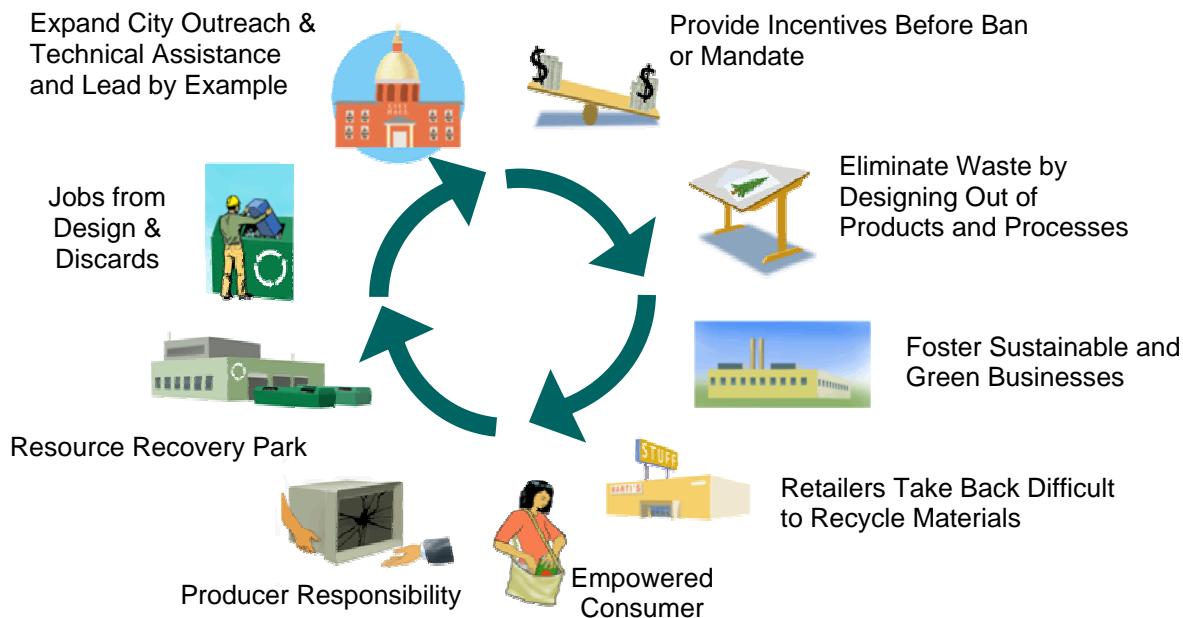




Zero Waste Strategic Plan



© Copyright Eco-Cycle, 2004 with text modifications by permission.
www.ecocycle.org/zerowaste/zwsystem

October 2005

Palo Alto Zero Waste Strategic Plan

October 2005

**Prepared for the City of Palo Alto, California and
the Palo Alto Zero Waste Task Force by:**

**Gary Liss & Associates
4395 Gold Trail Way
Loomis, California 95650-8929
916-652-7850
gary@garyliss.com, www.garyliss.com**

Associates:

**Ruth Abbe, Brown, Vence & Associates
Richard V. Anthony, Richard Anthony Associates
Arthur Robin Boone, Shannon Carman,
Laurie Fenwood, Kris Holstrom, Antoinette Stein
Neil Seldman, Institute for Local Self-Reliance**

Palo Alto Zero Waste Strategic Plan

Table of Contents

Executive Summary - Palo Alto Zero Waste Strategic Plan.....	1
Introduction.....	1
Current Situation.....	1
Challenges facing Zero Waste Adoption	2
Premises of a Zero Waste Approach.....	2
The Zero Waste Vision	3
The Zero Waste Strategic Plan	4
Conclusion	5
1. Introduction.....	6
1.1 What is Zero Waste?.....	6
1.2 The Hierarchy of Zero Waste	7
1.3 Zero Waste Strategic Plan Purpose and Objectives.....	8
1.4 Community involvement with Strategic Plan.....	8
2. Background and Analysis	9
2.1 How much waste is there?	9
2.2 Where does Palo Alto's waste come from?	11
2.3 Where does Palo Alto's waste go?.....	12
2.5 Priority Service Needs	14
2.6 Major Issues and Events Impacting on Design of Zero Waste System	14
2.7 Economics of Zero Waste.....	16
2.8 Funding for Zero Waste	18
3. Recommendations.....	19
3.1 Zero Waste Goal	20
3.2 Zero Waste Objectives and Strategies	20
Appendix A – Palo Alto Zero Waste Task Force Members	29
Appendix B – Summary of 1997 Waste Generation Study Data.....	30
Appendix C – Service Needs by Type of Material	34
Appendix D – Results of Task Force Discussions.....	38
Appendix E – Summary Of Zero Waste Community Surveys 2005	41
Appendix F - Economic Analysis of Zero Waste Strategic Plan.....	44

Executive Summary - Palo Alto Zero Waste Strategic Plan

To: The Palo Alto City Council

From: The Palo Alto Zero Waste Task Force

Re: ***Executive Summary- Palo Alto Zero Waste Strategic Plan***

This summary provides an overview of the current disposition of Palo Alto generated solid wastes, associated challenges that face our community, and key recommendations in the form of a waste reduction strategy, intended to help guide City officials in long range policy formation.

Introduction

Late last year, the City Council made the adoption of “Zero Waste” a guiding principle to create a framework for defining how Palo Alto solid wastes will be managed in the future. Zero Waste is theoretically simple: “a systems approach to avoid the creation of waste in the first place.” In practice, it is far more difficult to achieve. The notion of Zero Waste challenges our basic assumptions, business practices, and day-to-day behavior in making decisions about what we buy and consume, and how we handle the materials and by products left over from those decisions.

A Zero Waste strategy is timely for Palo Alto. The State has only recently set 2025 as a target date for achieving zero waste statewide. Other regional municipalities have either established such goals or are in the process of adopting them. Fitting to local needs, the reduction of waste aligns with the imminent loss of our own local landfill in 2011 and the invariable rise in cost in waste hauling rates to other sites if we choose to do nothing.

Current Situation

In 2003, it is estimated that approximately 166,548 tons of materials flowed through Palo Alto. More than half of that was diverted from landfill through various recovery programs.

When waste is disposed of, it has three destinations: slightly more than half goes to the Kirby Canyon landfill, a third to the Palo Alto Landfill, and about ten percent to other disposal sites.

It is currently estimated that most of the waste generation is from businesses and multi-family (58%), followed by single family residential (18%), then city and school operations (17%), and the remaining hauled to the Palo Alto landfill by residents and businesses (6%).

Palo Alto’s city sponsored recycling programs handle approximately 54 percent of the diverted waste, while non-city commercial recyclers, typically retained by businesses, handle 46 percent of the diverted waste by helping businesses to eliminate that waste, or by reuse, recycling or composting programs. Generally, what ends up in the landfill is there because there is not a service to recover that material.

Challenges facing Zero Waste Adoption

As the task force considered Zero Waste adoption, several challenges quickly surfaced.

- ◆ **The “Land Use” Challenge.** Any facilities for Zero Waste should not use park land.
- ◆ **The “Contracts” Challenge.** The city’s contract with Waste Management Inc., to use the Kirby Canyon landfill obligates the city to provide a minimum tonnage or the city must pay regardless of whether the waste is delivered or not. A similar tonnage commitment exists at the Sunnyvale Materials and Recovery Transfer station (SMaRT) in Sunnyvale.
- ◆ **A Challenge Greater than Palo Alto.** Waste generation is designed into the economy, and the city is limited in its capacity to bring about change in consumer habits and business practices.
- ◆ **The “Risk Assessment” Challenge.** The way in which environmental risks are calculated today understates the potential for future unknown costs to remediate potential releases from degrading landfill sites that the City has a growing stake in.
- ◆ **The “Regional Capacity” Challenge.** Serious capacity limitations exist in necessary processing facilities, within reasonable proximity to Palo Alto, such as food waste composting. This will be exacerbated as demands from other communities that also adopt waste reduction targets are brought to bear.

Premises of a Zero Waste Approach

Several working assumptions, or premises, have emerged as the Task Force’s basis to guide in the development of a zero waste strategy. These do not form the policy, but represent a basic approach of task force members, drawn from our discussions.

- ◆ **Encourage Non-City Waste Diversion.** Given that non-city managed service providers now perform almost half of the waste diversion, it is widely felt that these programs are effective. The City should encourage these programs to flourish as their success relieves the City of the burden of directly funding programs for those materials.
- ◆ **Focus on Upstream Purchasing as well as Downstream Recycling.** Zero waste as a comprehensive approach, is distinguished from traditional recycling in that it systematically addresses not just the diversion of materials downstream but also what causes waste in the first place. The City might encourage smarter consumption without overstepping its role in governance so long as it stays clear of discriminatory policies that could be interpreted as limiting consumer choice or exercising unfair restraint of trade.

The city’s educational programs should address this aspect in addition to maximizing recycling choices.

- ◆ **Begin with Recognition and Incentives, then finally Ban.** After services are created, to compel participation the Task Force believes that recognition and rate based incentives should be applied before bans are contemplated. Recognition of notable performance should include publicizing those businesses that achieve zero waste goals. Incentives include judicious use of the refuse rate collection structure, or rebates similar to those applied by the utility. Bans may be needed for materials like polystyrene packaging for “to-go” food where recyclable substitutes exist at an equivalent price.
- ◆ **Develop Services for Each Waste Fraction, and then Improve the Services.** Services to provide for the recovery of materials should be identified and developed to reach all sectors, including single-family, multi-family residential, commercial, and industrial. Ultimately the quality and efficiency of the recovery effort should improve over time.
- ◆ **Apply a Regional Approach.** Palo Alto’s tradition has been to have many of its recovery services within its boundaries. Given land use constraints, this is not likely to continue. Palo Alto should strive to create new services in the region and develop stronger regional alliances.
- ◆ **Make Zero Waste the Solid Waste Management Plan.** The Task Force’s efforts began with the theory that Zero Waste was an adjunct to the City’s program. Along the way, it became clear that Zero Waste permeates all elements of waste management from facilities to disposal. The interrelationship is demonstrated by the “contracts” challenge and incorporation of the programs will assure that contracts involving minimum tonnages are drafted to allow for successful waste reduction.

The Zero Waste Vision

Zero Waste seeks to eliminate waste wherever possible by encouraging a systems approach that avoids the creation of waste in the first place. A Zero Waste systems approach turns material outputs from one process into resources for other processes.

The Zero Waste Strategic Plan

The Zero Waste Strategic Plan should guide the City's solid waste management programs and the way future waste management decisions are made. City programs, policies, rates, and financial and contractual commitments should be adjusted to help achieve the Zero Waste goal as follows:

- ◆ **Encourage All Sectors to Implement Zero Waste.** Zero waste programs should be configured to service all generator sectors including residential, commercial, industrial, and government. For example a "commercial" program must differentiate between restaurant zero waste and grocery stores, as residential must differentiate between multi-family and single family. Encouragement should initially be by education, then economic incentives with the use of a rate based system, and then finally bans and mandates.
- ◆ **Develop Infrastructure Beyond Recycling.** Palo Alto now relies upon regional infrastructure such as the SMaRT station and the Kirby Canyon landfill. Beyond 2011, the need for local infrastructure is lessened so long as the City promotes both expanded independent service provider programs coupled with City contracted collections to aggressively pursue a much higher diversion of recyclable materials. Future well-placed infrastructure could complement regional programs by providing services that do not exist today. Given the existing success of non-city recycling, a Resource Recovery Park could offer a major source of opportunity for new businesses to emerge that provide specialized reuse or recycling services. Current examples are the businesses and nonprofit organizations emerging for the reuse of used building materials.
- ◆ **Lead by Example and Advocate Zero Waste.** City operations are a major waste generator. The City could demonstrate its commitment to the policy through changes in its own operations, such as moving more aggressively towards reducing paper in its operations. The City generates large quantities of waste through capital improvement and maintenance projects. More extensive reuse and recycling of all waste could show business and residents the way.
- ◆ **Update Waste Data and Develop Zero Waste Operational Plan.** The Strategic Plan was developed with best estimates of waste generation data; however the data was five to ten years old. Any zero waste programs should have effective metrics, and regular collection of waste data to guide program development. The Strategic Plan is meant to help guide City officials in long-range policy formation. A Zero Waste Operational Plan (ZWOP) will be developed next that will provide descriptions of the program elements that spring from this strategy. It is expected that the ZWOP would provide a description, budget and facility requirements, consideration of whether the program is City or non-City operated, and the education and incentives to secure adoption. While the ZWOP may need to consider new facility locations, given the closure of the Palo Alto Landfill, an ongoing assessment of the effectiveness of non-

City programs and the utilization of regional programs may ease some of the difficult land use choices.

Conclusion

City consideration of a zero waste policy is timely but also critical to addressing its changing priorities to convert its lands to park use. Palo Alto must either embark on a “capacity replacement strategy” to service its ongoing locally generated waste stream or alternatively, reduce its dependency on landfilling by addressing reductions at the source of generation, with residents and businesses.

The economic consequences of taking policy action now are both real and compelling. The avoided costs associated with an annual community wide reduction of 26,000 tons of garbage between now and 2011, as the basis for achieving a 73% diversion rate, is projected to be approximately \$2.1 million/year. It is estimated that on average, a small business that pays \$2,000/month in fees today, in going from 57% to 73% diversion by 2011, can reasonably expect to save on the order of \$300/month.

Garbage collection and disposal costs, on the other hand, will continue to rise. Long-term landfill capacity within reasonable hauling distance is not guaranteed, putting the community at risk to significantly higher rates in the future. The projected cumulative reduction of waste for 2011 aligns with the imminent loss of the City’s own landfill that year and the invariable rise in cost in waste hauling and disposal rates to other sites if we choose to do nothing. Continued long term dependence on landfilling our present waste stream also only adds to the uncertainty of the environmental liabilities we carry that are associated with those landfills far into the future.

Long-range waste reduction policies are a logical and economically viable and important alternative today to help free Palo Alto of its current dependence on landfilling its wastes. But this requires time to change. In order to be effective, it is vital to undertake this with careful planning. Moreover, these policies must be phased in slowly to allow both businesses and residents time to adjust if they are to avoid economic disruption from abrupt change.

