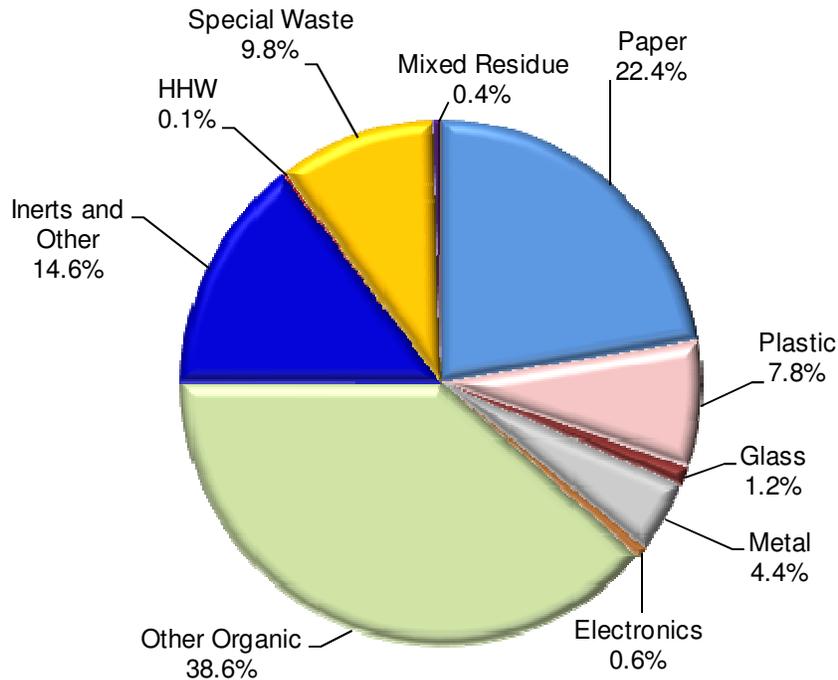


Figure 2. Waste Composition, City of Sunnyvale Overall, 2010



**Table 3. Ten Most Prevalent Disposed Materials, City of Sunnyvale Overall, 2010**

Material	Est.	Cum.	Est. Tons
	Percent	Percent	
Food	26.1%	26.1%	18,469
Compostable Paper	7.0%	33.2%	4,983
Bulky Items	4.7%	37.9%	3,326
Leaves and Grass	4.4%	42.3%	3,139
Remainder/Composite Construction and Demolition	4.1%	46.4%	2,878
Diapers	3.6%	50.0%	2,536
Uncoated Corrugated Cardboard	3.5%	53.5%	2,496
Other Miscellaneous Paper	3.5%	57.0%	2,463
Prunings and Trimmings	2.9%	59.9%	2,080
Treated Dimensional Lumber	2.4%	62.3%	1,699
<b>Total</b>	<b>62.3%</b>		<b>44,070</b>

Table 4. Detailed Waste Composition, City of Sunnyvale Overall, 2010

Material	Est. Percent	+ / -	Est. Tons	Material	Est. Percent	+ / -	Est. Tons
<b>Paper</b>	<b>22.4%</b>		<b>15,835</b>	<b>Organics</b>	<b>38.6%</b>		<b>27,270</b>
Uncoated Corrugated Cardboard	3.5%	0.9%	2,496	Food	26.1%	4.3%	18,469
Kraft Bags/Kraft Paper	0.0%	0.0%	34	Leaves and Grass	4.4%	1.9%	3,139
Kraft Grocer Bags	0.5%	0.2%	325	Prunings and Trimmings	2.9%	1.6%	2,080
Newspaper	2.1%	0.8%	1,468	Branches and Stumps	0.8%	0.7%	561
Other Office Paper	2.3%	0.7%	1,622	Agricultural Crop Residues	0.0%	0.0%	0
Catalogs, Directories, Magazines, and Phonebooks	1.9%	0.9%	1,372	Animal Feces	1.1%	0.7%	784
Compostable Paper	7.0%	1.4%	4,983	Textiles	2.1%	0.5%	1,459
Aseptic Packaging	0.0%	0.0%	13	Remainder/Composite Compostable Organic	0.5%	0.3%	382
Poly-coated Paperboard Packaging	0.2%	0.1%	113	Remainder/Composite Non-compostable Organic	0.6%	0.3%	397
Other Miscellaneous Paper	3.5%	0.8%	2,463				
Remainder/Composite Paper	1.3%	0.4%	947	<b>C &amp; D</b>	<b>14.6%</b>		<b>10,335</b>
<b>Plastic</b>	<b>7.8%</b>		<b>5,523</b>	Concrete	2.1%	2.7%	1,492
PETE Bottles	0.3%	0.1%	214	Asphalt Paving	0.0%	0.0%	0
PETE Food Packaging	0.1%	0.0%	45	Asphalt Composition Shingles	0.0%	0.0%	0
PETE Non-food Packaging	0.0%	0.0%	0	Roofing Tar Paper/Felt	0.0%	0.0%	0
HDPE Containers (<1 gallon)	0.3%	0.1%	235	Roofing Mastic	0.0%	0.0%	0
HDPE Containers (>1 gallon)	0.0%	0.0%	21	Built-up Roofing	0.0%	0.0%	0
Food Service Plastic	0.4%	0.1%	306	Other Asphalt Roofing Material	0.0%	0.0%	0
Miscellaneous Plastic Containers (#3, #4, #5, and	0.4%	0.1%	278	Untreated Dimensional Lumber	0.8%	0.8%	579
Expanded Polystyrene Food Packaging	0.4%	0.1%	314	Treated Dimensional Lumber	2.4%	2.4%	1,699
Expanded Polystyrene Other	0.1%	0.0%	80	Untreated Engineered Wood	0.1%	0.2%	76
Trash Bags	0.9%	0.2%	636	Treated Engineered Wood	0.6%	0.5%	405
Plastic Grocery Bags	0.3%	0.1%	216	Pallets and Crates	0.3%	0.4%	226
Other Merchandise Bags	0.2%	0.1%	167	Other Untreated Wood Waste	0.1%	0.1%	72
Non-Bag Commercial and Industrial Packaging Film	0.2%	0.2%	112	Other Treated Wood Waste	1.2%	1.2%	846
Film Products	0.0%	0.0%	14	Carpet	0.7%	0.6%	480
Other Film	1.7%	0.5%	1,223	Carpet Padding	0.8%	1.1%	562
Durable Plastic Items	1.6%	0.6%	1,132	Clean Gypsum Board	0.0%	0.0%	0
Remainder/Composite Plastic	0.8%	0.3%	531	Painted/Demolition Gypsum Board	0.5%	0.5%	341
				Rock, Soil, and Fines	1.0%	1.0%	678
				Remainder/Composite Construction and Demolition	4.1%	2.8%	2,878
<b>Glass</b>	<b>1.2%</b>		<b>842</b>	<b>Household Hazardous Waste (HHW)</b>	<b>0.1%</b>		<b>101</b>
Glass Bottles and Containers	1.0%	0.4%	684	Paint	0.0%	0.0%	0
Flat Glass	0.1%	0.2%	78	Vehicle and Equipment Fluids	0.1%	0.2%	68
Remainder/Composite Glass	0.1%	0.1%	79	Used Oil	0.0%	0.0%	0
<b>Metal</b>	<b>4.4%</b>		<b>3,122</b>	Lead-acid Batteries	0.0%	0.0%	0
Aluminum Cans	0.2%	0.1%	118	Other Batteries	0.0%	0.0%	3
Tin/Steel Cans	0.5%	0.2%	383	Remainder/Composite Household Waste	0.0%	0.0%	30
Major Appliances	0.0%	0.0%	0				
Used Oil Filters	0.0%	0.0%	0	<b>Special Waste</b>	<b>9.8%</b>		<b>6,916</b>
Other Ferrous	1.4%	0.7%	1,022	Ash	0.0%	0.0%	0
Other Non-ferrous	0.6%	0.5%	401	Kitty litter	1.1%	1.1%	805
Remainder/Composite Metal	1.7%	1.0%	1,198	Diapers	3.6%	1.5%	2,536
				Treated Medical Waste	0.2%	0.2%	108
<b>Electronics</b>	<b>0.6%</b>		<b>459</b>	Bulky Items	4.7%	3.2%	3,326
Small Appliances	0.2%	0.4%	166	Vehicle and Truck Tires	0.0%	0.0%	0
Brown Goods	0.0%	0.0%	0	Other Tires	0.1%	0.1%	50
Small Computer-related Electronics	0.0%	0.0%	14	Remainder/Composite Special Waste	0.1%	0.2%	91
Large Computer-related Electronics	0.2%	0.3%	108				
Other Consumer Electronics	0.2%	0.3%	171	<b>Mixed Residue</b>	<b>0.4%</b>		<b>318</b>
CRT Televisions and Monitors	0.0%	0.0%	0	Mixed Residue	0.4%	0.3%	318
				<b>Totals</b>	<b>100.0%</b>		<b>70,722</b>
				<b>Sample Count</b>	<b>46</b>		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

## Single-family – The City of Sunnyvale

The consultant team hand-sorted 17 samples of waste from this waste sector.

### Key Findings

As shown in Figure 3, the sampling results suggest the following key findings about recovery potential for The City of Sunnyvale’s single-family waste stream:

- **Approximately 76%** (18,458 tons) of The City of Sunnyvale’s single-family waste examined in this study was **Recyclable** or **Compostable/Potentially Compostable**.
- **Approximately 43%** (10,476 tons) of The City of Sunnyvale’s single-family waste was **Compostable/Potentially Compostable**, shown in green. The **Compostable/Potentially Compostable** fraction included the following material categories (see Table 6):
  - *Food* (7,991 tons)
  - *Compostable paper* (1,572 tons)
  - *Leaves & grass* (380 tons)
  - *Prunings & trimmings* (291 tons)
  - *Branches & stumps* (164 tons)
  - *Remainder/composite compostable organics* (78 tons)
  - *Agricultural crop residue* (none)
- **Approximately 33%** (7,981 tons) of The City of Sunnyvale’s single-family waste was **Recyclable**, including **Recyclable Paper** (14.6%; 3,531 tons), shown in blue, and **Other Recyclables** (18.4%; 4,451 tons), shown in purple.
  - By weight, the five largest **Recyclable Paper** categories included these materials:
    - *Other miscellaneous paper* (1,070 tons)
    - *Other office paper* (715 tons)
    - *Uncoated corrugated cardboard* (690 tons)
    - *Catalogs, directories, magazines, and phonebooks* (480 tons)
    - *Newspaper* (394 tons)
  - By weight, the five largest recyclable **Other Recyclable** categories included these materials:
    - *Bulky items* (930 tons)
    - *Other films* (414 tons)
    - *Other ferrous* (351 tons)
    - *Concrete* (310 tons)
    - *Durable plastic items* (283 tons)

- **Approximately 5%** (1,196 tons) of The City of Sunnyvale’s single-family waste was **Potentially Recyclable**, shown in peach. By weight, the five largest **Potentially Recyclable** categories included these materials:
  - *Textiles* (651 tons)
  - *Remainder/composite metal* (462 tons)
  - *Food service plastic* (142 tons)
  - *Expanded polystyrene food packaging* (124 tons)
  - *Carpet* (119 tons)
  
- **About 19%** (4,556 tons) of The City of Sunnyvale’s single-family waste was **Problem Materials**, shown in brown. By weight, the five largest **Problem Material** categories included these materials:
  - *Diapers* (1,007 tons)
  - *Animal feces* (655 tons)
  - *Remainder/composite construction and demolition* (636 tons)
  - *Other treated wood waste* (461 tons)
  - *Kitty litter* (459 tons)
  
- Waste composition is broken down by class in Figure 4 and the ten most prevalent disposed materials can be found in Table 5.

Figures and Tables: Single-family

Figure 3. Waste Composition & Recoverability, City of Sunnyvale Single-family, 2010

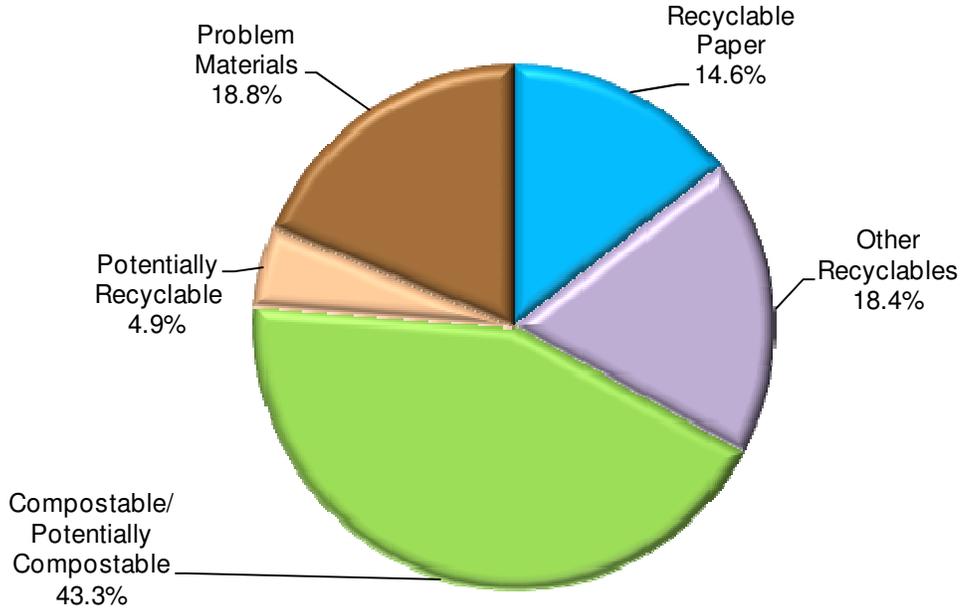
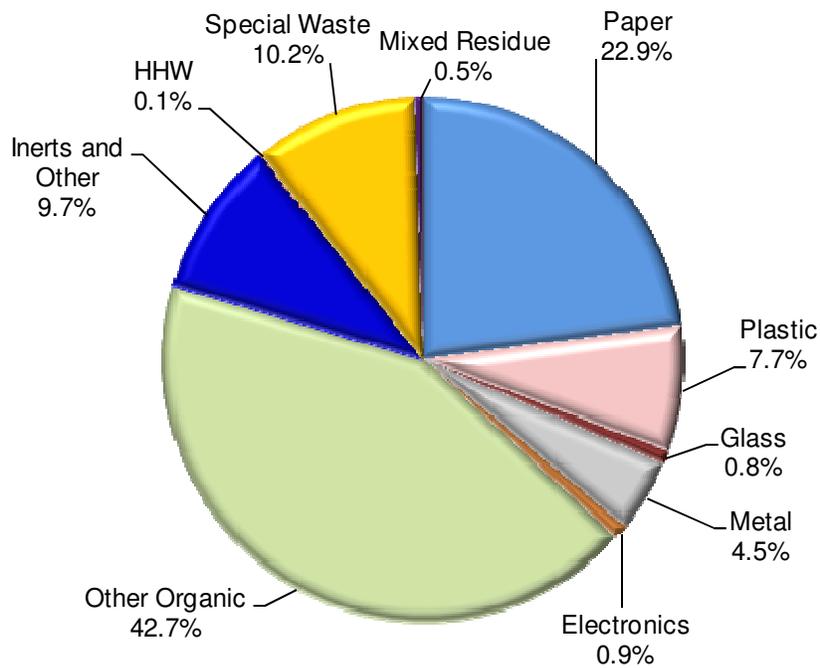


Figure 4. Waste Composition, City of Sunnyvale Single-family, 2010



**Table 5. Ten Most Prevalent Disposed Materials, City of Sunnyvale Single-family, 2010**

Material	Est.	Cum.	Est. Tons
	Percent	Percent	
Food	33.0%	33.0%	7,991
Compostable Paper	6.5%	39.5%	1,572
Other Miscellaneous Paper	4.4%	43.9%	1,070
Diapers	4.2%	48.1%	1,007
Bulky Items	3.8%	51.9%	930
Other Office Paper	3.0%	54.9%	715
Uncoated Corrugated Cardboard	2.9%	57.7%	690
Animal Feces	2.7%	60.4%	655
Textiles	2.7%	63.1%	651
Remainder/Composite Construction and Demolition	2.6%	65.8%	636
<b>Total</b>	<b>65.8%</b>		<b>15,918</b>

Table 6. Detailed Waste Composition, City of Sunnyvale Single-family, 2010

Material	Est. Percent	+ / -	Est. Tons	Material	Est. Percent	+ / -	Est. Tons
<b>Paper</b>	<b>22.9%</b>		<b>5,550</b>	<b>Organics</b>	<b>42.7%</b>		<b>10,345</b>
Uncoated Corrugated Cardboard	2.9%	1.1%	690	Food	33.0%	6.8%	7,991
Kraft Bags/Kraft Paper	0.0%	0.0%	0	Leaves and Grass	1.6%	1.2%	380
Kraft Grocer Bags	0.7%	0.4%	180	Prunings and Trimmings	1.2%	1.2%	291
Newspaper	1.6%	0.5%	394	Branches and Stumps	0.7%	1.1%	164
Other Office Paper	3.0%	1.2%	715	Agricultural Crop Residues	0.0%	0.0%	0
Catalogs, Directories, Magazines, and Phonebooks	2.0%	0.8%	480	Animal Feeces	2.7%	1.6%	655
Compostable Paper	6.5%	1.8%	1,572	Textiles	2.7%	0.7%	651
Aseptic Packaging	0.0%	0.0%	2	Remainder/Composite Compostable Organic	0.3%	0.3%	78
Poly-coated Paperboard Packaging	0.3%	0.1%	61	Remainder/Composite Non-compostable Organic	0.6%	0.2%	134
Other Miscellaneous Paper	4.4%	1.3%	1,070				
Remainder/Composite Paper	1.6%	0.6%	386	<b>C &amp; D</b>	<b>9.7%</b>		<b>2,343</b>
<b>Plastic</b>	<b>7.7%</b>		<b>1,875</b>	Concrete	1.3%	1.6%	310
PETE Bottles	0.3%	0.1%	69	Asphalt Paving	0.0%	0.0%	0
PETE Food Packaging	0.1%	0.1%	24	Asphalt Composition Shingles	0.0%	0.0%	0
PETE Non-food Packaging	0.0%	0.0%	0	Roofing Tar Paper/Felt	0.0%	0.0%	0
HDPE Containers (<1 gallon)	0.3%	0.1%	65	Roofing Mastic	0.0%	0.0%	0
HDPE Containers (>1 gallon)	0.0%	0.1%	10	Built-up Roofing	0.0%	0.0%	0
Food Service Plastic	0.6%	0.2%	142	Other Asphalt Roofing Material	0.0%	0.0%	0
Miscellaneous Plastic Containers (#3, #4, #5, and	0.5%	0.2%	112	Untreated Dimensional Lumber	0.2%	0.2%	40
Expanded Polystyrene Food Packaging	0.5%	0.3%	124	Treated Dimensional Lumber	0.7%	0.7%	160
Expanded Polystyrene Other	0.2%	0.1%	57	Untreated Engineered Wood	0.3%	0.5%	72
Trash Bags	0.9%	0.2%	214	Treated Engineered Wood	0.1%	0.2%	25
Plastic Grocery Bags	0.4%	0.1%	104	Pallets and Crates	0.0%	0.0%	0
Other Merchandise Bags	0.3%	0.1%	67	Other Untreated Wood Waste	0.0%	0.1%	8
Non-Bag Commercial and Industrial Packaging Film	0.1%	0.1%	21	Other Treated Wood Waste	1.9%	2.7%	461
Film Products	0.1%	0.1%	13	Carpet	0.5%	0.6%	119
Other Film	1.7%	0.5%	414	Carpet Padding	0.0%	0.0%	0
Durable Plastic Items	1.2%	0.6%	283	Clean Gypsum Board	0.0%	0.0%	0
Remainder/Composite Plastic	0.6%	0.3%	156	Painted/Demolition Gypsum Board	0.0%	0.0%	0
				Rock, Soil, and Fines	2.1%	2.7%	512
				Remainder/Composite Construction and Demolition	2.6%	2.7%	636
<b>Glass</b>	<b>0.8%</b>		<b>192</b>	<b>Household Hazardous Waste (HHW)</b>	<b>0.1%</b>		<b>13</b>
Glass Bottles and Containers	0.6%	0.2%	143	Paint	0.0%	0.0%	0
Flat Glass	0.0%	0.0%	0	Vehicle and Equipment Fluids	0.0%	0.0%	0
Remainder/Composite Glass	0.2%	0.2%	50	Used Oil	0.0%	0.0%	0
				Lead-acid Batteries	0.0%	0.0%	0
<b>Metal</b>	<b>4.5%</b>		<b>1,084</b>	Other Batteries	0.0%	0.0%	1
Aluminum Cans	0.1%	0.0%	19	Remainder/Composite Household Waste	0.1%	0.1%	12
Tin/Steel Cans	0.6%	0.2%	138				
Major Appliances	0.0%	0.0%	0	<b>Special Waste</b>	<b>10.2%</b>		<b>2,479</b>
Used Oil Filters	0.0%	0.0%	0	Ash	0.0%	0.0%	0
Other Ferrous	1.4%	1.2%	351	Kitty litter	1.9%	2.3%	459
Other Non-ferrous	0.5%	0.2%	114	Diapers	4.2%	1.5%	1,007
Remainder/Composite Metal	1.9%	1.2%	462	Treated Medical Waste	0.1%	0.2%	23
				Bulky Items	3.8%	5.3%	930
<b>Electronics</b>	<b>0.9%</b>		<b>209</b>	Vehicle and Truck Tires	0.0%	0.0%	0
Small Appliances	0.0%	0.0%	0	Other Tires	0.2%	0.3%	47
Brown Goods	0.0%	0.0%	0	Remainder/Composite Special Waste	0.1%	0.1%	12
Small Computer-related Electronics	0.0%	0.0%	4				
Large Computer-related Electronics	0.4%	0.7%	102	<b>Mixed Residue</b>	<b>0.5%</b>		<b>118</b>
Other Consumer Electronics	0.4%	0.7%	104	Mixed Residue	0.5%	0.5%	118
CRT Televisions and Monitors	0.0%	0.0%	0				
				<b>Totals</b>	<b>100.0%</b>		<b>24,209</b>
				<b>Sample Count</b>	<b>17</b>		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

## Multifamily – The City of Sunnyvale

The consultant team hand-sorted 8 samples of waste from this waste sector.

