CREDITS

CITY COUNCIL
Robin Parker, Mayor
Landon Curt Noll, Vice-Mayor
Stan J. Kawczynski
Jim Roberts
Manuel Valerio
Patricia Vorreiter
Jack Walker

PLANNING COMMISSION
Brian Cilker, Chair
Nancy Walker, Vice-Chair
Gerald Glaser
Mark O'Connor
Vicki Piazza
Joan Zamaroni

CITY STAFF CONTRIBUTING TO THE SUB-ELEMENT
Thomas F. Lewcock, City Manager
Members of the Planning and Economic Development Review Committee
Gail Price, Principal Planner

PUBLIC WORKS DEPARTMENT STAFF CONTRIBUTING TO THE SUB-ELEMENT
Marvin A. Rose, Director of Public Works
Solid Waste Program Staff

CONSULTANT
Cerene St. John
EcoNomics
Solana Beach, California

SUB-ELEMENT PREPARED BY
Mark A. Bowers, Solid Waste Program Manager
S Y Cheung, Solid Waste Specialist

This document is printed on recycled paper.

PREFACE

This Solid Waste Sub-Element establishes a policy framework for the future development of the solid waste management system in Sunnyvale. The document describes collection, recycling, disposal and other key components of the existing solid waste system. It also explains the economics of solid waste management and discusses various future issues. The meanings of the technical terms and acronyms used throughout the document are explained in the glossary shown as Appendix 1 of the Sub-Element.

Some of the future issues have long-term effects on the City. For example, the California Integrated Waste Management Act of 1989, commonly known as AB 939, requires each city and county in California to divert 25% of its solid waste from landfill by 1995 and 50% by the year 2000. It also requires each city to prepare a Source Reduction and Recycling Element (SRRE) outlining its plan to achieve the required diversion. The City was the first in the state to complete and adopt its SRRE.

The adoption of the Solid Waste Sub-Element will formalize the City's goals and financial strategies for safe collection and disposal of waste generated, as well as selection and management of source reduction and recycling programs. As discussed in the Sub-Element, the primary challenge over the next twenty years will be to integrate source reduction, recycling, and SMaRT Station recovery programs to achieve most cost-effectively the targeted level of diversion of solid waste.

In developing a document like the Solid Waste Sub-Element which directly affects businesses and residents, it is essential to gather as much information as possible on the values and preferences of the community. To this end, staff conducted public participation events aimed at reaching residential and commercial customers. These events were not designed to achieve strict statistical validity; rather they were "snap-shots" of a cross-section of the many customers for an assessment of the community's perceptions, needs and desires regarding solid waste services.

Focus group sessions were conducted in late 1995 and early 1996. The Facility Managers Meeting organized monthly by the Department of Community Development in cooperation with the Sunnyvale Chamber of Commerce was identified as the appropriate channel to reach out to Sunnyvale businesses. Staff attended the meeting in November 1995. For residential customers, a random list of residents was selected from the Utilities Billing System. Letters were sent to the residents inviting them to participate in a discussion session held at the Community Center in February 1996. City staff then followed up with

phone calls or personal visits to confirm their availability. During both meetings, the highlights of the draft Solid Waste Sub-Element were presented and current issues were discussed. Written surveys asking participants to rank the relative values they place on various aspects of solid waste management services were also conducted. Their priorities, feedback and concerns have been incorporated into the final document. Tables summarizing results from the written surveys are shown in Appendix 4.

The Solid Waste Sub-Element is a new sub-element in the Environmental Management Element of the City's General Plan. The other sub-elements of the Environmental Management Element include Water Resources, Sanitary Sewer System, Surface Runoff, Energy, Noise, and Air Quality. With careful planning, the City of Sunnyvale can preserve its environment and natural resources.

TABLE OF CONTENTS

	Page
Preface	
Executive Summary	
Purpose	1
Introduction	1
Existing Solid Waste Management System	3
Economics of Solid Waste Management	6
Future Solid Waste Management Issues	6
Conclusion	10
Goals and Policies	11
Community Conditions	
Introduction	
Solid Waste - What It Is and Where It Comes From	14
Community Condition Indicators	14
Existing Solid Waste Management System	
Collection of Garbage and Recyclables	15
Source Reduction Programs	17
Materials Recovery Operations	17
Landfill Disposal	19
Closed Sunnyvale Landfill and Recycling Center	21
Household Hazardous Waste	24
Customer Service and Public Education	24
Economics of Solid Waste Management	
The General Plan and Solid Waste Management	26
Providing Solid Waste Service as a Municipal Utility	26
Role of "Demand Management" in Refuse Rate Setting	30
Solid Waste Management and Economic Development	32
Search for Efficiency and Additional Sources of Revenue	33
Future Solid Waste Management Issues	
Changing Waste Stream	35
"Flow Control"	36
City Diversion Objective	38
Enhancing Source Reduction and Recycling Programs	41
Applying New Technologies	50
Securing Future Disposal Capacity	52
Use of closed Sunnyvale Landfill and Recycling Center	54
Conclusion	57

Interrelationships With Other Sub-Elements 58

Goals, Policies, And Action Statements

Introduction 62

Goals, Policies, And Action Statements 62

Appendices

1. Glossary of Acronyms and Technical Terms 71
2. Legislation on Solid Waste Management 76
3. Results from Waste Composition Study, August 199551 79
4. Survey results from Public Participation Events 81

Executive Summary

Purpose

This sub-element describes the reasons for the City's involvement in solid waste management; the physical, economic, and contractual structure of the City's existing waste management endeavors; and recommends policies intended to provide the City's residents and businesses with a stable, environmentally sound solid waste management system throughout a twenty-year planning period.

Introduction

During the past ten to fifteen years, Sunnyvale's solid waste management system has undergone significant changes, most notably the startup of the City's curbside recycling service in 1982 and the evolution of that service into a comprehensive source reduction and recycling program that, by 1995, was diverting an estimated 40-45% of the City's solid waste from landfill disposal.

From 1984 to 1993, the City's solid waste was disposed of in three different landfill sites (Mountain View, Sunnyvale, and Kirby Canyon landfills), with the City-owned Sunnyvale Landfill closing its gates permanently in 1993. New federal and state environmental regulations sharply increased the cost and complexity of all aspects of the solid waste management system. The total tons of refuse landfilled decreased by 48% from 222,000 tons in 1982 to 116,000 tons in 1994; the typical monthly residential refuse collection charge increased from $3.42 in 1982 to $24.89 in 1995 to recover the City's increased cost of managing solid waste in compliance with environmental regulations.

Household Hazardous Waste drop-off events were first offered to Sunnyvale residents twice per year in 1985 and have evolved to quarterly events that include businesses that generate small quantities of hazardous waste.

July 1994 saw the start of separate collection of yard waste, reducing single-family refuse collection tonnages by 30% and producing usable mulch and soil amendments.

Finally, by constructing the Sunnyvale Materials Recovery and Transfer (SMaRT) Station in conjunction with the cities of Mountain View and Palo Alto, the City now hosts a major regional recycling and waste transfer facility that is on the leading edge of both materials recovery technology and multi-jurisdictional cooperation.

The major components of a stable solid waste management system are now in place. The City has assured itself of refuse disposal capacity until at least the year 2021 by way of a long-term contract for refuse disposal. The SMaRT

Station, with long-term funding commitments from Mountain View and Palo Alto, provides a flexible means of transporting refuse to virtually any disposal site on the West Coast. The materials recovery component of the SMaRT Station plays a major role in City compliance with a state mandate to reduce refuse disposal by 50% by the year 2000. The combination of the SMaRT Station's materials recovery capabilities and the City's existing and planned source reduction and source-separation recycling programs makes Sunnyvale one of few jurisdictions likely to achieve the 50% diversion mandate.

Financial, rather than technical issues now pose the most significant solid waste management challenges to the City. In fiscal year 1995-96 the amount budgeted to manage Sunnyvale solid waste is $22.0 million (excluding SMaRT Station and landfill expenditures which are reimbursed by the cities of Mountain View and Palo Alto), making this the largest single program budget the City has, and is exceeded only by the $32.8 million budget for the entire Department of Public Safety and the $27.1 million budget for the rest of the Department of Public Works (see Figure 1).

City Operating Budget 1995/96

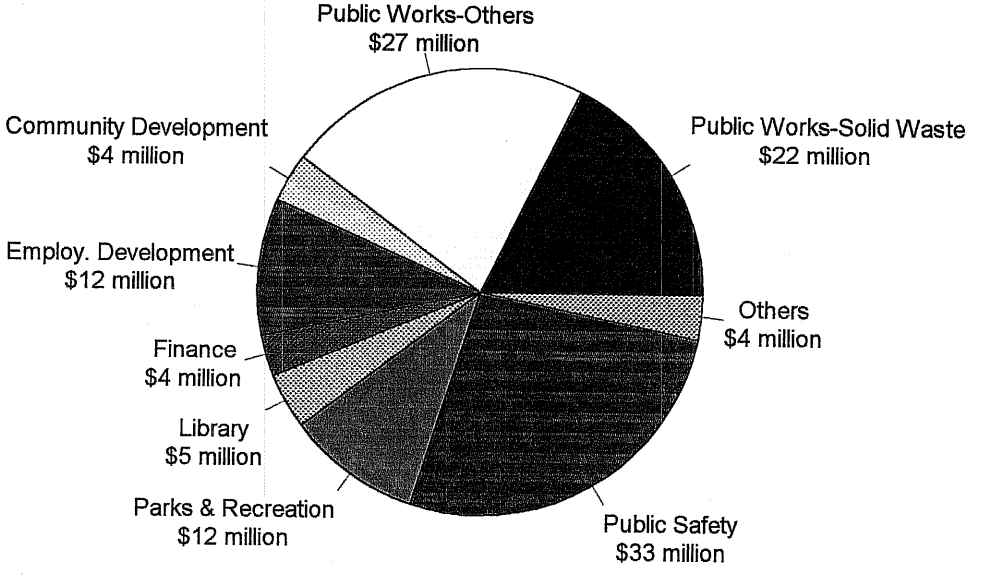


Figure 1

As refuse collection rates are driven up by the cost of recycling services and compliance with environmental mandates, businesses have been coping with those higher rates by increasing recycling to minimize their costs for refuse disposal. While these private recycling efforts help move the City toward the 50% recycling mandate, they force more fixed costs of the solid waste utility to be allocated over less refuse, further increasing rates. The City's response to this trend should focus on both reducing expenses and increasing revenues. Along with searching for efficiencies that would promote achievement of the goals articulated in this Sub-Element while helping lower solid waste management expenses over the long term, the City can seek out additional sources of revenue. Potential sources of revenue include development of new markets for existing recovered materials and searching for markets for new categories of materials to be recovered. The City can influence markets through its legislative advocacy at both the state and federal levels. Legislative directives to eliminate tradition-based barriers to use of recycled products and mandate minimum recycled content for key products can be effective in stimulating use of recycled products by both the private sector and public sector.