Palo Alto is only now beginning to emerge from a serious economic down cycle. In order to be successful, the City must develop strong community support for this endeavor, with clear ongoing communications and well reasoned and executed programs. If done correctly, Palo Alto will reassert its position as an environmental leader in both the region and the state. No action, on the other hand, will allow a window of opportunity to close as we approach 2011, making solutions far more difficult and costly to implement while exposing Palo Altans to the vagaries of a far more uncertain landfill market.

1. Introduction

The City of Palo Alto (City) has long been a leader in recycling and sustainability, and has developed many innovative and comprehensive programs. On April 2, 2001 the City Council adopted a Sustainability Policy and on November 15, 2004, the City Council directed City staff to prepare a Zero Waste Plan for Palo Alto.¹

In this Section:

- ◆ **What is Zero Waste?**
- ◆ **The Hierarchy of Zero Waste**
- ◆ **Zero Waste Strategic Plan Purpose and Objectives**
- ◆ **Community involvement with Strategic Plan**

This Zero Waste Strategic Plan has been developed as the first step in planning to achieve Zero Waste in Palo Alto. As City staff plans to complete a detailed waste characterization study in the fall of 2005 comparable to those done in 1990 and 1997, it was decided that it would be best if this Zero Waste Plan focused on policies and services needed as a Strategic Plan, and that a more detailed Zero Waste Operations Plan be developed later.

1.1 What is Zero Waste?

The Zero Waste International Alliance broadly defines Zero Waste as:

“A philosophy and visionary goal that emulates natural cycles, where all outputs are simply an input for another process. It means designing and managing materials and products to conserve and recover all resources and not destroy or bury them, and eliminate discharges to land, water or air that do not contribute productively to natural systems or the economy.”²

For Palo Alto, although the intent of this Plan is to strive for *Zero Waste*, practically if the City diverts at least 90 percent of the waste generated by all sources (residential, business, schools, and institutions), it will be well on the way to Zero Waste and the program will be deemed a success.

Unlike our current system of *managing* waste, Zero Waste seeks to *eliminate* waste wherever possible by encouraging a systems approach that avoids the creation of waste in the first place. A Zero Waste systems approach turns material outputs from one process into resources for other processes.

Although there have been great strides in expanding recycling over the last decade, recycling more materials is not enough to achieve a truly sustainable economy. For every ton of waste buried in municipal solid waste landfills, about 71 tons of manufacturing, mining, oil and gas exploration, agricultural, coal combustion and other wastes are produced along the way.³ If materials are buried in a landfill or burned in an incinerator, industry must extract and process new virgin materials to make new products. It's as if there is a long shadow of depleted

¹ CMR:470:04

² <http://www.zwia.org/standards.html>

³ Brenda Platt and Neil Seldman, *Wasting and Recycling in the United States 2000*, prepared by the Institute for Local Self-Reliance for the GrassRoots Recycling Network, page 13.

resources and wastes left over for every product and package used that is much larger than the product or package itself.

The U.S. Environmental Protection Agency (EPA) also determined that “Source reduction and recycling can reduce greenhouse gas emissions at the manufacturing stage, increase forest carbon sequestration, and avoid landfill methane emissions.”⁴ EPA determined that energy use and greenhouse gas emissions were reduced the most by eliminating waste and the reuse of materials.⁵ That is why Zero Waste emphasizes the reduction and reuse of materials first, *then* recycling and composting, so that resources are not unnecessarily wasted in the first place.

It has become increasingly apparent that recycling and composting alone, to the extent practiced, are not keeping up with the demands on the system. Even though over the last twenty years the United States has recycled a greater portion of materials, nationally more materials are buried or incinerated than twenty years ago.⁶ California is doing only slightly better than national trends. From 1988 to 2002, California disposed of about 5.5 million tons less waste, or a decrease of about 12.5%.⁷ During this period, population increased by 4.1 million people, and the economy grew significantly, so any decrease is truly significant. But this highlights that the current level of recycling alone will not achieve Zero Waste. Although recycling and composting are improvements over landfilling or incineration, they also have their own environmental impacts that could be reduced by eliminating much of the waste in the first place.

1.2 The Hierarchy of Zero Waste

Zero Waste focuses first on *reducing* the volume and toxicity of waste by eliminating them in the first place. Zero Waste then focuses on *reusing* materials and products for their original intended uses, and then for alternative uses, before recycling. Once materials have been reduced and reused as much as possible, then Zero Waste focuses on *recycling* and *composting* all remaining materials for their highest and best use. Zero Waste encourages local and regional public-private partnerships to develop Resource Recovery Parks to provide the infrastructure and services needed to accomplish all of these functions.⁸ In a Zero Waste system, any materials that cannot be easily and conveniently reduced, reused, recycled or composted are either returned to the manufacturer direct or through retail channels, or no longer used.

⁴ U.S. Environmental Protection Agency, Office of Solid Waste, *Solid Waste Management and Greenhouse Gases: a Life-Cycle Assessment of Emissions and Sinks*, May 2002, 2nd edition, EPA530-R-02-006, page ES-9.

⁵ Henry Ferland, presentation to the California Integrated Waste Management Board, September 23, 2005.

⁶ Platt and Seldman, *Wasting and Recycling in the United States 2000*, page 2.

⁷ Going from 44 million tons in 1988 to 38.49 million tons in 2002, according to unpublished report by Arthur Robin Boone, “Monitoring Success Of California’s Recycling Programs,” August 2004.

⁸ A Resource Recovery Park may co-locate reuse, recycling and composting processing, manufacturing and/or retail businesses. For Palo Alto or vicinity, it could include several of the following: a drop-off/purchase of used furniture, appliances, building materials; a recycling buy-back and/or drop-off center; a permanent residential and small business hazardous waste drop-off program; yard trimmings and discarded food composting; compost sales; construction and demolition debris recycling; other reuse activities; and/or an assistance/education center. Resource Recovery Parks in CA range in size from 3 acres to 590 acres, as documented in the case study prepared by Gary Liss & Associates for the California Integrated Waste Management Board entitled *Resource Recovery Parks: a Model for Local Government Recycling and Waste Reduction*, October 2001 (see <http://www.ciwmb.ca.gov/LGLibrary/Innovations/RecoveryPark/>). The size and scope of any proposed project for Palo Alto will be addressed in the Zero Waste Operational Plan.

1.3 Zero Waste Strategic Plan Purpose and Objectives

This Zero Waste Strategic Plan is intended to guide City officials in the planning & decision making process to achieve Zero Waste goals.

The objectives of this Zero Waste Strategic Plan are to identify opportunities to:

- ◆ Reduce volume and toxicity of wastes
- ◆ Reuse materials and products
- ◆ Expand recycling and composting services for all sectors and materials, to recover materials for their highest and best use
- ◆ Adopt policies and incentives to help achieve Zero Waste in Palo Alto

1.4 Community involvement with Strategic Plan

On January 13, 2005, a Zero Waste Task Force (Task Force) of residents and businesses was formed by City staff to assist in the creation of a Zero Waste Policy and Plan for Palo Alto. The Task Force met eight times over six months. Meetings were open to public participation. Gary Liss & Associates (GLA)⁹ was hired to assist and counsel the Task Force and the City to identify goals, objectives, and policy options, and then synthesize them into a “Zero Waste Strategic Plan.”

The Task Force and City staff worked hard to obtain input from a wide cross-section of the community. Public meetings were held. Surveys were sent to at least 1,000 businesses throughout Palo Alto. In addition, surveys were sent to over 400 reuse, recycling and composting service providers throughout the San Francisco Bay Area. All residents received information about a residential survey in their May utility bills. Both commercial and residential surveys were posted on the City’s website.¹⁰

Other local participation was encouraged through news releases, attending local business meetings,¹¹ door-to-door visits with Palo Alto service providers, a special zero waste web site (www.cityofpaloalto.org/zerowaste), newspaper ads, Community Recycler newsletter, Utility bill inserts, flyers (at local libraries, May Fete parade, and the City landfill), and the Recycling Center kiosk.

However, the public has not become fully engaged yet in these deliberations. Only 6.1% of the businesses that were contacted actually completed the surveys, and only 0.4% of residents completed surveys. Those that did respond are not necessarily representative of the overall community. So far, this issue resonates only with a small portion of the community. It is not likely to increase in importance until there are major policies or programs that might be considered by Council.

⁹ See www.garyliss.com for background.

¹⁰ See Appendix B for summaries of the surveys.

¹¹ Including the Stanford Shopping Center, Chamber Government Affairs Committee, Stanford Research Park, and food generating businesses.

2. Background and Analysis

2.1 How much waste is there?

In 2003, the California Integrated Waste Management Board (CIWMB) estimated that the City of Palo Alto generated 166,548 tons of waste annually.¹²

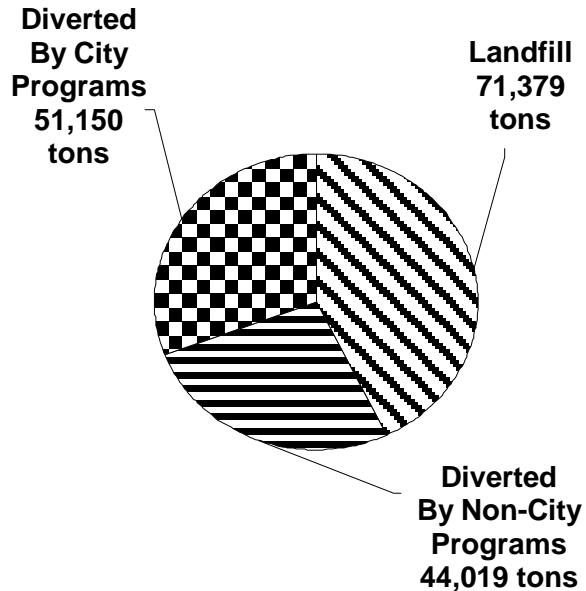
In this Section:

- ◆ **How much waste is there?**
- ◆ **Where is waste from?**
- ◆ **Where does waste go?**
- ◆ **Major Issues and Events**
- ◆ **Types of Materials Landfilled in 1997**
- ◆ **Priority Service Needs**
- ◆ **Economics of Zero Waste**
- ◆ **Funding for Zero Waste**

Of this total generated tonnage, 71,379 tons were landfilled and 95,169 tons were diverted from disposal through source reduction, reuse, recycling, and composting activities, including:

- ◆ 44,019 tons were diverted through non-City programs, including programs that helped reduce and reuse materials, as well as independent recycling and composting programs.¹³ See Appendix B for summary of a survey reporting some of the material types and tonnages diverted in 1997 from such programs.
- ◆ 51,150 tons were diverted through City operated reuse, recycling and composting programs.

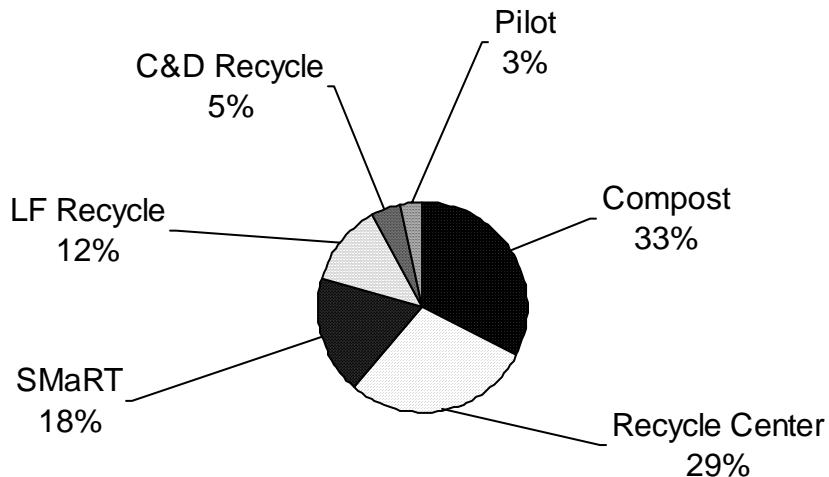
Chart 1 – Total Waste Generated



¹² The latest detailed data for Palo Alto is from a 1997 waste generation study conducted for the City of Palo Alto. More recent data was obtained only on a statewide basis, and estimates were calculated by the State for each jurisdiction to use for general planning purposes.

¹³ The amount of non-City programs is actually a number calculated by the CIWMB by subtracting the total tonnage landfilled and documented from City recycling programs from the total waste generated.

Chart 2 - City Recycling Programs¹⁴



City Recycling Programs include:

- The City composting facility at the Palo Alto landfill processed 16,890 tons of green waste.
- The City's recycling drop-off center at the Palo Alto landfill processed 15,130 tons of recyclable materials (paper, glass, metal, and plastic) and some reusable products and household hazardous wastes from residents and businesses.
- The SMaRT¹⁵ station diverted another 9,480 tons of recyclables, which were recovered *after* source separation programs.
- The City also obtained another 6,470 tons from recycling at the City Landfill, and 2,510 tons from recycling of construction and demolition debris.
- A single-stream recycling pilot recovered another 1,670 tons of recyclables, and resulted in the citywide expansion of this program beginning July 2005.
- The City promoted reducing and reusing materials (e.g., promoting citywide garage sales, grasscycling, backyard composting, and use of

¹⁴ Additional information about City programs and their history can be found in the 2003 City's Annual Recycling Report at: http://www.city.palo-alto.ca.us/zerowaste/graphics/2003_Annual_Report.pdf.

¹⁵ Sunnyvale Material Recovery and Transfer (SMaRT) station, see <http://sunnyvale.ca.gov/Departments/Public+Works/Solid+Waste+and+Recycling/SMaRT+Station>

canvas bags) and recently placed a Goodwill trailer at the Palo Alto Recycle Center at the landfill.