### Key Findings

As shown in Figure 5, the sampling results suggest the following key findings about recovery potential for The City of Sunnyvale’s multifamily waste stream:

- **Approximately 69%** (10,593 tons) of The City of Sunnyvale’s multifamily waste examined in this study was **Recyclable** or **Compostable/Potentially Compostable**.
- **Approximately 40%** (6,085 tons) of The City of Sunnyvale’s multifamily waste was **Compostable/Potentially Compostable**, shown in green. The **Compostable/Potentially Compostable** fraction included the following material categories (see Table 8):
  - *Food* (3,270 tons)
  - *Leaves & grass* (1,568 tons)
  - *Compostable paper* (642 tons)
  - *Prunings & trimmings* (300 tons)
  - *Branches & stumps* (208)
  - *Remainder/composite compostable organics* (97 tons)
  - *Agricultural crop residue* (none)

- **Approximately 29%** (4,508 tons) of The City of Sunnyvale’s multifamily waste was **Recyclable**, including **Recyclable Paper** (15.9%; 2,448 tons), shown in blue, and **Other Recyclables** (13.4%; 2,060 tons), shown in purple.
  - By weight, the five largest **Recyclable Paper** categories included these materials:
    - *Uncoated corrugated cardboard* (1,008 tons)
    - *Other miscellaneous paper* (514 tons)
    - *Catalogs, directories, magazines, and phonebooks* (304 tons)
    - *Newspaper* (272 tons)
    - *Other office paper* (270 tons)
  - By weight, the five largest recyclable **Other Recyclable** categories included these materials:
    - *Bulky items* (692 tons)
    - *Durable plastic items* (286 tons)
    - *Glass bottles and containers* (164 tons)
    - *Other films* (161 tons)
    - *Aluminum cans* (74 tons)
- **Approximately 4%** (574 tons) of The City of Sunnyvale’s multifamily waste was **Potentially Recyclable**, shown in peach. By weight, the six largest **Potentially Recyclable** categories included these materials:
  - *Textiles* (331 tons)
  - *Non-bag commercial and industrial packaging film* (105 tons)
  - *Carpet padding* (96 tons)
  - *Food service plastic* (87 tons)
  - *Remainder/composite metal* (72 tons)
- **About 27%** (4,182 tons) of The City of Sunnyvale’s multifamily waste was **Problem Materials**, shown in brown. By weight, the five largest **Problem Material** categories included these materials:
  - *Remainder/composite construction and demolition* (2,404 tons)
  - *Diapers* (478 tons)
  - *Kitty litter* (395 tons)
  - *Treated dimensional lumber* (185 tons)
  - *Treated engineered wood* (179 tons)
- Waste composition is broken down by class in Figure 6 and the ten most prevalent disposed materials can be found in Table 7

Figures and Tables: Multifamily

Figure 5. Waste Composition & Recoverability, City of Sunnyvale Multifamily, 2010

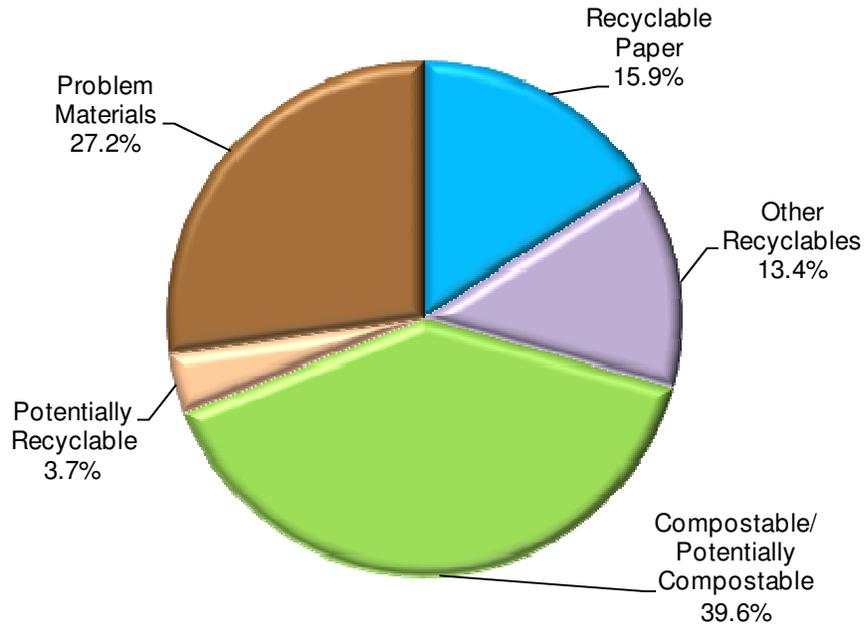
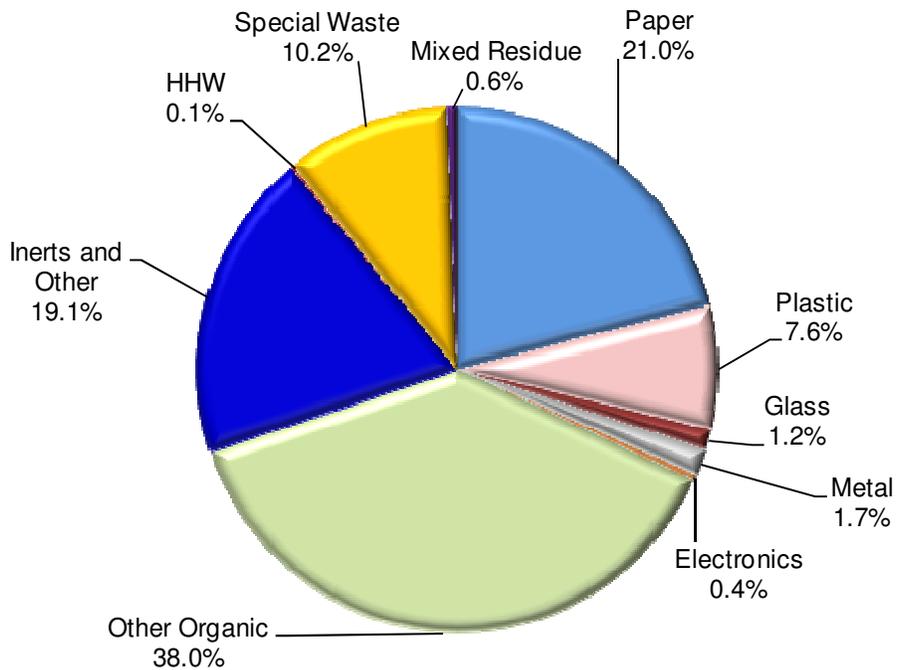


Figure 6. Waste Composition, City of Sunnyvale Multifamily, 2010



**Table 7. Ten Most Prevalent Disposed Materials, City of Sunnyvale Multifamily, 2010**

Material	Est.	Cum.	Est. Tons
	Percent	Percent	
Food	21.3%	21.3%	3,270
Remainder/Composite Construction and Demolition	15.7%	37.0%	2,404
Leaves and Grass	10.2%	47.2%	1,568
Uncoated Corrugated Cardboard	6.6%	53.7%	1,008
Bulky Items	4.5%	58.3%	692
Compostable Paper	4.2%	62.4%	642
Other Miscellaneous Paper	3.3%	65.8%	514
Diapers	3.1%	68.9%	478
Kitty litter	2.6%	71.5%	395
Textiles	2.2%	73.6%	331
<b>Total</b>	<b>73.6%</b>		<b>11,302</b>

Table 8. Detailed Waste Composition, City of Sunnyvale Multifamily, 2010

Material	Est. Percent	+ / -	Est. Tons	Material	Est. Percent	+ / -	Est. Tons
<b>Paper</b>	<b>21.0%</b>		<b>3,230</b>	<b>Organics</b>	<b>38.0%</b>		<b>5,829</b>
Uncoated Corrugated Cardboard	6.6%	3.9%	1,008	Food	21.3%	7.1%	3,270
Kraft Bags/Kraft Paper	0.0%	0.0%	0	Leaves and Grass	10.2%	6.3%	1,568
Kraft Grocer Bags	0.5%	0.3%	80	Prunings and Trimmings	2.0%	3.2%	300
Newspaper	1.8%	1.1%	272	Branches and Stumps	1.4%	2.2%	208
Other Office Paper	1.8%	0.8%	270	Agricultural Crop Residues	0.0%	0.0%	0
Catalogs, Directories, Magazines, and Phonebooks	2.0%	1.0%	304	Animal Feces	0.2%	0.3%	29
Compostable Paper	4.2%	1.7%	642	Textiles	2.2%	1.0%	331
Aseptic Packaging	0.1%	0.1%	9	Remainder/Composite Compostable Organic	0.6%	0.7%	97
Poly-coated Paperboard Packaging	0.1%	0.1%	16	Remainder/Composite Non-compostable Organic	0.2%	0.1%	26
Other Miscellaneous Paper	3.3%	1.4%	514				
Remainder/Composite Paper	0.8%	0.5%	117	<b>C &amp; D</b>	<b>19.1%</b>		<b>2,935</b>
<b>Plastic</b>	<b>7.6%</b>		<b>1,167</b>	Concrete	0.0%	0.0%	0
PETE Bottles	0.4%	0.1%	57	Asphalt Paving	0.0%	0.0%	0
PETE Food Packaging	0.0%	0.0%	4	Asphalt Composition Shingles	0.0%	0.0%	0
PETE Non-food Packaging	0.0%	0.0%	0	Roofing Tar Paper/Felt	0.0%	0.0%	0
HDPE Containers (<1 gallon)	0.5%	0.2%	70	Roofing Mastic	0.0%	0.0%	0
HDPE Containers (>1 gallon)	0.1%	0.1%	9	Built-up Roofing	0.0%	0.0%	0
Food Service Plastic	0.6%	0.3%	87	Other Asphalt Roofing Material	0.0%	0.0%	0
Miscellaneous Plastic Containers (#3, #4, #5, and	0.2%	0.2%	38	Untreated Dimensional Lumber	0.0%	0.1%	8
Expanded Polystyrene Food Packaging	0.4%	0.2%	57	Treated Dimensional Lumber	1.1%	1.6%	162
Expanded Polystyrene Other	0.0%	0.0%	3	Untreated Engineered Wood	0.0%	0.0%	0
Trash Bags	0.7%	0.4%	109	Treated Engineered Wood	1.2%	1.7%	179
Plastic Grocery Bags	0.4%	0.2%	56	Pallets and Crates	0.0%	0.0%	0
Other Merchandise Bags	0.4%	0.2%	63	Other Untreated Wood Waste	0.0%	0.0%	0
Non-Bag Commercial and Industrial Packaging Film	0.7%	1.1%	105	Other Treated Wood Waste	0.2%	0.3%	35
Film Products	0.0%	0.0%	0	Carpet	0.0%	0.0%	0
Other Film	1.0%	0.5%	161	Carpet Padding	0.6%	1.0%	96
Durable Plastic Items	1.9%	1.4%	286	Clean Gypsum Board	0.0%	0.0%	0
Remainder/Composite Plastic	0.4%	0.3%	63	Painted/Demolition Gypsum Board	0.3%	0.4%	51
<b>Glass</b>	<b>1.2%</b>		<b>189</b>	Rock, Soil, and Fines	0.0%	0.0%	0
Glass Bottles and Containers	1.1%	0.8%	164	Remainder/Composite Construction and Demolition	15.7%	13.8%	2,404
Flat Glass	0.0%	0.1%	6	<b>Household Hazardous Waste (HHW)</b>	<b>0.1%</b>		<b>17</b>
Remainder/Composite Glass	0.1%	0.2%	20	Paint	0.0%	0.0%	0
<b>Metal</b>	<b>1.7%</b>		<b>256</b>	Vehicle and Equipment Fluids	0.0%	0.0%	0
Aluminum Cans	0.5%	0.6%	74	Used Oil	0.0%	0.0%	0
Tin/Steel Cans	0.5%	0.2%	70	Lead-acid Batteries	0.0%	0.0%	0
Major Appliances	0.0%	0.0%	0	Other Batteries	0.0%	0.0%	0
Used Oil Filters	0.0%	0.0%	0	Remainder/Composite Household Waste	0.1%	0.2%	17
Other Ferrous	0.1%	0.1%	22	<b>Special Waste</b>	<b>10.2%</b>		<b>1,565</b>
Other Non-ferrous	0.1%	0.1%	18	Ash	0.0%	0.0%	0
Remainder/Composite Metal	0.5%	0.3%	72	Kitty litter	2.6%	4.3%	395
<b>Electronics</b>	<b>0.4%</b>		<b>62</b>	Diapers	3.1%	1.7%	478
Small Appliances	0.0%	0.0%	0	Treated Medical Waste	0.0%	0.0%	0
Brown Goods	0.0%	0.0%	0	Bulky Items	4.5%	6.9%	692
Small Computer-related Electronics	0.1%	0.1%	8	Vehicle and Truck Tires	0.0%	0.0%	0
Large Computer-related Electronics	0.0%	0.0%	0	Other Tires	0.0%	0.0%	0
Other Consumer Electronics	0.3%	0.6%	54	Remainder/Composite Special Waste	0.0%	0.0%	0
CRT Televisions and Monitors	0.0%	0.0%	0	<b>Mixed Residue</b>	<b>0.6%</b>		<b>98</b>
				Mixed Residue	0.6%	1.0%	98
				<b>Totals</b>	<b>100.0%</b>		<b>15,349</b>
				<b>Sample Count</b>	<b>8</b>		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

## Commercial – The City of Sunnyvale

The consultant team hand-sorted 21 samples of waste from this waste sector.

### Key Findings

As shown in Figure 7, the sampling results suggest the following key findings about recovery potential for The City of Sunnyvale’s commercial waste stream:

- **Approximately 78%** (24,182 tons) of The City of Sunnyvale’s commercial waste examined in this study was **Recyclable** or **Compostable/Potentially Compostable**.
- **Approximately 42%** (12,966 tons) of The City of Sunnyvale’s commercial waste was **Compostable/Potentially Compostable**, shown in green. The **Compostable/Potentially Compostable** fraction included the following material categories (see Table 9):
  - *Food* (7,007 tons)
  - *Compostable paper* (2,667 tons)
  - *Prunings & trimmings* (1,459 tons)
  - *Leaves & grass* (1,413 tons)
  - *Remainder/composite compostable organics* (211 tons)
  - *Branches & stumps* (209 tons)
  - *Agricultural crop residue* (none)
- **Approximately 36%** (11,216 tons) of The City of Sunnyvale’s commercial waste was **Recyclable**, including **Recyclable Paper** (12.4%; 3,876 tons), shown in blue, and **Other Recyclables** (23.6%; 7,340 tons), shown in purple.
  - By weight, the five largest **Recyclable Paper** categories included these materials:
    - *Uncoated corrugated cardboard* (911 tons)
    - *Other miscellaneous paper* (871 tons)
    - *Newspaper* (793 tons)
    - *Other office paper* (614 tons)
    - *Catalogs, directories, magazines, and phonebooks* (590 tons)
  - By weight, the five largest recyclable **Other Recyclable** categories included these materials:
    - *Bulky items* (1,700 tons)
    - *Concrete* (1,109 tons)
    - *Other films* (624 tons)
    - *Other ferrous* (602 tons)
    - *Durable plastic items* (574 tons)
- **Approximately 6%** (1,940 tons) of The City of Sunnyvale’s commercial waste was **Potentially Recyclable**, shown in peach. By weight, the five largest **Potentially Recyclable** categories included these materials:

- *Remainder/composite metal* (618 tons)
  - *Textiles* (478 tons)
  - *Carpet padding* (463 tons)
  - *Carpet* (337 tons)
  - *Expanded polystyrene food packaging* (130 tons)
- **About 16%** (5,042 tons) of The City of Sunnyvale’s waste was **Problem Materials**, shown in brown. By weight, the five largest **Problem Material** categories included these materials:
- *Treated dimensional lumber* (1,335 tons)
  - *Diapers* (1,031 tons)
  - *Remainder/composite paper* (422 tons)
  - *Other treated wood waste* (311 tons)
  - *Trash bags* (305 tons)
- Waste composition is broken down by class in Figure 9 and the ten most prevalent disposed materials can be found in Table 10.