As reflected in public opinion gathered from the public participation events, community acceptance of the 50% diversion goal appears to be very strong and, in light of the substantial capital investments made thus far, it may be desirable for the City to establish its own 50% diversion goal independent of the state mandate. Whether it targets 50% or some higher or lower level of diversion, the City's primary challenge over the next twenty years will be to integrate source reduction, recycling, and SMaRT Station recovery programs to achieve most cost-effectively the targeted level of diversion of solid waste.

Existing Solid Waste Management System

Sunnyvale provides a broad range of solid waste management services to its residents and businesses by way of a municipal solid waste utility. At the present time the three major service components (collection of solid waste and recyclables, SMaRT Station operation, and disposal) are provided by private companies working under contract with the City. Costs of garbage collection service are among the top four aspects as ranked by the businesses and residents attending the focus group meetings. Each of these three contracts was awarded by a competitive procurement process designed to ensure that long-term costs to the City and its ratepayers are minimized. The key solid waste service components and their relationship to City goals are described below:

Source Reduction: The most effective way to manage solid waste is to avoid producing it in the first place. In order to reduce the generation of solid waste, the City encourages "source reduction" by providing residents with workshops on

backyard composting and making composting bins available to workshop participants (at a reduced price). A City-sponsored City-Wide Garage Sale is also held each spring in advance of the free refuse disposal services offered to residents, to encourage reuse, rather than disposal, of discarded items. The City also conducts a public information program designed to encourage source reduction behavior and promote recycling.

Recycling: Using recycled or "secondary" materials to produce consumer goods and industrial outputs reduces the environmental impact of manufacturing. Factories utilizing recycled materials generate less air and water pollution and consume less energy than comparable plants using virgin materials. When avoided landfill disposal costs are factored in, it often costs the City less to collect and recycle materials than to collect and landfill those materials. Materials can be "source separated" for recycling by the resident or business generating the waste material or separated by a centralized "materials recovery facility" after it has been collected as refuse. The City provides a variety of source separation recycling services including: curbside recycling for single-family homes, duplexes, triplexes, and mobile homes; collection of cardboard from commercial customers; commercial waste audits, recycling information, and referral services designed to link generators of recyclable materials with private sector recycling service providers; a concrete and asphalt recycling facility; and a comprehensive source separated recyclables drop-off center and a materials recovery facility at the SMaRT Station.

Household Hazardous Waste: Lack of convenient, low cost, legal disposal for household hazardous wastes leads to dangerous accumulations in homes or improper and environmentally damaging disposal in landfills or storm drains. To reduce the environmental impact and to minimize the City's long-term liability for landfill cleanup expenses, the City provides "no charge" quarterly hazardous waste drop-off events for paint, pesticides, automotive fluids, and other hazardous wastes produced by residents and small businesses.

Yard Waste Collection: Because grass clippings, tree trimmings, and other green waste make up a large portion of residential refuse and are difficult to separate out from mixed garbage, the City provides separate collection of residential yard waste. This service, initiated in 1994, has reduced nearly 30% the total refuse collected from single-family homes, duplexes, triplexes, and mobile homes. Materials collected are processed at the SMaRT Station for use as mulch and soil amendment.

Refuse Collection: In order to protect the public from the health hazards posed by accumulations of garbage and other debris, the Sunnyvale Municipal Code requires that refuse be collected at least once per week. The City contracts with a private waste hauler for collection of refuse from residences, businesses,

institutions, and construction sites in Sunnyvale. All refuse collected by this hauler is delivered to the SMaRT Station.

Materials Recovery: Although source separation recycling diverts significant quantities of sorted, high-value secondary materials from disposal, significant amounts of recyclable materials remain in refuse when it is delivered to the SMaRT Station. In order to further divert these materials from landfill disposal, refuse received from Sunnyvale, Mountain View and Palo Alto is passed through a sophisticated materials recovery process where recyclable products (paper, glass, aluminum and other metals, and plastic bottles) are removed. The materials recovery accomplished by the SMaRT Station makes this facility a key element of the City's efforts to divert 50% of its waste from disposal by the year 2000. The SMaRT Station was built by the City on City-owned land adjacent to the Sunnyvale Landfill and is operated under contract by a private company. The Station's construction was funded by the issuance of $21.3 million in revenue bonds by the City. Sunnyvale, Mountain View, and Palo Alto share the cost of the debt service on the bonds, and the SMaRT Station's materials recovery and refuse transfer operating expenses are also shared by these cities in proportion to the amount of refuse each city delivers to the facility.

Disposal: Despite the City's efforts, materials for which recycling markets do not exist or which are difficult and expensive to divert still must be disposed. Currently the most cost-effective and environmentally safe disposal alternative available to the City is in a state-of-the-art landfill. The closure of the Sunnyvale Landfill in 1993 made it necessary to haul the City's refuse 27 miles to the Kirby Canyon Landfill in southern San Jose for disposal. The SMaRT Station can consolidate the refuse from three collection trucks into one large transfer trailer for delivery to the landfill, thus promoting the efficient use of vehicles and workers for transfer of the residue from the SMaRT Station to Kirby Canyon. This landfill is designed and operated to meet the most stringent federal and state environmental regulations. The City has landfill capacity under contract through at least 2021.

Landfill Post-Closure Maintenance: Portions of the closed Sunnyvale Landfill are used for purposes related to solid waste management and may provide revenues to the solid waste enterprise fund. The landfill offers recreational open space and an energy resource in the methane contained in landfill gas. The landfill is also a long-term financial liability for the City and its ratepayers, as the City is required to monitor gas emissions and migration, groundwater quality, and the condition of the landfill surface for a minimum of thirty years.

Economics of Solid Waste Management

The City of Sunnyvale provides solid waste management services as a municipal utility. The City provides the solid waste services and facilities described above, the cost of which is charged to refuse collection ratepayers according to a cost of service rate-setting policy approved in 1993 by the City Council. The rate for each service is based on the City's cost of providing that service. The City bills residential and business customers for solid waste management charges, along with charges for City water and sewer service. Customer payments, along with revenues from sales of recyclable materials, reimbursements from the cities of Mountain View and Palo Alto, and revenues from franchise fees, leases, grants, and interest earnings are deposited in a solid waste enterprise fund. All solid waste management costs are then paid for from this fund. No General Fund (tax) monies are used to provide solid waste management services.

Future Solid Waste Management Issues

The City's solid waste management system has become much more stable and financially predictable in recent years, with the acquisition of long-term disposal capacity, completion of the SMaRT Station, and implementation of new programs designed to increase diversion of wastes from landfill disposal. However, several critical factors largely outside the City's control could have significant impacts on the system in the future. These factors and the challenges they pose are described below.

Changing Waste Stream: Both the quantity and composition of the waste stream managed by the City have changed and will continue to change over time. These changes will primarily impact the City's revenues from refuse collection customers and the sale of recyclables, thus affecting refuse collection rates.

Waste Stream Quantity: As noted above, the amount of waste disposed by the City declined 48% between 1982 and 1994, primarily due to economic changes in the City and increased recycling by industry. As waste quantities declined, the City's collection and disposal costs, which reflect large investments in solid waste infrastructure, declined more slowly than rate revenues. Fixed costs, such as the expense of landfill engineering and recycling programs, were also spread over fewer refuse collection customer accounts, thus pushing collection rates higher. While the amount of refuse collected by the City may continue to decrease, the City is not likely to see as sharp a decline as during the 1982-1994 period. Depending on population changes, economic conditions, and other factors, increases in tonnage are possible. In general, increased waste tonnage is likely to have a downward influence on future collection rates, while tonnage decreases will increase rates. A rate increase or decrease does not necessarily

translate into an increase or decrease in monthly charges to an individual customer, since the amount of refuse disposed by that customer may also change. For example, even if the rate for weekly pickup of a three cubic yard commercial bin increases, an individual customer could see a decrease in cost by reducing his/her level of service to weekly pickup of a two cubic yard bin.

Waste Stream Quality: The quality, or composition, of the waste generated in Sunnyvale is a key factor in determining the achievable level of diversion and the bottom-line cost to refuse collection ratepayers. Waste composition, and thus the overall value of the materials available to be recycled, is affected by a number of factors that remain largely out of the City's control but will affect the City's costs and ensuing rates charged to refuse collection customers. These factors include:

- Changes in the output of City industries
- Economic status and consumer confidence of City residents
- Packaging and product marketing decisions by consumer goods manufacturers
- Recycling performed by others before refuse or recyclables are collected by the City

Superfund and Flow Control: Federal law is likely to play a larger role in the City's solid waste management system than it has in the past. The federal "Superfund" site cleanup law attaches to the City a potentially unlimited liability for future cleanup of leaking disposal sites that contain waste generated in Sunnyvale. This liability exists even if the City played virtually no role in directing waste to the site. Businesses generating wastes in the City (and in some cases even individual residents) can also incur their own liability for cleanup costs under Superfund. This fact is an incentive for the City to use a strong hand in directing the flow of disposed waste to sites that are well-engineered and operated to minimize the potential for future cleanup activities.

At the same time that federal law assigns the City with virtually unlimited liability for the cleanup of sites containing waste generated in Sunnyvale, a 1994 U.S. Supreme Court decision and subsequent proposed federal legislation have the potential to reduce the City's ability to decide where Sunnyvale wastes are disposed ("flow control"). While the impact on Sunnyvale of the Court's decision in *C&A Carbone vs. Town of Clarkstown, N.Y.* is unclear, and proposed legislation to respond to the decision is still slowly moving through Congress, the *Carbone* decision places the federal government squarely into local solid waste management issues in an unprecedented manner. Regardless of how the federal flow control issue is resolved, in the future the City will be affected by national policy as never before.