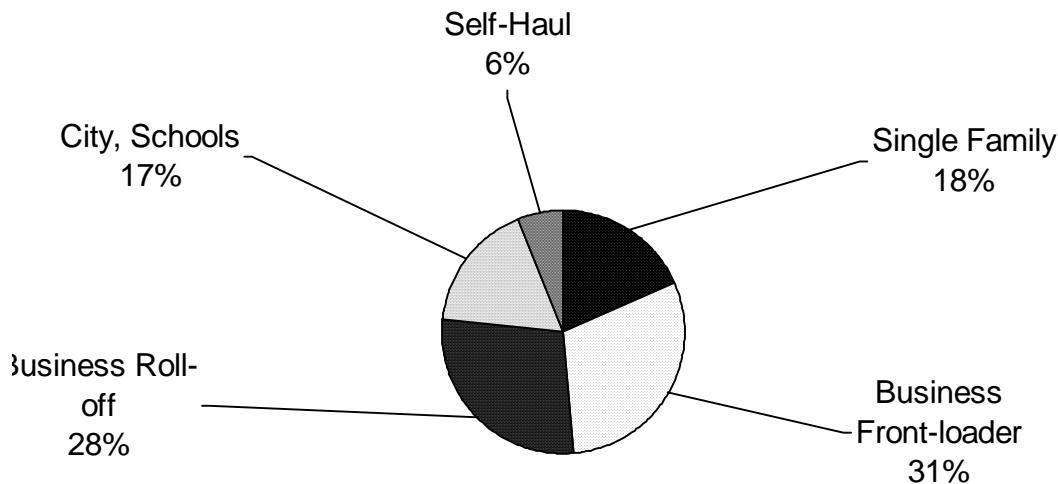
- The City's Household Hazardous Waste (HHW) program collects about 270 tons per year of HHW from both its recycling drop-off center and its HHW collection events that operate out of the Water Quality Control Plant.

The combination of the City and non-City programs resulted in the CIWMB calculating a 57% diversion rate for Palo Alto for calendar year 2003.

2.2 Where does Palo Alto's waste come from?

Single-family residents create only 18.3% of all Palo Alto materials currently landfilled.¹⁶ Over 58% of materials come from businesses (30.3% front-loader¹⁷ collection and 28% collected in roll-offs¹⁸). However, the numbers for commercial include, by definition, materials from apartment buildings in the City. Table 1 highlights the business sectors of the top 50 waste generators in Palo Alto. Another 17.3% comes from City and other institutional operations, including the Community Improvement Project and schools. Only 6% is hauled directly to the Palo Alto landfill by residents and businesses.

Chart 3 – Sources of Waste



¹⁶ All the data in this paragraph based on email from Russell Reiserer to Bob Wenzlau, June 10, 2005.

¹⁷ A front loader truck collects materials by inserting “forks” like on a fork-lift that extend out from the front of the truck into slots on the side of metal bins that vary in size generally from 1 to 8 cu. yds. Front loader trucks raise their forks and rotate containers upside down to empty their contents into the top of the truck.

¹⁸ A roll-off truck uses cables and winches to roll large containers (varying in size generally from 10 to 40 cu. yds.) onto tracks on the truck that guide the container into position. These trucks are usually used to collect the heaviest of materials, particularly construction and demolition debris.

Table 1 – Business Sectors of Top 50 Waste Generators in Palo Alto

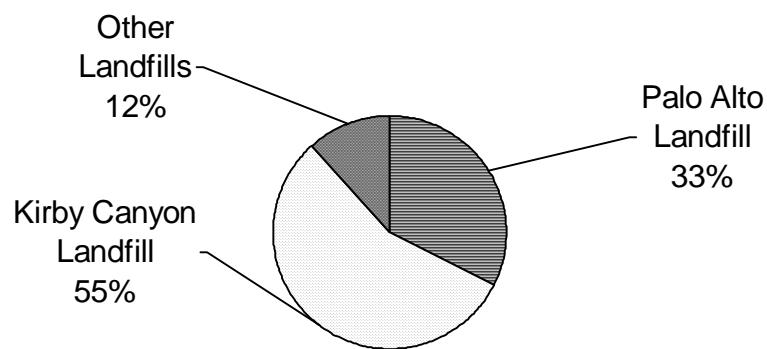
Medical	36.5%
Commercial	18.8%
Multi-Tenant Buildings (residential and commercial)	14.2%
Schools	7.4%
Grocery Stores	4.8%
City Services	4.4%
Law Offices	4.1%
Hotels	3.7%
Restaurants	1.8%
Senior Housing	1.5%
Retail	1.4%
Real Estate	1.5%

2.3 Where does Palo Alto's waste go?

The City of Palo Alto (City) owns and operates a municipal solid waste landfill that includes a 7.5-acre composting facility and a 1.5-acre recycling drop-off center within the property boundary. The recycling drop-off center accepts recyclable materials (paper, glass, metal, and plastic) and some household hazardous wastes from residents and businesses.

The CIWMB reported that 71,379 tons of City waste was disposed of in 2003, 23,230 of which were disposed of at the Palo Alto Landfill, 39,846 tons at the Kirby Canyon Landfill and 8,303 tons at other landfills in California.

Chart 4 – Destinations of Waste



The Palo Alto Landfill final closure is scheduled to occur in 2011.¹⁹ All facilities operating there will be removed and the public passive Byxbee Park will be completed.

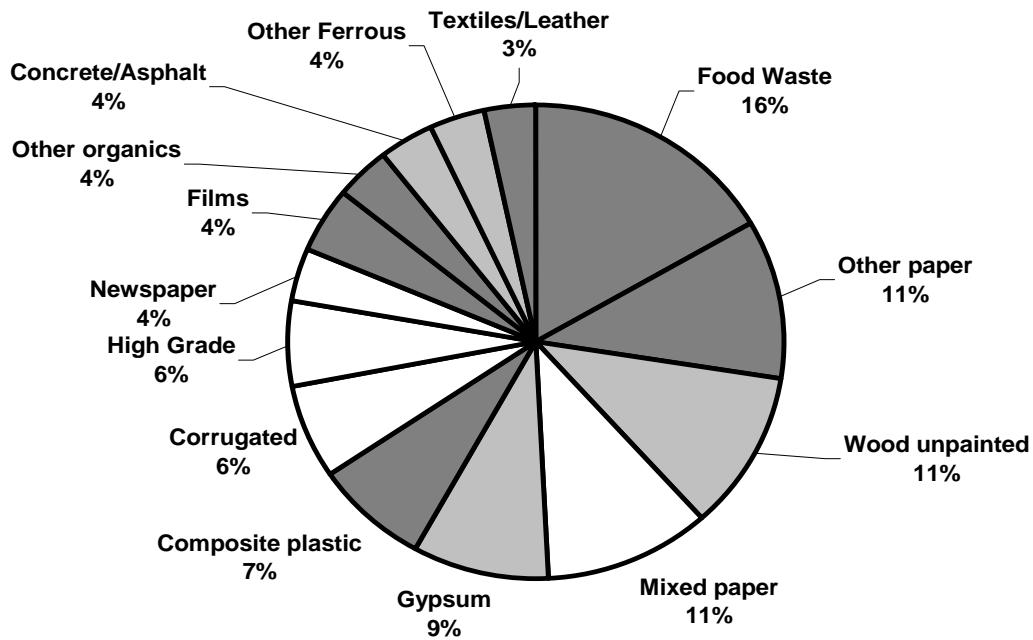
In addition to these facilities, the City partnered with the cities of Mountain View and Sunnyvale for the operation of the Sunnyvale Materials Recovery and Transfer (SMaRT) station. The SMaRT station receives about 2/3 of Palo Alto's waste, diverts about 19% of it and disposes the remainder at the Kirby Canyon Landfill through an agreement with Waste Management Inc.

2.4 Types of Materials Landfilled in 1997

One of the key tools to identify priorities for Zero Waste policies and programs is an analysis of the 12 master categories of materials that are still being landfilled. As Palo Alto does not have accurate current data, this Plan reviewed the latest data from 1997, to identify the largest volume and most toxic materials to be designated as targets to reduce or eliminate to achieve Zero Waste. Once identified, additional analysis was then done (see Appendix C) to consider the likely changes in the amounts of these materials resulting from City policies and programs implemented since 1997. Although this data is outdated, it provides some valuable insight until the City completes a new waste generation study.

Chart 5 is a pie chart that highlights the top 14 materials still disposed in landfills in 1997 when considering the entire waste stream (all four sectors: residential, commercial, roll-off and self-haul). The total amount of waste reported landfilled in 1997 was 85,357 tons for the year.

Chart 5 - Top 14 Materials Landfilled in Palo Alto in 1997



¹⁹ More details on this are in Section 2.6.

2.5 Priority Service Needs

Gary Liss & Associates (GLA) extensively evaluated reuse, recycling and composting services in the Palo Alto area. A companion report was developed²⁰ detailing how this analysis was performed. The report also describes different methodologies used to determine priorities for services needed in Palo Alto. Priority service needs were identified for material types where no or low services were found to be available and where the specific material type was found to be a significant weight percent of disposed waste.

Table 2 summarizes the materials where priority services may be needed. Chart 5 also highlights the priority services, with the darkest areas being primary service needs and the light gray areas being secondary service needs. Please note that service priorities could be met by eliminating these materials instead of adding new services to collect them: If materials cannot be eliminated then new services may be dependent on the availability of markets for those materials, or the possibility of developing new markets for those materials. A discussion covering each of the major types of materials found in Palo Alto is also included in Appendix C.

Table 2 - Priority Service Needs

Primary Service Needs For all Palo Alto waste streams
◆ Food Wastes
◆ Other Paper ²¹
◆ Composite Plastics ²²
◆ Film Plastics
◆ Textiles and Leather
Secondary Service Needs For all Palo Alto waste streams
◆ Wood unpainted
◆ Gypsum wallboard
◆ Other Ferrous

2.6 Major Issues and Events Impacting on Design of Zero Waste System

One of the most significant issues identified to date that could be an impediment to Zero Waste in Palo Alto is the existing contract the City has with Waste Management, Inc. for accepting waste at the Kirby Canyon Landfill, and the corresponding commitment included in the

²⁰ Toni Stein, *Palo Alto Service Needs Analysis*, Gary Liss & Associates, October 2005.

²¹ Nonrecyclable but potentially compostable paper (e.g., food contaminated paper such as pizza boxes and frozen food containers), according to 1997 Palo Alto Waste Generation Study.

²² In Palo Alto 1997 Waste Generation Study, this category was for all plastics other than film plastics, PET and HDPE containers.

Memorandum of Understanding the City has with cities using the SMaRT station. Today, the City is obligated to deliver a minimum amount of waste annually to the SMaRT station and the Kirby Canyon Landfill or pay a fee regardless of whether the waste is delivered or not.²³ Palo Alto committed to approximately a minimum of 27% of its waste stream, so it would only be able to get to 73% waste diversion before these contractual obligations impact the City. If Palo Alto actually had no waste to landfill, then it could continue to cost the City up to \$1.5 million per year for services not rendered, according to this contractual provision.²⁴

Although Zero Waste is the goal, it will not be achieved overnight, and therefore well-designed and operated landfills need to be viewed as a scarce resource to be optimized and conserved as long as possible. Landfills are also one of the largest contributors to greenhouse gas emissions in North America, and many landfills have leaked toxins underground to neighboring properties, causing major liabilities for the owners. In fact, staff of the U.S. Environmental Protection Agency (EPA) acknowledged that all landfills will leak,²⁵ and that the problems are just being postponed to some point in the future.²⁶ Staff of the California Integrated Waste Management Board (CIWMB) first raised the issue of planning for post-post-closure care and maintenance for all landfills in the state in a Presentation to the CIWMB Permit and Enforcement Committee on Post-Closure Maintenance on November 3, 2003. Since that time, CIWMB staff has held several meetings with industry leaders to determine how best to resolve this problem. In a December 2004 Discussion Report, CIWMB indicate:

“...some landfills may remain a threat to the environment for longer than 30 years. For example, stakeholders have reported to Board staff that landfill gas control systems have had to be installed at landfills that had not operated for up to 60 years. Dry tomb landfills (favored by Subtitle D and 27 CCR) indefinitely suspend and/or retard the decomposition process such that a breach in containment (e.g. extreme climate or earthquake event or inappropriate land use, or simply failure of equipment or containment barriers) could trigger uncontrolled production and release of landfill gas and leachate, and public contact with waste. The state of the science thus indicates that municipal solid waste

²³ In the business, these are referred to as “Put or Pay” contracts, which have been commonly used for the development of many capital facilities in the solid waste arena. The Task Force clarified that this is more appropriately “Pay whether you put or not.”

²⁴ City staff estimate.

²⁵ EPA in the Federal Register of Aug. 30, 1988 stated: ☐[E]ven the best liner and leachate collection systems will ultimately fail due to natural deterioration...☐

²⁶ After the end of the post-closure period and funds necessary to maintain the site become exhausted, the closed site may become destabilized as rainfall reenters the wastes through breaches in the deteriorating cover. Kirby Canyon is expected to contain over 40 million tons of wastes when closed. For such a site, the costs to prevent or respond to major site failures could be in the hundreds of millions of dollars or more. Yet, current rules only provide financial assurance for the post-closure period and don’t address how to assure financing of maintenance costs and problems after that period. At that point in time, the owner of the landfill is not certain to be in existence, and, even if it were, it may not have the financial resources to pay for these costs as similar problems may be encountered with other of its landfill assets. Following official landfill closure and a 30-year post-closure period, financial assurance and liabilities for environmental impacts and consequences of the landfill will likely revert back to the parties that generated the materials in the first place.

landfills will in many cases pose a significant threat to the environment well beyond the conventional 30-year post-closure maintenance period.”²⁷

Due to such major potential liabilities, all landfills used by Palo Alto residents and businesses need to meet the highest environmental standards, and reflect their full past, present and reasonably anticipated future costs in their user fees and/or in budget analyses.