Figures and Tables: Commercial

Figure 8. Waste Composition & Recoverability, City of Sunnyvale Commercial, 2010

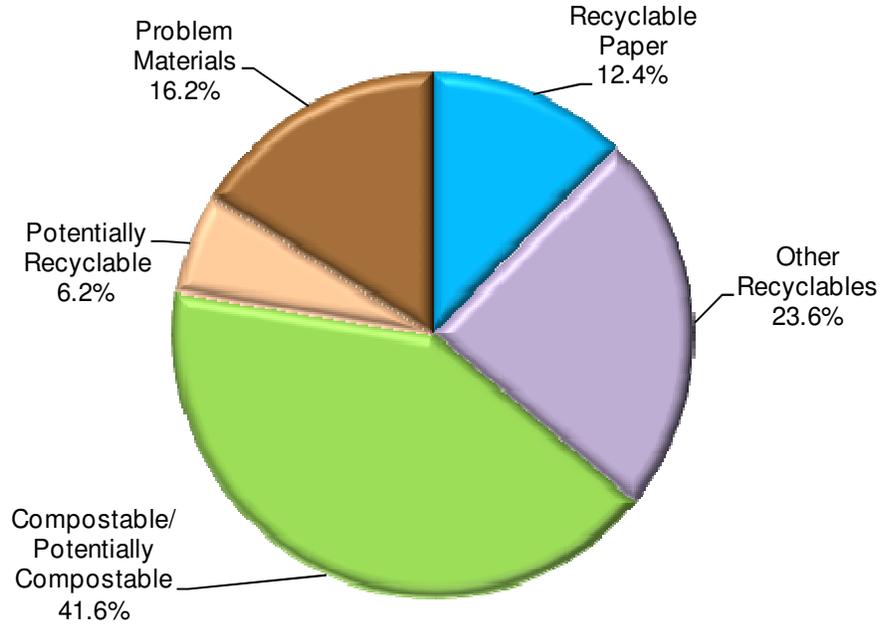
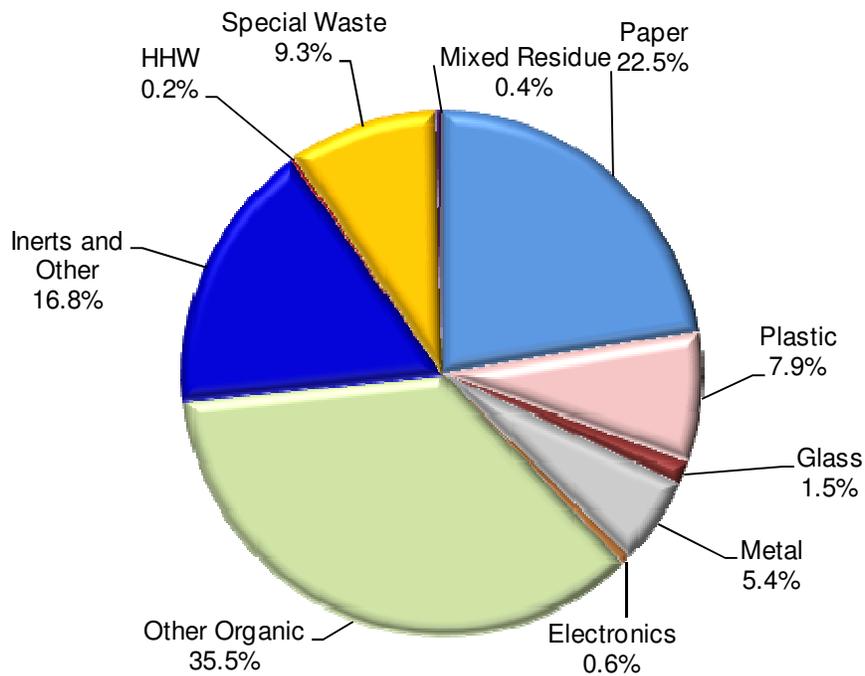


Figure 9. Waste Composition, City of Sunnyvale Commercial, 2010



**Table 10. Ten Most Prevalent Disposed Materials, City of Sunnyvale Commercial, 2010**

Material	Est.	Cum.	Est. Tons
	Percent	Percent	
Food	22.5%	22.5%	7,007
Compostable Paper	8.6%	31.0%	2,667
Bulky Items	5.5%	36.5%	1,700
Prunings and Trimmings	4.7%	41.2%	1,459
Leaves and Grass	4.5%	45.7%	1,413
Treated Dimensional Lumber	4.3%	50.0%	1,335
Concrete	3.6%	53.6%	1,109
Diapers	3.3%	56.9%	1,031
Uncoated Corrugated Cardboard	2.9%	59.8%	911
Other Miscellaneous Paper	2.8%	62.6%	871
<b>Total</b>	<b>62.6%</b>		<b>19,503</b>

Table 11. Detailed Waste Composition, City of Sunnyvale Commercial, 2010

Material	Est. Percent	+ / -	Est. Tons	Material	Est. Percent	+ / -	Est. Tons
<b>Paper</b>	<b>22.5%</b>		<b>7,003</b>	<b>Organics</b>	<b>35.5%</b>		<b>11,059</b>
Uncoated Corrugated Cardboard	2.9%	0.9%	911	Food	22.5%	6.9%	7,007
Kraft Bags/Kraft Paper	0.1%	0.1%	32	Leaves and Grass	4.5%	3.0%	1,413
Kraft Grocer Bags	0.2%	0.1%	66	Prunings and Trimmings	4.7%	3.0%	1,459
Newspaper	2.5%	1.6%	793	Branches and Stumps	0.7%	0.8%	209
Other Office Paper	2.0%	1.1%	614	Agricultural Crop Residues	0.0%	0.0%	0
Catalogs, Directories, Magazines, and Phonebooks	1.9%	1.9%	590	Animal Feces	0.2%	0.2%	60
Compostable Paper	8.6%	2.5%	2,667	Textiles	1.5%	0.7%	478
Aseptic Packaging	0.0%	0.0%	4	Remainder/Composite Compostable Organic	0.7%	0.5%	211
Poly-coated Paperboard Packaging	0.1%	0.1%	34	Remainder/Composite Non-compostable Organic	0.7%	0.6%	223
Other Miscellaneous Paper	2.8%	1.1%	871				
Remainder/Composite Paper	1.4%	0.6%	422	<b>C &amp; D</b>	<b>16.8%</b>		<b>5,241</b>
<b>Plastic</b>	<b>7.9%</b>		<b>2,474</b>	Concrete	3.6%	5.7%	1,109
PETE Bottles	0.3%	0.1%	91	Asphalt Paving	0.0%	0.0%	0
PETE Food Packaging	0.0%	0.0%	15	Asphalt Composition Shingles	0.0%	0.0%	0
PETE Non-food Packaging	0.0%	0.0%	0	Roofing Tar Paper/Felt	0.0%	0.0%	0
HDPE Containers (<1 gallon)	0.3%	0.1%	105	Roofing Mastic	0.0%	0.0%	0
HDPE Containers (>1 gallon)	0.0%	0.0%	3	Built-up Roofing	0.0%	0.0%	0
Food Service Plastic	0.3%	0.1%	81	Other Asphalt Roofing Material	0.0%	0.0%	0
Miscellaneous Plastic Containers (#3, #4, #5, and	0.4%	0.2%	123	Untreated Dimensional Lumber	1.6%	1.7%	506
Expanded Polystyrene Food Packaging	0.4%	0.2%	130	Treated Dimensional Lumber	4.3%	5.1%	1,335
Expanded Polystyrene Other	0.1%	0.0%	16	Untreated Engineered Wood	0.0%	0.0%	0
Trash Bags	1.0%	0.3%	305	Treated Engineered Wood	0.7%	0.8%	225
Plastic Grocery Bags	0.2%	0.1%	58	Pallets and Crates	0.7%	0.8%	216
Other Merchandise Bags	0.1%	0.1%	44	Other Untreated Wood Waste	0.2%	0.3%	60
Non-Bag Commercial and Industrial Packaging Film	0.0%	0.0%	5	Other Treated Wood Waste	1.0%	1.5%	311
Film Products	0.0%	0.0%	0	Carpet	1.1%	1.2%	337
Other Film	2.0%	1.0%	624	Carpet Padding	1.5%	2.4%	463
Durable Plastic Items	1.8%	1.1%	574	Clean Gypsum Board	0.0%	0.0%	0
Remainder/Composite Plastic	1.0%	0.5%	300	Painted/Demolition Gypsum Board	0.9%	1.0%	286
				Rock, Soil, and Fines	0.4%	0.6%	126
<b>Glass</b>	<b>1.5%</b>		<b>463</b>	Remainder/Composite Construction and Demolition	0.9%	0.9%	267
Glass Bottles and Containers	1.2%	0.7%	383	<b>Household Hazardous Waste (HHW)</b>	<b>0.2%</b>		<b>70</b>
Flat Glass	0.2%	0.4%	70	Paint	0.0%	0.0%	0
Remainder/Composite Glass	0.0%	0.0%	10	Vehicle and Equipment Fluids	0.2%	0.3%	65
<b>Metal</b>	<b>5.4%</b>		<b>1,681</b>	Used Oil	0.0%	0.0%	0
Aluminum Cans	0.1%	0.1%	37	Lead-acid Batteries	0.0%	0.0%	0
Tin/Steel Cans	0.5%	0.4%	171	Other Batteries	0.0%	0.0%	2
Major Appliances	0.0%	0.0%	0	Remainder/Composite Household Waste	0.0%	0.0%	3
Used Oil Filters	0.0%	0.0%	0	<b>Special Waste</b>	<b>9.3%</b>		<b>2,885</b>
Other Ferrous	1.9%	1.1%	602	Ash	0.0%	0.0%	0
Other Non-ferrous	0.8%	1.1%	253	Kitty litter	0.0%	0.0%	0
Remainder/Composite Metal	2.0%	2.0%	618	Diapers	3.3%	3.0%	1,031
<b>Electronics</b>	<b>0.6%</b>		<b>179</b>	Treated Medical Waste	0.3%	0.4%	79
Small Appliances	0.5%	0.8%	158	Bulky Items	5.5%	5.0%	1,700
Brown Goods	0.0%	0.0%	0	Vehicle and Truck Tires	0.0%	0.0%	0
Small Computer-related Electronics	0.0%	0.0%	4	Other Tires	0.0%	0.0%	0
Large Computer-related Electronics	0.0%	0.0%	0	Remainder/Composite Special Waste	0.2%	0.4%	75
Other Consumer Electronics	0.1%	0.1%	17	<b>Mixed Residue</b>	<b>0.4%</b>		<b>109</b>
CRT Televisions and Monitors	0.0%	0.0%	0	Mixed Residue	0.4%	0.5%	109
				<b>Totals</b>	<b>100.0%</b>		<b>31,164</b>
				<b>Sample Count</b>	<b>21</b>		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

## C&D – The City of Sunnyvale

The consultant team visually characterized 47 samples of waste from this waste sector.

### Key Findings

As shown in Figure 10, the sampling results suggest the following key findings about recovery potential for The City of Sunnyvale’s C&D waste stream:

- **Approximately 72%** (4,981 tons) of The City of Sunnyvale’s C&D waste examined in this study was **Recyclable** or **Compostable/Potentially Compostable**.
- **Approximately 5%** (367 tons) of The City of Sunnyvale’s C&D waste was **Compostable/Potentially Compostable**, shown in green. The **Compostable/Potentially Compostable** fraction included the following material categories (see Table 13):
  - *Leaves & grass* (196 tons)
  - *Prunings & trimmings* (101 tons)
  - *Branches & stumps* (27 tons)
  - *Food* (24 tons)
  - *Remainder/composite compostable organics* (16 tons)
  - *Compostable paper* (4 tons)
  - *Agricultural crop residue* (none)
- **Approximately 66%** (4,613 tons) of The City of Sunnyvale’s C&D waste was **Recyclable**, including **Recyclable Paper** (1.4%; 97 tons), shown in blue, and **Other Recyclables** (65.0%; 4,516 tons), shown in purple.
  - By weight, the five largest **Recyclable Paper** categories included these materials:
    - *Uncoated corrugated cardboard* (61 tons)
    - *Other office paper* (21 ton)
    - *Other miscellaneous paper* (8 tons)
    - *Kraft bags/kraft paper* (4 ton)
    - *Newspaper* (2 tons)
  - By weight, the five largest recyclable **Other Recyclable** categories included these materials:
    - *Rock, soil, and fines* (2,887 tons)
    - *Untreated dimensional lumber* (612 tons)
    - *Pallets and crates* (237 tons)
    - *Concrete* (223 tons)
    - *Asphalt paving* (190 tons)

- **Approximately 8%** (583 tons) of The City of Sunnyvale’s C&D waste was **Potentially Recyclable**, shown in peach. By weight, the five largest **Potentially Recyclable** categories included these materials:
  - *Clean gypsum board* (244 tons)
  - *Remainder/composite metal* (120 tons)
  - *Film products* (80 tons)
  - *Asphalt composition shingles* (50 tons)
  - *Flat glass* (43 tons)
  
- **About 20%** (1,381 tons) of The City of Sunnyvale’s C&D waste was **Problem Materials**, shown in brown. By weight, the five largest **Problem Material** categories included these materials:
  - *Remainder/composite construction and demolition* (786 tons)
  - *Painted/demolition gypsum board* (167 tons)
  - *Treated engineered wood* (155 tons)
  - *Roofing tar paper/felt* (78 tons)
  - *Treated dimensional lumber* (56 tons)
  
- Waste composition is broken down by class in Figure 11 and the ten most prevalent disposed materials can be found in Table 12

Figures and Tables: C&D

Figure 10. Waste Composition & Recoverability, City of Sunnyvale C&D, 2010

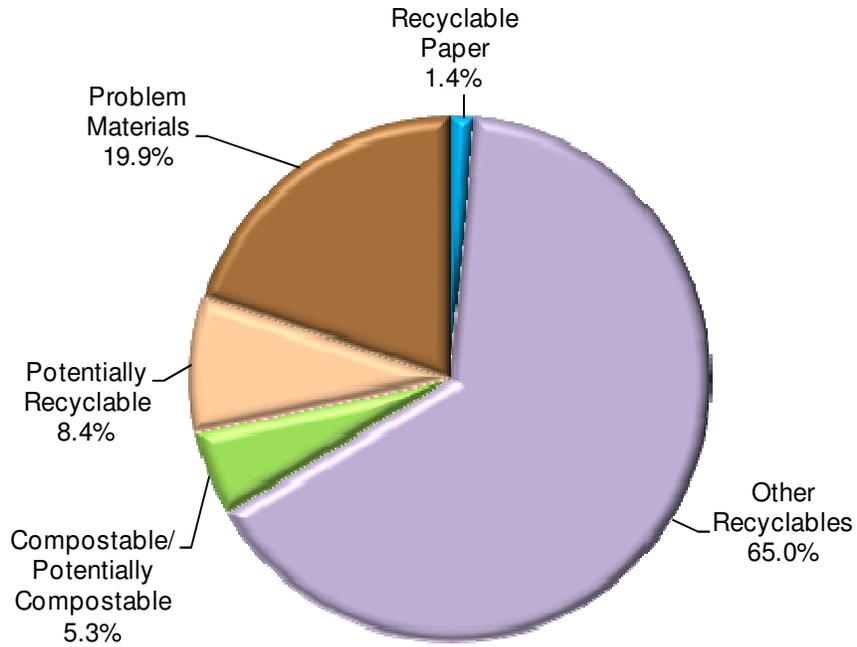
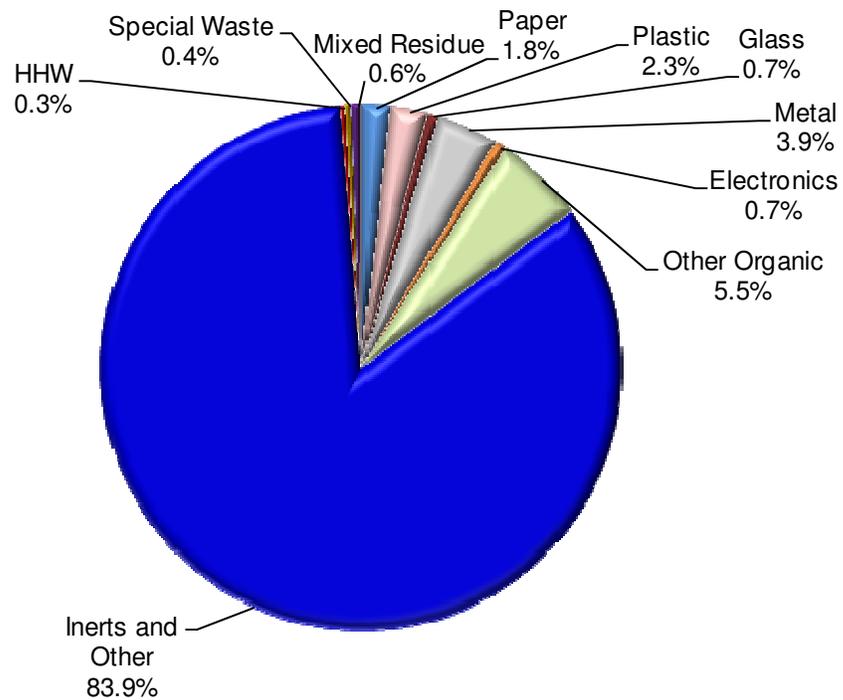


Figure 11. Waste Composition, City of Sunnyvale C&D, 2010



**Table 12. Ten Most Prevalent Disposed Materials, City of Sunnyvale C&D, 2010**

Material	Est.	Cum.	Est. Tons
	Percent	Percent	
Rock, Soil, and Fines	41.6%	41.6%	2,887
Remainder/Composite Construction and Demolition	11.3%	52.9%	786
Untreated Dimensional Lumber	8.8%	61.7%	612
Clean Gypsum Board	3.5%	65.2%	244
Pallets and Crates	3.4%	68.6%	237
Concrete	3.2%	71.8%	223
Leaves and Grass	2.8%	74.7%	196
Asphalt Paving	2.7%	77.4%	190
Painted/Demolition Gypsum Board	2.4%	79.8%	167
Treated Engineered Wood	2.2%	82.0%	155
<b>Total</b>	<b>82.0%</b>		<b>5,696</b>

**Table 13. Detailed Waste Composition, City of Sunnyvale C&D, 2010**

Material	Est. Percent	+ / -	Est. Tons	Material	Est. Percent	+ / -	Est. Tons
<b>Paper</b>	<b>1.8%</b>		<b>124</b>	<b>Organics</b>	<b>5.5%</b>		<b>383</b>
Uncoated Corrugated Cardboard	0.9%	0.4%	61	Food	0.4%	0.3%	24
Kraft Bags/Kraft Paper	0.1%	0.1%	4	Leaves and Grass	2.8%	3.0%	196
Kraft Grocer Bags	0.0%	0.0%	0	Prunings and Trimmings	1.5%	1.7%	101
Newspaper	0.0%	0.0%	2	Branches and Stumps	0.4%	0.5%	27
Other Office Paper	0.3%	0.3%	21	Agricultural Crop Residues	0.0%	0.0%	0
Catalogs, Directories, Magazines, and Phonebooks	0.0%	0.0%	0	Animal Feces	0.0%	0.0%	0
Compostable Paper	0.1%	0.1%	4	Textiles	0.1%	0.1%	6
Aseptic Packaging	0.0%	0.0%	0	Remainder/Composite Compostable Organic	0.2%	0.3%	16
Poly-coated Paperboard Packaging	0.0%	0.0%	0	Remainder/Composite Non-compostable Organic	0.2%	0.2%	13
Other Miscellaneous Paper	0.1%	0.2%	8				
Remainder/Composite Paper	0.3%	0.2%	22	<b>C &amp; D</b>	<b>83.9%</b>		<b>5,827</b>
<b>Plastic</b>	<b>2.3%</b>		<b>158</b>	Concrete	3.2%	2.0%	223
PETE Bottles	0.0%	0.0%	1	Asphalt Paving	2.7%	4.5%	190
PETE Food Packaging	0.0%	0.0%	0	Asphalt Composition Shingles	0.7%	0.9%	50
PETE Non-food Packaging	0.0%	0.0%	0	Roofing Tar Paper/Felt	1.1%	1.5%	78
HDPE Containers (<1 gallon)	0.0%	0.0%	0	Roofing Mastic	0.0%	0.0%	0
HDPE Containers (>1 gallon)	0.0%	0.0%	1	Built-up Roofing	0.0%	0.0%	0
Food Service Plastic	0.0%	0.0%	0	Other Asphalt Roofing Material	0.0%	0.0%	0
Miscellaneous Plastic Containers (#3, #4, #5, and	0.0%	0.0%	0	Untreated Dimensional Lumber	8.8%	6.0%	612
Expanded Polystyrene Food Packaging	0.0%	0.0%	1	Treated Dimensional Lumber	0.8%	0.6%	56
Expanded Polystyrene Other	0.0%	0.0%	1	Untreated Engineered Wood	1.2%	0.7%	84
Trash Bags	0.0%	0.0%	1	Treated Engineered Wood	2.2%	1.3%	155
Plastic Grocery Bags	0.0%	0.0%	0	Pallets and Crates	3.4%	1.6%	237
Other Merchandise Bags	0.0%	0.0%	0	Other Untreated Wood Waste	0.3%	0.3%	19
Non-Bag Commercial and Industrial Packaging Film	0.1%	0.1%	9	Other Treated Wood Waste	0.1%	0.1%	5
Film Products	1.2%	1.2%	80	Carpet	0.4%	0.3%	27
Other Film	0.0%	0.0%	3	Carpet Padding	0.1%	0.1%	8
Durable Plastic Items	0.3%	0.3%	22	Clean Gypsum Board	3.5%	4.2%	244
Remainder/Composite Plastic	0.6%	0.3%	39	Painted/Demolition Gypsum Board	2.4%	2.0%	167
<b>Glass</b>	<b>0.7%</b>		<b>48</b>	Rock, Soil, and Fines	41.6%	16.7%	2,887
Glass Bottles and Containers	0.0%	0.0%	0	Remainder/Composite Construction and Demolition	11.3%	5.1%	786
Flat Glass	0.6%	0.6%	43	<b>Household Hazardous Waste (HHW)</b>	<b>0.3%</b>		<b>23</b>
Remainder/Composite Glass	0.1%	0.1%	5	Paint	0.1%	0.1%	7
<b>Metal</b>	<b>3.9%</b>		<b>268</b>	Vehicle and Equipment Fluids	0.0%	0.0%	0
Aluminum Cans	0.0%	0.0%	0	Used Oil	0.0%	0.0%	1
Tin/Steel Cans	0.0%	0.1%	3	Lead-acid Batteries	0.0%	0.0%	0
Major Appliances	0.1%	0.1%	5	Other Batteries	0.0%	0.0%	0
Used Oil Filters	0.0%	0.0%	0	Remainder/Composite Household Waste	0.2%	0.3%	14
Other Ferrous	2.0%	0.8%	137	<b>Special Waste</b>	<b>0.4%</b>		<b>25</b>
Other Non-ferrous	0.1%	0.0%	4	Ash	0.0%	0.0%	0
Remainder/Composite Metal	1.7%	2.5%	120	Kitty litter	0.0%	0.0%	0
<b>Electronics</b>	<b>0.7%</b>		<b>49</b>	Diapers	0.0%	0.0%	0
Small Appliances	0.3%	0.3%	20	Treated Medical Waste	0.0%	0.0%	0
Brown Goods	0.2%	0.3%	15	Bulky Items	0.3%	0.2%	22
Small Computer-related Electronics	0.1%	0.1%	4	Vehicle and Truck Tires	0.0%	0.0%	2
Large Computer-related Electronics	0.0%	0.0%	0	Other Tires	0.0%	0.0%	0
Other Consumer Electronics	0.0%	0.0%	1	Remainder/Composite Special Waste	0.0%	0.0%	0
CRT Televisions and Monitors	0.1%	0.2%	10	<b>Mixed Residue</b>	<b>0.6%</b>		<b>39</b>
				Mixed Residue	0.6%	0.9%	39
				<b>Totals</b>	<b>100.0%</b>		<b>6,944</b>
				<b>Sample Count</b>	<b>47</b>		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

## SMaRT Station Residuals

The consultant team hand-sorted 30 samples of waste from this waste stream. This is waste that is left over after MRFinng and will go directly to the landfill.