Establishing a Diversion Goal: Because the State of California mandated that cities and counties must divert 50% of their solid waste by the year 2000, Sunnyvale responded with source reduction, recycling, yard waste collection, and materials recovery programs and facilities. The City expects to be near 50% diversion by 2000. However, some California cities and counties are making weak diversion efforts and are calling for a reduction in the 50% mandate. Now that Sunnyvale has invested resources and resident effort to reach 50% diversion, the City should consider making a commitment to its own diversion goal, regardless of the State standard.

Enhancing Source Reduction and Recycling Programs: Reaching 50% diversion may require enhancement of existing source reduction and recycling services and/or new services, such as adding mixed waste paper and additional plastics to the items collected at curbside, or initiating a new multifamily recycling collection program. Careful selection of the mix of services will be required to achieve the diversion goal most cost-effectively.

City's Commercial/Industrial Recycling Role: Commercial and industrial customers generate 68% of the solid waste in Sunnyvale, and are key factors in the City's overall success at increasing recycling and reducing refuse landfilled. Commercial and industrial wastes contain, on average, more recyclable materials than residential wastes. As refuse collection rates have risen in recent years, many larger waste generators have begun having their recyclable wastes collected outside the City's franchised system. These activities are permitted under existing City practices which allow the open collection of recyclables (but not solid waste) by any vendor that a business selects. The result has been that the fixed costs of the Solid Waste Program have been spread over a smaller refuse collection revenue base. This gradual "flight" of tonnage has increased the upward pressure on refuse collection rates for the remaining customers. The most powerful argument for this option is that it is in full compliance with recent legal decisions on the ownership of recyclables. The California Supreme Court has ruled that recyclable material becomes "waste" only when it is discarded, and that any material that can be sold or given away has "value" and thus is fully protected under private property precedents.

From a City revenue perspective, the drawback of this option is that collection fee revenues decline quickly as the amount of solid waste collected is reduced, while the cost of the City's collection system declines more slowly. This approach also leaves the general provisions of the Municipal Code as the only control over the side effects of collection. While the City has contractual control over the actions of the franchised refuse collection company, it has only the Code to address complaints about spilling of materials from vehicles and noisy collections at early hours of the morning by non-franchised collectors of recyclable materials.

years of disposal capacity under contract, the City should initiate actions to arrange for sufficient capacity to accommodate present and projected needs any time that available capacity equals ten years or less.

Use of Closed Sunnyvale Landfill and Recycling Center: A variety of uses of the closed Sunnyvale Landfill are planned or currently exist. These include concrete recycling on the East Hill of the landfill; occasional use of a sludge monofill in the valley between the East and South Hills; a permanent Household Hazardous Waste drop-off facility at the Recycling Center on Carl Road; use of the Recycle Hill for 4-H animal grazing; and recreational use of the remaining landfill by walkers, joggers, bird-watchers, etc. Given the landfill's unique status as nearly 100 acres of essentially undeveloped land in a nearly built-out city, other proposals for its use are likely to be made. Decisions will need to consider physical constraints (the need to protect the clay cap, differential settlement of the surface, and the presence of landfill gas) and evaluate each proposal's ability to assist the City in achieving its solid waste diversion goal, in addition to considering more traditional issues such as potential revenues, aesthetics, and public access to open space.

Conclusion

In the past ten to fifteen years, increasingly stringent environmental regulations have been applied to refuse disposal. During the same period, recycling has replaced disposal as the public's favored method for handling discarded wastes, leading to an ambitious diversion mandate handed down from the state legislature. At the same time, the City-owned landfill, a low-cost disposal site that had been used for some 60 years, reached capacity and closed permanently.

Sunnyvale has emerged from this period with a well-developed, stable, and cost-effective solid waste management system that is a state-wide leader in diverting refuse from landfill disposal. The City has long been recognized for its leading role in solid waste management issues. As mentioned in the California Integrated Waste Management Board's 1994 Annual Report, "(t)he City of Sunnyvale is another community that has responded to the call to reduce waste. Since 1989, their waste diversion has doubled, going from about 18 percent in 1989 to nearly 40 percent today. Their efforts to invest in new waste management technologies and expand their education programs for the public are just a part of their formula for success."

The City has already in place the physical components it needs to assure compliance with environmental regulations and the state's diversion mandate, and can assure its customers of long-term refuse disposal capacity. However, the cost of achieving this condition has increased refuse collection costs for the

customers of the City-franchised solid waste system. The City's primary challenge over the next twenty years will be to integrate source reduction, recycling, and SMaRT Station recovery programs to achieve the appropriate level of diversion of solid waste in a manner that minimizes costs to the community.

Goals and Policies

Based on the findings and issues summarized above and discussed in more detail in the body of the Sub-Element, the following Goals and Policies for the management of solid waste are proposed:

Goal 3.2A. **Ensure that all municipal solid waste generated within the City is collected and transported in a manner that protects public health and safety.**

Policy 3.2A.1. Provide convenient, competitively priced solid waste collection services.

Policy 3.2A.2. Ensure that standards of Customer Service Excellence policies are met by those providing solid waste collection service.

Goal 3.2B. **Reduce solid waste disposal to 50% or less of the amount generated in 1990 (as adjusted to reflect population and economic changes) in the most cost-effective manner.**

Policy 3.2B.1. Reduce generation of solid waste by providing source reduction programs and promoting source reduction behavior.

Policy 3.2B.2. Maximize diversion of solid waste from disposal by use of demand management techniques, providing and promoting recycling programs, and encouraging private sector recycling.

Policy 3.2B.3 Meet or exceed all federal, state, and local laws and regulations concerning solid waste diversion and implementation of recycling and source reduction programs.

Policy 3.2B.4 Increase demand for recycled materials by advocating local, state and federal legislation that will increase use of recycled content products.

Goal 3.2C. **Encourage residents to maintain clean neighborhoods by preventing unsightly accumulations of discarded materials and illegal dumping of municipal solid waste.**

Policy 3.2C.1. Provide periodic opportunities for residents to dispose of refuse at discounted or no charge.

Goal 3.2D. **Dispose of solid waste generated within the City in an environmentally sound, dependable, and cost-effective manner.**

Policy 3.2D.1. Assure that the City possesses a minimum of five years of refuse disposal capacity at all times.

Policy 3.2D.2. Reduce the amount of refuse being disposed, generate recycling revenues, and minimize truck travel to the disposal site through use of the Sunnyvale Materials Recovery and Transfer (SMaRT) Station.

Goal 3.2E. **Minimize potential future City liability for wastes generated in the City.**

Policy 3.2E.1. Select disposal methods and sites for solid and hazardous wastes that incorporate technologies and practices most likely to eliminate or minimize future City liabilities.

Policy 3.2E.2. Minimize impact on future rate payers of potential liability for past disposal practices.

Policy 3.2E.3. Minimize illegal and inappropriate disposal of Household Hazardous Waste (HHW).

Policy 3.2E.4. To meet or exceed all federal, state, and local laws and regulations concerning Household Hazardous Waste (HHW) and implementation of HHW programs.

Goal 3.2F. **Maintain sound financial strategies and practices that will enable the City to provide comprehensive solid waste management services to the community while keeping refuse rates at or below countywide averages for cities using cost of service pricing.**

Policy 3.2F.1. Establish refuse collection and disposal rates in a manner that equitably allocates program costs among rate payers and promotes rate stability.

Policy 3.2F.2. To the greatest extent possible, anticipate changes required in refuse collection rates in response to changes in laws, regulations, and economic factors affecting the solid waste management system.

Policy 3.2F.3. Identify additional revenue sources and, where possible, increase revenues from solid waste programs, services, and facilities without jeopardizing program goals and customer service quality.

Goal 3.2G. Contribute to an economic development environment that is supportive of a wide variety of businesses.

Policy 3.2G.1. Provide solid waste services desired by businesses at competitive rates.

Goal 3.2H. Manage the closed Sunnyvale Landfill in a manner that protects the public health and safety and the environment, promotes enjoyable public use of the site, and assists in the achievement of other goals of the Solid Waste Sub-Element.

Policy 3.2H.1. Ensure compliance with federal, state, and local laws and regulations.

Policy 3.2H.2. Extract available resources from the refuse buried at the landfill.

Policy 3.2H.3. Provide for safe, enjoyable recreational access to portions of the landfill.

Policy 3.2H.4. Provide for facilities and activities on portions of the landfill that support achievement of the City's solid and household hazardous waste goals and policies.

Policy 3.2H.5. Generate revenues from post-closure uses of the landfill.

Community Conditions

Introduction

Solid Waste - What It Is and Where It Comes From

Solid waste consists of virtually all of the materials discarded by residents and businesses in the course of daily life, business activities, and manufacturing. It does not include hazardous wastes, medical waste, sewage, or liquids. Because accumulation of solid waste can present public health problems, the Sunnyvale Municipal Code requires all residences and business premises to subscribe to regular collection service.

In 1995, the City of Sunnyvale has a residential population of 125,600, including 50,620 households in single family, multifamily and mobile home park dwellings. According to the disposal records of the Department of Public Works, approximately 32% of the solid waste disposed from the City of Sunnyvale is generated by the residential sector.

The eight main business sectors within Sunnyvale are semiconductors, computers/communications, defense/space, business services, software, environmental, bioscience, and retail. Combined with government agencies, schools, and construction and demolition projects, these main business sectors generate approximately 68% of the solid waste in Sunnyvale.

Community Condition Indicators

The City tracks a number of statistical indicators of the well-being of the community. Solid waste statistics currently included among those indicators are the total annual tonnage of solid waste landfilled and the total annual tonnage of recyclables diverted from disposal by the City. These figures are updated annually. Additional community condition indicators may be added in accordance to the "Goals, Policies, and Action Statements" section.

Existing Solid Waste Management System

Collection of Garbage and Recyclables

Refuse Collection

The collection of solid waste in Sunnyvale is performed by a private company under contract to the City. The current franchise agreement will expire in 2004. Solid waste is collected from residences at curbside on weekdays using a combination of manual, semi-automated, and fully-automated collection vehicles.