In addition, four major events will significantly impact Palo Alto’s ability to change its solid waste and recycling system and the timing of such changes. These events need to be factored into the design of any Zero Waste system for Palo Alto:

- ◆ Palo Alto’s agreement with Palo Alto Sanitation Company/ Waste Management Inc. for solid waste and recyclable material handling services could terminate on July 1, 2007. If the City extends for two additional years in 2005, then the City will need to decide by the summer of 2007 how to structure a competitive procurement process to be completed by July 1, 2009.
- ◆ Palo Alto’s City-owned landfill on Byxbee Park will close in 2011. By 2007, the City will need to decide if it wants to continue to operate a Recycling Center like the existing facility and where that should be located.²⁸ If the City chooses to continue to operate a Recycling Center in Palo Alto, a design for that facility needs to be prepared, environmental review completed, permits obtained, and construction completed by the time the landfill closes.
- ◆ Palo Alto’s Memorandum of Understanding (MOU) with Sunnyvale and Mountain View to use the SMaRT station will terminate on October 15, 2021. At that time, it would be possible to extend the term of this contract if all parties agree to terms. This may or may not be desirable for Palo Alto, depending on the status of new capital commitments to replace equipment and other City options at that time..
- ◆ Palo Alto’s agreement with Waste Management Inc. to use the Kirby Canyon Landfill will terminate on December 31, 2021. At that time, the City will have the option to extend the term for an additional 10 years.

2.7 **Economics of Zero Waste**

In an effort to assess the strategic economic impact of Zero Waste as a goal for Palo Alto using best assumptions, an analysis was undertaken to compare the economics of the proposed interim goal for achieving Zero Waste versus maintaining the status quo (see Appendix F). This analysis

²⁷ CIWMB, *Discussion Paper Regarding Postclosure Maintenance Beyond the Initial 30 Years and Financial Assurance Demonstrations* (December 6, 2004). Discussion Paper may be viewed at:

<http://www.ciwmb.ca.gov/Agendas/agenda.asp?RecID=1015&Year=2004&Comm=PEN&Month=12>

²⁸ In the past, the Recycling Center has included one-half acre for dropping off materials, and one acre for processing of materials collected by the curbside recycling program. With the introduction of single stream recycling in July 2005, processing is now being done off-site.

is only an estimate and numbers are rounded due to the preliminary nature of these estimates. Detailed analysis of program costs will be done in the Zero Waste Operations Plan that will follow the adoption of this Strategic Plan.

In 2003, the total tons generated were 166,548. The current City diversion rate of 57% equals about 95,000 tons per year. If the City adopts an interim goal of 73% diversion by 2011 as part of a Zero Waste Strategic Plan, it would need to divert an additional 26,000 tons per year of materials.

The current processing, transfer and disposal costs are about \$82.50/ton.²⁹ On that basis, the avoided costs of processing, transfer and disposal for this additional 26,000 tons would be approximately \$2.1 million/year.

Based on assumptions detailed in Appendix F, there should be savings overall to the City of over \$800,000 per year. This could be more if generators pursue their own waste reduction programs without City involvement other than for outreach and technical assistance. If the City structures its rates and incentives appropriately, residents and businesses should be able to pay much less to eliminate wastes, and pay somewhat less to reuse, recycle and compost the rest needed to achieve this interim goal.

For individual businesses, the good news is that Zero Waste should help them save money. By eliminating wastes, businesses can save the most money. Expanded reuse, recycling and composting programs should also avoid sufficient costs of garbage collection and disposal to more than cover their costs. For example, a small business that pays \$2,000/month in fees today, in going from 57% diversion to 73% by 2011 should save about \$300/month if they eliminate their own wastes from their production or operations, and assuming that they are not required to pay for additional recycling services needed.³⁰ These benefits to waste generators could be enhanced by new economic or policy incentives adopted by the City to foster Zero Waste. Incentives might include both discount rates for those who reduce, not just rate premiums in the case of those who waste more.

The projected cumulative reduction of waste for 2011 also aligns with the imminent loss of the City's own landfill that year and the invariable rise in cost in waste hauling and disposal rates to other sites if the City chooses to do nothing.

In addition, the current liability to the City of disposing 71,739 tons/year in landfills should be considered as a long-term strategic impact into the future. As there has been no provision for providing financial assurance for costs after the end of the 30-year post-closure care period at the City or Kirby Canyon Landfills, a potentially significant liability exists for the City of about \$8 million by 2021. Irrespective of the precise amount, it is clearly in the interest of Palo Alto to begin a waste reduction strategy now to alleviate the magnitude of this problem in the future.

³⁰ \$2,000/month * (73%-57%) = \$320/month. Generators may have to pay something for some recycling services in an open competitive marketplace, but those costs should still be less than the price they are paying now for waste collection and disposal.

Although these numbers require more detailed review in the Zero Waste Operations Plan, this should provide an order of magnitude understanding of the benefits of a Zero Waste Strategic Plan for the City of Palo Alto.

2.8 Funding for Zero Waste

If the City were to try to accomplish Zero Waste by itself, it could be a costly venture. However, funding for Zero Waste initiatives may come from a wide variety of sources. Stakeholders and service providers may be willing to assist with the expansion of solid waste, reuse, recycling and composting services for Palo Alto without public investments. Other local businesses might want to invest in new Zero Waste ventures (such as a Resource Recovery Park), or self-finance the expansion of new reuse, recycling and/or composting services by diversifying existing unrelated businesses. Properly designed avoided collection and disposal costs can become the economic engine that drives the system to Zero Waste.

If state and national legislation is adopted requiring retailers and/or producers to assume responsibility for their products and packaging, these businesses will incorporate the costs of reuse, recycling and/or composting within the purchase price of the products. This becomes a self-funding system, and is one of the most powerful opportunities that exist to move towards Zero Waste, particularly for products and packaging items currently difficult to recycle.

Socially responsible investors will be interested in investing in projects like a Resource Recovery Park and new reuse, recycling and composting ventures. There is strong interest in investments in sustainable development and Zero Waste certainly qualifies as a tool to achieve a sustainable local economy. Gil Friend, CEO of Natural Logic, Berkeley, CA, estimates that there is over \$5 billion now available for investment in such sustainable development enterprises from the private sector. A report was developed for this project that identifies funding sources for public, private and non-profit initiatives to provide the services needed to move Palo Alto to achieve Zero Waste.³¹

³¹ Neil Seldman, *Funding of Zero Waste Initiatives in Palo Alto*, 2005, Gary Liss & Associates and Institute for Local Self-Reliance.

3. Recommendations

The Task Force envisions that policies formulated in the pursuit of Zero Waste should be within the context of a larger set of coordinated City economic and environmental sustainability policies. As public policies harness and engage the forces of the marketplace, it is believed that business waste generators and service providers will be brought together to work out details of how to most efficiently reduce, reuse, and recycle or compost their materials without the traditional reliance on the City to arrange such services. This is the essence of “Strategic Recycling,” in which government plays the role as a catalyst, providing information, creating incentives and setting the rules, but not in directly providing services to all.³²

In this Section:

- ◆ Zero Waste Goal
- ◆ Zero Waste Objectives and Strategies

The most critical policy step for the City is to adopt both a long-range Zero Waste goal and intermediate target(s) and to mobilize all community stakeholders to participate in working to achieve them.

The Task Force believes that stakeholders should be initially encouraged through rate-based incentives to pursue Zero Waste, rather than resorting to waste reduction mandates that invoke fines or assessments for non-performance. Policies and incentives need to be applied to restructure rates and fees to provide a clear price signal to reward those who waste less and recycle more.³³ In this way the City will help those who eliminate and recycle waste, and let those who choose to waste, pay higher fees for those services.

Palo Alto will need to clearly differentiate policies and programs for the various types of business sectors, particularly: multi-tenant buildings (both residential and commercial), downtown businesses, strip malls, restaurants and hospitality industry, and major industrial areas (e.g., Stanford Research Park).

The City will need to work with other communities in the San Francisco Bay Area to coordinate policies that will generate and maintain adequate recycling and composting capacity for the region while the City also works to eliminate wastes and keep recyclable materials from being landfilled. The City needs to expand existing reuse, recycling and composting activities by working to site one or more Resource Recovery Parks in the region. Adding such services will mean adding businesses to Palo Alto and the region.

³² Kay Martin, *Strategic Recycling: Necessary Revolutions in Local Government Policy*, Darkhorse Press, Ventura, 1996, ISBN 0-9653545-0-4).

³³ For rates to be adjusted in this way, new rates for services will need to be justified during the garbage rate-setting process.

3.1 Zero Waste Goal

The initial target for reduction of waste provides 5 years to implement recommendations that will be finalized by July 1, 2006. This also aligns with the imminent loss of the City's own local landfill in 2011. The initial target is a reasonable expansion beyond the current 57% waste diversion rate, and is the maximum diversion the City may pursue without impacting current contract commitments for transfer and landfilling of wastes from Palo Alto. The final target year provides another 10 years to implement recommendations, and aligns with the end of existing contracts for transfer and landfilling of wastes from Palo Alto.

3.2 Zero Waste Objectives and Strategies

The following objectives and strategies have been identified to provide a framework to guide City officials and the community in the planning and decision making process towards achieving Zero Waste. The Zero Waste goal will only be possible to achieve if sufficient funding, staffing and authority are provided to staff, and recommended policies are adopted. What will be required to implement this Zero Waste Strategic Plan will be detailed in the Zero Waste Operations Plan that is expected to follow. To accomplish the goal of Zero Waste, the Task Force recommends that the City will:

Objective 1 – Reduce - Work with Residents and Businesses to Eliminate Waste

- ◆ **Strategy 1:**
Expand City educational and technical assistance programs –
 1. Encourage residents and businesses to eliminate wastes as a priority, on a voluntary basis.
 2. Provide technical assistance to local businesses to adopt sustainable best business practices to minimize waste and avoid landfill and incineration (e.g., more waste audits, how-to guides, and periodic advice on how to implement recommendations of waste audits).
 3. Promote and incentivize Palo Alto businesses to create and market products and services that utilize processes and means that reduce the volume and toxicity of waste and materials.
- ◆ **Strategy 2**
Promote Voluntary Takebacks
 1. Encourage retailers and their suppliers to take-back products and packaging that are currently difficult to reuse, recycle or compost in Palo Alto.³⁴

³⁴ Like Ottawa, Canada program, see: http://www.city.ottawa.on.ca/gc/takeitback/index_en.shtml

2. Publicize take-back programs by posting all cooperating retailers on City's Zero Waste website and regularly include articles and/or ads about this program in area newsletters and newspapers.

Objective 2 – Reuse – Develop Infrastructure Beyond Recycling

◆ **Strategy 1**

Expand opportunities for reuse of used materials and products.

1. Develop and communicate to residents and businesses a list of the highest priority materials to be reused, such as used building materials, used plastic toys, textiles and leather, and arrange for each of these materials to be accepted in at least one drop-off location each.
2. Work with local reuse nonprofits and businesses to expand convenient drop off locations within the City.

◆ **Strategy 2**

Work to preserve residential buildings that are still functional

1. Encourage adaptive reuse as a priority in City building standards for residential construction.

Objective 3 – Offer Recycling and Composting Services to All

◆ **Strategy 1**

Expand Recycling Services

1. Develop and communicate to the public a list of the highest priority materials for recovery of those currently disposed to be added to local recycling programs (e.g., film plastics). . Include materials on this list in at least one drop-off location each.
2. Maintain one or more recycling drop-off centers within the City limits once the City's landfill closes in 2011, not on City parklands unless consistent with the Park Dedication Ordinance and the Baylands Master Plan.
3. Support other regional recycling centers used by Palo Alto residents and businesses to help them expand and provide additional services needed.
4. Work with independent recyclers to help the community recycle their waste.

♦ **Strategy 2**
Expand Composting Services

1. Develop composting collection program for discarded food and food-contaminated paper as the highest next priority for new services in Palo Alto for both the residential and commercial sectors. Include composting programs on the list of highest priority materials for recovery and provide at least one drop-off location for these materials.
2. Help Palo Alto Unified School District and interested businesses to start food waste composting pilot program.

Objective 4 - Incentives and Support for Zero Waste Initiatives

♦ **Strategy 1**
Renegotiate Contracts³⁵

1. Renegotiate with Waste Management, Inc. and the SMaRT station Cities to significantly reduce or eliminate the financial obligations in the current service contracts that pose a barrier to waste reduction.

♦ **Strategy 2**
Establish Rate-Based Incentives and Disincentives to Reduce Landfilling

1. Seek ways to incentivize businesses to adopt Zero Waste goals and to develop Zero Waste plans. Consider granting any business that measurably exceeds the interim 2011 Zero Waste goal before 2011 favorable rate status (discounts) beyond those established in the normal rate structure. The size of the rate discount should be tied to both volume and percentage reduction of designated materials and target criteria.
2. An example of a possible progression from rate incentives to mandates is as follows:
 - a. Stage 1 - In the first stage of this plan, create a progressive multi-stage rate structure tied to measurable material reduction goals to ensure that both residents and businesses that waste less pay less. Communicate the rollout of the program to the public of material reduction targets at least three months in advance of stage two implementation.
 - b. Stage 2 - Beginning in stage two, implement first stage rate structure incentives, targeted at high priority waste materials to be reduced. Put into place

³⁵ Until 2021, the City is obligated to deliver a minimum amount of waste annually to the SMaRT station and the Kirby Canyon Landfill or pay a fee regardless of whether the waste is delivered or not (“Pay whether put or not”).

an effective and credible monitoring procedure and system to assess progress toward operational goals and provide progress report both at mid-year (6 months) and at year end on the City's Zero Waste website. Evaluate mid-year progress and move to stage two rate structures if insufficient progress has been achieved.

c. Stage 3 - Beginning in stage three, if progress meets operational reduction targets, then maintain rate structures. If not, then advance to higher stage rate structures for another six-month trial, reporting back, twice each year until stage 4.

d. Stage 4 - If, by the end of stage 3, designated materials have not been decreased by more than 50% from 2005 levels, following implementation of progressive rate structure and periodic reporting, then consider adopting bans or mandates with fines to require proper handling of those materials which have not been successfully reduced.

3. Develop and communicate to residents and businesses a list of the highest priority materials for recovery of those currently disposed, to eliminate from the waste stream in addition to materials already being reduced or recovered. Suggest viable alternatives to those materials and products and where to get them. Provide information and assistance as needed for implementation.