### Key Findings

As shown in Figure 12, the sampling results suggest the following key findings about recovery potential for the overall SMaRT Station residuals substream:

- **Approximately 84%** (117,054 tons) of SMaRT Station residuals examined in this study was **Recyclable** or **Compostable/Potentially Compostable**.
- **Approximately 57%** (79,689 tons) of SMaRT Station residuals was **Compostable/Potentially Compostable**, shown in green. The **Compostable/Potentially Compostable** fraction included the following material categories (see Table 15):
  - *Compostable paper* (63,536 tons)
  - *Food* (13,150 tons)
  - *Prunings & trimmings* (1,874 tons)
  - *Remainder/composite compostable organics* (553 tons)
  - *Leaves & grass* (536 tons)
  - *Branches & stumps* (41 tons)
  - *Agricultural crop residue* (none)
- **Approximately 27%** (37,365 tons) of SMaRT Station residuals was **Recyclable**, including **Recyclable Paper** (14.0%; 19,581 tons), shown in blue, and **Other Recyclables** (12.8%; 17,784 tons), shown in purple.
  - By weight, the five largest **Recyclable Paper** categories included these materials:
    - *Other miscellaneous paper* (6,380 tons)
    - *Uncoated corrugated cardboard* (5,352 tons)
    - *Other office paper* (3,183 tons)
    - *Newspaper* (3,063 tons)
    - *Catalogs, directories, magazines, and phonebooks* (723 tons)
  - By weight, the five largest recyclable **Other Recyclable** categories included these materials:
    - *Other films* (5,225 tons)
    - *Durable plastic items* (2,302 tons)
    - *Other ferrous* (1,084 tons)
    - *HDPE containers (<1 gallon)* (822 tons)
    - *PETE bottles* (716 tons)

- **Approximately 5%** (6,256 tons) of SMaRT Station residuals was **Potentially Recyclable**, shown in peach. By weight, the five largest **Potentially Recyclable** categories included:
  - *Textiles* (3,588 tons)
  - *Food service plastic* (1,333 tons)
  - *Remainder/composite metal* (988 tons)
  - *Expanded polystyrene food packaging* (689 tons)
  - *Carpet* (672 tons)
  
- **About 12%** (16,170 tons) of SMaRT Station residuals was **Problem Materials**, shown in brown. By weight, the five largest **Problem Material** categories included:
  - *Diapers* (3,759 tons)
  - *Trash bags* (3,251 tons)
  - *Remainder/composite paper* (2,727 tons)
  - *Remainder/composite plastic* (1,771 tons)
  - *Treated engineered wood* (1,199 tons)
  
- Waste composition is broken down by class in Figure 13 and the ten most prevalent disposed materials can be found in Table 14.

Figures and Tables: SMaRT Station Residuals

Figure 12. Waste Composition & Recoverability, SMaRT Station Residuals, 2010

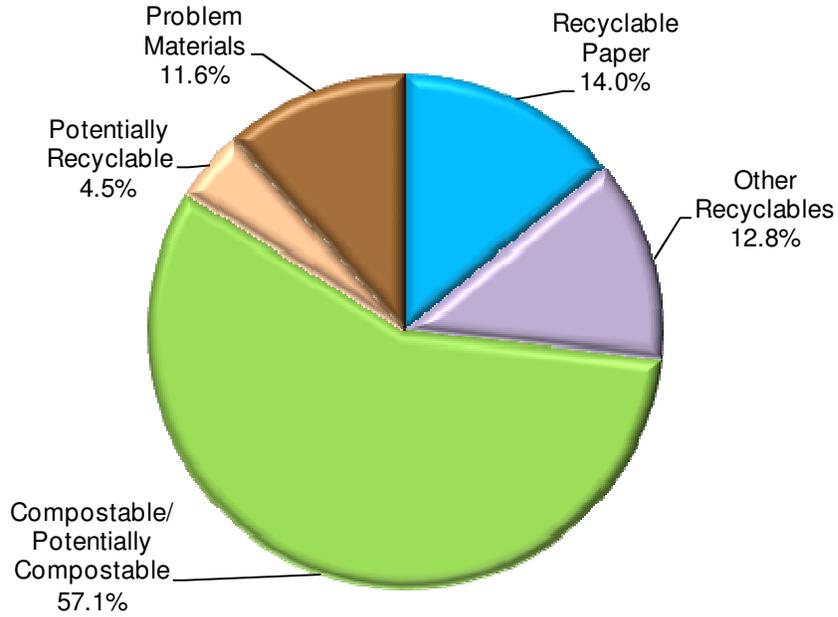
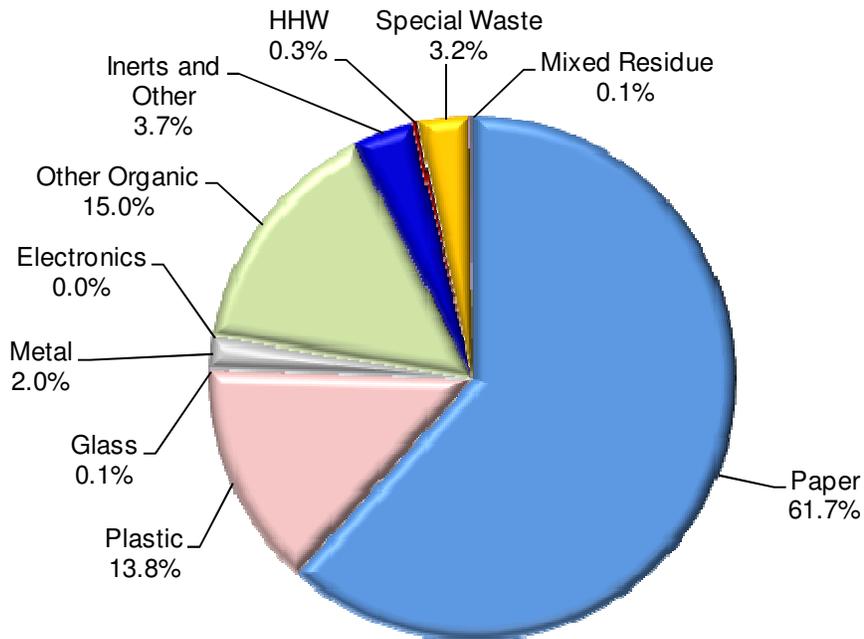


Figure 13. Waste Composition, SMaRT Station Residuals, 2010



**Table 14. Ten Most Prevalent Materials, SMaRT Station Residuals, 2010**

<b>Material</b>	<b>Est. Percent</b>	<b>Cum. Percent</b>	<b>Est. Tons</b>
Compostable Paper	45.6%	45.6%	63,536
Food	9.4%	55.0%	13,150
Other Miscellaneous Paper	4.6%	59.6%	6,380
Uncoated Corrugated Cardboard	3.8%	63.4%	5,352
Other Film	3.7%	67.1%	5,225
Diapers	2.7%	69.8%	3,759
Textiles	2.6%	72.4%	3,588
Trash Bags	2.3%	74.7%	3,251
Other Office Paper	2.3%	77.0%	3,183
Newspaper	2.2%	79.2%	3,063
<b>Total</b>	<b>79.2%</b>		<b>110,486</b>

Table 15. Detailed Waste Composition, SMaRT Station Residuals, 2010

Material	Est. Percent	+ / -	Est. Tons	Material	Est. Percent	+ / -	Est. Tons
<b>Paper</b>	<b>61.7%</b>		<b>86,077</b>	<b>Organics</b>	<b>15.0%</b>		<b>20,932</b>
Uncoated Corrugated Cardboard	3.8%	0.9%	5,352	Food	9.4%	2.6%	13,150
Kraft Bags/Kraft Paper	0.1%	0.1%	199	Leaves and Grass	0.4%	0.3%	536
Kraft Grocer Bags	0.5%	0.2%	682	Prunings and Trimmings	1.3%	0.9%	1,874
Newspaper	2.2%	0.4%	3,063	Branches and Stumps	0.0%	0.0%	41
Other Office Paper	2.3%	0.6%	3,183	Agricultural Crop Residues	0.0%	0.0%	0
Catalogs, Directories, Magazines, and Phonebooks	0.5%	0.2%	723	Animal Feces	0.2%	0.1%	250
Compostable Paper	45.6%	3.4%	63,536	Textiles	2.6%	0.7%	3,588
Aseptic Packaging	0.0%	0.0%	18	Remainder/Composite Compostable Organic	0.4%	0.3%	553
Poly-coated Paperboard Packaging	0.2%	0.1%	216	Remainder/Composite Non-compostable Organic	0.7%	0.2%	940
Other Miscellaneous Paper	4.6%	1.1%	6,380				
Remainder/Composite Paper	2.0%	0.6%	2,727	<b>C &amp; D</b>	<b>3.7%</b>		<b>5,207</b>
<b>Plastic</b>	<b>13.8%</b>		<b>19,205</b>	Concrete	0.0%	0.1%	55
PETE Bottles	0.5%	0.1%	716	Asphalt Paving	0.0%	0.0%	0
PETE Food Packaging	0.1%	0.1%	134	Asphalt Composition Shingles	0.0%	0.0%	0
PETE Non-food Packaging	0.0%	0.0%	0	Roofing Tar Paper/Felt	0.0%	0.0%	0
HDPE Containers (<1 gallon)	0.6%	0.1%	822	Roofing Mastic	0.0%	0.0%	0
HDPE Containers (>1 gallon)	0.3%	0.4%	397	Built-up Roofing	0.0%	0.0%	0
Food Service Plastic	1.0%	0.1%	1,333	Other Asphalt Roofing Material	0.0%	0.0%	0
Miscellaneous Plastic Containers (#3, #4, #5, and	0.5%	0.1%	661	Untreated Dimensional Lumber	0.6%	0.3%	874
Expanded Polystyrene Food Packaging	0.5%	0.1%	689	Treated Dimensional Lumber	0.6%	0.3%	798
Expanded Polystyrene Other	0.3%	0.1%	418	Untreated Engineered Wood	0.3%	0.2%	408
Trash Bags	2.3%	0.3%	3,251	Treated Engineered Wood	0.9%	0.4%	1,199
Plastic Grocery Bags	0.4%	0.1%	620	Pallets and Crates	0.0%	0.0%	0
Other Merchandise Bags	0.4%	0.1%	589	Other Untreated Wood Waste	0.0%	0.0%	21
Non-Bag Commercial and Industrial Packaging Film	0.2%	0.2%	276	Other Treated Wood Waste	0.4%	0.5%	586
Film Products	0.0%	0.0%	0	Carpet	0.5%	0.4%	672
Other Film	3.7%	0.6%	5,225	Carpet Padding	0.0%	0.0%	0
Durable Plastic Items	1.7%	0.4%	2,302	Clean Gypsum Board	0.0%	0.0%	34
Remainder/Composite Plastic	1.3%	0.2%	1,771	Painted/Demolition Gypsum Board	0.0%	0.0%	9
<b>Glass</b>	<b>0.1%</b>		<b>135</b>	Rock, Soil, and Fines	0.0%	0.1%	51
Glass Bottles and Containers	0.1%	0.1%	102	Remainder/Composite Construction and Demolition	0.4%	0.3%	501
Flat Glass	0.0%	0.0%	0	<b>Household Hazardous Waste (HHW)</b>	<b>0.3%</b>		<b>412</b>
Remainder/Composite Glass	0.0%	0.0%	33	Paint	0.0%	0.0%	0
<b>Metal</b>	<b>2.0%</b>		<b>2,812</b>	Vehicle and Equipment Fluids	0.2%	0.3%	271
Aluminum Cans	0.1%	0.0%	91	Used Oil	0.0%	0.0%	0
Tin/Steel Cans	0.2%	0.1%	336	Lead-acid Batteries	0.0%	0.0%	0
Major Appliances	0.0%	0.0%	0	Other Batteries	0.1%	0.1%	98
Used Oil Filters	0.0%	0.0%	0	Remainder/Composite Household Waste	0.0%	0.0%	43
Other Ferrous	0.8%	0.4%	1,084	<b>Special Waste</b>	<b>3.2%</b>		<b>4,484</b>
Other Non-ferrous	0.2%	0.1%	313	Ash	0.0%	0.0%	0
Remainder/Composite Metal	0.7%	0.4%	988	Kitty litter	0.0%	0.0%	0
<b>Electronics</b>	<b>0.0%</b>		<b>51</b>	Diapers	2.7%	0.6%	3,759
Small Appliances	0.0%	0.0%	0	Treated Medical Waste	0.0%	0.0%	6
Brown Goods	0.0%	0.0%	0	Bulky Items	0.4%	0.7%	589
Small Computer-related Electronics	0.0%	0.0%	6	Vehicle and Truck Tires	0.0%	0.0%	0
Large Computer-related Electronics	0.0%	0.0%	0	Other Tires	0.1%	0.1%	99
Other Consumer Electronics	0.0%	0.1%	45	Remainder/Composite Special Waste	0.0%	0.0%	30
CRT Televisions and Monitors	0.0%	0.0%	0	<b>Mixed Residue</b>	<b>0.1%</b>		<b>164</b>
				Mixed Residue	0.1%	0.2%	164
				<b>Totals</b>	<b>100.0%</b>		<b>139,480</b>
				<b>Sample Count</b>	<b>30</b>		

Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

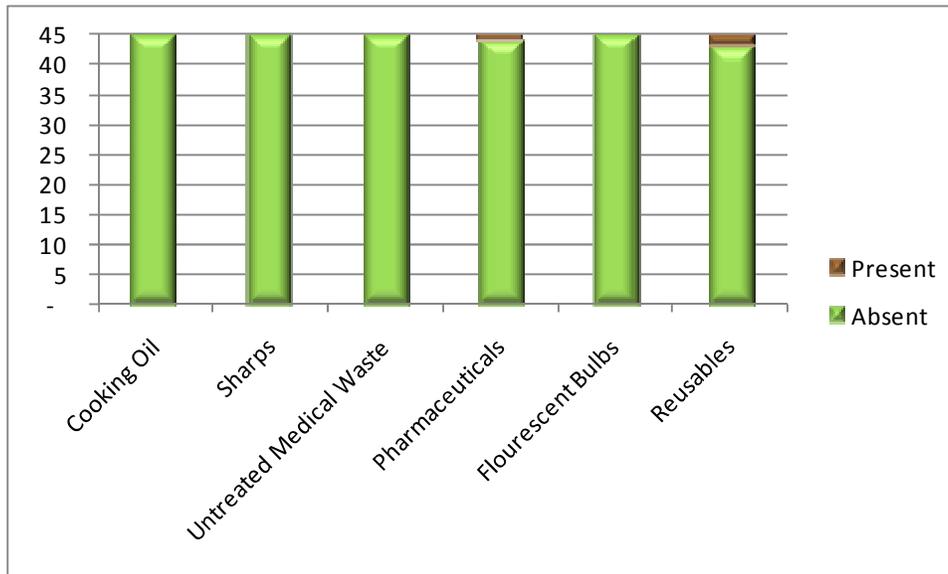
## Presence and Absence of Targeted Materials

In addition to characterizing composition and recoverability of waste, the consultant team also carefully observed the presence or absence of six targeted materials: *cooking oil*, *sharps*, *untreated medical waste*, *pharmaceuticals*, *fluorescent bulbs*, and *reusables*. This section describes the observed incidence of these materials in the City of Sunnyvale’s overall waste stream; in its single-family, multifamily, commercial, and C&D waste sectors; and in SMaRT Station residuals from both the Cities of Mountain View and Sunnyvale.

### Overall Waste Stream – The City of Sunnyvale

Two out of 46 (4.4%) of sampled loads contained *reusables* and one out of 46 (2.2%) contained *pharmaceuticals* in the Overall waste stream from the City of Sunnyvale. No other targeted materials were observed in Sunnyvale’s Overall waste stream.