Residents with unlimited garbage service place their trash in a black wheeled cart provided by the City which is picked up curbside weekly. Solid waste that will not fit in the wheeled cart can be placed in 32-gallon cans or plastic garbage bags. A baseline level of service is available to residents generating 32 gallons (one standard-size garbage can) or less of solid waste per week at a lower cost commensurate with this service. Rear yard collection is available for the elderly and physically disabled. Residents in most multifamily dwellings (four units or more) receive similar service as commercial and industrial customers, described below.

Solid waste is collected from commercial and industrial customers on a weekly basis using front-loading vehicles. Large roll-off boxes and compactors are collected either weekly or on an as-needed basis, using special trucks for that purpose. The solid waste that is collected is transported to the SMaRT Station. (The SMaRT Station operations are detailed in a later section.)

Disposal Programs at Discounted or No Charge

A number of disposal programs are provided periodically to residents at discounted or no charge. These programs are designed to reduce the amount of discarded materials accumulated in the community and illegal dumping activities. They include:

- *Spring/Fall Cleanups*

Spring and Fall Cleanups are "Extended Curbside Collection" events that are provided two times per year for residents in all single family homes, duplexes, triplexes, and mobile home parks in Sunnyvale. These events, normally scheduled in spring and fall, last for four weeks. During the cleanup period, residents can set out household debris for pickup on their regular garbage day for pickup at no extra charge. Extra items that will be picked up include appliances such as refrigerators, water heaters, washers and dryers, bundled carpets and tree trimmings, and extra refuse for residents subscribing to baseline service.

- *Extra Dump Weekends*

During the Spring/Fall Cleanups, the City also offers "Extra Dump Weekends." On four weekends per year (two each for spring and fall), Sunnyvale residents can dispose of their garbage and refuse at the SMaRT Station for no charge. The "Extra Dump Weekends" are for residents only and not for businesses, contractors, non-resident property owners, or other commercial establishments.

- *Neighborhood Cleanups*

In conjunction with recognized neighborhood associations, the City organizes a number of neighborhood cleanup events. The City arranges for delivery of roll-off debris boxes, typically on Fridays, to locations pre-selected by the neighborhood association. The debris boxes are emptied and returned throughout the weekends as needed, and are removed on the following Monday. These cleanup events provide a close-by and convenient disposal means for residents who do not utilize other no-cost disposal options.

Recyclables Collection

In order to meet the 50% diversion mandate, the City has implemented numerous recycling programs, for residents and businesses.

- *Residential Curbside Recycling Program*

A weekly curbside collection of newspaper, glass, metal cans, PET (#1) plastic bottles, used motor oil, oil filters and cardboard is provided to all single family, duplex, triplex, and mobile home park residences in Sunnyvale. Residents are given three plastic bins to be set out on the same day as their garbage collection. Used motor oil is collected in 1- gallon plastic jugs (also provided by the City). These collection services are provided by the City's solid waste collection contractor.

- *Residential Yard Waste Collection Program*

Single family, duplex, triplex, and mobile home park residences are provided with a gray wheeled cart for curbside yard waste pickup on their regular solid waste collection day. This program is also operated by the City's solid waste collection contractor. The collected yard waste is transported to the SMaRT Station for processing.

- *Commercial Cardboard Collection Program*

Upon request, Sunnyvale businesses are provided with weekly cardboard collection at no extra cost. Cardboard is flattened and placed into gray metal

bins. Two special front-loader trucks collect the cardboard for recycling. This collection service is also provided by the City's solid waste collection contractor.

Source Reduction Programs

The City sponsors several source reduction programs to eliminate solid waste, either before it is created or before it leaves the waste generator.

Home Composting Program

Workshops are held at the Sunnyvale Community Center and City parks on how to compost yard trimmings and food waste (with the exception of meat and dairy products). The City provides participating residents with a home composting unit. The units are made of recycled plastic and are large enough to compost yard trimmings and food waste from a typical size single family home. The composting units are sold during the workshops at 25% of retail cost to encourage participation in the program.

City-Wide Garage Sale

Each spring the City sponsors a City-Wide Garage Sale. Residents are urged to sell their unwanted furniture, clothing, and other household items, instead of sending these items to the landfill. The City publicizes the event by compiling a list of the participating households and publishing the list in the local newspaper. Residents of neighboring communities are encouraged to attend the City-Wide Garage Sale.

Materials Recovery Operations

Materials Recovery Facility: the SMaRT Station

The Sunnyvale Materials Recovery and Transfer (SMaRT) Station is the focal point for the transfer and processing of solid waste and recyclable materials collected in Sunnyvale. The Station, which opened in October 1993, is located on a nine-acre site north of Caribbean Drive. It has a total floor area of over 110,000 square feet, including a tipping floor and recycling/processing area. The City sold $21 million worth of revenue bonds to finance the design and construction of the SMaRT Station. Under the Memorandum of Understanding among the cities of Sunnyvale, Mountain View and Palo Alto, the cities will pay pre-determined shares of the debt service payment on the bonds throughout the 25-year term of the bonds.

Principal features of the Station include:

- waste tipping areas
- refuse compactor/transfer trailer loading area
- two materials recovery sorting lines
- curbside recycling unloading and processing area
- recyclables buy-back and drop-off center
- wood and yard waste processing and storage area
- hazardous waste storage building
- entrance facility including gatehouse, pay booth, and scales

The SMaRT Station has the capacity to receive and process 1500 tons of solid waste per day. The Station currently processes approximately 1000 tons per day and 260,000 tons annually. The unused capacity of the Station is available, at an appropriate price, to public or private enterprises outside the City.

Materials Recovery and Transfer Operations

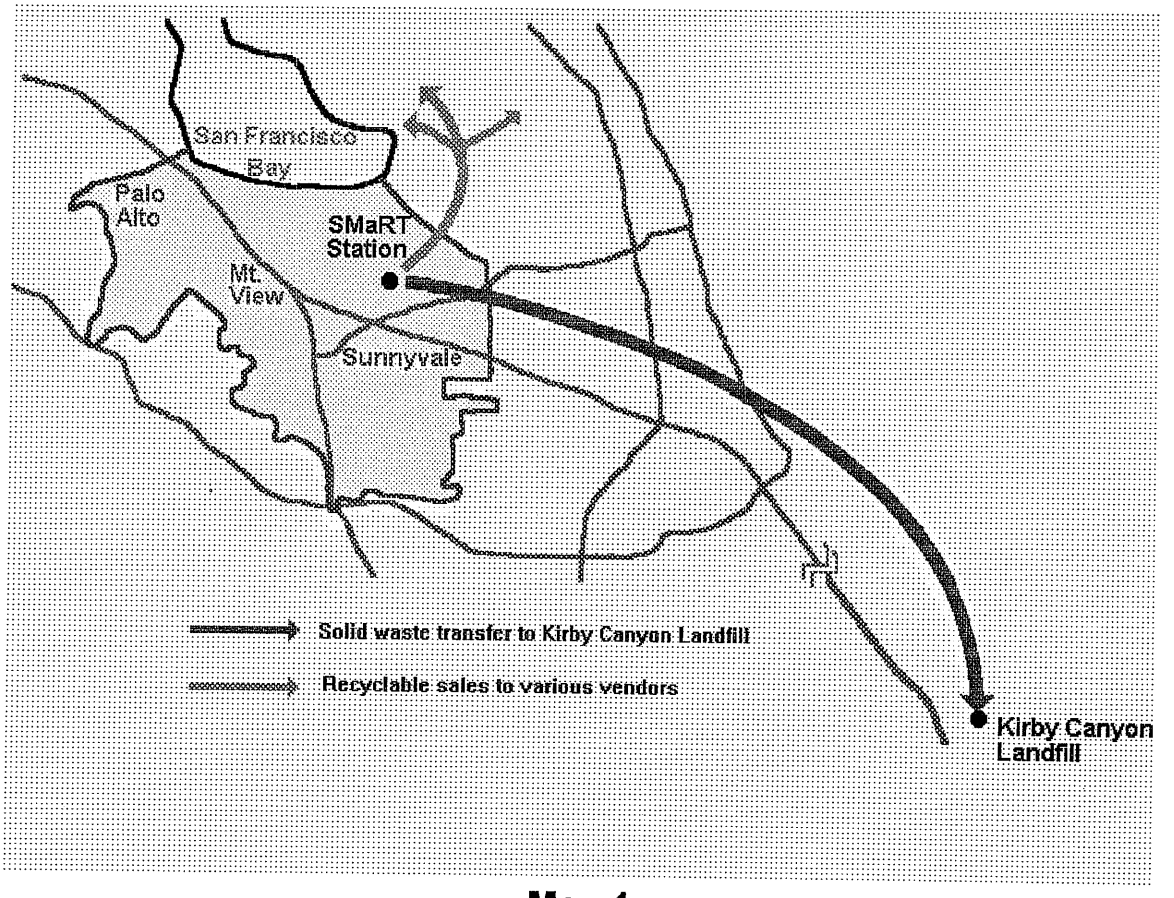
Solid waste arrives at the Station in franchised haulers' collection vehicles, City trucks, and in private autos and trucks. The composition of the waste delivered to the Station is a key factor in the level of recovery that can be achieved by sorting recyclables from refuse. The most recent waste composition study was conducted in August 1995 by Brown, Vence & Associates. Results of the study are shown in Appendix 3. Paper of various types made up the largest group of disposed waste, at 29%. Yard waste comprised 17%, although almost three-fifth of the material was separately collected by the yard waste program. Interestingly, among the residential waste stream, the one household item that makes up the largest percentage share is disposable diapers which comprised 2.7% of the residential waste (about 1000 tons of diapers per year).

Incoming waste is sorted manually to remove scrap metals, wood, and other bulky items. Loads that contain large quantities of recyclable materials are moved to the materials recovery area, placed on conveyor belts, and passed by sorting stations where recyclable materials such as cardboard, paper, glass, metals, and certain plastics are picked off the conveyor belt. The recovered materials are loaded into containers to be hauled to market.

The yard waste collection trucks unload in a separate wood waste room where the yard waste is further processed by a grinder and vibrating screen. The resulting products are then loaded into large trucks and hauled to an end user. These products are also made available to the public for local use.