♦ **Strategy 3**

Adopt Business Investment Policies to Expand Services

1. Encourage the cost effective development and expansion of services to reduce, reuse, then recycle and compost for all materials in Palo Alto. Establish minimum qualifications for service vendors to provide such services as appropriate to ensure public health and safety. Establish mandatory service vendor reporting requirements to accurately capture quantities and weights of diverted materials.
2. Implement policies that penalize the discharge of toxic materials into the environment.
3. Increase public and private collection and processing services on an open, competitive basis, and help develop new businesses that add value to materials recovered and minimize residues that require disposal.
4. Encourage innovative services to be added by the private sector and nonprofit groups so the City does not have to invest in those activities. Encourage different types of services to be provided for different types of businesses.
5. Develop new requirements for owners and managers of multi-family dwellings and multi-tenant commercial buildings that ensure that all tenants have reasonable access to services and premises-based facilities comparable to single-family dwellings and small businesses.

6. Utilize economic resources staff to encourage expansion of services related to reduce, reuse, recycle, and compost. Recognize that the services may be provided in Palo Alto, but the businesses may be located elsewhere.
7. Establish target for the full avoided disposal costs to be basis for evaluating economics of Zero Waste programs and policies.

♦ **Strategy 4**

Educate and engage the community to support Zero Waste initiatives

1. Continue to develop and implement a public education and communications program concurrent with the design of new waste diversion programs. Develop new Zero Waste promotional materials. Promote positive Zero Waste buying power and behavior with promotional materials and website. Post local Zero Waste models on City's website and link to other examples
2. Continue to implement new education and outreach in advance of the implementation of any new programs to obtain the maximum support for new initiatives that will help the City achieve Zero Waste goal.
3. Coordinate outreach programs for sustainability and pollution prevention with Zero Waste, waste prevention and recycling programs.
4. Implement community-based social marketing programs to more actively engage residents and businesses.
5. Work with industry groups to promote Sustainable Business and Green Business programs.
6. Recognize business and residential Zero Waste leaders. For example, the City should sponsor a “Zero Waste Leadership Awards” program to recognize businesses that:
 - a) Are models of one or more Zero Waste Business Principles;³⁶
 - b) Show significant measured progress in moving toward ZW; or
 - c) Exceed the City interim targeted 2011 diversion goal.

♦ **Strategy 5**

Develop Resource Recovery Park

1. Develop or help cause to be developed a Resource Recovery Park within Palo Alto City limits or nearby (but not on City parklands) to provide location(s) for expansion of reuse, recycling and composting businesses.

³⁶ For copy of the Principles, go to: <http://www.grrn.org/zerowaste/business/>

Objective 5 -Lead by Example and Advocate Zero Waste

♦ Strategy 1

Maintain a Public Advisory Review Body for Zero Waste Policy

1. Continue a Zero Waste Task Force or other advisory body at discretion of Council, made up of community representatives to serve for limited duration to review the staff prepared Zero Waste Operations Plan and advise the Council on its implementation of and changes to associated City Zero Waste policies.

♦ Strategy 2

Maintain Active State and Regional Profile on Zero Waste Public Policy

1. Work with State and Federal legislators and encourage other communities in the region to adopt similar Zero Waste goals and plans. Work with them where appropriate to remove and resolve mutual obstacles.
2. Undertake a coordinated effort with regional cooperation, to support state and national efforts to adopt:
 - Extended producer responsibility;
 - Deposit programs;
 - Funding of zero waste initiatives through statewide or regional landfill surcharges and product charges;
 - Full cost accounting for waste disposal;
 - Packaging levies (e.g., on plastic bags);
 - Minimum recycled content standards for additional products;
 - Design for the environment programs;
 - Green procurement and green building guidelines for the public sector;
 - National measuring, monitoring and reporting in achieving zero waste goals; and
 - New mechanisms for financial assurance for post-post-closure liabilities for landfills.

♦ Strategy 3

Make City a Zero Waste Model

1. Brief all City departments on Zero Waste and explore opportunities for collaboration.
2. Implement Zero Waste in all City buildings and programs with milestone targets and annual progress reports, no less than that which is voluntarily requested from businesses or other community institutions.
3. Coordinate with other environmental and sustainability programs in the City to help them achieve Zero Waste.

4. Arrange for independent review of City diversion progress periodically over the next six years.
5. Develop measurable Zero Waste goals in job descriptions and annual performance evaluations. Post major accomplishments and highlights of progress for all departments on the City Zero Waste Web site on an annual basis.
6. Expand standard specifications to govern waste handling and diversion procedures for contractors involved in operating City waste, capital and repair projects, as well as recycling and sustainability programs.
7. Consider leasing Green Buildings as a priority for City leased facilities.
8. Adopt and implement an environmentally preferable purchasing policy and additional environmentally preferable procurement guidelines. Collaborate with other organizations to enhance purchasing power.

♦ **Strategy 4**
Minimize long-term landfill liabilities

1. Ensure that the full capital and operating, closure, post-closure and post-post-closure costs are factored into current rates and financial assurances, particularly for private landfills.
2. Establish a target to reflect the benefits of avoiding these future liabilities as an avoided disposal cost.
3. Work actively with City landfill contractor and regulators to increase mechanisms for financial assurance for landfill liabilities.

♦ **Strategy 5**
Provide Funding to Implement Zero Waste Plan

1. Create a Zero Waste fund to encourage local innovation and participation. Fund community Zero Waste initiatives with fees levied on the transport, transfer and disposal of wastes where feasible.
2. Leverage the investments of the private sector by adopting supportive policies and providing technical assistance and support letters for independent financing and/or grants. The more that nonprofits and private companies invest in expansion of reuse, recycling and composting programs, the less the City needs to invest.
3. Identify and support proposals for state, federal and foundation grants and loans for Palo Alto businesses and service providers.

Objective 6 - Update Waste Data and Develop Zero Waste Operations Plan

- ◆ **Strategy 1**
Update Waste Data

1. Proceed promptly with a Waste Composition Study this year to report updated data in categories and subcategories designed for programs targeted to reduce or recover those materials. Include analyses of different segments of the commercial and industrial sectors, and institutions (including restaurants, medical services, retail, offices, multi-family dwellings and government/schools).³⁷
2. The Waste Composition Study should clearly identify reusables and materials in the waste stream that are likely to be significant targets for programs to reduce or reuse such materials.
3. After the Waste Composition Study is completed, monitor, measure and keep the community informed of progress and results. Provide annual reports on the City's Zero Waste website on progress of all waste reduction initiatives. Highlight results of recent policy and program changes (e.g., 2004 City Construction Debris Recycling Ordinance and 2005 implementation of Single-Stream Recycling Program).

- ◆ **Strategy 2**
Develop Zero Waste Operations Plan (ZWOP)

1. Identify what type of facilities need to be developed by and for the City to meet the service needs identified in this Strategic Plan.
2. Evaluate whether facilities exist or will be built to meet City needs by the private sector, or recommend what facilities the public sector will be required to build. Compare costs of capital-intensive approaches that could be built on more expensive land in the vicinity of Palo Alto vs. more land-intensive lower cost approaches that exist or could be built on the outskirts of the San Francisco Bay Area (e.g., for composting facilities).
3. Evaluate the market value of reusables, recyclables and compostables still being landfilled.
4. Identify public or private programs necessary to reduce, reuse, recycle or compost the materials identified from the Waste Generation Study.
5. Design different programs for different sectors, including multi-tenant buildings (residential and commercial), downtown businesses, strip malls, restaurants and

³⁷ This could be accomplished through a combination of informal visual assessments of randomly selected businesses and modeling using statewide data applied to Palo Alto lists of numbers, types and sizes of businesses.

hospitality industry, and major industrial areas. Provide universal access to opportunities to reduce, reuse, then recycle and compost.

6. Evaluate long-range reliance on single-stream recycling services versus expanded source separated collection.
7. Identify the appropriate role for the SMaRT station in Zero Waste, and explore whether more diversion could take place at this facility or nearby.
8. Identify candidate locations for other new public and private facilities that might be required, with a conceptual basis for how to pursue the development of those facilities, while honoring the Task Force's recommendations to not use park land for such facilities.
9. Reduce potential releases from degrading landfill sites that the City has a growing stake in.
10. Assess the financial impacts from proposed changes to be negotiated for the SMaRT station and Kirby Canyon Landfill.
11. Recommend policies and incentives consistent with this Strategic Plan.
12. Estimate jobs expected to be created and financial benefits from implementing the Zero Waste Operations Plan.
13. Identify which financing tools might be most helpful to local businesses to expand services needed to achieve Zero Waste in Palo Alto, working with the City's Economic Development/Redevelopment agency.
14. Determine what funding, staffing and authority will be needed for staff to implement a Zero Waste goal in Palo Alto.
15. Establish targets and goals for the Operational Plan.
16. Establish criteria for implementing bans and mandates where voluntary efforts have not been effective in meeting Zero Waste.

Appendix A – Palo Alto Zero Waste Task Force Members

Task Force Co-Chairs	Organization/Affiliation
Walt Hays	Resident
Bud Mission	Roche Palo Alto
Name	Organization/Affiliation*
Michael Closson	Acterra / Z.W. Taskforce of Santa Clara and San Mateo Counties
Karen Holman	Resident
Scott Nixon	Agilent Technologies
Tom Moutoux	Foundation For Global Community
James Kao	Green Citizen
Anna Payne	Hewlett Packard
Irene Sampson	League of Women Voters
Frank Rocha	Lockheed Martin
Eric Hassett	Palo Alto Hardware
Michael Kearney	PAUSD
Walt Hays	Resident
Emily Renzel	Resident, Parks representative
Bob Wenzlau	Resident, Terradex (small Palo Alto business)
Bud Mission	Roche Palo Alto
Greg Mize (alternate)	Roche Palo Alto
Ann Schneider	Sierra Club Zero Waste Committee
Alyssa Rice Wilson (alternate)	Sierra Club Zero Waste Committee
Julie Garcia	Simons Operations- Stanford Shopping Center
Ramsey Shuayto	Stanford Management Co.
Barbara Pressman	Stanford Terrace Inn
Henry Clark	TIBCO Software Inc
Mirna Cintron	Stanford Hospital/Packard Children's Hospital
Melissa Stai	Palo Alto Medical Foundation
Consultant	
Gary Liss	Zero Waste Consultant
City Staff attending Task Force meetings	
Susan Arpan	City of Palo Alto Economic Resources Department representing City Manager's office
Jim Burch	City of Palo Alto Mayor
Michael Jackson Russell Reiserer Annette Puskarich Wendy Hediger Robert Le	City of Palo Alto Public Works- Refuse
Julie Weiss Dan Firth Joe Afong (alternate for Dan Firth)	City of Palo Alto Public Works Environmental Compliance/City of PA Sustainability Committee City of Palo Alto Fire Dept./City of PA Sustainability Committee.

* Each organization has one member on Task Force; subsequent members are alternates.

Appendix B – Summary of 1997 Waste Generation Study Data (By Sector, in tons per year)

Material	Residential	Commercial	Roll-off	Self haul	Combined
PAPER	34.6%*				
Corrugated	722	2688	1606	88	5104
High Grade	792	2698	431	56	3977
Newspaper	828	1700	38	43	2609
Magazines	659	574	25	34	1292
Mixed paper	2756	3287	1478	204	7725
Other paper	1598	3646	2497	83	7824
METALS	5.3%				
Aluminum Cans	66	118	8	3	195
other non-ferrous	51	107	2	27	187
Steel Food and Bev Cans	154	187	4	8	353
Other Ferrous	188	534	2471	134	3327
Comp. Bulky Items	0	0	53	217	270
GLASS	0.2%				
Recyclable glass	452	1006	234	31	0
Remainder/composite glass	39	68	113	38	195
TEXTILES	2.8%				
Textiles and Leather	492	629	1045	134	2300
PLASTICS	11.8%				
HDPE containers	209	215	52	12	488
PET containers	80	93	22	4	199
Film Plastics	706	1915	302	66	2989
Remainder/composite plastic	833	3073	1984	195	6085
PLANT DEBRIS	3.5%				
Leaves and Grass	535	383	52	261	1231
Branches and Brush	730	109	71	761	1671
PUTRESCIBLES	19.1%				
Food Waste	5007	5649	586	260	11502
Diapers	696	262	6	36	1000
Other organics	282	232	2516	181	3211
WOOD	9.9%				
Wood	147	875	5362	1736	8120
C&D CERAMICS	12.5%				
Inert solids	582	323	7874	1508	10287
SOILS	0%				
CHEMICALS	1.0%				
HHW	113	156	3	6	278
Brown Goods	19	338	72	81	510
TOTAL	18717	30527	28835	6126	82419

* All shaded numbers in this column are percentages of that material for the combined waste stream in 1997.

The following are pie charts prepared for each of the four sectors that highlight 11 of the 12 major categories of materials that were still landfilled as of 1997. There was no data available for the 12th category: reusables.