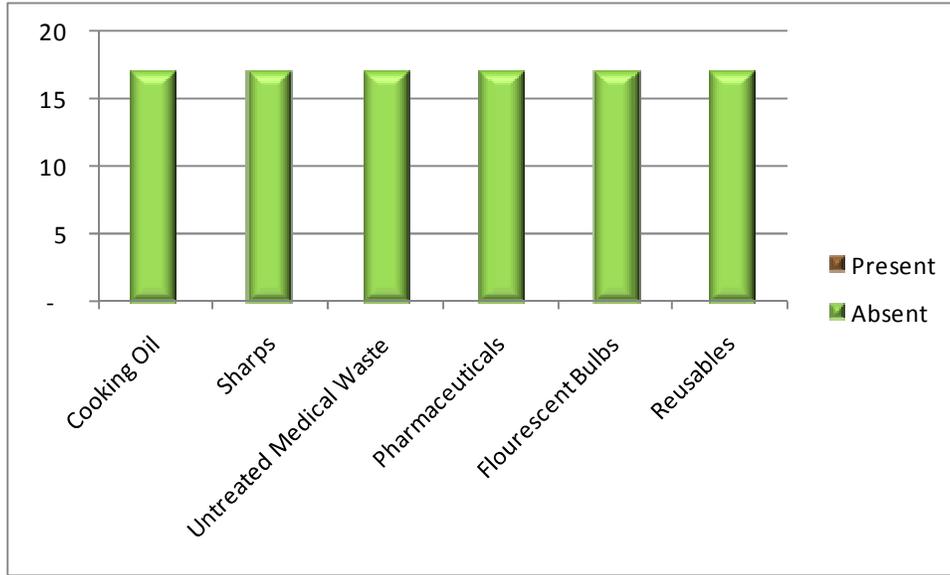
Figure 14. Presence vs. Absence, City of Sunnyvale Overall, 2010



## Single-family – The City of Sunnyvale

No targeted materials were observed in any Single-family loads sampled from The City of Sunnyvale

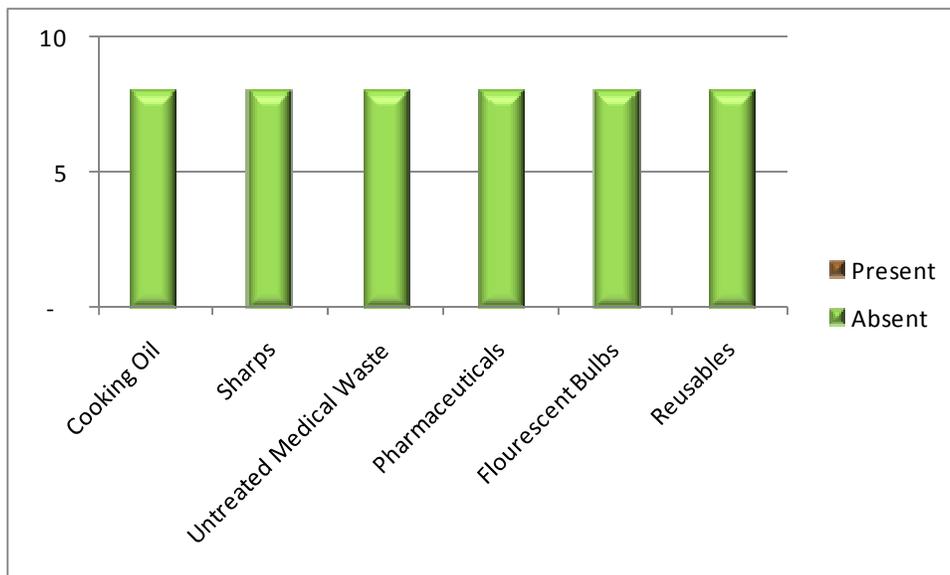
Figure 15. Presence vs. Absence, City of Sunnyvale Single-family, 2010



## Multifamily – The City of Sunnyvale

No targeted materials were observed in any Multifamily loads sampled from The City of Sunnyvale

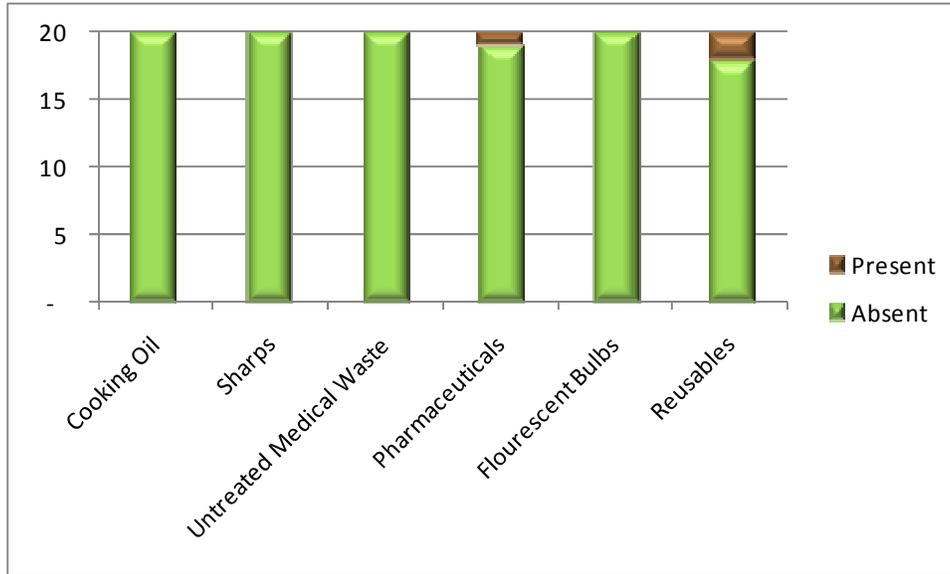
Figure 16. Presence vs. Absence, City of Sunnyvale Multifamily, 2010



## Commercial – The City of Sunnyvale

Two out of 21 (10.0%) of sampled loads contained *reusables* and one out of 21 (5.0%) contained *pharmaceuticals* in the Commercial waste stream from the City of Sunnyvale. No other targeted materials were observed in the Sunnyvale’s Commercial waste stream.

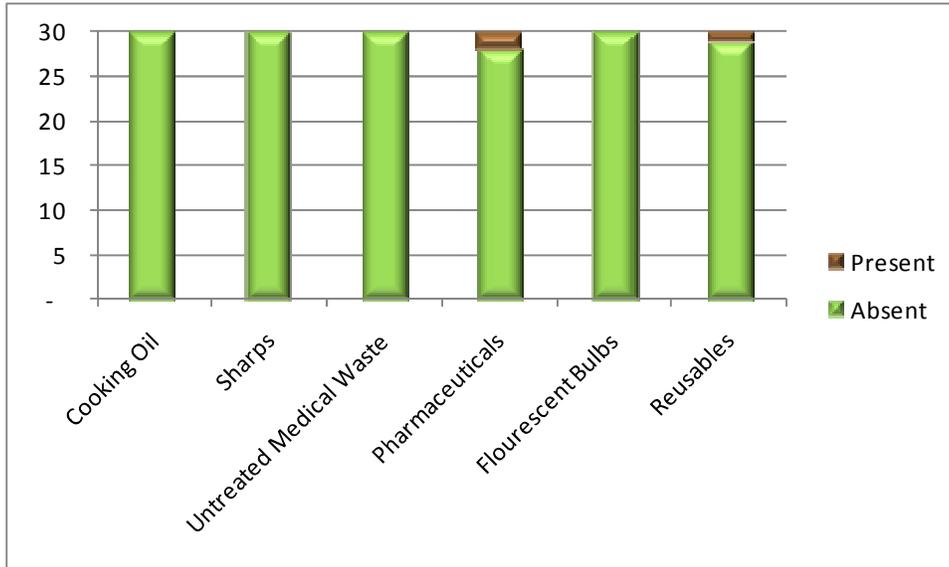
Figure 17. Presence vs. Absence, City of Sunnyvale Commercial, 2010



## SMaRT Station Residuals

Two out of 30 (6.7%) of sampled loads contained *pharmaceuticals*, and one out of 30 (3.3%) contained *reusables* in the SMaRT Station Residual waste stream. No other targeted materials were observed in the SMaRT Station Residual waste stream.

Figure 18. Presence vs. Absence, SMaRT Station Residuals, 2010



## Appendix A: Material Type Definitions

### Paper

1. **Uncoated Corrugated Cardboard** usually has three layers. The center wavy layer is sandwiched between the two outer layers. It does not have any wax coating on the inside or outside and is free of food contamination. Examples include entire cardboard containers, such as shipping and moving boxes, computer packaging cartons, and sheets and pieces of boxes and cartons. This type does not include chipboard boxes such as cereal and tissue boxes.
2. **Kraft Bags/Kraft Paper** means bags and sheets made from kraft paper. The paper may be brown (unbleached) or white (bleached). Examples include paper fast food bags, department store bags, and heavyweight sheets of kraft packing paper.
3. **Kraft Grocer Bags** means bags originating from a grocer made from kraft paper. The paper may be brown (unbleached) or white.
4. **Newspaper** means paper used in newspapers. Examples include newspaper and glossy inserts found in newspapers, and all items made from newsprint, such as free advertising guides, election guides, and tax instruction booklets.
5. **Other Office Paper** means paper used in offices. Examples include white paper used in photocopiers and laser printers, letter paper, colored ledger, computer paper, manila folders, manila envelopes, index cards, white envelopes, white window envelopes, notebook paper, ground wood computer paper, junk mail, and carbonless forms.
6. **Catalogs, Directories, Magazines, and Phonebooks** means either items made of glossy coated paper or thin paper between coated covers. These items are bound along the spine with glue. Examples include magazines, catalogs, brochures, pamphlets, whole or damaged telephone books, yellow pages, and real estate listings.
7. **Compostable Paper** means paper not defined in other categories that can be composted, such as paper towels, paper cups, paper plates, paper take-away food packaging, tissues, pizza boxes, and waxed cardboard boxes.
8. **Aseptic Packaging** means packaging that is multilayer, often including a paper layer, a foil layer, and a plastic layer. Most aseptic packaging has a foil/plastic pull tab for as an opener. Examples include some juice boxes, milk cartons, some soymilk cartons, and some broth cartons.
9. **Poly-coated Paperboard Packaging** means packaging that is made of a stiffer paperboard and coated with a plastic lining. Examples include milk cartons, orange juice cartons, and other juice cartons.
10. **Other Miscellaneous Paper** means items made mostly of paper that are used for things other than food, and that do not fit into any of the other paper types. Paper may be combined with minor amounts of other materials such as wax or glues. Examples include chipboard packaging such as tissue boxes, paperboard boxes for software, paper sleeves for CD or DVD cases, paper packaging for over-the-counter medications, boxes for games, containers for printer ink or toner cartridges, and non-corrugated consumer electronics packaging.

11. **Remainder/Composite Paper** means items made mostly of paper but combined with large amounts of other materials such as wax, plastic, glues, foil, food, and moisture. Examples include packages laminated with Mylar, boxes with large plastic windows (common for children's toys), packages with foam or plastic cushions integrated into the package, paper-coated polystyrene containers.

## Glass

---

12. **Glass Bottles and Containers** means glass containers with or without a California Redemption Value (CRV) label of all colors. Examples include whole or broken soda and beer bottles, fruit juice bottles, peanut butter jars, and mayonnaise jars.
13. **Flat Glass** means clear or tinted glass that is flat. Examples include glass window panes, doors and table tops, flat automotive window glass (side windows), safety glass, and architectural glass. This type does not include windshields, laminated glass, or any curved glass.
14. **Remainder/Composite Glass** means glass that cannot be put in any other type. It includes items made mostly of glass but combined with other materials. Examples include Pyrex, Corningware, crystal and other glass tableware, mirrors, light bulbs, auto windshields, laminated glass, or any curved glass.

## Metal

---

15. **Aluminum Cans** means any food or beverage container made mainly of aluminum. Examples include aluminum soda or beer cans, and some pet food cans. These items do not include bimetal containers with steel sides and aluminum ends.
16. **Tin/Steel Cans** means rigid containers made mainly of steel. These items will stick to a magnet and may be tin-coated. This type of can is used to store food, beverages, paint, and a variety of other household and consumer products. Examples include canned food and beverage containers, empty metal paint cans, empty spray paint and other aerosol containers, and bimetal containers with steel sides and aluminum ends.
17. **Major Appliances** means discarded major appliances of any color. These items are often enamel-coated. Examples include washing machines, clothes dryers, hot water heaters, stoves, and refrigerators. These items do not include electronics, such as televisions and stereos.
18. **Used Oil Filters** means metal oil filters used in motor vehicles and other engines, which contain a residue of used oil.
19. **Other Ferrous** means any iron or steel that is magnetic or any stainless steel item. This type does not include tin/steel cans. Examples include structural steel beams, metal clothes hangers, metal pipes, stainless steel cookware, security bars, and scrap ferrous items.
20. **Other Non-ferrous** means any metal item, other than aluminum cans, that is not stainless steel and that is not magnetic. These items may be made of aluminum, copper, brass, bronze, lead, zinc, or other non-ferrous metals. Examples include aluminum window frames, aluminum siding, copper wire, shell casings, brass pipe, and aluminum foil.

21. **Remainder/Composite Metal** means metal items that cannot be categorized as any other material type. This material type includes items made mostly of metal but combined with other materials and items made of both ferrous metal and non-ferrous metal combined. Examples include small non-electronic appliances such as toasters and hair dryers, motors, insulated wire, and finished products that contain a mixture of metals, or metals and other materials, whose weight is derived significantly from the metal portion of its construction.

## Electronics

---

22. **Small Appliances** means small appliances without extensive circuitry. Examples include toasters, blenders, mixers, coffee makers, kitchen scales, and other small appliances.
23. **Brown Goods** means generally larger, non-portable electronic goods that have some circuitry. Examples include microwaves, stereos, VCRs, DVD players, large radios, fax machines, and audio/visual equipment. Does not include items with video display devices.
24. **Small Computer-related Electronics** means electronics with large circuitry that is computer-related, not including monitors. Items in this category should be smaller than a basketball. Examples include mice, disk drives, and modems.
25. **Large Computer-related Electronics** means electronics with large circuitry that is computer-related, not including monitors. Items in this category should be larger than a basketball. Examples include processors, scanners, keyboards, and printers.
26. **Other Consumer Electronics** means portable non-computer-related electronics with large circuitry. Examples include personal digital assistants (PDA), cell phones, phone systems, phone answering machines, computer games and other electronic toys, portable CD players, camcorders, and digital cameras.
27. **CRT Televisions and Monitors** means items with video displays larger than 4 inches. Includes televisions, computer monitors, and other items containing a cathode ray tube (CRT), portable DVD players, laptop computers, and non-CRT televisions (such as LCD and LED televisions).

## Plastic

---

28. **PETE Bottles** means clear or colored PETE (polyethylene terephthalate) bottles that are one liter or less in size. When marked for identification, they bear the number 1 in the center of the triangular recycling symbol and may also bear the letters PETE or PET. The color is usually transparent green or clear. A PETE water bottle usually has ribs and a narrow neck as well as a small dot, not a seam, left from the manufacturing process. Examples include single-serve water bottles, sports drink bottles, and soda bottles.
29. **PETE Food Packaging** means clear or colored PETE (polyethylene terephthalate) food packaging. When marked for identification, they bear the number 1 in the center of the triangular recycling symbol and may also bear the letters PETE or PET. The color is usually clear. Examples include clamshells of various sizes and food trays.
30. **PETE Non-food Packaging** means clear or colored PETE (polyethylene terephthalate) non-food packaging. When marked for identification, they bear the number 1 in the center of the triangular recycling symbol and may also bear the letters PETE or PET. The color is usually

clear. Examples include electronics packaging, small retail packaging, battery packaging, and many other types.

31. **HDPE Containers (One gallon or less)** means natural and colored HDPE (high-density polyethylene) containers, not including HDPE buckets of 1-gallon or more in size. This plastic is usually either cloudy white, allowing light to pass through it (natural) or a solid color, preventing light from passing through it (colored). When marked for identification, it bears the number 2 in the triangular recycling symbol and may also bear the letters HDPE. Examples include milk jugs, water jugs, detergent bottles, some hair-care bottles, HDPE sealed containers (must be cut, pried, or torn to be opened), empty motor oil, empty antifreeze, and other empty vehicle and equipment fluid containers.
32. **HDPE Containers (Greater than one gallon)** means colored and natural containers (typically buckets and pails) made of HDPE (high-density polyethylene) and designed to hold 1 gallon or more of material. This plastic is usually either cloudy white, allowing light to pass through it (natural) or a solid color, preventing light from passing through it (colored). When marked for identification, it bears the number 2 in the triangular recycling symbol and may also bear the letters HDPE. This category includes buckets regardless of whether they are attached to metal handles. Examples include large paint buckets and commercial buckets used to contain food for commercial use (restaurants, etc.). These objects are packages containing material for sale, and are not sold as buckets themselves (such as mop buckets).
33. **Miscellaneous Food Service Plastic Containers (#3, #4, #5, and #7)** means containers made of types of plastic other than HDPE (high-density polyethylene), or PETE (polyethylene terephthalate), that must be cut, pried or torn to be opened, and have 2 or more parts, which may be hinged or fitted, that are sealed together. Items may be made of PVC (polyvinyl chloride), LDPE (low-density polyethylene), PP (polypropylene), or mixed resins. When marked for identification, these items may bear the number 3, 4, 5, or 7 in the triangular recycling symbol and may also bear letters (PP, PVC, etc). Examples include non-PETE clam shells, plastic flatware, plastic plates, plastic cups, plastic tubs, and all other food service plastic that does not occur in another plastics category.
34. **Miscellaneous Plastic Containers (#3, #4, #5, and #7)** means containers made of types of plastic other than HDPE (high-density polyethylene), or PETE (polyethylene terephthalate), that must be cut, pried or torn to be opened, and have 2 or more parts, which may be hinged or fitted, that are sealed together. Items may be made of PVC (polyvinyl chloride), LDPE (low-density polyethylene), PP (polypropylene), or mixed resins. When marked for identification, these items may bear the number 3, 4, 5, or 7 in the triangular recycling symbol and may also bear letters (PP, PVC, etc). Examples include hardware, small electronics and battery packaging; these containers may be clear but could also be colored.
35. **Expanded Polystyrene Food Packaging** means food packaging containers made of expanded polystyrene, or “Styrofoam.” When marked for identification, items bear the number 6 or the letters “PS” in the triangular recycling symbol. Examples include clamshells, cups, plates, and bowls.
36. **Expanded Polystyrene Other** means non-food packaging containers made of expanded polystyrene, or “Styrofoam.” When marked for identification, items bear the number 6 or the letters “PS” in the triangular recycling symbol. This material type excludes clamshells, cups, plates, and bowls.

37. **Trash Bags** means plastic bags sold for use as trash bags, for both residential and commercial use. This type includes garbage, kitchen, compactor, can-liner, composting, yard, lawn, leaf, and recycling bags. This type does not include other plastic bags, like shopping bags, that might have been used to contain trash.
38. **Plastic Grocery Bags** means plastic carryout shopping bags with handles intended to carry goods from supermarkets or grocery stores. Bags are provided by the grocery store with the purchase. Does not include produce bags.
39. **Other Merchandise Bags** means plastic shopping bags used to contain merchandise to transport from the place of purchase, given out by the store with the purchase. This type includes dry cleaning bags intended for one-time use. Does not include grocery bags or produce bags.
40. **Non-Bag Commercial and Industrial Packaging Film** means film plastic used for large-scale packaging or transport packaging. Examples include shrink-wrap, mattress bags, furniture wrap, and film bubble wrap.
41. **Film Products** means plastic film used for purposes other than packaging. Examples include agricultural film (films used in various farming and growing applications, such as silage greenhouse films, mulch films, and wrap for hay bales), plastic sheeting used as drop cloths, and building wrap.
42. **Other Film** means all other plastic film that does not fit into any other type. Examples include other types of plastic bags such as sandwich bags, zipper-recloseable bags, newspaper bags, mailing pouches, bank bags, X-ray film, and metalized film (wine containers and balloons).
43. **Durable Plastic Items** means plastic items other than containers, film plastic, or miscellaneous plastic containers (#3-#7. These items may bear the numbers 1 through 7 in the triangular recycling symbol. Examples include plastic outdoor furniture, plastic toys and sporting goods, CDs, and plastic housewares, such as mop buckets, dishes, cups, and cutlery. This type also includes building materials such as house siding, window sashes and frames, housings for electronics such as computers, televisions and stereos, fan blades, impact-resistant cases such as tool boxes and first aid boxes, and plastic pipes and fittings.
44. **Remainder/Composite Plastic** means plastic that cannot be put in any other type. These items are usually recognized by their optical opacity. This material type includes items made mostly of plastic but combined with other materials. Examples include auto parts made of plastic attached to metal, plastic drinking straws, trays found in cookie packages, plastic strapping, and new Formica, vinyl, or linoleum.

## Other Organic

---

45. **Food** means food material resulting from the processing, storage, preparation, cooking, handling, or consumption of food. This type includes material from industrial, commercial, or residential sources. Examples include discarded meat scraps, dairy products, egg shells, fruit or vegetable peels, and other food items from homes, stores, and restaurants. This type includes grape pomace and other processed residues or material from canneries, wineries, or other industrial sources.