The buy-back and drop-off center receives recyclable materials delivered by residents and businesses. These materials are combined with other materials inside the Station for further processing. For the last six months of 1995, the SMaRT Station has an overall diversion rate of 16% which resulted in a diversion of 8,797 tons of Sunnyvale's solid waste for the period.

Solid waste containing little recyclable material and the residue left over from material recovery operations are loaded into trailers for transfer to the landfill (see Map 1).



Map 1

Landfill Disposal

The solid waste generated in Sunnyvale is hauled from the SMaRT Station to the Kirby Canyon Landfill 27 miles away in south San Jose. The contract for use of the Kirby Canyon Landfill resulted from a competitive Request for Proposal process wherein seven cities in North Santa Clara County jointly requested

proposals for long-term landfill capacity. Sunnyvale, Palo Alto, and Mountain View elected to contract for use of the Kirby Canyon Landfill, which is operated by Waste Management Inc.

Sunnyvale has contracted for disposal capacity (with a maximum of 4,123,310 tons), ending on December 31, 2021 with an option to extend the disposal agreement for up to 10 years (to 2031) if the landfill operator is able to extend its land lease. This disposal agreement was signed in 1991, and the City began delivering solid waste to Kirby Canyon in 1993.

The contract establishes a base tipping fee for each ton of solid waste disposed. The tipping fee is increased for inflation on an annual basis. The tipping fee may also be adjusted to reflect changes in landfill rules and regulations. The tipping fee does not include various San Jose, county and state taxes, inspection and other fees that are passed directly through to the City by Waste Management. These taxes and fee constitute a large portion of the City's disposal expense. For example, in 1995 the total cost to dispose of a ton of garbage at Kirby Canyon Landfill is $40.83, of which $16.40 or 40% is taxes and fees. The largest of these is the $13 per ton City of San Jose Landfill Excise Tax.

Landfill Allocation Quantities

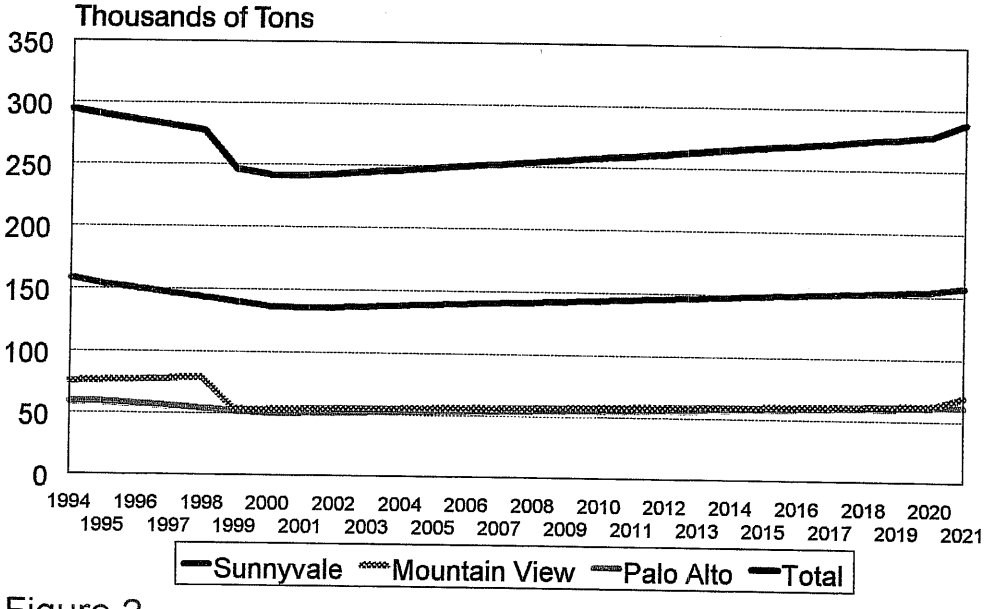


Figure 2

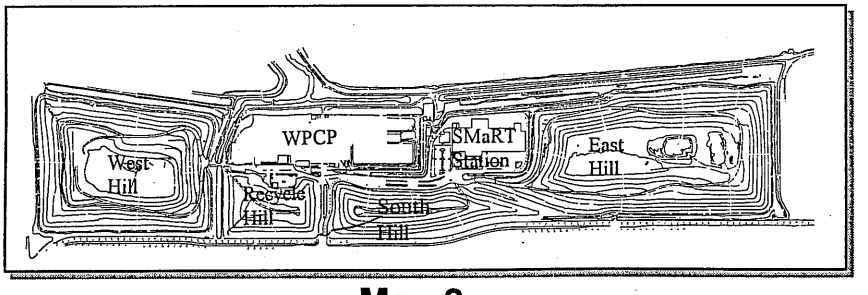
Through the Waste Management disposal contract, Sunnyvale has committed to deliver all residual solid waste from the SMaRT Station to the Kirby Canyon Landfill. Palo Alto and Mountain View have made similar commitments of their waste from the SMaRT Station to Kirby Canyon. Each city has estimated the quantity of solid waste that will be delivered each year, known as "Allocation Quantities." Figure 2 shows the Allocation Quantities for the three cities. The size of the allocation quantities was based upon projections of the amount of landfill capacity each city will need through 2021. The projections take into account source reduction, recycling programs, and future economic and population growth.

Each of the three cities has agreed to a "put-or-pay" provision in their respective contracts with Waste Management. The contracts require that the three cities pay for a minimum of 75% of their total combined annual Allocation Quantities. In any years that the total tons delivered to Kirby Canyon by the three cities are less than 75% of the Allocation Quantities for that year, the cities must pay Waste Management for the difference. The capacity paid for is "banked" for future use by the cities. Through 1995 the cities have delivered sufficient waste to Kirby Canyon to satisfy their "put-or-pay" obligations.

Closed Sunnyvale Landfill and Recycling Center

Closed Sunnyvale Landfill

The closed Sunnyvale Landfill is located at the northern end of Borregas Avenue in the City of Sunnyvale (see Map 2), adjacent to the City's Water Pollution Control Plant (WPCP) and the SMaRT Station. The landfill occupies approximately 90 acres and is composed of four fill areas (hills), separated from one another and the adjacent facilities by various roadways, surface water channels, and underground utility easements. The four hills are often referred to (from east to west) as the "East Hill," "South Hill," "Recycle Hill," and "West Hill." Final heights of the hills vary from approximately 40 feet to 90 feet above sea level.



Map 2

Refuse disposal ceased in 1993. Final cover placement in compliance with state regulations commenced in 1986 and was completed in 1994. Perimeter fencing, trees, gates, and bollards remain at the site to prevent unauthorized access by automobiles and motorcycles.

Post-Closure Maintenance at the Landfill

Post-closure maintenance is composed primarily of the following activities: a) landfill gas extraction and combustion, and monitoring for subsurface landfill gas migration; b) water quality monitoring and a related groundwater migration control system; c) leachate level monitoring and periodic extraction and disposal; and d) final cover inspection and repairs as needed.

- *Landfill Gas Extraction and Combustion, and Monitoring for Subsurface Landfill Gas Migration*

A landfill gas extraction system was constructed in 1987 to comply with regulations of the Bay Area Air Quality Management District (BAAQMD). Approximately 65 extraction wells and trenches are connected by underground piping to a flare station located at the WPCP.

Potential subsurface migration of landfill gas is monitored by perimeter gas probes installed along the landfill perimeter and between the SMaRT Station and the landfill. These probes are monitored at least quarterly. In addition, approximately 90 underground conduit boxes and other locations of concern within the WPCP, former Recycling Center, SMaRT Station, and vicinity are monitored monthly.

- *Water Quality Monitoring, Extraction, and Disposal*

Groundwater quality at the site is monitored in compliance with regulations of the Regional Water Quality Control Board (RWQCB) with the goal of early detection of any potential release of harmful materials that could pollute the San Francisco Bay.

As a proactive measure to prevent landfill leaks to groundwater from entering storm sewers or nearby surface channels should leakage occur, the City installed three groundwater extraction wells in 1991. These wells, along with the naturally "flat" local groundwater gradient, were expected to provide complete isolation of groundwater from other water at the site.

- *Leachate Monitoring, Extraction, and Disposal*

As water from rainfall or other sources interacts with buried solid waste, it can become polluted with minerals and organic compounds. To prevent this leachate, or "garbage tea," from building up to levels that could move out of the

landfill, leachate elevations are monitored. In addition, a vacuum truck pumps out any leachate accumulated in any of the eight on-site leachate risers (leachate wells).

- *Final Cover Inspection and Repair*

Routine inspections of the landfill surface are conducted as required by the Post-closure Maintenance Plan for the site. Inspection criteria include: cover integrity, slope stability, erosion, cracks, exposed refuse, ponded water, and condition of vegetation. Additional inspections are conducted following significant natural events such as earthquakes and storms. Any identified problems are repaired promptly.

Current Uses at the Landfill

The landfill is currently used for passive open space, concrete and asphalt recycling, and as a potential source of fuel (landfill gas) for the planned Power Generation Facility at the WPCP. A small unfilled valley between the East and South Hills is permitted as a disposal area for dried municipal wastewater sludge produced by the WPCP. It is anticipated that a maximum of 150,000 cubic yards of sludge can be disposed of in the valley. One or two movements of sludge from the WPCP sludge drying facility to the valley are anticipated each year, with each disposal event taking one to three days to complete. Due to the dried and decomposed condition of the sludge, no odors or other negative impacts are expected. A similar but much larger sludge moving project was conducted in 1993, with no noticeable odor.

The concrete and asphalt recycling operation is located on top of the East Hill. Trucks delivering used concrete and asphalt or drivers buying the finished products enter the recycling area via the SMaRT Station entrance road.

Passive open space use at this time is limited to pedestrian trails. With the exception of the asphalt and concrete recycling area on top of the East Hill, the entire site is open to pedestrians. A pathway exists on the South Hill, and gravel perimeter roads exist around the East and West Hills. Drought-resistant grasses and wildflowers have been planted throughout the site.

When sludge filling begins, portions of the South Hill and portions of the perimeter of the East Hill will no longer be accessible for pedestrian use.

Household Hazardous Waste

Household hazardous wastes are household wastes or products that contain toxic chemicals, such as pesticides, pool chemicals, oven cleaner, paint, solvents, and batteries.