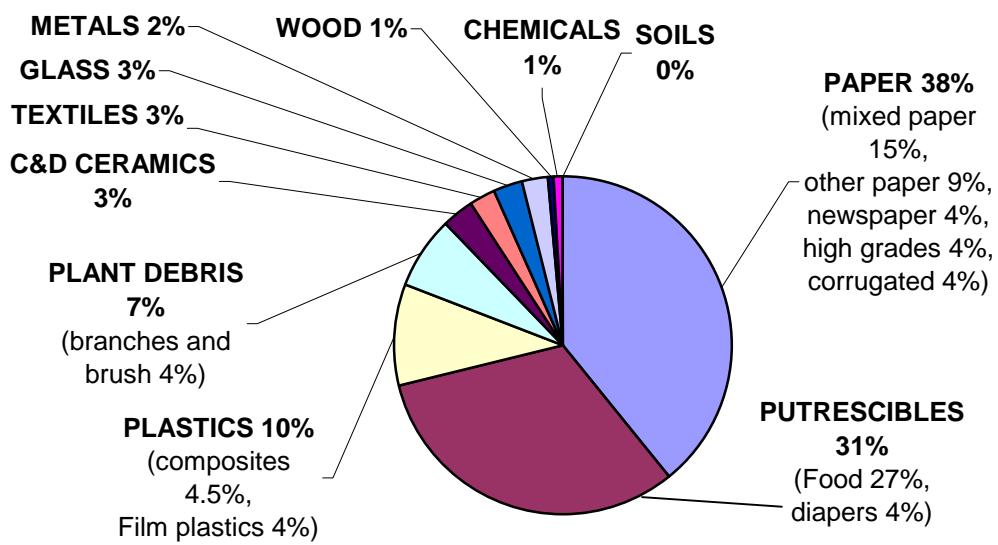


Chart 6 - Single Family Residential Waste Stream
Total waste 18736 tons, Palo Alto 1997 WCS

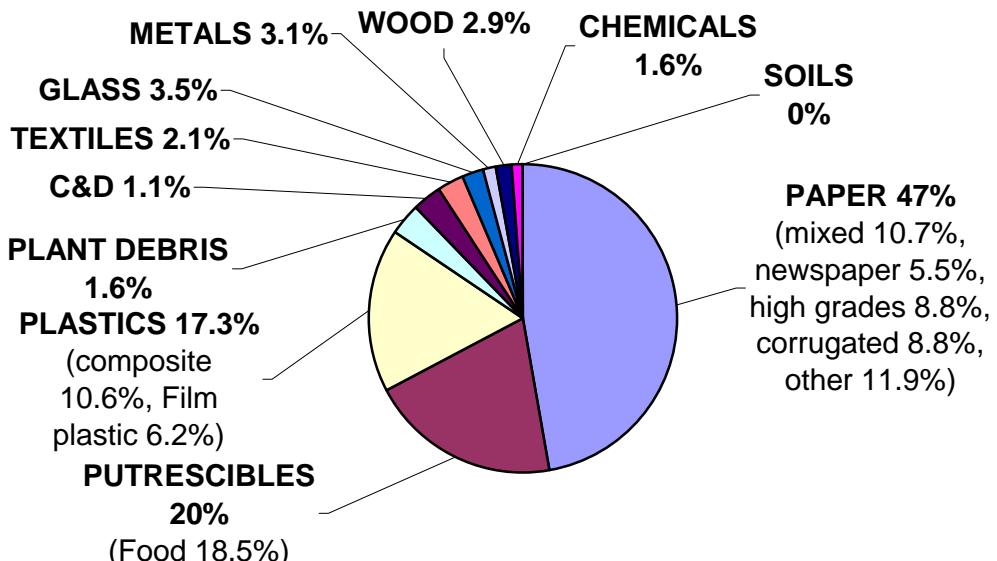


Chart 7 - Commercial and Multi-Family Waste Stream
Total waste 30527 tons, Palo Alto 1997 WCS

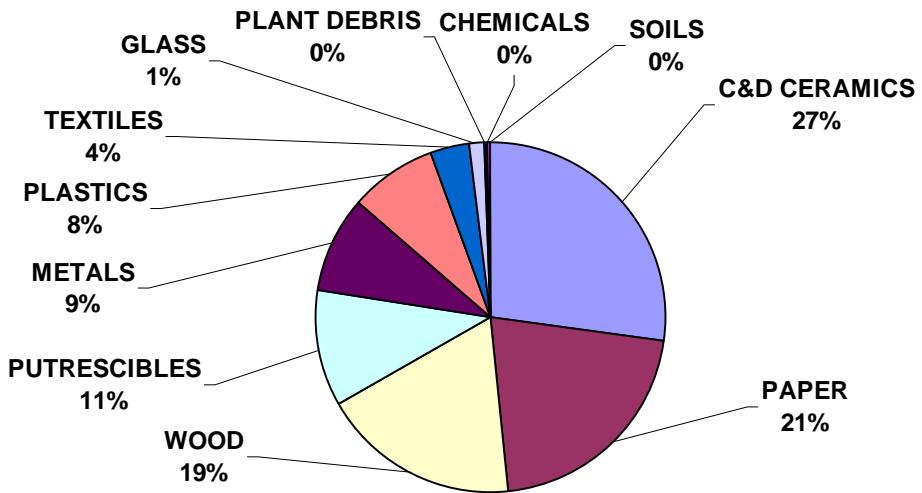


Chart 8 - Roll-off Waste Stream Composition*
Total roll off waste 28835 tons, Palo Alto 1997 WCS

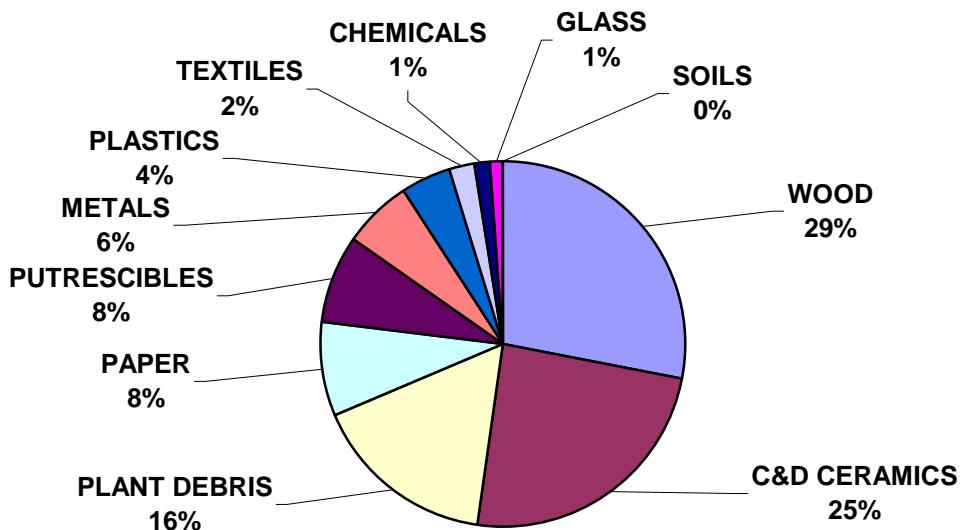


Chart 9 - Self Haul Waste Stream Composition
Total self haul 6126 tons, Palo Alto 1997 WCS

* Roll-offs are large metal boxes that are used to store large quantities of materials, and are collected by trucks that use a winch to roll the boxes onto the bed of the truck.

Tables 3.2 and 3.3 from the 1997 study highlight specific amounts of materials documented being collected by recycling businesses (service providers) and reported by business recyclers (waste generating businesses). In addition to these documented amounts, the CIWMB estimated additional amounts were recycled to calculate a total waste generation amount, then subtracted the documented City recycling programs from that and calculated the total of 44,019 tons diverted through non-City programs.

Table 3.2 1996 Recycling Business Diversion: Programs not funded or operated by City (tons)

Recycling Business	Cardboard	Paper	Containers	Metals	Wood	Other	Organics	H-HW	Electronics	Butcher	Goodwill	Other	TOTAL
All Shred	156												156
Berman's													12
Best Metals	180			840				12					1,320
City Metals				600				300					600
Darling International											444		444
DCD/DOR		108											108
Dolson Recycling		276											276
Enterprise Recycling		180	12										192
Hackett Enterprises													112
Hockman Recycling				960									960
Insta Shred		300											300
Jerry's Salvage		96											96
Micro Metallics													180
N CA Pulp & Paper		30											30
Paper Recovery		160											180
Peninsula Sanitary	214	185	12										411
Phoenix Recycling								21					21
Polymer Recovery					6								6
ProShred				78									78
Recycled Fibers		168											168
SJ Tailow													120
Security Shredding				56									96
Shred It		156											156
Shred Works		12						12					12
Sims/LMC				1,200									1,200
Smurfit								252					252
Valley Recycling													120
VP Electronics													120
Waste Resource Recovery								120					120
Weyerhaeuser		656											636
Total Recycling Business Diversion	478	3,389	414	2,685	120	-	-	516	564	-	-	-	8,166
TOTAL RECYCLING	896	3,389	414	2,688	199	-	-	536	564	-	-	-	8,676

Table 3.3 1996 Business Recycling Diversion: Programs not funded or operated by City (tons)

	Cardboard	Paper	Containers	Metals	Wood	Other	Organics	H-HW	Electronics	Butcher	Goodwill	Other	TOTAL
Lucky	240												240
Safeway	158												160
Hewlett Packard-Calif. Ave.					3	50				20			73
Hewlett Packard -Page Mill								12					12
Varian								17					17
Total Business Recycling Diversion	408	-	-	3	79	-	-	-	-	20	-	-	510
TOTAL RECYCLING	896	3,389	414	2,688	199	-	-	536	564	-	-	-	8,676

Appendix C – Service Needs by Type of Material

The following is a description of the service needs and opportunities that were identified for each of the 12 master categories of materials discarded in Palo Alto.

1. Reusables.

- Materials in the reuse category were assessed as a high priority need because there were limited services found and because reuse is above recycling on the integrated waste management hierarchy. Facilities selectively take certain grades of reusable materials, primarily the high end.
- A limited number of facilities accept and process reusable materials like large appliances, mattresses and reusable building and construction materials. Only a few organizations have pickup services, and those process a limited set of materials.
- There are no facilities for used building materials in Palo Alto and nearby facilities are very limited in what they accept (e.g., have many specifications for what grade, type or age of materials they accept).
- The Palo Alto website could also promote other reuse services (e.g., Free-cycle, Cal-Max, e-Bay, Resource Area for Teachers, and Craig's list).
- The City of Palo Alto and the State waste characterization studies do not provide any data on reusables found in disposed waste to help determine priority of reusable service needs.

2. Paper.

- Adequate services are provided for most types of paper in Palo Alto. However, there are no services available in the vicinity of Palo Alto that accept plasticized paper/paperboard and the Palo Alto Recycling Center does not accept waxed corrugated (only juice and milk boxes).
- The Palo Alto waste characterization study from 1997 did not provide itemization of waxed cardboard, however the “other paper” category did appear as a top 10 material type representing 13% of the waste stream. Also because there is some evidence that there has been a significant increase in use of this type of material in product packaging since 1997, this category was included, as a priority service need.
- There are services that recycle source separated high-grade office paper from commercial sectors, which provides more value to generators.³⁸ Such high-grade paper recycling was therefore not noted to be a high priority service need, but rather a “niche opportunity.”
- There is a lack of services for recycling thermal paper but it is not indicated as a priority as it is not a large quantity of materials disposed (and likely decreasing in importance over time).
- There are services to accept blueprints, however education is needed (e.g., a brochure and website info) to explain these services to architectural businesses, and residents that dispose of blueprints.

³⁸ If white paper is kept separate from other colors and types of paper, it commands a higher price in the marketplace. Large businesses that generate such material can sell it and generate some net revenue. Although they could also recycle that as mixed paper, they would not get the revenue from that material.

- More detailed information is also needed on the website for services that take waxed or plasticized coated paper.

3. Glass.

- Adequate services are provided for mixed glass containers. Service is needed for recycling glass for higher and better uses (e.g., wine bottles back to wine bottles, clear glass back to clear glass). None of the glass categories were found to be high in quantity in disposed waste. As a result, even though the following lacks of services were noted, none of these are priority.
- Due to the close proximity of Palo Alto to wine country wine bottle reuse represents another niche opportunity if a market could be developed.
- Very few beverage container redemption depots³⁹ exist in Palo Alto.
- Other services needed include: plate glass recycling in or near Palo Alto aside from debris box services where they may likely be broken and contaminated and services to recycle non-fluorescent light bulbs, Pyrex, ceramics, and composites. These may be niche opportunities.

4. Metals.

- Services are adequate for most metals recycling. None of the metals categories were found to be high in quantity in the disposed waste stream from the 1997 study so the following lack of services are not considered high priority.
- There is a need for more information on scrap metal services to all sectors. Although scrap metal is accepted at curbside for residential customers, there is no dedicated container to separate this material to inform residents of its acceptance.
- No scrap metal curbside services are offered to business and multi-family sectors and they are noted as a niche opportunity especially since there are strong markets for scrap metal.
- As noted above, Palo Alto lacks adequate beverage container redemption depots, which also creates a niche opportunity for aluminum can recycling.
- A new mattress recycling service exists, but needs more publicity.
- Information on Automobile reuse and recycling (including automobile donation services) will be helpful to list in the Recyclopedia.

5. Plant Debris.

- Adequate services exist for most plant debris. Branches and brush were found in significant quantities (12%) in disposed self haul waste in 1997 however it is not noted as a priority since specific green waste policies have been implemented since 1997 that are expected to have resulted in a major decrease in the disposal of these materials.
- Better signage and information is needed to direct self-haulers to the recycling of plant debris section at the landfill and to clarify that this material is not buried in the landfill.
- More information about grasscycling and on-site composting is needed.

³⁹ Facilities that would redeem containers under the AB2020 recycling system (see <http://www.consrv.ca.gov/DOR/gpi/FactSheet04New.pdf>)

6. Putrescibles (Food Wastes).

- The 1997 waste characterization study identified food wastes as significant in quantity, 26.5% in residential and 13% in all sectors combined. There are NO services for drop off or pick up of all types of putrescibles. As a result discarded food collection and composting services are noted as a top priority for services needed for residential and commercial food waste.
- Vegetative and food contaminated paper may be composted on-site but there is limited information about on-site composting for all sectors. The Recyclopedia does not provide information about on-site composting services and the Palo Alto website does not provide a brochure on these services.
- Commercial generators of excess edible food need to be advised of the “Good Samaritan” law that allows them to donate such food to the needy without incurring any liability.

7. Wood.

- Unpainted wood was found in significant quantities in disposed waste in 1997. Unpainted wood was seen in significant quantities in roll off (17%) and self haul (24%) streams in 1997. However, unpainted wood is anticipated to be significantly lower in the roll-off stream today because of the recent C&D ordinance requiring recycling of large projects. Its unclear if unpainted wood remains in the self-haul waste streams that may be from small-scale generators (e.g., small remodels). Because there are adequate recycling services for these materials outside of Palo Alto and because Palo Alto has a C&D ordinance in place for large projects, the service need for unpainted wood is considered 2nd priority and needs to be reconsidered with updated waste characterization data.
- Information on best practices to recycle wood from remodeling and demolition projects will be helpful. Wood mixed into a debris box may become inseparable for recycling when mixed with soil concrete and other items.
- Limited services and information are available on drop off recycle locations for painted and unpainted lumber and wood (including pallets) in or near Palo Alto.