46. **Leaves and Grass** means plant material, except woody material, from any public or private landscapes. Examples include leaves, grass clippings, plants, and seaweed. This type does not include woody material or material from agricultural sources.
47. **Prunings and Trimmings** means woody plant material up to 4 inches in diameter from any public or private landscape. Examples include prunings, shrubs, and small branches with branch diameters that do not exceed 4 inches. This type does not include stumps, tree trunks, branches exceeding 4 inches in diameter, or material from agricultural sources.
48. **Branches and Stumps** means woody plant material, branches, and stumps that exceed 4 inches in diameter, from any public or private landscape.
49. **Agricultural Crop Residues** means vegetative materials disposed of from an agricultural scale source. Examples include seed hulls, husks, chaff, or agricultural by-product. Excludes production residues such as pulp, cores, etc.
50. **Animal Feces** means feces, manure, and soiled bedding materials from domestic, farm, or ranch animals. Examples include manure and soiled bedding from animal production operations, race tracks, riding stables, animal hospitals, dog feces, cat feces, and feces from other sources.
51. **Textiles** means items made of thread, yarn, fabric, or cloth. Examples include clothes, fabric trimmings, draperies, and all natural and synthetic cloth fibers. This type does not include cloth covered furniture, mattresses, leather shoes, leather bags, or leather belts.
52. **Remainder/Composite Compostable Organic** means organic material that cannot be put in any other type. This type includes items made mostly of organic materials, but combined with other material types. Examples include cork, hemp rope, hair, small wood products (such as Popsicle sticks and tooth picks), sawdust, and agricultural crop residues.
53. **Remainder/Composite Non-compostable Organic** means organic material that cannot be put in any other type. This type includes items made mostly of organic materials, but combined with other material types. Examples include leather items, garden hoses, rubber items, and cigarette butts.

## Construction and Demolition

---

54. **Concrete** means a hard material made from sand, aggregate, gravel, cement mix and water. Examples include pieces of building foundations, concrete paving, and concrete/cinder blocks.
55. **Asphalt Paving** means a black or brown, tar-like material mixed with aggregate used as a paving material.
56. **Asphalt Composition Shingles** means composite shingles composed of fiberglass or organic felts saturated with asphalt and covered with inert aggregates. This material type is commonly known as three tab roofing and does not include built-up roofing.
57. **Roofing Tar Paper/Felt** means a heavy paper impregnated with tar or a fiberglass or polyester fleece impregnated with tar and used as part of a roof for waterproofing.
58. **Roofing Mastic** means a paste-like material used as an adhesive or seal in roofing applications.

59. **Built-up Roofing** means other roofing material made with layers of felt, asphalt, aggregates, and attached roofing tar and tar paper normally used on flat/low pitched roofs usually on commercial buildings.
60. **Other Asphalt Roofing Material** means any other roofing material containing asphalt that cannot be put into any of the other roofing material types.
61. **Untreated Dimensional Lumber** means unpainted new or demolition dimensional lumber. This material type includes materials such as 2 x 4s, 2 x 6s, 2 x 12s, and other residual materials from framing and related construction activities. May contain nails or other trace contaminants.
62. **Treated Dimensional Lumber** means treated/painted/stained new or demolition dimensional lumber. This material type includes materials such as 2 x 4s, 2 x 6s, 2 x 12s, and other residual materials from framing and related construction activities. May contain nails or other trace contaminants.
63. **Untreated Engineered Wood** means unpainted new or demolition scrap from sheathed goods such as plywood, particleboard, wafer board, oriented strand board, and other residual materials used for sheathing and related construction uses. Items may contain nails or other trace contaminants.
64. **Treated Engineered Wood** means treated/painted/stained new or demolition scrap from sheathed goods such as plywood, particleboard, wafer board, oriented strand board, and other residual materials used for sheathing and related construction uses. Items may contain nails or other trace contaminants.
65. **Pallets and Crates** means unpainted wood pallets, and crates, as well as packaging made of lumber/ or engineered wood.
66. **Other Untreated Wood Waste** means wood waste that cannot be put into any other material type. This type may include untreated/unpainted scrap from production of prefabricated wood products such as wood furniture or cabinets, untreated or unpainted wood roofing and siding.
67. **Other Treated Wood Waste** means wood waste that cannot be put into any other material type. This type may include treated/painted/stained scrap from production of prefabricated wood products such as wood furniture or cabinets, and treated/ painted/stained wood roofing and siding.
68. **Carpet** means flooring applications consisting of various natural or synthetic fibers bonded to some type of backing material. This material type does not include carpet padding.
69. **Carpet Padding** means foam rubber or other materials used as padding under carpets.
70. **Clean Gypsum Board** means unpainted gypsum wallboard or interior wall covering made of a sheet of gypsum sandwiched between paper layers. Examples include used or unused, broken or whole sheets. Gypsum board may also be called sheetrock, drywall, plasterboard, gypboard, gyproc, or wallboard.
71. **Painted/Demolition Gypsum Board** means painted gypsum wallboard or interior wall covering made of a sheet of gypsum sandwiched between paper layers. Examples: This type includes used or unused, broken or whole sheets. Gypsum board may also be called sheetrock, drywall, plasterboard, gypboard, gyproc, or wallboard.

72. **Rock, Soil, and Fines** means rock pieces of any size and soil, dirt, and other matter. Examples include rock, stones, sand, clay, soil and other fines. This type also includes non-hazardous contaminated soil.
73. **Remainder/Composite Construction and Demolition** means inerts and other material that cannot be put in any other type. This type may include items from different types combined, which would be very hard to separate. Examples include brick, ceramics, tiles, toilets, sinks, and fiberglass insulation. This type may also include demolition debris that is a mixture of items such as plate glass, wood, tiles, gypsum board, and aluminum scrap.

## Household Hazardous Waste

---

74. **Paint** means containers with paint in them. Examples include latex paint, oil based paint, and tubes of pigment or fine art paint. This type does not include dried paint, empty paint cans, or empty aerosol containers.
75. **Vehicle and Equipment Fluids** means containers with fluids used in vehicles or engines, except used oil. Examples include used antifreeze and brake fluid. This type does not include empty vehicle and equipment fluid containers.
76. **Used Oil** means the same as defined in [Health and Safety Code section 25250.1\(a\)](#). Examples include spent lubricating oil such as crankcase and transmission oil, gear oil, and hydraulic oil.
77. **Lead-acid Batteries** means batteries fueled by lead-acid cells, such as auto batteries.
78. **Other Batteries** means any type of battery other than lead-acid (automotive) batteries. Examples include household batteries such as AA, AAA, D, button cell, 9 volt, and rechargeable batteries used for flashlights, small appliances, watches, and hearing aids.
79. **Remainder/Composite Household Waste** means household hazardous material that cannot be put in any other type. This type also includes household hazardous material that is mixed. Examples include household hazardous waste which if improperly put in the solid waste stream may present handling problems or other hazards, such as pesticides and caustic cleaners.

## Special Waste

---

80. **Ash** means a residue from the combustion of any solid or liquid material. Examples include ash from fireplaces, incinerators, biomass facilities, waste-to-energy facilities, and barbecues. This type also includes ash and burned debris from structure fires.
81. **Kitty litter** means kitty litter, may be clay, sand, silica, or biodegradable.
82. **Diapers** means disposable diapers of all styles and sizes, include baby diapers, adult diapers, feminine hygiene pads, and absorbent pet pads.
83. **Treated Medical Waste** means medical waste that has been processed in order to change its physical, chemical, or biological character or composition, or to remove or reduce its harmful properties or characteristics, as defined in [Section 25123.5 of the Health and Safety Code](#).

84. **Bulky Items** means large hard to handle items that are not defined elsewhere in the material types list, including furniture, mattresses, and other large items. Examples include all sizes and types of furniture, mattresses, box springs, and base components.
85. **Vehicle and Truck Tires** means pneumatic tires or solid tires manufactured for use on any type of motor vehicle such as trucks, automobiles, motorcycles, and heavy equipment.
86. **Other Tires** means tires not used on motor vehicles such as bicycle tires and lawn mower tires.
87. **Remainder/Composite Special Waste** means special waste that cannot be put in any other type. Examples include asbestos-containing materials such as certain types of pipe insulation and floor tiles, auto fluff, auto bodies, trucks, trailers, truck cabs, untreated medical waste, and artificial fireplace logs.

## Mixed Residue

---

88. **Mixed Residue** means material that cannot be put in any other type or category. This category includes mixed residue that cannot be further sorted. Examples include clumping kitty litter, cosmetics, and residual material from a materials recovery facility or other sorting process that cannot be put in any other material type, including remainder/composite types.

## Presence vs. Absence Materials

---

1. **Cooking Oil** means any edible oil used for cooking.
2. **Sharps** mean any piercing medical device including but not limited to hypodermic needles, suture needles, and scalpels.
3. **Untreated Medical Waste** means any medical waste that has not been bagged in a biomedical waste bag and autoclaved prior to disposal. Examples of untreated medical waste include surgical supplies, bandage material, used gloves, and many other materials clearly associated with a medical practice.
4. **Pharmaceuticals** means any consumable medicine distributed by prescription or over the counter. Examples include pills, liquids, multivitamins, lozenges, and many more.
5. **Florescent Bulbs** means any gas-discharge type lamp. Examples include fluorescent tubes, compact florescent bulbs, and any other type of gas-discharge lamp.
6. **Reusable Items** means any material considered to be reusable by the sort crew. Examples include functional lumber, sellable furniture, and any other item a member of the crew might consider functional or valuable.

## Appendix B: Study Plan

This section presents the study plan as it was written prior to collecting and characterizing waste samples.

### **Selection of Single-family Residential, Multifamily Residential, and Commercial loads**

---

Scheduled collection routes will be classified as single-family, multifamily or commercial loads. Only loads of 85% or greater purity will be eligible for inclusion in the sampling process (i.e., routes that include 85% or more waste from commercial sources will be classified as commercial). In addition, separate procedures will be developed to select loads that are from the SMaRT Station residual waste sector and to select loads that are from the C&D waste sector.

Information has been requested from each City's waste haulers in order to establish lists of single-family, multifamily, and commercial collection routes associated with particular sampling days at each facility. A sampling calendar (i.e., a schedule) will be established based on the availability of single-family, multifamily, and commercial routes on particular days.

For selected sampling days, Cascadia will work with the haulers to develop daily counts of single-family, multifamily, and commercial collection routes. For each sampling day, scheduled single-family, multifamily, and commercial collection vehicles will be chosen at random from eligible vehicles arriving each day. Selection intervals for each category will be generated to allow for random selection across each category based on daily traffic averages and known route data.

Multifamily loads from the city of Sunnyvale are an exception from this sampling plan. In the case of Sunnyvale multifamily, a random site selection process has generated a list of 13 approved sites that will be sampled across the two sampling seasons.

The scalehouse staff will be asked to direct eligible vehicles to the sorting area. Scalehouse staff also will be asked to place a brightly colored SAMPLE placard on the windshield of each selected vehicle, in order to make it visible to the sampling crew (see Appendix C for examples of sample placard). Sample placards will be coded by sample type, jurisdiction, and will be uniquely numbered for sample identification.

To insure proper training of the SMaRT Station scalehouse staff, a member of Cascadia Consulting's staff will be onsite for the first day of sampling. This staff member will be responsible for delivering the proper documentation, coaching SMaRT Station staff, and troubleshooting for the first season of characterization.

The manager of the sampling crew will have a list of the eligible routes and vehicles for each day. When a single-family, multifamily, or commercial load is directed to the sampling crew, the sampling crew manager will verify the vehicle against the list and will verify that the vehicle contains the correct type of waste from the expected jurisdiction. The vehicle's entry on the selection list will be "checked off" to record that it has been sampled. In addition, the sampling

crew manager will write the route number and the waste sector on the sample composition data form.

SMaRT station residuals will be sampled at randomly selected intervals throughout the sampling period. A list of sample times will be provided to the MRF operations manager so that samples may be taken at known intervals throughout the week. The manager of the sampling crew will be responsible for coordinating sample relocation throughout the sampling day. Residual samples will have a target weight of 125 pounds.

**Summary of Expected Roles for Facility Staff in Selecting Single-family, Multifamily, or Commercial loads:**

- For each sampling day, the scalehouse attendant will be given a sampling schedule for single-family, multifamily, commercial routes, and C&D loads to watch for. When a designated vehicle arrives at the scale house, the attendant will inform the driver that the load is to be tipped in a designated area for characterization. The attendant will then write the hauler and transaction or route number on the sampling schedule and place a SAMPLE placard on the vehicle's windshield.
- The scalehouse attendant will continue selecting single-family, multifamily, and commercial collection routes, and C&D loads until the quota for each type has been met. (Quotas will be printed on the *Vehicle Selection Schedule* that is given to the attendant.)
- Sunnyvale multifamily routes will be pre-selected.

## **Selection of C&D Vehicles Loads**

---

For each sampling day, the sampling crew manager will be equipped with a list of the numbers and types of C&D vehicles that must be obtained on that day. The list will not describe individual targeted vehicles, but it will provide daily quotas and a sequence in which to obtain the different types of samples.

As the sampling day progresses, the sampling crew manager will use a copy of the vehicle selection schedule to confirm systematic vehicle selection by the scalehouse. Typically, the list will randomly alternate between calling for one of two types of C&D loads. For example, first call for a self-haul load and then three debris boxes.

The sampling crew manager will proceed through the list one vehicle at a time, each time instructing the scalehouse staff to select and send a vehicle of the designated type. When the characterization team has finished with one vehicle load or when there is enough room in the sampling area to accommodate the tipping of an additional vehicle load, the sampling crew manager will instruct the scalehouse staff to send the next vehicle of the type called for in the list.

C&D loads will be stratified according to two types – commercially hauled C&D drop boxes and C&D loads self-hauled by the public. All C&D loads will be characterized visually.

The specific method for selecting self-haul loads will be as follows:

1. At approximately the beginning of each sampling day, after a sufficient number of single-family, multifamily, and commercial samples have been captured and prepared for sorting, the sampling crew manager will instruct scalehouse staff to identify the next eligible C&D vehicle entering the facility and to direct that vehicle to the sampling crew.
2. The scalehouse staff will query the driver of the next vehicle that arrives, verifying that it meets the following conditions:
  - The vehicle matches one of the two C&D categories.
  - Subsequent loads for each C&D stratum are selected systematically.
3. If the vehicle meets the conditions described in step 2, above, then the scalehouse staff will write the transaction or license number on the vehicle selection schedule and place the associated SAMPLE placard on the vehicle's windshield. The scalehouse staff will then instruct the driver to take the vehicle to the sampling area and tip the load in the designated sampling area.
4. When the selected vehicle arrives at the sampling area, the sampling crew manager will briefly remove the SAMPLE placard from the vehicle's windshield and will note the date and sample number. The sampling crew manager will then place the placard back on the windshield for later collection by the scalehouse staff person. The sampling manager will instruct the driver to weigh out and deliver the sample placard back to the scalehouse staff.
5. C&D loads will be tipped in an area where the visual estimator has adequate room to walk around it and observe it undisturbed for several minutes while recording estimates of waste composition. (The process of characterizing the load is described in the next section.)
6. After tipping the load, the vehicle will go back to the scalehouse with the SAMPLE placard still on its windshield. The scalehouse staff person will instruct the driver to weigh the vehicle out and will collect the SAMPLE placard from the windshield. The scalehouse staff will then write the net weight on the SAMPLE placard.
7. When the characterization process has been finished for the load, or when there is enough room for additional loads to be tipped in the sorting area, the sampling manager will contact the scalehouse staff and instruct them to identify the next load to be directed to the sampling area. The sampling manager will alternate between the two types of C&D loads and will indicate in his instructions to the scale house what the next selected load needs to be.

8. At the end of each sampling day, the sampling crew manager will collect the SAMPLE placards with recorded transaction numbers and net weights from the scalehouse staff.

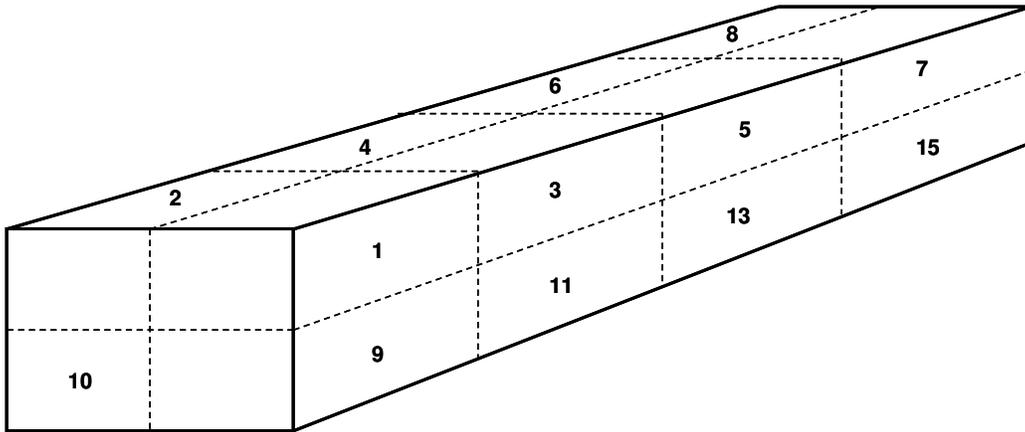
#### **Summary of Expected Roles for Facility Staff in Selecting C&D Loads:**

- The sampling crew manager will communicate to the scalehouse attendant when the sampling crew is ready to receive the first load of C&D waste during a given day. The types of loads that will be called for include:
  - Commercially hauled C&D
  - Self-hauled C&D
- When the next load arrives that matches the type needed by the sampling crew, the scalehouse attendant will stop the vehicle and query the driver to ensure that the waste fits into one of the two C&D categories. If the load meets the selection criteria, then the scalehouse attendant will write the vehicle's license number (or the transaction number) on the SAMPLE placard and will place the placard on the vehicle's windshield and instruct driver to go to the sorting area.
- When the selected vehicle returns to the scalehouse after having tipped its load, the scalehouse attendant will retrieve the SAMPLE placard and will write the net weight on the placard.
- The sampling crew manager will collect the completed placards from the scalehouse attendant at the end of each day.

## **Sampling and Characterization of Hand-sorted Waste Samples**

When a load from a scheduled single-family, multifamily, or commercial route arrives at the sampling area, the sampling crew manager will confirm information about the load, as discussed in the previous section, and the driver will be directed to tip the load in an elongated pile below the operating face of the landfill. At this point, the pile will be divided into an imaginary 16-cell grid, as shown in the diagram below, and a sample of waste consisting of 200 or more pounds of material will be extracted from a randomly selected cell using a loader or other machinery operated by facility staff. Residual loads sampled from the SMaRT Station MRF will consist of samples weighing 125 pounds or more. This material will be placed on a tarp. After the extracted material is deposited on the tarp, the sampling crew manager will estimate the weight of each sample. If judged to be less than 200 pounds, additional material will be pulled from the same cell area until the desired weight is achieved. Samples judged to be excessively heavy will be pared down by removing a homogenous slice of material from the tarp. After the sample has been obtained, the remainder of the load can be removed from the tipping area.

Figure 19. Visual Overlay Showing “Cells” of Material



### Sorting of Waste Samples

Once a sample has been selected, extracted from the load, and placed on a clean tarp, it will be sorted by hand into the prescribed material categories. (Please refer to Appendix A for the complete list and definitions of the material categories.) Materials will be placed in plastic laundry baskets to be weighed and recorded. Members of the sorting crew typically specialize in groups of materials, but each is trained in the full list of components. Each crew person will direct materials to the appropriate specialist.

The sampling crew manager will monitor the homogeneity of the material baskets as they accumulate, rejecting items that may be improperly classified. Open laundry baskets allow the manager to see the material at all times. The manager will also verify the purity of each material as it is weighed, before recording the weight on the *hand-sort sample form*. (Please refer to Appendix C for a copy of the *hand-sort sample form*.)

The waste samples will be sorted by hand until no more than a small amount of homogeneous fine material (“mixed residue”) remains. The overall goal is to sort each sample directly into the material categories in order to reduce the amount of indistinguishable fines or miscellaneous categories.

### Visual Characterization Procedures for C&D Loads

C&D loads will be characterized visually using the method that has been employed by the California Integrated Waste Management Board and using a condensed version of the material list. For these samples, the entire load of each sampled vehicle will be characterized. Once the selected load is placed on the tipping floor, the visual estimator will perform the following steps. Please refer to Appendix C for the *visual sample form*.

The steps for characterizing a load of self-hauled waste will be as follows:

**Step 1: Measure load volume.** After the driver has dumped the load onto the ground, the visual estimator measures the length, width, and height of the load and records the information on the visual sample form.