Quarterly Household Hazardous Waste Drop-Off Days

Each quarter the City sponsors a household hazardous waste drop-off event where residents are encouraged to bring their household hazardous waste. The events are held at the site of the former Sunnyvale Recycling Center. The City contracts with a private firm specializing in these events to collect the wastes delivered and transport them to a hazardous waste recycler or a permitted hazardous waste landfill or incinerator.

The City also participates in a program operated by Santa Clara County in which a drop-off event is organized monthly at various sites within the county. However, unlike the City events, residents must call the county in advance for an appointment to use these events.

Quarterly Small Quantity Generator Program

A similar hazardous waste drop-off program is provided for Sunnyvale businesses generating small quantities of hazardous waste. To participate in this program, businesses must qualify as "Conditionally Exempt Small Quantity Generators" as set forth by state and federal law. These programs are held quarterly the day before the household hazardous waste drop-off events, and businesses are encouraged to bring their small quantities of hazardous waste to the events, where they are charged at cost for the service. Companies generating large quantities of hazardous materials are required by state and federal laws to establish their own hazardous waste management programs and are not eligible for the Small Quantity Generator Program.

Customer Service and Public Education

Customer service is an essential component in all services provided by the City to residents and businesses. For example, the City has a commitment to excellence: a dedication to performing each task to the best of its ability. This is also reflected in the daily interaction between City employees and customers by treating customers with respect, maintaining accessibility to customers, and following through on requests and promises.

To ensure that this high standard of customer service is extended to operations conducted by the City's solid waste contractors, there are customer service requirements in the City's vendor contracts. For example, contractors are

required to respond to customer complaints within eight hours, and they must complete their tasks within a certain time frame after a customer order is received. The franchised garbage hauler and the SMaRT Station operator are subjected to monetary penalties if they fail to comply with these customer service standards.

The City also provides various public education programs on solid waste services. Information is passed on through utility bill inserts, the Quarterly Report, cable television announcements, the Sun Dial telephone information system, doorhangers, newspaper ads, display boards, and direct mail flyers. Residents receive semiannual reminders concerning the curbside, yard waste, and other recycling programs. Reminders concerning the cardboard recycling program are given to Sunnyvale businesses. The City assists the County staff in providing county-wide workshops on various recycling and source reduction topics. The City also coordinates speakers for local civic and environmental organizations and works with local schools to provide data and materials for classroom use.

Both residents and businesses are notified of the household hazardous waste and small quantity generator hazardous waste programs through newspaper ads, utility bill inserts, and flyers. Periodically the City provides information to residents and businesses on ways they can reduce the quantity and types of hazardous wastes they purchase and use. Literature on "safer substitutes" for commonly used household hazardous wastes is distributed throughout the community.

Economics of Solid Waste Management

The General Plan and Solid Waste Management

In Sunnyvale, the General Plan serves as the City's vision for both short- and long-term policy setting, budget planning, service delivery, and evaluation. Virtually every decision made by the City Council and every major assignment undertaken by City staff is designed to take the City one step closer to implementing its vision, goal, or plan of action. While most cities are required by state law to prepare a general plan outlining the direction of their community, few, if any, use the document like Sunnyvale does: as a foundation of all City planning and budgetary action.

The General Plan is composed of seven Elements: Transportation, Community Development, Environmental Management, Public Safety, Socio-Economic, Cultural, and Planning and Management.

Each Element has a series of Sub-Elements (e.g. Solid Waste is a Sub-Element of Environmental Management) in which long-range policy-making is developed and ultimately put into action via legislative decision (city ordinance, zoning changes, etc.) and budgetary allocations (capital improvement projects, funding of additional staff, etc.).

The City budget is viewed as a tool to implement the General Plan. It is a service-oriented budget, designed to focus on the desired level of service provided to the community at a specific cost. The City budget is designed to communicate whether services provided implement the goals, policies, and direction that the Council believes is important to the community, as reflected in the City's long-range plan.

Providing Solid Waste Service as a Municipal Utility

Solid waste management is one of the most costly expenses for the City. The Solid Waste Program has the largest budget of any City programs, at $22.0 million in Fiscal Year 1995-96, not including various expenses related to handling and disposal of waste from Mountain View and Palo Alto for which Sunnyvale is reimbursed by the other cities. The Solid Waste Program budget is exceeded only by the $32.8 million budget for the entire Department of Public Safety and the $27.2 million budget for the rest of the Department of Public Works.

Costs for refuse collection, transfer, processing, disposal, recycling, source reduction, household hazardous waste programs, post-closure maintenance of the Sunnyvale Landfill, and the costs for administering the solid waste system are all included in the Solid Waste Program budget (the costs of each major area

of the Solid Waste Program budget are shown in Figure 3). The budget for operation of the solid waste management system is developed and approved along with the entire City budget. Capital projects are budgeted as part of the City's Capital Improvement Program. Due to the high costs associated with replacing the franchised hauler's collection vehicles, the refuse collection franchise agreement includes detailed depreciation and replacement schedules showing the date at which each collection vehicle is to be replaced, along with the estimated purchase price. This schedule is reviewed annually and any changes to the type of equipment or the schedule for replacement must be approved in advance by the City.

The SMaRT Station also has a long-range plan for replacement of the various components of the City's investment in the facility. This plan includes an equipment replacement reserve that is funded by the cities of Sunnyvale, Mountain View and Palo Alto in proportion to their original investment in the SMaRT Station. Over 30 years, the fund will pay for replacement of items such as the refuse compactor and conveyors, the various components of the materials recovery facility, the roof, and the specially hardened concrete floor. Past and anticipated expenditures, inflation assumptions, and interest earnings are reviewed annually by the three cities so that contributions to the fund are maintained at a level sufficient to maintain a positive balance until the three city Memorandum of Understanding expires in 2021. The present level of contributions to this fund will not provide for the replacement of the SMaRT buildings themselves in 2021, when they will be ready for replacement or rehabilitation. Determining the future of the SMaRT Station after 2021 and how to finance its rehabilitation at that time is an issue that should be examined in conjunction with the City's review of its refuse disposal arrangements, which also potentially expire in 2021.

As with all City operations, a twenty-year budget forecast is prepared. This forecast shows the expected trends in revenues and expenses for the program. The budget is used to project the trend of future garbage rates, allowing rates to be increased incrementally to provide rate stability and predictability. At the time the budget for Fiscal Year 1995/96 was prepared, rate revenues were projected to increase by 5.06% per year through 2003/04, and by 4.55% annually thereafter.

The entire Solid Waste Program budget is funded almost entirely by user fees collected through garbage rates. Figure 4 illustrates the sources of revenue to the Solid Waste Fund (disregarding reimbursements from the cities of Mountain View and Palo Alto). In Sunnyvale, the City acts as a Municipal Utility as it provides garbage service, then bills and collects the service fees directly from the customers. Billing and collecting of garbage service fees are performed by the City's Finance Department as part of the City utility bills (which also include water and sewer fees). The funds collected are placed in the Enterprise Fund

Solid Waste Program Expenditures 1995/96

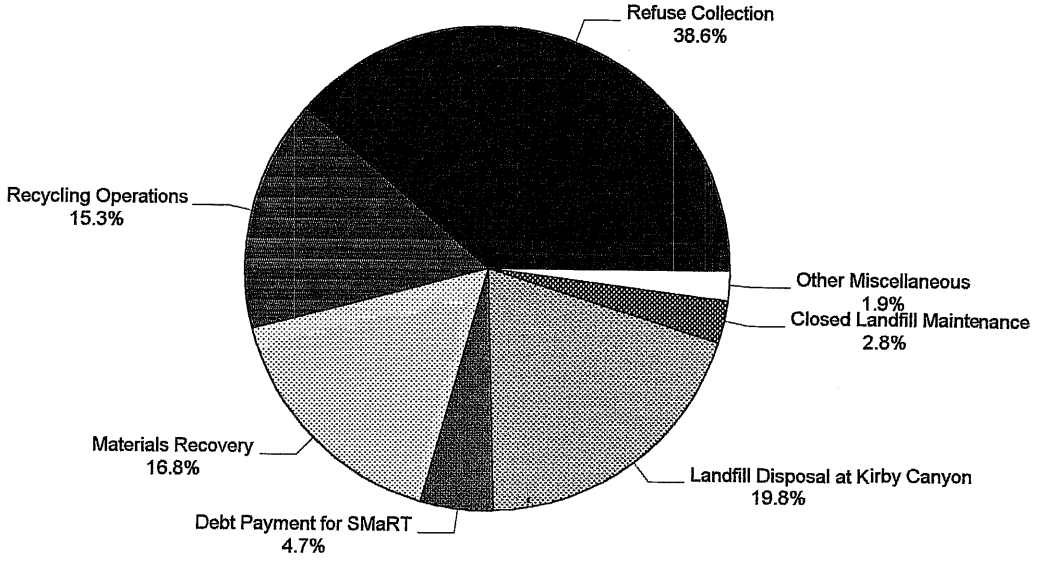


Figure 3

Solid Waste Program Revenues 1995/96

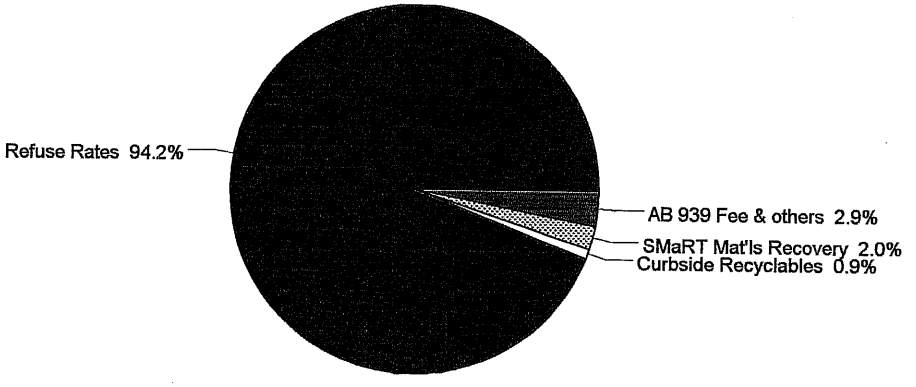


Figure 4

for Solid Waste. This Fund is managed and administered by the Solid Waste Program Manager in the Department of Public Works.