8. Construction & Demolition Debris/Ceramics.

- Gypsum wallboard was found in significant quantities (7%) in the overall waste stream in 1997. Because the analysis shows that gypsum wallboard is primarily brought into the disposed stream from roll-off containers, it is not identified as a priority service need but needs to be restudied closely to see if significant quantities remain in the roll-off stream from projects that are not triggered by the requirements of the C&D ordinance.
- More information is needed on best practice procedures to recycle C&D materials. These materials may become contaminated and inseparable in debris boxes.
- No drop off or pick up service is in place for carpet and carpet padding recycling in or near Palo Alto, nor is there a way to conveniently recycle gypsum wallboard, porcelain, brick, and composite roofing from small building improvement projects not required to recycle these materials by ordinance.

9. Soils.

- Rock and soil were not found to be disposed of in significant quantities in the 1997 study and are therefore not considered a top priority. With the adoption of a construction and

demolition (C&D) ordinance an updated waste study may find that rock and soil are now adequately serviced in Palo Alto.

10. Plastics.

- There are very limited services available for film plastics and composite plastics, both of which were identified to be in significant quantities (3.5% and 6% respectively) in the overall waste stream. Additionally there is some evidence that since 1997 these materials have increased in quantity due to their increased use in packaging and products. As a result both film plastics and composite plastics are considered a top priority service need.
- The Palo Alto Recycling Center accepts #6 foam containers and Styrofoam blocks that are used to ship products. Foam containers are not identified in significant quantities in disposed waste from the 1997 characterization study, however the State waste study from 1999 did identify restaurants as one of the top 4 waste generators in the commercial sector. As take-out food is commonly sold in #6 foam containers, when restaurants are surveyed, the City should get a better estimate of the quantities of these wastes generated and discarded.

11. Textiles.

- The 1997 waste characterization study found textiles to be enough of a quantity of the overall disposed waste stream at 2.7% to be considered a priority for review.
- There are no services provided near or in Palo Alto for recycling of textile products including cotton and wool (which have relatively stable markets).
- There are only a few organizations that pick up textiles with a primary intent of processing these items for reuse.

12. Chemicals.

- Information and services are limited for recycling of pharmaceuticals and treated medical waste (such as needles), or for the proper handling and disposal of treated wood. These materials present possible health protection issues, and they may contain toxic constituents even though they may not be regulated as hazardous wastes.
- With the successful implementation of SB 20 in 2005, there is a need for increased free and convenient drop off services for recycling of TVs, computer monitors and other hazardous electronics to discourage dumping or hiding these toxic items in disposal especially in anticipation of greater high definition TV sales.

Appendix D – Results of Task Force Discussions

The Task Force spent several meetings reviewing a wide variety of incentives and policies that could be adopted to restructure the marketplace to encourage waste prevention, reuse, recycling & composting. Some of the proposed incentives and policies would require changes in policies and definitions in:

- RFPs & Contracts
- Rates, Ordinances
- Land Use Permits
- Facility Permits
- Zoning

The Task Force also considered how the City structures its fees and taxes, which it recognized could have a significant influence on corporate actions. The Task Force considered how the Zero Waste Strategic Plan could change the economic choices made in the community, so that waste prevention, reuse, recycling & composting programs that were marginal in the past would become economic and cost-effective. The Task Force explored how to reward businesses more that design wastes out and eliminate materials from being wasted. The Task Force explored the impacts on the producer of the materials (residential and commercial waste generators), the waste haulers and recyclers and the facilities that will receive these materials.

The Task Force also explored how the City pays for garbage and recycling services to contractors. It discussed restructuring such payments so that the City pays more for what it wants (waste prevention, reuse, recycling & composting), and much less for wasting. This would recognize wasting as a symptom of inefficiency, waste that is landfilled as a failure of the system, and harness the forces of the marketplace to achieve the public policy goal of Zero Waste.

As the City plays a critical role in education and outreach responsibilities in the current Palo Alto system, the Zero Waste Task force also discussed policies and incentives for improved education and outreach by both the City and service providers. The Task Force explored how service providers could help more to implement Zero Waste programs cost effectively and efficiently, and to process and market high quality products for their highest and best use. The Task Force explored how this could help reinvest those resources into the local economy whenever possible.

After review and discussion, the City's Zero Waste Task Force selected policies that initially encouraged and provided incentives for the pursuit of Zero Waste in Palo Alto, rather than mandating policies and requiring participation in programs. The Task Force wants to create a partnership among all the stakeholders involved, and work together positively to achieve the many benefits that Zero Waste offers. The Task Force also wants to change thinking of this as a waste disposal problem to solve, and view it more as an economic development opportunity to create new jobs and businesses in the area, and to make Palo Alto businesses "Greener," more "Sustainable," and more cost competitive. Following are the policy options selected by the Task Force to be included in the Zero Waste Strategic Plan.

1. Adopt Zero Waste (ZW) as a community goal by 2020 and set a goal for the City to divert from landfill at least 75% of all materials generated by 2010. Adopt in strategic Zero Waste Action Plan (ZWAP).
2. Develop Zero Waste Operations Plan to detail priorities for facilities to be developed for the City as a whole after the City updates its detailed waste characterization study. Develop Zero Waste Implementation Plan to detail City's priorities for facilities to be developed after the City updates its detailed waste characterization study.⁴⁰
3. Consider Zero Waste, waste prevention, reuse, recycling and composting to be economic development priorities to make Palo Alto businesses more sustainable and globally competitive. Leverage community reinvestment and economic development strategies to help expand needed services.
4. Recognize businesses that are models of one or more Zero Waste Business Principles.⁴¹
5. Expand City's waste audit and technical assistance services for businesses, coordinating with Pollution Prevention Program of Environmental Compliance Division with Integrated Environmental Audits (like with Green Business Certification programs), to provide detailed analyses like the Alameda County StopWaste Partnership Program.⁴²
6. More actively promote Bay Area Green Business Program and recruit Palo Alto businesses to participate. List Palo Alto Green Businesses on City's website with contact information and URL links to websites of those business to encourage the public to patronize them. For Palo Alto businesses certified as Green Businesses, provide discounted development fees and prioritize applications for permits by the Palo Alto Development Center.
7. Train businesses and City staff on how to truly achieve a "paperless office," using the latest technologies (e.g., extensive use of electronic mail and electronic document storage and retrieval systems⁴³) to reduce wastes and develop programs to recycle >80% of discarded materials in offices.⁴⁴
8. Work with all government offices (including courts) to be able to accept electronic submittal of all applications and required submittals.
9. Provide wireless Internet throughout downtown and other major commercial areas.
10. Promote material exchanges, including CalMax, EBay, Resource Area for Teachers (RAFT) and FreeCycle. Assist to develop South San Francisco Bay Area computerized matching system for donations of excess inventory materials and products to local nonprofits (as done by LA Shares in Los Angeles).⁴⁵
11. Require PASCO to offer recycling services at no additional cost to businesses (without monthly bin rental fee).
12. Review performance of construction, renovation and demolition (C&D) Ordinance one year after its implementation, to confirm that 90% of inert and 50% of other C&D debris is actually diverted from landfill. If target goals are not met, require deposits be paid to ensure implementation, to be refunded if waste diversion requirements are met, as a condition of building or demolition permits.⁴⁶
13. Require all new private construction and major renovation projects in Palo Alto to be LEED-certified Green Buildings or meet comparable Green Building policies already adopted for public facilities.⁴⁷ Require all construction and major renovation of facilities leased by the City, to be LEED-certified Green Buildings, if not covered already by existing City Green Building policy.
14. Adopt adaptive reuse as a priority in City building standards for both residential and commercial construction.

⁴⁰ Scheduled for FY2005-2006.

⁴¹ For copy of the Principles, go to: <http://www.grnn.org/zerowaste/business/>

⁴² See <http://www.stopwaste.org/home/index.asp?page=9>

⁴³ For example, President Bush called for national adoption of electronic medical records in his recent state of the union address (<http://www.actalliance.org/onlinehealth.htm>). Dr. Paul Tang at the Palo Alto Medical Foundation is a pioneer in using such electronic medical records (http://www.pamf.org/news/2003/0403_hipaa.html).

⁴⁴ Brenda Platt, *Mini Bins Help Office Settings Reduce Waste 50 Percent and More*, Institute for Local Self-Reliance, July 2002, see <http://www.ciwm.ca.gov/LGLibrary/Innovations/MiniBins/>

⁴⁵ <http://www.lashares.org/>

⁴⁶ Chapter 5.24 of the Palo Alto Municipal Code requires that all covered projects shall divert at least ninety percent of inert solids and at least fifty percent of the remaining project-related construction and demolition waste to an approved facility or by salvage.

⁴⁷ The Leadership in Energy and Environmental Design (LEED) Green Building Rating System® is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. For more info, see <http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>

15. Ask businesses to adopt Zero Waste goals and plans.
16. Set environmentally preferable purchasing and recycled content as “defaults” for departments to use in departmental purchases of supplies and equipment not centrally procured. Use fees from solid waste system to help fund staff in Purchasing and Contract Administration Division to monitor and implement environmentally preferable purchasing program.⁴⁸
17. Require PASCO to reuse, recycle and/or compost at least 50% of the materials collected in City Clean-up Day. Consider alternative ways of collecting so usable materials are not compacted on route.⁴⁹
18. Implement comprehensive community-based social marketing programs to more actively engage residents and businesses to commit to preventing waste, reusing, recycling and composting. Work on region wide development of messages and promotions for events such as Earth Day (April 22), World Environment Day (June 1-5, 2005), Second Chance Week (September) and America Recycles Day (November 15).
19. Identify and involve existing businesses and nonprofits that could provide waste prevention, reuse, recycling and composting services.
20. Structure payments to PASCO to be paid inversely to the amount landfilled.
21. Facilitate and/or provide equipment, containers, land, building space and financing support to make waste prevention, reuse, recycling and composting more economic.
22. Build on existing private and nonprofit waste prevention, reuse, recycling and composting operations to minimize public investments.
23. Solicit other companies to provide collection and transport services for Recyclable Materials⁵⁰ and/or solid waste from Commercial/Industrial Premises as non-exclusive franchises. This would allow additional haulers to compete within the City and the City could require detailed reporting and performance requirements, including requiring one or more of the following recycling policies as a condition of franchise to do business in Palo Alto.
24. Provide recycling services to multi-family residential dwellings (MFDs) at least equal to those of single-family curbside recycling services. Compile data on MFDs to establish clear baseline to measure progress.
25. Require haulers to achieve a waste diversion goal for their overall operations (e.g., 50% initially and 10% more each year).
26. Set substantially lower rates for clean source-separated materials from residents going to Palo Alto compost area. Establish greater discount for clean source-separated materials from businesses going to Palo Alto compost area
27. Provide areas at Palo Alto Landfill and SMART station for drop-off of reusable furniture, appliances, toys, pallets, mattresses, and used building materials, in conjunction with local nonprofits and/or reuse businesses.
28. Require source separation of all materials that can be reused, recycled or composted. Charge penalties for all designated materials found in loads
29. Encourage retailers and their suppliers to takeback products and packaging that are currently difficult to reuse, recycle or compost in Palo Alto (like Ottawa, Canada program). Post all cooperating retailers on City’s Zero Waste website and regularly include articles and/or ads about this program in area newsletters and newspapers.

⁴⁸ With leadership from the City’s Sustainable Purchasing Committee, the City is already expanding the purchase of environmentally preferable products. Currently in use are chlorine-free, 100% recycled content papers, low-mercury fluorescent lights, and recycled carpet tiles in high traffic areas, and uses 20% bio-diesel fuel in all heavy equipment. Source: <http://www.cityofpaloalto.org/fire/sustainability/pdf/citygreenbuscert.pdf>

⁴⁹ See *Community Cleanups* case study prepared by Gary Liss & Associates for the CIWMB with alternative ways that different communities are accomplishing that at: <http://www.ciwmb.ca.gov/LGLibrary/Innovations/CleanUps/>

⁵⁰ As defined in Attachments No. 1 and 2 of the *Agreement for Solid Waste and Recyclable Materials Handling Services*, 1999 between the City of Palo Alto and PASCO.

Appendix E – Summary Of Zero Waste Community Surveys 2005

Residential and Commercial Surveys⁵¹

The City received 61 responses to the Commercial Survey and 111 responses to the Residential Survey. The responses provided support and suggestions for the issues posed. However, these numbers do not represent a statistically valid sample and should only be considered as one part of the input provided through this Zero Waste planning process.

Of those responding to the Surveys, more than half indicated support for Zero Waste, and would like more information about how to pursue that. Strong support (> 50%) was also indicated from those responding to the Surveys for the following:

Garbage And Recycling Rates - Keep current structure (Garbage rates structured so businesses that prevent waste, reuse, and recycle can reduce their garbage bill by reducing their level of service. Provides recycling collection, at no additional cost. Recycling and garbage rate are rolled into one monthly rate.)

Recycling Center - Operate and maintain a recycling center within the city limits.

Resource Recovery Park - Establish a Resource Recovery Park within Palo Alto City limits or nearby.

Require Tenant Access - Require property management companies to provide tenants (e.g., apartment complexes, office buildings) with access to City's Recycling Program.

Commercial Yard Waste Collection - Implement a landscape/plant debris collection program for commercial customers.

Implement Food Waste Collection - Expand collection services to include separated food waste for composting.

Require Compostable Packaging And Containers - Ban disposable food-service containers and require compostable food-service containers only.

Those responding to the Residential Survey also strongly supported the following:

Establish Zero Waste Refuse Rate - Establish a reduced refuse rate for residents that generate less waste than the Mini-can (20 gallon) level of service. Rate would still include costs for other programs/services funded by Refuse rates (e.g., Household Hazardous Waste Program, street sweeping).

Adopt Product Life-Cycle Regulations - Encourage Palo Alto elected officials to advocate for the adoption of legislation, on a State or National level that would require Producer Responsibility, financial and physical, for the take-back of products and packaging they produce at the end of the product's useful life.

Implement Green Building - Implement a Green Building Program for new construction and major renovations.

Implement Food Waste Collection - Expand collection services to include separated food waste (including food-soiled paper like pizza boxes, waxy cardboard, and frozen food boxes) for composting.

Landfill Ban on Recyclable Materials - Ban materials from the Palo Alto Landfill that are recyclable, such as, cardboard, paper, metal, bottles and cans and construction and demolition debris. The Palo Alto Landfill receives waste for disposal from debris boxes, residents/businesses self-hauling garbage.