**Step 2: Note which material classes and materials are present.** The visual estimator walks entirely around the load and indicates on the visual sample form which materials and material classes are present in the load. The ten material classes are *Paper, Glass, Metal, Electronics, Plastic, Other Organics, Construction and Demolition, Household Hazardous Waste, Special Waste* and *Mixed Residue*. An example of a material in the *Paper* material class is *newspaper*.

**Step 3: Estimate composition by volume for each material class.** Beginning with the largest material class present by volume, the visual estimator then estimates the volumetric percentage of this material class and records it on the form. This process is repeated for the next most common material class, and so forth, until the volume percentage of every material class has been estimated. The estimator then calculates the total for this step, ensuring that it totals 100 percent.

**Step 4: Estimate composition by volume for each material within each material class.** The visual estimator considers each material class separately and estimates the percentage of that material class that is made up of each material. For example, the *Metal* material class includes the following materials:

- Aluminum Cans
- Tin/Steel Cans
- Other Nonferrous
- Ferrous Metals

The sum of the percentages for all of the materials in each material class must equal 100 percent. This process will be repeated for the other material classes.

**Step 5: Check and reconcile percentage data.** The visual estimator then makes sure the percentage estimates for the material classes add up to 100 percent. Also, the percentage estimates for the materials within each class must total 100 percent.

## Appendix C: Detailed Sampling Schedule

This appendix presents the planned sampling schedule developed with the study plan.

### March

#### Single-family Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
City of Mountain View	2	1	2	2	1
City of Sunnyvale	2	1	2	1	1

*n=15*

#### Multifamily Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
City of Mountain View	2	2	1	1	1
City of Sunnyvale	2	1	1	1	1

*n=13*

#### Commercial Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
City of Mountain View	2*	2	2*	2*	2
City of Sunnyvale	2*	2	2*	2*	2

\* Sampling on these days will include one commercial packer and one roll-off

*n=20*

#### SMaRT Station Residual Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
SMaRT Station MRF	3	3	3	3	3

*n=15*

#### C&D Visual Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
City of Mountain View	4	4	4	4	4
City of Sunnyvale	4	4	4	4	4

*n=40*

## June

### Single-family Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
City of Mountain View	2	1	2	1	1
City of Sunnyvale	2	1	2	2	1

*n=15*

### Multifamily Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
City of Mountain View	2	1	1	1	1
City of Sunnyvale	2	2	1	1	1

*n=13*

### Commercial Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
City of Mountain View	2*	2	2*	2*	2
City of Sunnyvale	2*	2	2*	2*	2

\* Sampling on these days will include one commercial packer and one roll-off

*n=20*

### SMaRT Station Residual Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
SMaRT Station MRF	3	3	3	3	3

*n=15*

### C&D Visual Sampling Schedule

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
City of Mountain View	4	4	4	4	4
City of Sunnyvale	4	4	4	4	4

*n=40*

## Appendix D: Data Collection Forms

This appendix presents data collection forms used to select loads and routes for sampling, identify loads at the SMaRT Station to be sampled, and record data from hand-sorting or visual characterization.

## Daily Load Selection Sheet

<b>City of Mountain View and City of Sunnyvale Waste Characterization Vehicle Selection Form</b>																															
<b>Site:</b> <u>SMaRT Station</u>	<b>Goal:</b> <u>13</u> Characterizations																														
<b>Date:</b> <u>Monday, June 14</u>	<u>0</u> Visuals																														
<p>Each number represents an expected vehicle based on the available data.</p> <p>Cross off each number as a vehicle representing each category passes through the scalehouse. When a circled number comes up, cross it off and hand the corresponding vehicle a pink placard.</p> <p>Place a number placard in the window of each vehicle chosen for a sample and instruct them to drive to the South Compactor Building where they will be met by the sorting supervisor.</p>																															
Single Family (SF)																															
<b>Recology (MV):</b> 1 2 <b>3</b> 4 5 Total: 1	<b>Specialty (SV):</b> 1 2 3 <b>4</b> 5 6 7 8 <b>9</b> 10 11 12 13 Total: 2																														
Multifamily (MF)																															
<b>Recology (MV):</b> Route 18 Route 21 Total: 2	<b>Specialty (SV):</b> Special Route (collect two samples) Total: 1																														
Commercial (Com)																															
<b>Recology (MV):</b> Packer 1 2 3 4 <b>5</b> 6 7 8 Rolloff 1 2 3 4 5 6 <b>7</b> 8 9 10 11 12 13 14 Total: 2	<b>Specialty (SV):</b> Packer 1 2 <b>3</b> 4 5 6 Rolloff 1 2 3 4 5 6 7 8 9 10 <b>11</b> 12 13 14 15 16 17 18 19 20 21 22 23 Total: 2																														
Residuals (R)																															
<b>SMaRT Station:</b> <b>1 2 3</b> Total: 3																															
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Tag</th> <th>Net Weight</th> </tr> </thead> <tbody> <tr><td>Mount. View SF-1</td><td></td></tr> <tr><td>Mount. View MF-1</td><td></td></tr> <tr><td>Mount. View MF-2</td><td></td></tr> <tr><td>Mount. View Com-1</td><td></td></tr> <tr><td>Mount. View Com-2</td><td></td></tr> <tr><td>Sunnyvale SF-1</td><td></td></tr> <tr><td>Sunnyvale SF-2</td><td></td></tr> <tr><td>Sunnyvale MF-1</td><td></td></tr> <tr><td>Sunnyvale MF-2</td><td>Same as MF-1</td></tr> <tr><td>Sunnyvale Com-1</td><td></td></tr> <tr><td>Sunnyvale Com-2</td><td></td></tr> <tr><td>SMaRT R-1</td><td></td></tr> <tr><td>SMaRT R-2</td><td></td></tr> <tr><td>SMaRT R-3</td><td></td></tr> </tbody> </table>		Tag	Net Weight	Mount. View SF-1		Mount. View MF-1		Mount. View MF-2		Mount. View Com-1		Mount. View Com-2		Sunnyvale SF-1		Sunnyvale SF-2		Sunnyvale MF-1		Sunnyvale MF-2	Same as MF-1	Sunnyvale Com-1		Sunnyvale Com-2		SMaRT R-1		SMaRT R-2		SMaRT R-3	
Tag	Net Weight																														
Mount. View SF-1																															
Mount. View MF-1																															
Mount. View MF-2																															
Mount. View Com-1																															
Mount. View Com-2																															
Sunnyvale SF-1																															
Sunnyvale SF-2																															
Sunnyvale MF-1																															
Sunnyvale MF-2	Same as MF-1																														
Sunnyvale Com-1																															
Sunnyvale Com-2																															
SMaRT R-1																															
SMaRT R-2																															
SMaRT R-3																															

# Special Route Selection Sheet

**Monday, June 14, 2010**

**Please complete this form and hand to scalehouse as you scale in**

**How to use this form:**

**Step 1:** Collect all of the garbage from a listed site. If you think all of the garbage won't fit in the truck, then skip the site entirely.

**Step 2:** Continue with the other sites on the list until the truck is approaching full (approximately 30 containers). Don't do a "partial collection" for a site. Stop when the truck is approaching full.

**Step 3:** Put a check mark in the box next to the addresses or complexes you collected and note the actual number of containers collected at that location.

**Step 4:** Hand this sheet to the scalehouse attendant as you scale in, ask them to note your net weight on it and have them put it with the rest of the day's study paperwork.

**Scalehouse:**

Truck Number: \_\_\_\_\_

Arrival Time: \_\_\_\_\_

Route #	Order	Bldg. Name or Contact	Street Address	Street Directional	Street Name	Street Type	Customer #	Expected # of Containers	All Containers Collected?	# of Containers Collected	UTLCID	UTSRR	Collection Days
105	54	WEDDELL ARMS	205	W	WEDDELL	DR		1			1736	C1914	M Th
107	75	ASTER PARK	1059		REED	AV		6			47024	D0417	M
												D0419	M
												D0421	M
												D0422	M
												D0430	M
												D0431	M
111	136	H. MANNINA	1331	S	WOLFE	RD		4			11362	C0272	M Th
												C2731	M Th
												C2825	M Th
												C3760	M Th
102	8	BT PROPERTIES	126	W	AHWANEE	AV		3			52882	C0698	M Th
												C0699	M Th
												C0700	M Th
107	83	EVELYN GLEN OWNERS	108-160	S	-160 WOLFE	RD		7			48466	C3565	M Th
												C3609	M Th
												C3634	M Th
												C3648	M Th
												C3659	M Th
												C3663	M Th
102	3	SUTTON PLACE HOA	315		DUNSMJR	TER		4			49704	C0060	M
												C0062	M
												C3390	M
												C3391	M
101	4	CHATEAU SIERRA	540	E	MAUDE	AV A		3			51368	D0068	M
												D0071	M
												D0074	M
102	5	FAIR OAKS 90 H O A	755	N	FAIR OAKS	AV		8			52906	C2340	M
												C3410	M
												D0320	M
												D0321	M
												D0322	M
												D0323	M
												D0336	M
												D3340	M

**Sample Placard**

---

Cell Number: 9

**SUNNYVALE**

**SF - 1**

**6/14/2010**

# Hand-sort Data Entry Sheet

<p><b>PAPER</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>OCC</td><td></td><td></td><td></td></tr> <tr><td>Kraft Bag/Kraft Paper</td><td></td><td></td><td></td></tr> <tr><td>Kraft Grocer Bags</td><td></td><td></td><td></td></tr> <tr><td>Newspaper</td><td></td><td></td><td></td></tr> <tr><td>Other Office Paper</td><td></td><td></td><td></td></tr> <tr><td>Catalogs, Directories, Mags., &amp; Phonebooks</td><td></td><td></td><td></td></tr> <tr><td>Compostable Paper</td><td></td><td></td><td></td></tr> <tr><td>Aseptic Packaging</td><td></td><td></td><td></td></tr> <tr><td>Poly-coated Paper/brd Pack.</td><td></td><td></td><td></td></tr> <tr><td>Other Misc. Paper</td><td></td><td></td><td></td></tr> <tr><td>R/C Paper</td><td></td><td></td><td></td></tr> </table> <p><b>PLASTIC</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>PETE Bottles</td><td></td><td></td><td></td></tr> <tr><td>PETE Food Packaging</td><td></td><td></td><td></td></tr> <tr><td>PETE Non-food Packaging</td><td></td><td></td><td></td></tr> <tr><td>HDPE Containers (&lt;1gal.)</td><td></td><td></td><td></td></tr> <tr><td>HDPE Containers (&gt;1gal.)</td><td></td><td></td><td></td></tr> <tr><td>Misc. Food Service Plastic</td><td></td><td></td><td></td></tr> <tr><td>Misc. Plastic Containers</td><td></td><td></td><td></td></tr> <tr><td>Exp. Polystyrene Food</td><td></td><td></td><td></td></tr> <tr><td>Exp. Polystyrene Other</td><td></td><td></td><td></td></tr> <tr><td>Trash Bags</td><td></td><td></td><td></td></tr> <tr><td>Plastic Grocery Bags</td><td></td><td></td><td></td></tr> <tr><td>Other Merchandise Bags</td><td></td><td></td><td></td></tr> <tr><td>Non-bag Com. &amp; Ind. Pack. Film</td><td></td><td></td><td></td></tr> <tr><td>Film Products</td><td></td><td></td><td></td></tr> <tr><td>Other Film</td><td></td><td></td><td></td></tr> <tr><td>Durable Plastic Items</td><td></td><td></td><td></td></tr> <tr><td>R/C Plastic</td><td></td><td></td><td></td></tr> </table> <p><b>GLASS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Glass Bottles and Conts.</td><td></td><td></td><td></td></tr> <tr><td>Flat Glass</td><td></td><td></td><td></td></tr> <tr><td>R/C Glass</td><td></td><td></td><td></td></tr> </table> <p>Write notes on other side and check here <input type="checkbox"/></p>	OCC				Kraft Bag/Kraft Paper				Kraft Grocer Bags				Newspaper				Other Office Paper				Catalogs, Directories, Mags., & Phonebooks				Compostable Paper				Aseptic Packaging				Poly-coated Paper/brd Pack.				Other Misc. Paper				R/C Paper				PETE Bottles				PETE Food Packaging				PETE Non-food Packaging				HDPE Containers (<1gal.)				HDPE Containers (>1gal.)				Misc. Food Service Plastic				Misc. Plastic Containers				Exp. Polystyrene Food				Exp. Polystyrene Other				Trash Bags				Plastic Grocery Bags				Other Merchandise Bags				Non-bag Com. & Ind. Pack. Film				Film Products				Other Film				Durable Plastic Items				R/C Plastic				Glass Bottles and Conts.				Flat Glass				R/C Glass				<p><b>METAL</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Aluminum Cans</td><td></td><td></td><td></td></tr> <tr><td>Tin/Steel Cans</td><td></td><td></td><td></td></tr> <tr><td>Major Appliances</td><td></td><td></td><td></td></tr> <tr><td>Used Oil Filters</td><td></td><td></td><td></td></tr> <tr><td>Other Ferrous</td><td></td><td></td><td></td></tr> <tr><td>Other Non-ferrous</td><td></td><td></td><td></td></tr> <tr><td>R/C Metal</td><td></td><td></td><td></td></tr> </table> <p><b>OTHER ORGANICS</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Food</td><td></td><td></td><td></td></tr> <tr><td>Leaves &amp; Grass</td><td></td><td></td><td></td></tr> <tr><td>Prunings &amp; Trimmings</td><td></td><td></td><td></td></tr> <tr><td>Branches &amp; Stumps</td><td></td><td></td><td></td></tr> <tr><td>Agricultural Crop Residue</td><td></td><td></td><td></td></tr> <tr><td>Animal Feces</td><td></td><td></td><td></td></tr> <tr><td>Textiles</td><td></td><td></td><td></td></tr> <tr><td>R/C Compostable Organics</td><td></td><td></td><td></td></tr> <tr><td>R/C Non-compostable Organic</td><td></td><td></td><td></td></tr> </table> <p><b>Electronics</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Small Appliances</td><td></td><td></td><td></td></tr> <tr><td>Brown Goods</td><td></td><td></td><td></td></tr> <tr><td>Small Computer-related Electronics</td><td></td><td></td><td></td></tr> <tr><td>Large Computer-related Electronics</td><td></td><td></td><td></td></tr> <tr><td>Other Consumer Electronics</td><td></td><td></td><td></td></tr> <tr><td>CRT Televisions &amp; Monitors</td><td></td><td></td><td></td></tr> </table> <p><b>Special Waste</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Ash</td><td></td><td></td><td></td></tr> <tr><td>Kitty Litter</td><td></td><td></td><td></td></tr> <tr><td>Diapers</td><td></td><td></td><td></td></tr> <tr><td>Treated Medical Waste</td><td></td><td></td><td></td></tr> <tr><td>Bulky Items</td><td></td><td></td><td></td></tr> <tr><td>Vehicle &amp; Truck Tires</td><td></td><td></td><td></td></tr> <tr><td>Other Tires</td><td></td><td></td><td></td></tr> <tr><td>R/C Special Waste</td><td></td><td></td><td></td></tr> </table> <p><b>MIXED RESIDUE</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Mixed Residue</td><td></td><td></td><td></td></tr> </table>	Aluminum Cans				Tin/Steel Cans				Major Appliances				Used Oil Filters				Other Ferrous				Other Non-ferrous				R/C Metal				Food				Leaves & Grass				Prunings & Trimmings				Branches & Stumps				Agricultural Crop Residue				Animal Feces				Textiles				R/C Compostable Organics				R/C Non-compostable Organic				Small Appliances				Brown Goods				Small Computer-related Electronics				Large Computer-related Electronics				Other Consumer Electronics				CRT Televisions & Monitors				Ash				Kitty Litter				Diapers				Treated Medical Waste				Bulky Items				Vehicle & Truck Tires				Other Tires				R/C Special Waste				Mixed Residue				<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">Sample ID</td> <td style="width:50%; text-align: center;"><b>PHOTO</b> <input type="checkbox"/></td> </tr> <tr> <td>Date</td> <td style="text-align: center;"><b>TAKEN</b></td> </tr> <tr> <td></td> <td style="text-align: center;"><b>JURISDICTION: (circle)</b> SV    MV</td> </tr> <tr> <td><b>SECTOR: (circle)</b> MF - Multi-Family R - SMaRT Residuals</td> <td>SF - Single Family COM - Commercial</td> </tr> </table> <p><b>HAZARDOUS WASTE</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Paint</td><td></td><td></td><td></td></tr> <tr><td>Veh. &amp; Equip. Fluids</td><td></td><td></td><td></td></tr> <tr><td>Used Oil</td><td></td><td></td><td></td></tr> <tr><td>Lead-acid Batteries</td><td></td><td></td><td></td></tr> <tr><td>Other Batteries</td><td></td><td></td><td></td></tr> <tr><td>R/C Household Waste</td><td></td><td></td><td></td></tr> </table> <p><b>C &amp; D</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Concrete</td><td></td><td></td><td></td></tr> <tr><td>Asphalt Paving</td><td></td><td></td><td></td></tr> <tr><td>Asph. Comp. Shingles</td><td></td><td></td><td></td></tr> <tr><td>Roofing Tar Paper/Felt</td><td></td><td></td><td></td></tr> <tr><td>Roofing Mastic</td><td></td><td></td><td></td></tr> <tr><td>Built-up Roofing</td><td></td><td></td><td></td></tr> <tr><td>Other Asph. Roof Mat.</td><td></td><td></td><td></td></tr> <tr><td>Untreated Dim. Lumber</td><td></td><td></td><td></td></tr> <tr><td>Treated Dim. Luber</td><td></td><td></td><td></td></tr> <tr><td>Untreated Eng. Wood</td><td></td><td></td><td></td></tr> <tr><td>Treated Eng. Wood</td><td></td><td></td><td></td></tr> <tr><td>Pallets and Crates</td><td></td><td></td><td></td></tr> <tr><td>Other Untreated Wood Waste</td><td></td><td></td><td></td></tr> <tr><td>Other Treated Wood Waste</td><td></td><td></td><td></td></tr> <tr><td>Carpet</td><td></td><td></td><td></td></tr> <tr><td>Carpet Padding</td><td></td><td></td><td></td></tr> <tr><td>Clean Gypsum Board</td><td></td><td></td><td></td></tr> <tr><td>Pnt./Demo. Gyp. Board</td><td></td><td></td><td></td></tr> <tr><td>Rock, Soil, and Fines</td><td></td><td></td><td></td></tr> <tr><td>R/C C&amp;D</td><td></td><td></td><td></td></tr> </table>	Sample ID	<b>PHOTO</b> <input type="checkbox"/>	Date	<b>TAKEN</b>		<b>JURISDICTION: (circle)</b> SV    MV	<b>SECTOR: (circle)</b> MF - Multi-Family R - SMaRT Residuals	SF - Single Family COM - Commercial	Paint				Veh. & Equip. Fluids				Used Oil				Lead-acid Batteries				Other Batteries				R/C Household Waste				Concrete				Asphalt Paving				Asph. Comp. Shingles				Roofing Tar Paper/Felt				Roofing Mastic				Built-up Roofing				Other Asph. Roof Mat.				Untreated Dim. Lumber				Treated Dim. Luber				Untreated Eng. Wood				Treated Eng. Wood				Pallets and Crates				Other Untreated Wood Waste				Other Treated Wood Waste				Carpet				Carpet Padding				Clean Gypsum Board				Pnt./Demo. Gyp. Board				Rock, Soil, and Fines				R/C C&D			
OCC																																																																																																																																																																																																																																																																																																																																																																										
Kraft Bag/Kraft Paper																																																																																																																																																																																																																																																																																																																																																																										
Kraft Grocer Bags																																																																																																																																																																																																																																																																																																																																																																										
Newspaper																																																																																																																																																																																																																																																																																																																																																																										
Other Office Paper																																																																																																																																																																																																																																																																																																																																																																										
Catalogs, Directories, Mags., & Phonebooks																																																																																																																																																																																																																																																																																																																																																																										
Compostable Paper																																																																																																																																																																																																																																																																																																																																																																										
Aseptic Packaging																																																																																																																																																																																																																																																																																																																																																																										
Poly-coated Paper/brd Pack.																																																																																																																																																																																																																																																																																																																																																																										
Other Misc. Paper																																																																																																																																																																																																																																																																																																																																																																										
R/C Paper																																																																																																																																																																																																																																																																																																																																																																										
PETE Bottles																																																																																																																																																																																																																																																																																																																																																																										
PETE Food Packaging																																																																																																																																																																																																																																																																																																																																																																										
PETE Non-food Packaging																																																																																																																																																																																																																																																																																																																																																																										
HDPE Containers (<1gal.)																																																																																																																																																																																																																																																																																																																																																																										
HDPE Containers (>1gal.)																																																																																																																																																																																																																																																																																																																																																																										
Misc. Food Service Plastic																																																																																																																																																																																																																																																																																																																																																																										
Misc. Plastic Containers																																																																																																																																																																																																																																																																																																																																																																										
Exp. Polystyrene Food																																																																																																																																																																																																																																																																																																																																																																										
Exp. Polystyrene Other																																																																																																																																																																																																																																																																																																																																																																										
Trash Bags																																																																																																																																																																																																																																																																																																																																																																										
Plastic Grocery Bags																																																																																																																																																																																																																																																																																																																																																																										
Other Merchandise Bags																																																																																																																																																																																																																																																																																																																																																																										
Non-bag Com. & Ind. Pack. Film																																																																																																																																																																																																																																																																																																																																																																										
Film Products																																																																																																																																																																																																																																																																																																																																																																										
Other Film																																																																																																																																																																																																																																																																																																																																																																										
Durable Plastic Items																																																																																																																																																																																																																																																																																																																																																																										
R/C Plastic																																																																																																																																																																																																																																																																																																																																																																										
Glass Bottles and Conts.																																																																																																																																																																																																																																																																																																																																																																										
Flat Glass																																																																																																																																																																																																																																																																																																																																																																										
R/C Glass																																																																																																																																																																																																																																																																																																																																																																										
Aluminum Cans																																																																																																																																																																																																																																																																																																																																																																										
Tin/Steel Cans																																																																																																																																																																																																																																																																																																																																																																										
Major Appliances																																																																																																																																																																																																																																																																																																																																																																										
Used Oil Filters																																																																																																																																																																																																																																																																																																																																																																										
Other Ferrous																																																																																																																																																																																																																																																																																																																																																																										
Other Non-ferrous																																																																																																																																																																																																																																																																																																																																																																										
R/C Metal																																																																																																																																																																																																																																																																																																																																																																										
Food																																																																																																																																																																																																																																																																																																																																																																										
Leaves & Grass																																																																																																																																																																																																																																																																																																																																																																										
Prunings & Trimmings																																																																																																																																																																																																																																																																																																																																																																										
Branches & Stumps																																																																																																																																																																																																																																																																																																																																																																										
Agricultural Crop Residue																																																																																																																																																																																																																																																																																																																																																																										
Animal Feces																																																																																																																																																																																																																																																																																																																																																																										
Textiles																																																																																																																																																																																																																																																																																																																																																																										
R/C Compostable Organics																																																																																																																																																																																																																																																																																																																																																																										
R/C Non-compostable Organic																																																																																																																																																																																																																																																																																																																																																																										
Small Appliances																																																																																																																																																																																																																																																																																																																																																																										
Brown Goods																																																																																																																																																																																																																																																																																																																																																																										
Small Computer-related Electronics																																																																																																																																																																																																																																																																																																																																																																										
Large Computer-related Electronics																																																																																																																																																																																																																																																																																																																																																																										
Other Consumer Electronics																																																																																																																																																																																																																																																																																																																																																																										
CRT Televisions & Monitors																																																																																																																																																																																																																																																																																																																																																																										
Ash																																																																																																																																																																																																																																																																																																																																																																										
Kitty Litter																																																																																																																																																																																																																																																																																																																																																																										
Diapers																																																																																																																																																																																																																																																																																																																																																																										
Treated Medical Waste																																																																																																																																																																																																																																																																																																																																																																										
Bulky Items																																																																																																																																																																																																																																																																																																																																																																										
Vehicle & Truck Tires																																																																																																																																																																																																																																																																																																																																																																										
Other Tires																																																																																																																																																																																																																																																																																																																																																																										
R/C Special Waste																																																																																																																																																																																																																																																																																																																																																																										
Mixed Residue																																																																																																																																																																																																																																																																																																																																																																										
Sample ID	<b>PHOTO</b> <input type="checkbox"/>																																																																																																																																																																																																																																																																																																																																																																									
Date	<b>TAKEN</b>																																																																																																																																																																																																																																																																																																																																																																									
	<b>JURISDICTION: (circle)</b> SV    MV																																																																																																																																																																																																																																																																																																																																																																									
<b>SECTOR: (circle)</b> MF - Multi-Family R - SMaRT Residuals	SF - Single Family COM - Commercial																																																																																																																																																																																																																																																																																																																																																																									
Paint																																																																																																																																																																																																																																																																																																																																																																										
Veh. & Equip. Fluids																																																																																																																																																																																																																																																																																																																																																																										
Used Oil																																																																																																																																																																																																																																																																																																																																																																										
Lead-acid Batteries																																																																																																																																																																																																																																																																																																																																																																										
Other Batteries																																																																																																																																																																																																																																																																																																																																																																										
R/C Household Waste																																																																																																																																																																																																																																																																																																																																																																										
Concrete																																																																																																																																																																																																																																																																																																																																																																										
Asphalt Paving																																																																																																																																																																																																																																																																																																																																																																										
Asph. Comp. Shingles																																																																																																																																																																																																																																																																																																																																																																										
Roofing Tar Paper/Felt																																																																																																																																																																																																																																																																																																																																																																										
Roofing Mastic																																																																																																																																																																																																																																																																																																																																																																										
Built-up Roofing																																																																																																																																																																																																																																																																																																																																																																										
Other Asph. Roof Mat.																																																																																																																																																																																																																																																																																																																																																																										
Untreated Dim. Lumber																																																																																																																																																																																																																																																																																																																																																																										
Treated Dim. Luber																																																																																																																																																																																																																																																																																																																																																																										
Untreated Eng. Wood																																																																																																																																																																																																																																																																																																																																																																										
Treated Eng. Wood																																																																																																																																																																																																																																																																																																																																																																										
Pallets and Crates																																																																																																																																																																																																																																																																																																																																																																										
Other Untreated Wood Waste																																																																																																																																																																																																																																																																																																																																																																										
Other Treated Wood Waste																																																																																																																																																																																																																																																																																																																																																																										
Carpet																																																																																																																																																																																																																																																																																																																																																																										
Carpet Padding																																																																																																																																																																																																																																																																																																																																																																										
Clean Gypsum Board																																																																																																																																																																																																																																																																																																																																																																										
Pnt./Demo. Gyp. Board																																																																																																																																																																																																																																																																																																																																																																										
Rock, Soil, and Fines																																																																																																																																																																																																																																																																																																																																																																										
R/C C&D																																																																																																																																																																																																																																																																																																																																																																										