Garbage collection rates are established annually by the City Council. A comparison of the monthly garbage rates for a single family home in Sunnyvale and neighboring cities in 1995 is as follows:

City	Monthly Garbage Rate (unlimited or 3-can service)
Palo Alto	$51.50
Los Altos	$50.04
Cupertino	$41.30
San Jose	$37.50
Mountain View	$33.00
Sunnyvale	**$24.89**
Santa Clara	$19.40
Milpitas	$17.44

Sunnyvale bases its utility rates on the actual costs of providing service to customers. Utility rates for some other cities are not based on costs of service, and some categories of customers may subsidize other categories. For example, in the table above the Santa Clara rate does not pay for all garbage and refuse services in Santa Clara, and certain services are tax supported.

Periodically, the City reviews the methodology used to calculate the garbage collection rates to ensure that the rates reflect the actual costs of providing services. City staff constantly monitors and evaluates each component of the solid waste management system in order to deliver each service at the lowest possible cost. When new programs are considered, a cost benefit analysis is prepared to determine whether the results expected from the program justify the costs.

The cost of service methodology is also used in setting the Gate Fee at the SMaRT Station. When residents from the three cities bring in and dispose of their waste at the SMaRT Station, they will be charged a Gate Fee. The Gate Fee is determined by the volume and composition of waste materials. There are a number of waste categories, each charged at a different per cubic yard basis. The rates for these waste categories in turn are set according to the City's costs in handling, transport and disposal of the waste. Since most of these costs are weight-based, the per cubic yard Gate Fee for a waste category like concrete is much higher than that of general refuse because of its higher density.

Establishing rates tied to the cost of service also encourages residents and businesses to source reduce and recycle to avoid paying additional refuse

collection and disposal fees. This financial incentive to reduce the amount of waste generated has caused many residents and businesses to greatly reduce their waste generation and level of refuse service. The impact on the City's Solid Waste Fund over the past ten years has been a shrinking revenue base. Figure 5 illustrates how the amount of refuse landfilled has declined since 1982. During the same time, costs increased due to inflation, new source reduction and recycling services, and capital projects needed to comply with federal and state mandates to divert materials from disposal and mandates affecting closure and post-closure maintenance of the Sunnyvale Landfill. One of the greatest challenges facing the City over the next decade will be to minimize expenses in order to keep rate increases reasonable while the number of tons flowing through the system decreases.

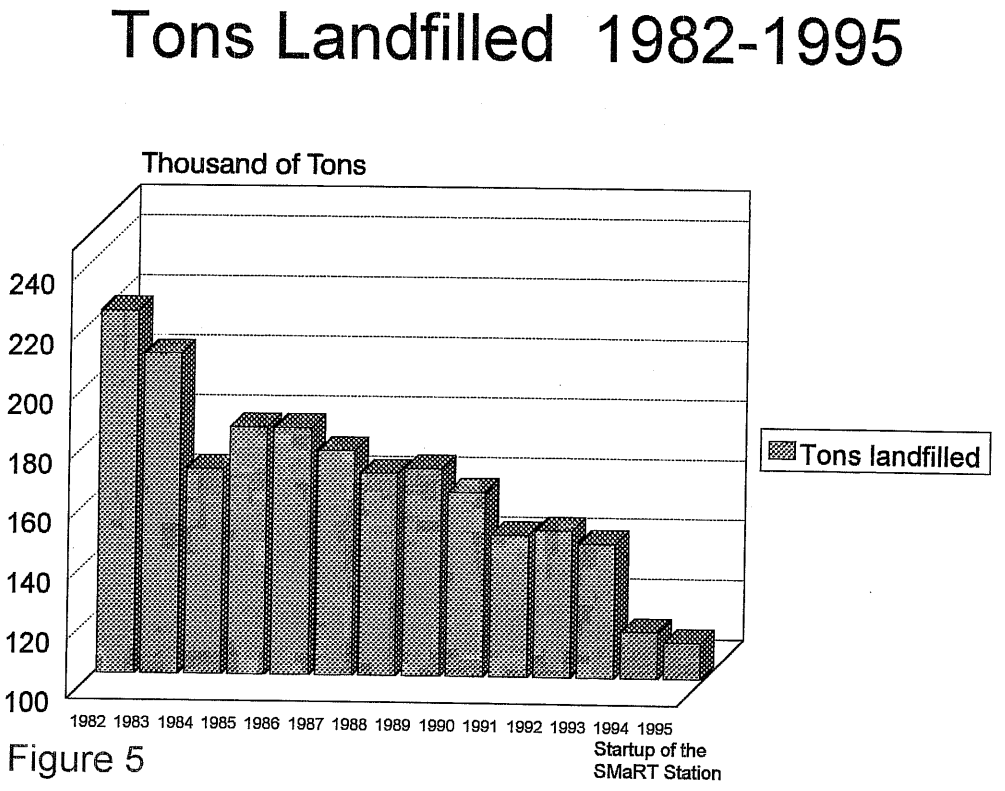


Figure 5

Role of "Demand Management" in Refuse Rate Setting

As noted above, the garbage rate structure will continue to be analyzed periodically to ensure that costs are allocated to rate-payers according to policies set by the City Council, and to verify that these policies remain valid.

The related concept of "demand management" should also underlie solid waste policy and rate-setting decisions. Demand management is the application of market-oriented principles of supply and demand to the pricing of services. The City's existing solid waste policies and practices contain many instances of the use of demand management to influence customer behavior. Some examples are:

- The collection, at no additional charge, of unlimited quantities of curbside recyclables, source-separated yard waste, and commercial cardboard encourages customer use of these services and diverts materials that have been separated from refuse. Because customer cooperation is desired, barriers to participation are kept low.

- The collection of refuse, an activity in which the City would like to see a reduction in tonnage, is charged to customers at rates that reflect both the direct cost of collecting and disposing of the refuse and the cost of recycling programs, which is allocated to customers on the basis of how much refuse they produce. This rate structure gives customers a financial incentive to reduce refuse outputs.

- By requiring only the purchase of a business license by private sector recycling companies, the City hosts a large number of private sector recycling service providers, thus encouraging businesses to reduce their waste disposal costs by recycling discarded materials.

Along with rates and policies, customer service quality plays an important role in demand management. Particularly for residents and those small businesses that may see little direct financial benefit from recycling and other diversion activities, the City should provide recycling services that are convenient and fulfilling. Residents and small businesses should be viewed as volunteers donating their time and efforts to help the City reach its solid waste diversion goals. In each step of the process, from ordering recycling containers to the collection of the recycled materials to providing promotional feedback to customers, recycling and yard waste customers should find simple, easy to follow procedures; customer should be made aware that their actions are appreciated.

The principles of demand management should continue to be applied to the City's solid waste management policies and should be incorporated into future decisions regarding rate structures, the future of the unlimited residential refuse collection service option, and provision of "free" services such as spring and fall cleanup events.

Solid Waste Management and Economic Development

Businesses are becoming increasingly aware of the cost of waste disposal. Increasing landfill costs, which lead to higher refuse collection rates, are motivating businesses to source reduce and recycle. Numerous Fortune 500 companies have adopted corporate strategies to generate "zero waste" within the next ten years. These companies view solid waste as lost profits or wasted assets. They are looking for ways to design their products and their manufacturing processes to minimize waste and reuse materials now being disposed. During the public participation event for commercial customers, many larger industries in Sunnyvale have their own comprehensive recycling programs. The City has already experienced a significant reduction in the quantity of commercial and industrial waste being disposed because of that. This trend is expected to continue, although at a slower pace, since businesses have already implemented the most cost-effective changes.

This new attitude toward reducing solid waste combined with sharp increases in the cost of refuse disposal has resulted in creation of waste reduction, reuse, and recycling programs at large companies such as Lockheed-Martin, Hewlett-Packard, AMD, Macy's, Marriott Hotels, Sun Microsystems, and Apple Computer. Through internal recycling programs, reuse of shipping containers, and other practices, such companies have sharply reduced their waste disposal. Lockheed-Martin's Sunnyvale facility, for example, has reduced its solid waste volumes by 80% through increased recycling. This voluntary reduction in the quantity of solid waste generated will impact the future quantity and composition of solid waste requiring processing and disposal in Sunnyvale.

The increased business awareness of refuse disposal costs is producing a response in the business community beyond "industrial ecology's" increased recycling and source reduction. The increasing expense of solid waste management, as reflected in higher refuse collection rates, has the potential to affect the City's efforts to attract and retain commercial and industrial facilities. Just as businesses are keenly aware of the cost of electricity and business licenses as factors in deciding where to locate, they are beginning to realize that the cost of refuse disposal can be significant and can vary depending upon where they operate.

In Santa Clara County, collection rates can vary significantly from city to city depending upon the level of solid waste management services and how each city funds its solid waste management program. For example, the cost per pickup of industrial refuse will appear to be higher in a city like Sunnyvale (which uses an enterprise fund approach to charge all solid waste costs to solid waste collection customers) than in a city that uses general fund money [tax revenues] to pay for a significant portion of the solid waste services it provides and does not regulate rates for collection of industrial refuse. The final total cost to the

industrial customer may be similar, but in another city, the industrial customer may be paying (in addition to its refuse collection charges) property taxes or a business license fee that provides post-closure maintenance for a closed landfill owned by the city, household hazardous waste events, or other solid waste programs.

In Sunnyvale no tax monies are used for this purpose and expenses for landfill post-closure maintenance are funded by the refuse collection fee. In addition, because Sunnyvale's tax revenues are not used for solid waste management, more General Fund revenue is available to fund a higher service level for other City functions such as libraries, public safety, street maintenance, parks, and so on. The advantages of the City's enterprise fund method of funding solid waste services include:

- Clear statement to the customer of all solid waste management expenses; no hidden charges, emphasizing City accountability
- Directly charges the users of the system for costs they incur, as opposed to charging on the basis of land ownership, taxable sales, or other measures that may not be related to the cost of service to a particular customer
- Allows tax revenues to be used for more appropriate general expenditures such as public safety, libraries, street maintenance, etc.