Ban on Recyclables in Garbage - Ban materials from garbage pick-up that are recyclable, such as, cardboard, paper, bottles and cans.

Adopt Precautionary Principle - Require the City to adopt the Precautionary Principle as a strategy in conducting business (e.g. city operations, program and service offerings). The Precautionary Principle

⁵¹ For full details of these surveys, go to: http://www.city.palo-alto.ca.us/zerowaste/graphics/ZW_Survey/Business_survey_results_summary_final.pdf and http://www.city.palo-alto.ca.us/zerowaste/graphics/ZW_Survey/Residential_survey_results_summary_final.pdf

requires analysis of materials and processes to eliminate the risks of environmental and human health before problems occur,

Respondents also overwhelmingly supported a goal of Zero Waste, and 95 percent would either adopt a goal for themselves now, or would do so with more information provided. In general, the response to the survey of residents suggested a more aggressive set of policies be adopted than recommended by either the respondents to the Commercial Survey or the Zero Waste Task Force.

Palo Alto Service Providers

This survey was prepared to better understand what services are provided in the area, and to get suggestions of what additional services local businesses could provide to help move towards Zero Waste in Palo Alto. To achieve Zero Waste, Palo Alto would like to build on the investments and interests of everyone in the community that are working to reduce, reuse, recycle or compost waste. Palo Alto wanted to make sure that existing activities are included in Plans, and include any new endeavors that may be contemplated. Palo Alto also wanted to know if businesses were interested in participating in the development of a Resource Recovery Park.

Over 400 surveys were sent by email to lists of service providers found throughout the San Francisco Bay Area that could provide services in Palo Alto. Although only 17 firms responded, they provide some interesting insights into the types of services currently available, new services being offered, and interest in developing a Resource Recovery Park. Clearly many are interested, and some are willing to invest their own resources to make it happen.

Companies Responding (17)

Auction BDI
FP International
Granite Rock Company
GreenTeam/Zanker
Hackett Electronics
Harbor Sand & Gravel
Home Composting Education Program
Palo Alto Music Boosters Flea Market
Palo Alto Sanitation Company (Waste Management, Inc.)
Peninsula Center for the Blind
Peninsula Sanitary Services
Resource Area for Teachers
Sonrise Consolidated
Students Recycling Used Technology (StRUT)
Synergis Waste Management Services
Zero Waste Solutions.
One company also responded confidentially (which removes and processes CFC-11 from refrigerator walls).

Services Firms Provide

Reduce: _3_Waste Audits __ Process and Product Redesigns

Reuse: _6_Collection Services _5_ Drop-off Locations _4_ Retail Sales _3_ Assets Liquidation
1 Computerized Matching

Recycle: _7_Paper _8_Metals _6_Wood _7_Plastics _7_Glass _6_C&D _3_Tires
_4_Other: EPS, Concrete & Asphalt (2), Vendor Management

Compost: 3 Collect Yard Waste (YW) 1 YW Drop-off Locations 4 Collect Food Waste (FW)
On-Site FW Composting 1 YW Composting Facility 1 FW Composting Facility
1 Education Program 1 Vendor Management

Hazardous Wastes: ABOP HHW 1 SQG 4 Ewaste 2 Other: excess electronic inventory

Procurement: 7 Sell Recycled Products Sell Envt. Pref. Products Precautionary Principle Analyses Zero Waste Services: 1 Takeback Programs Leasing Highest & Best Use Analyses 1 Pollution Prevention Services Reverse Logistics/Supply Chain Management GRI or ISO Reporting Services 1 Consulting 2 Resource Management Incentives/Performance Based Contracting 1 Green Certification Sustainable Development or Investing Resource Recovery Park Development Other: Stormwater, Electronic Equipment (specifically computers for schools)

Affiliations (Organizations, business/trade associations, in which businesses participate)

2 PA Chamber of Commerce 3 Rotary 2 Silicon Valley Manufacturing Group (SVMG) 2 CA Refuse Removal Council 5 CA Resource Recovery Assn. Other: Independent Recyclers Council (CRRA), Redwood City Chamber of Commerce, Seaport Industry Association, Silicon Valley Toxics Coalition, Northern CA Recycling Association (NCRA), International Facilities Management Association (IFMA), US Environmental Protection Agency (1 mentioned generally, and another mentioned EPA's Waste Wise Program), United Nations Task Force on Global Warming.

Services and Programs Offered

In addition to the services noted above, some of the companies underscored their capabilities and interest in providing the following services and programs in Palo Alto: Ewaste, baled expanded polystyrene plastics (EPS), concrete/asphalt recycling (including portable unit), food waste composting (commercial and residential), home composting, flea market, reuse of excess materials for teacher to use, mixed construction and demolition debris, deconstruction, demolition, business technical assistance and performance based contracting; ongoing solid waste assessments and best practices.

Most indicated that they already offer these services, or could start them quickly in Palo Alto.⁵² Many indicated that these services have been offered for 10-15 years, although there were a number of new services (e.g., ewaste and zero waste consulting services).

Eight of the firms indicated an interest in investing buildings, land, money or time in private or nonprofit ventures to expand reuse, recycling and/or composting services to Palo Alto residents and businesses. Nine of the firms indicated an interest in helping to develop a Resource Recovery Park for reuse, recycling and composting activities in Palo Alto or surrounding areas.

Of particular note, the current franchised hauler, PASCO (a Waste Management company) said "PASCO is committed to assisting the City in achieving its admirable goals of additional diversion and Zero Waste. Based on our experience, Palo Alto is a very proactive community and we look forward to partnering with them in these efforts."

⁵² For full details of the survey, go to http://www.city.palo-alto.ca.us/zerowaste/graphics/ZW_Survey/Service_Provider_Survey_Summary_071805.pdf.

Appendix F - Economic Analysis of Zero Waste Strategic Plan

Although there has not been a detailed analysis of the programs and facilities needed to achieve 73% diversion by 2011, the following are initial assumptions that provide a preliminary estimate of the opportunities ahead.

The current processing, transfer and disposal costs are about \$82.50/ton.⁵³ On that basis, the avoided costs of processing, transfer and disposal for this additional 26,000 tons would be approximately \$2.1 million/year⁵⁴

This analysis assumes that approximately 3,900 tons⁵⁵ of materials will be eliminated by improved product and process designs. Half of the diversion could come from composting programs arranged by the City at a cost of about \$50/ton for processing.⁵⁶ The other half of the diversion could come from eliminating wastes, and expanding reuse and recycling programs, at an average cost to commercial waste generators of about \$35/ton.⁵⁷

Estimate of Tonnages Needed to Meet Interim Diversion Goal

	Tons/Year
A. Total Waste Generated	166,548
B; Interim Diversion Goal (73%*A)	121,580
C. Current Diversion Rate (57%)	95,169
D. Additional Diversion Needed	~26,000
E. Reduce (15% of D)	3,900
F. Reuse (25% of (D-E))	5,525
G. Recycle (25% of (D-E))	5,525
H. Compost (50% of (D-E))	11,050

These benefits to waste generators could be enhanced by new economic or policy incentives adopted by the City to foster Zero Waste. Incentives might include both discount rates for those who reduce, not just rate premiums in the case of those who waste more.

⁵³ Disposal cost today at Kirby Canyon Landfill is \$51.74 per ton. The FY03/04 SMaRT station processing and transfer cost is \$30.74 per ton. The total would be (\$51.74 + \$30.74) = approximately \$82.48/ton.

⁵⁴ Calculation: 26,000 tons * \$82.50/ton = \$2,145,000.

⁵⁵ About 15% of the total additional 26,000 tons to be diverted.

⁵⁶ Greg Ryan, Z-Best Composting Facility, Gilroy, personal communication, September 9, 2005, says the price for wet commercial food waste composting is about \$50/ton, depending on how clean the incoming materials are and may be higher in a couple of years. Steve Sherman, Applied Composting Consulting, personal communication, September 9, 2005, said it could be \$25 to \$50/ton, with lower end for processing cleaner incoming materials, and higher end to process dirtier, mixed materials. Also, Hilary Gans, BFI Waste Systems, personal communication, September 9, 2005, said range could be \$35 to over \$50/ton, similar to Steve Sherman's comments.

⁵⁷ Frank Weigel, GreenWaste Recovery personal communication, August 9, 2005, rate for processing mixed dry commercial recyclables is \$45/ton. In the *Resource Recovery Park Feasibility Study*, prepared for the Del Norte Solid Waste Management Authority by Gary Liss & Associates in March 2001, the net cost of processing reusables was determined to be \$38/ton. Eliminating wastes typically saves money. For this analysis, costs were assumed to be zero for eliminating wastes. If eliminating waste diverts 3,900 tons, and reuse and recycling each divert 1/2 of the remaining waste stream (5,525 tons each), then the average cost per ton for these materials would be [(5,525 tons * 45/ton) + (5,525 tons * 38/ton) + (3,900 tons * 0)]/13,000 tons = \$35.28/ton

Transportation costs to get recovered materials to processing sites will remain the same as current costs to transport materials to SMaRT, for materials being processed in locations other than Palo Alto.⁵⁸ This analysis assumes that approximately 3,900 tons⁵⁹ of materials will be eliminated by improved product and process designs. For the remaining 22,511 tons, there would also be *additional* costs for recyclables to be collected separately from garbage of about \$10/ton.⁶⁰

Based on these assumptions, there should be savings overall to the City of about \$950,000/year.⁶¹ This could be more if generators pursue their own waste reduction programs without City involvement other than for outreach and technical assistance.

For the City to achieve this additional diversion, it will require City staff to provide outreach and technical assistance. These additional costs to the City are estimated to be about \$250,000/year during the first 3-5 years of the program.⁶² This would result in a net savings for Zero Waste initiatives after this investment of about \$700,000/year. If the City structures its rates and incentives appropriately, residents and businesses should be able to pay much less to eliminate wastes, and pay somewhat less to reuse, recycle and compost the rest needed to achieve this interim goal.

The projected cumulative reduction of waste for 2011 also aligns with the imminent loss of the City's own landfill that year and the invariable rise in cost in waste hauling and disposal rates to other sites if the City chooses to do nothing.

In addition, the current liability to the City of disposing 71,739 tons/year in landfills should be considered as a long-term strategic impact into the future. As there has been no provision for providing financial assurance for costs after the end of the 30-year post-closure care period at either the City or Kirby Canyon Landfills, a potentially significant long-range liability may exist for the City.

⁵⁸ The September 2001 *Refuse Fund Cost of Service Study* estimated that the cost for PASCO to transport wastes from Palo Alto to the SMaRT station was \$10.22 per ton. This analysis assumes that transportation costs would be comparable to this to get materials to markets.

⁵⁹ About 15% of the total additional 26,411 tons diverted.

⁶⁰ There should be no additional costs to the City for these recycling services, if generators pursue them on an open, competitive basis. However, for purposes of this analysis, we included this average, based on current costs to collect and process recyclables vs. costs of waste collection and disposal. The September 2001 Refuse Fund Cost of Service Study estimated that the cost for PASCO to collect wastes in Palo Alto was \$68.63 per ton. When added to processing, transfer and disposal costs of \$82.48 per ton, the total costs for handling waste collection and disposal (without transportation to SMaRT station included) was \$151.31 per ton. The City's Cost of Service Study also reported that it cost the City \$124.40 per ton to collect recyclables and \$86.95 per ton to process these recyclables. Assuming an average value of recyclables of \$50/ton (a low estimate for recyclables from curbside programs), the costs of recycling are estimated as (\$124.40 + \$86.95 - \$50) or \$161.35. The net costs of collecting recyclables compared to wastes could be approximately \$10/ton.

⁶¹ $\$2,145,000 - [(50*11,050 \text{ tons}) + (35*11,050 \text{ tons}) + (\$10*22,100 \text{ tons})] = \$984,750.$

⁶² This is only an estimate. Detailed analysis of City staff costs will be done in the Zero Waste Operations Plan.

For a major landfill such as Kirby Canyon Landfill the cost of “non-routine” corrective actions (e.g., replacing the final cover repeatedly) could be as much as \$78 million,⁶³ and attempts to restabilize this site could cost as much as \$800 million.⁶⁴ If that is factored over the full term of the existing contracts (through 2021), a very preliminary estimate of the potential costs to Palo Alto for this post-post-closure period could be about \$23 million if implemented by 2006.⁶⁵ If the amount of waste disposed by 2011 is 73%, and 90% by 2021, then the associated savings in landfill liability could be on the order of \$8 million by 2021.⁶⁶ Irrespective of the precise amount, it is clearly in the interest of Palo Alto to begin a waste reduction strategy now to alleviate the magnitude of this problem in the future.

⁶³ Peter Anderson, personal communication, September 10, 2005, indicated that such costs are \$250,000 per acre for the full replacement of the cover, and subsequent replacements, if funds are placed into an annuity to cover this anticipated cost.

⁶⁴ Peter Anderson, personal communication, September 10, 2005, indicated that a site which is failing and needs to be stabilized can cost as much as \$80 per ton in place. For this analysis, we assumed that 25% of the site might be required to be stabilized.

⁶⁵ Kirby Canyon has about 57 million cubic yards of remaining life according to CIWMB SWIS reports. At a density of 1300 pounds/cubic yard, that equals about 37 million tons. Palo Alto will produce over the next 15 years $71,739 \text{ tons} * 15 = 1,076,085 \text{ tons}$. Therefore Palo Alto’s liability for the remaining capacity at Kirby might be approximately $1 \text{ million} / 37 \text{ million} = 3\%$. For restabilizing this site, the liability to Palo Alto could be \$800 million * 3% or \$22.5 million for Palo Alto. Dividing \$22.5 million by 1,076,085 tons for this period equals \$21/ton.

⁶⁶ Assuming that on average over the next 5 years, the City will increase its diversion by 13,000 tons, and that on average over the following 5 years the City will increase its diversion by another 26,000 tons, and that on average in the final five years of this period the City will increase its diversion by another 13,000 tons (to 39,000 tons/year), then the savings would be: $\$21/\text{ton} * [(13,000 \text{ tons/year} * 5 \text{ years}) + (26,000 \text{ tons/year} * 5 \text{ years}) + (39,000 \text{ tons/year} * 5 \text{ years})] = \$8,190,000$.