Fluorescent bulbs  
 Pharmaceuticals  
 Untreated med. waste  
 Sharps  
 Reuseables  
 Cooking oil

# Visual Characterization Data Entry Sheet

<input type="checkbox"/> <b>PAPER: _____%</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td>OCC</td></tr> <tr><td> </td><td>Kraft Bag/Kraft Paper</td></tr> <tr><td> </td><td>Kraft Grocer Bags</td></tr> <tr><td> </td><td>Newspaper</td></tr> <tr><td> </td><td>Other Office Paper</td></tr> <tr><td> </td><td>Catalogs, Directories, Mags.,</td></tr> <tr><td> </td><td>Compostable Paper</td></tr> <tr><td> </td><td>Aseptic Packaging</td></tr> <tr><td> </td><td>Poly-coated Paper/brd Pack.</td></tr> <tr><td> </td><td>Other Misc. Paper</td></tr> <tr><td> </td><td>R/C Paper</td></tr> <tr><td> </td><td><b>Subtotal %</b></td></tr> </table>		OCC		Kraft Bag/Kraft Paper		Kraft Grocer Bags		Newspaper		Other Office Paper		Catalogs, Directories, Mags.,		Compostable Paper		Aseptic Packaging		Poly-coated Paper/brd Pack.		Other Misc. Paper		R/C Paper		<b>Subtotal %</b>	<input type="checkbox"/> <b>PLASTIC: _____%</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td>PETE Bottles</td></tr> <tr><td> </td><td>PETE Food Packaging</td></tr> <tr><td> </td><td>PETE Non-food Packaging</td></tr> <tr><td> </td><td>HDPE Containers (&lt;1gal.)</td></tr> <tr><td> </td><td>HDPE Containers (&gt;1gal.)</td></tr> <tr><td> </td><td>Misc. Food Service Plastic</td></tr> <tr><td> </td><td>Misc. Plastic Containers</td></tr> <tr><td> </td><td>Exp. Polystyrene Food Pack.</td></tr> <tr><td> </td><td>Exp. Polystyrene Other</td></tr> <tr><td> </td><td>Trash Bags</td></tr> <tr><td> </td><td>Plastic Grocery Bags</td></tr> <tr><td> </td><td>Other Merchandise Bags</td></tr> <tr><td> </td><td>Non-bag Com. &amp; Ind. Pack. Film</td></tr> <tr><td> </td><td>Film Products</td></tr> <tr><td> </td><td>Other Film</td></tr> <tr><td> </td><td>Durable Plastic Items</td></tr> <tr><td> </td><td>R/C Plastic</td></tr> <tr><td> </td><td><b>Subtotal %</b></td></tr> </table>		PETE Bottles		PETE Food Packaging		PETE Non-food Packaging		HDPE Containers (<1gal.)		HDPE Containers (>1gal.)		Misc. Food Service Plastic		Misc. Plastic Containers		Exp. Polystyrene Food Pack.		Exp. Polystyrene Other		Trash Bags		Plastic Grocery Bags		Other Merchandise Bags		Non-bag Com. & Ind. Pack. Film		Film Products		Other Film		Durable Plastic Items		R/C Plastic		<b>Subtotal %</b>	<input type="checkbox"/> <b>OTHER ORGANICS: _____%</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td>Food</td></tr> <tr><td> </td><td>Leaves &amp; Grass</td></tr> <tr><td> </td><td>Prunings &amp; Trimmings</td></tr> <tr><td> </td><td>Branches &amp; Stumps</td></tr> <tr><td> </td><td>Agricultural Crop Residue</td></tr> <tr><td> </td><td>Animal Feces</td></tr> <tr><td> </td><td>Textiles</td></tr> <tr><td> </td><td>R/C Compostable Organics</td></tr> <tr><td> </td><td>R/C Non-compostable Organic</td></tr> <tr><td> </td><td><b>Subtotal %</b></td></tr> </table>		Food		Leaves & Grass		Prunings & Trimmings		Branches & Stumps		Agricultural Crop Residue		Animal Feces		Textiles		R/C Compostable Organics		R/C Non-compostable Organic		<b>Subtotal %</b>	<input type="checkbox"/> <b>C &amp; D: _____%</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td>Concrete</td></tr> <tr><td> </td><td>Asphalt Paving</td></tr> <tr><td> </td><td>Asph. Comp. Shingles</td></tr> <tr><td> </td><td>Roofing Tar Paper/Felt</td></tr> <tr><td> </td><td>Roofing Mastic</td></tr> <tr><td> </td><td>Built-up Roofing</td></tr> <tr><td> </td><td>Other Asph. Roof Mat.</td></tr> <tr><td> </td><td>Untreated Dim. Lumber</td></tr> <tr><td> </td><td>Treated Dim. Luber</td></tr> <tr><td> </td><td>Untreated Eng. Wood</td></tr> <tr><td> </td><td>Treated Eng. Wood</td></tr> <tr><td> </td><td>Pallets and Crates</td></tr> <tr><td> </td><td>Other Untreated Wood Waste</td></tr> <tr><td> </td><td>Other Treated Wood Waste</td></tr> <tr><td> </td><td>Carpet</td></tr> <tr><td> </td><td>Carpet Padding</td></tr> <tr><td> </td><td>Clean Gypsum Board</td></tr> <tr><td> </td><td>Pnt./Demo. Gyp. Board</td></tr> <tr><td> </td><td>Rock, Soil, and Fines</td></tr> <tr><td> </td><td>R/C C&amp;D</td></tr> <tr><td> </td><td><b>Subtotal %</b></td></tr> </table>		Concrete		Asphalt Paving		Asph. Comp. Shingles		Roofing Tar Paper/Felt		Roofing Mastic		Built-up Roofing		Other Asph. Roof Mat.		Untreated Dim. Lumber		Treated Dim. Luber		Untreated Eng. Wood		Treated Eng. Wood		Pallets and Crates		Other Untreated Wood Waste		Other Treated Wood Waste		Carpet		Carpet Padding		Clean Gypsum Board		Pnt./Demo. Gyp. Board		Rock, Soil, and Fines		R/C C&D		<b>Subtotal %</b>
	OCC																																																																																																																												
	Kraft Bag/Kraft Paper																																																																																																																												
	Kraft Grocer Bags																																																																																																																												
	Newspaper																																																																																																																												
	Other Office Paper																																																																																																																												
	Catalogs, Directories, Mags.,																																																																																																																												
	Compostable Paper																																																																																																																												
	Aseptic Packaging																																																																																																																												
	Poly-coated Paper/brd Pack.																																																																																																																												
	Other Misc. Paper																																																																																																																												
	R/C Paper																																																																																																																												
	<b>Subtotal %</b>																																																																																																																												
	PETE Bottles																																																																																																																												
	PETE Food Packaging																																																																																																																												
	PETE Non-food Packaging																																																																																																																												
	HDPE Containers (<1gal.)																																																																																																																												
	HDPE Containers (>1gal.)																																																																																																																												
	Misc. Food Service Plastic																																																																																																																												
	Misc. Plastic Containers																																																																																																																												
	Exp. Polystyrene Food Pack.																																																																																																																												
	Exp. Polystyrene Other																																																																																																																												
	Trash Bags																																																																																																																												
	Plastic Grocery Bags																																																																																																																												
	Other Merchandise Bags																																																																																																																												
	Non-bag Com. & Ind. Pack. Film																																																																																																																												
	Film Products																																																																																																																												
	Other Film																																																																																																																												
	Durable Plastic Items																																																																																																																												
	R/C Plastic																																																																																																																												
	<b>Subtotal %</b>																																																																																																																												
	Food																																																																																																																												
	Leaves & Grass																																																																																																																												
	Prunings & Trimmings																																																																																																																												
	Branches & Stumps																																																																																																																												
	Agricultural Crop Residue																																																																																																																												
	Animal Feces																																																																																																																												
	Textiles																																																																																																																												
	R/C Compostable Organics																																																																																																																												
	R/C Non-compostable Organic																																																																																																																												
	<b>Subtotal %</b>																																																																																																																												
	Concrete																																																																																																																												
	Asphalt Paving																																																																																																																												
	Asph. Comp. Shingles																																																																																																																												
	Roofing Tar Paper/Felt																																																																																																																												
	Roofing Mastic																																																																																																																												
	Built-up Roofing																																																																																																																												
	Other Asph. Roof Mat.																																																																																																																												
	Untreated Dim. Lumber																																																																																																																												
	Treated Dim. Luber																																																																																																																												
	Untreated Eng. Wood																																																																																																																												
	Treated Eng. Wood																																																																																																																												
	Pallets and Crates																																																																																																																												
	Other Untreated Wood Waste																																																																																																																												
	Other Treated Wood Waste																																																																																																																												
	Carpet																																																																																																																												
	Carpet Padding																																																																																																																												
	Clean Gypsum Board																																																																																																																												
	Pnt./Demo. Gyp. Board																																																																																																																												
	Rock, Soil, and Fines																																																																																																																												
	R/C C&D																																																																																																																												
	<b>Subtotal %</b>																																																																																																																												
<input type="checkbox"/> <b>GLASS: _____%</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td>Glass Bottles and Conts.</td></tr> <tr><td> </td><td>Flat Glass</td></tr> <tr><td> </td><td>R/C Glass</td></tr> <tr><td> </td><td><b>Subtotal %</b></td></tr> </table>		Glass Bottles and Conts.		Flat Glass		R/C Glass		<b>Subtotal %</b>	<input type="checkbox"/> <b>E-Waste: _____%</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td>Small Appliances</td></tr> <tr><td> </td><td>Brown Goods</td></tr> <tr><td> </td><td>Small Computer-related Electronics</td></tr> <tr><td> </td><td>Large Computer-related Electronics</td></tr> <tr><td> </td><td>Other Consumer Electronics</td></tr> <tr><td> </td><td>CRT Televisions &amp; Monitors</td></tr> <tr><td> </td><td><b>Subtotal %</b></td></tr> </table>		Small Appliances		Brown Goods		Small Computer-related Electronics		Large Computer-related Electronics		Other Consumer Electronics		CRT Televisions & Monitors		<b>Subtotal %</b>	<input type="checkbox"/> <b>HHW: _____%</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td>Paint</td></tr> <tr><td> </td><td>Veh. &amp; Equip. Fluids</td></tr> <tr><td> </td><td>Used Oil</td></tr> <tr><td> </td><td>Lead-acid Batteries</td></tr> <tr><td> </td><td>Other Batteries</td></tr> <tr><td> </td><td>R/C Household Waste</td></tr> <tr><td> </td><td><b>Subtotal %</b></td></tr> </table>		Paint		Veh. & Equip. Fluids		Used Oil		Lead-acid Batteries		Other Batteries		R/C Household Waste		<b>Subtotal %</b>	<input type="checkbox"/> <b>Special: _____%</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td>Ash</td></tr> <tr><td> </td><td>Kitty Litter</td></tr> <tr><td> </td><td>Diapers</td></tr> <tr><td> </td><td>Treated Medical Waste</td></tr> <tr><td> </td><td>Bulky Items</td></tr> <tr><td> </td><td>Vehicle &amp; Truck Tires</td></tr> <tr><td> </td><td>Other Tires</td></tr> <tr><td> </td><td>R/C Special Waste</td></tr> <tr><td> </td><td><b>Subtotal %</b></td></tr> </table>		Ash		Kitty Litter		Diapers		Treated Medical Waste		Bulky Items		Vehicle & Truck Tires		Other Tires		R/C Special Waste		<b>Subtotal %</b>	<input type="checkbox"/> <b>MIXED RES.: _____%</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td>Mixed Residue</td></tr> <tr><td> </td><td><b>Subtotal %</b></td></tr> </table>		Mixed Residue		<b>Subtotal %</b>																																																															
	Glass Bottles and Conts.																																																																																																																												
	Flat Glass																																																																																																																												
	R/C Glass																																																																																																																												
	<b>Subtotal %</b>																																																																																																																												
	Small Appliances																																																																																																																												
	Brown Goods																																																																																																																												
	Small Computer-related Electronics																																																																																																																												
	Large Computer-related Electronics																																																																																																																												
	Other Consumer Electronics																																																																																																																												
	CRT Televisions & Monitors																																																																																																																												
	<b>Subtotal %</b>																																																																																																																												
	Paint																																																																																																																												
	Veh. & Equip. Fluids																																																																																																																												
	Used Oil																																																																																																																												
	Lead-acid Batteries																																																																																																																												
	Other Batteries																																																																																																																												
	R/C Household Waste																																																																																																																												
	<b>Subtotal %</b>																																																																																																																												
	Ash																																																																																																																												
	Kitty Litter																																																																																																																												
	Diapers																																																																																																																												
	Treated Medical Waste																																																																																																																												
	Bulky Items																																																																																																																												
	Vehicle & Truck Tires																																																																																																																												
	Other Tires																																																																																																																												
	R/C Special Waste																																																																																																																												
	<b>Subtotal %</b>																																																																																																																												
	Mixed Residue																																																																																																																												
	<b>Subtotal %</b>																																																																																																																												
<input type="checkbox"/> <b>Est. % of All Wood that is Salvageable _____%</b>																																																																																																																													
<input type="checkbox"/> <b>Grand Total: _____%</b> (must equal 100%)																																																																																																																													
Write notes on back side of sheet and check here <input type="checkbox"/>																																																																																																																													
___ Cooking oil   ___ Reuseables   ___ Sharps   ___ Untreated med. waste   ___ Pharmaceuticals   ___ Fluorescent bulbs																																																																																																																													