Moreover, in response to consumer demands for more recycling and more "environmental" approaches to product development, many manufacturers are now designing with an eye to recycling when their product's life is completed. Designers are also creating more durable products. The City should closely track these trends and use its knowledge in designing solid waste facilities and programs so that the facilities and programs can effectively handle the materials that will be in the waste stream in the future.

Other manufacturers respond by making household items that are more durable or reusable. This trend will also impact the quantity and types of solid waste that the City's solid waste system will be handling in future years.

Search for Efficiency and Additional Sources of Revenue

In order to deal with the shrinking waste stream and a continued increase in program expenditures, the City will need to consider various methods to increase efficiency. One way is to reduce fixed operating costs, where possible, to reflect the reduced tonnages. This cost reduction may mean eliminating refuse collection routes, switching to automated refuse collection service to reduce labor costs and other measures that will increase collection efficiency. Testing of

"single-pass" vehicles, to reduce the size of the fleet for collection of refuse, recyclable materials, and green waste, may also be considered. Such vehicles might, for example, collect refuse and recyclables in a single, multi-compartment truck. A combined refuse/recyclables collection truck was tested by the City in 1992 and found to be less cost-effective than separate vehicles. However, further advances in this area are anticipated as other communities grapple with this issue. The City should remain alert for new opportunities to reduce collection and other costs.

Other than searching for efficiency, the City can also seek out additional sources of revenue. Potential sources include development of new markets for existing recovered materials as well as searching for markets for new categories of materials to be recovered.

The closed Sunnyvale Landfill can also offer opportunities in revenue generation from its post-closure use. For example, the current concrete recycling operation on the East Hill benefits the City not only by diverting concrete and asphalt from the waste stream and hence avoiding expensive landfill disposal costs, but also by generating a per ton royalty for materials brought onto the site. Another project already underway is the Power Generation Facility at the WPCP. The planned facility will utilize digester gas from WPCP operation and landfill gas collected from the landfill to generate electricity. The power generated will be more than sufficient for the WPCP's demand and the excess can be provided to the SMaRT Station or other industrial users.

Significant physical and regulatory constraints limit future generation of revenues from use of the closed landfill. These constraints include:

- The need to protect the clay cap over the surface of the landfill and to maintain access to the cap for inspection and repair purposes.
- Differential settlement of waste materials and restrictions on use of irrigation water make placement of structures or playfields on the landfill problematic.
- The presence of landfill gas requires use of specific design and construction techniques and ongoing monitoring and maintenance to protect the public from the explosion potential and other risks posed by landfill gas.

For these reasons the closed landfill may not be suitable for some revenue-generating uses, such as office buildings that would be possible on other, non-landfill sites.

Future Solid Waste Management Issues

Changing Waste Stream

Quantity

Typically, if other factors remain the same, the quantity of solid waste generated within a city is a result of the following factors:

- Population: As the number of people living in a city increases, if there is no other change in people's behavior, waste generation increases.
- Retail sales levels: If sales increase, waste generation increases as product packaging is discarded and the articles being replaced are discarded.
- Industrial output levels: As more goods are produced, manufacturing wastes and other related wastes (advertising materials, packaging from raw materials, etc.) are produced.
- Vibrancy of the local economy: The nature of the industries located in a city and the occupancy levels of commercial and industrial properties affect the amount of waste generated.
- Real estate development, redevelopment, and remodeling: Clearing of land, demolition of existing structures, and construction all produce significant amounts of waste, which are in turn affected by interest rates, land use policies, and the general health of the local economy.
- Weather: Rainfall amounts greatly influence the amount of plant trimmings ("garden wastes") generated and the moisture content and hence weight of other types of solid waste.
- Packaging decisions by manufacturers of goods consumed in a city: Decisions made by manufacturers of goods shipped to a city from distant locations, such as detergents or restaurant supplies, increase and decrease local waste generation.
- Natural disasters (floods, freezes, earthquakes, windstorms): All such natural events increase the amount of solid waste generated.
- Community income and wealth: The more affluent and confident consumers are, the more waste they produce.

While the conventional belief that increased city growth and a healthy economy will generate additional waste is still true in general, fluctuation in waste stream quantities no longer tracks directly with economic growth or the amount of new

housing. With the advent of increased recycling and waste reduction programs, growth in the waste stream due to economic and/or population growth is offset, to varying extents, by source reduction and recycling efforts.

Quality

As with the quantity of solid waste, the composition of the City's solid waste is affected by a number of factors largely outside the City's control. The difficulty of anticipating future changes in waste composition in a twenty-year planning document is best illustrated by looking at the past twenty years and observing the significant changes in the City's waste composition. For example, in 1975, glass bottles were used extensively for soft drinks, food, shampoo, vitamins, and numerous household items. Glass recycling was still in its infancy, so glass comprised a significant portion of the waste stream. Twenty years later, the above-listed products are all available in plastic containers. The quantity of plastic in the waste stream has increased significantly and the quantity of glass has decreased.

In 1975, the typical office used electric typewriters to produce letters, memos, and reports. Bond paper and carbon sheets comprised a large portion of the waste stream from banks, insurance companies, real estate agents, and large companies. Twenty years later, computers and laser printers have replaced typewriters, along with the ubiquitous photocopying machine, making it easy for office workers to generate large numbers of copies of documents. Carbon paper has almost completely disappeared from the waste stream.

The City's solid waste system should remain flexible so it can adapt to changes in the waste stream.

"Flow Control"

As noted above, businesses, refuse collection companies, and recyclers now view the "waste stream" as a "resource stream." This trend has led to arguments over ownership of the waste, a hotly contested topic in the courts for many years that is likely to be addressed by legislation at the state and federal levels. New legislation and judicial decisions will impact the manner in which the City manages the waste stream. Changes in contracts, the City Code, and Solid Waste Program funding sources may be needed to comply with new legal decisions and adapted to address the ownership of the resource stream.

At the state level, the 1994 decision by the California Supreme Court in the case of *Waste Management of the Desert vs. Palm Springs Recycling* indicated that recyclables must be viewed as tradable commodities under the control of the waste generator if they are purchased or collected at no charge by a recycler. Sunnyvale's existing policies are consistent with the Court's ruling, but it is

expected that this expansion of "recycling rights" will continue and it is possible that some future court decision may change the City's policies.

Of far more concern, at the federal level, the U.S. Supreme Court ruling on May 16, 1994, in the case of *C&A Carbone, Inc. vs. Town of Clarkstown* declared that a local jurisdiction could not, by way of an ordinance, mandate that all of the waste within the jurisdiction be disposed at a specific facility. While the specific ruling in the *Carbone* case has little immediate impact on Sunnyvale, the Court's ruling was stated broadly and raised many questions regarding the appropriate role that a local jurisdiction should play in the solid waste management arena. The full impact of the Court's ruling and its long-term impact on the City's power to grant an exclusive franchise for refuse collection, to set customer rates, and to fund an integrated solid waste management program with user fees may depend on the ultimate resolution of a number of lawsuits filed around the country in the wake of the *Carbone* decision, as well as current federal legislation being proposed to clarify the role local government can play in solid waste management. Because it potentially threatens the City's ability to pay for source reduction, recycling, and household hazardous waste services, and the $21 million debt for the SMaRT Station, the City should take a vigorous, proactive stance toward influencing legislation on the topic of flow control.

City control over the handling of wastes generated in Sunnyvale is also of great importance to the City and its ratepayers due to the liability associated with the federal Superfund law. If refuse generated in Sunnyvale is disposed of at a site that later requires remedial cleanup, the City may have a virtually unlimited liability for the cost of that cleanup, regardless of how large or small a role the City played in handling the refuse. This fact gives critical importance to City policies that affect the ultimate disposal site for Sunnyvale refuse. Large industrial waste generators would likely be named directly in any cleanup actions, and these waste generators tend to share the City's concern about the integrity of disposal sites. During the focus group discussion, when asked to rank fourteen solid waste management issues, facility managers of six large Sunnyvale industries ranked "Avoiding long-term disposal site(s) cleanup liability" as their top concern.

The City's decision to enter into a long-term contract with Waste Management was driven in part by the technical qualifications of that company and the compliance of Kirby Canyon Landfill with the most recent standards for landfill construction, operation, and monitoring. Future City decisions and policies that affect where Sunnyvale wastes are disposed should likewise consider not just the immediate cost of disposal but also the potential for long-term environmental cleanup liabilities.

City Diversion Objective

A key issue the City faces in light of the state's current AB 939 diversion requirement is the City's own waste diversion policy. Should the City adopt whatever diversion goal is currently required by the state? Or should the City independently set a diversion goal that may exceed the state's minimum requirement? The City could also adopt a Legislative Action Statement promoting legislative changes in the state-mandated diversion requirements. This issue is important because the state's minimum diversion requirement may increase or decrease over time, and because it will be more cost-effective for the City to target a particular diversion level without changing the goal frequently.

The California Integrated Waste Management Board (CIWMB) has proposed regulations containing a mathematical formula to calculate the diversion achieved by each city and county in California, using the number of tons landfilled in the baseline year (1990) and in 1995. The formula calculates the total reduction in tons landfilled. It also includes an adjustment to waste generation for population changes and employment since 1990 and for inflation-adjusted increases or decreases in taxable sales. This waste generation number, calculated after the end of each year, will be compared with the actual amount of waste disposed (landfilled) to determine the percentage of waste disposed and thus the percentage diverted. The 1993 and 1994 figures calculated by City staff are shown below:

		1993	1994
	(Calculated) Waste generation	= 196,167 tons	198,238 tons
Less	(Actual) Waste landfilled	= 144,814 tons	115,601 tons
Equals	Waste diverted	= 51,353 tons	82,637 tons
	Percentage diversion:	26%	42%

Thus in 1993 the City had, two years in advance, exceeded the 25% diversion level mandated for 1995.

City staff makes an annual calculation of diversion achieved, using the CIWMB regulations and formula. In 1993, the most recent year for which all adjustment factors are available, the City's diversion rate was at 26%. As of spring 1995, the combination of City-funded recycling programs, private sector recycling programs, and materials recovery operations at the SMaRT Station has resulted in an estimated diversion of 45% of the City's solid waste, when compared against the 1990 tonnages. Figure 6 shows the tons of waste generated, disposed, and diverted for the years 1990-1994. Additions to the City-funded recycling programs may be needed to reach the 50% diversion mandate for the