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Solid Waste Management Program
Analysis and Recommendations

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Draft Report to the Town of Silver City, New Mexico: Solid Waste Management Program Analysis and Recommendations

1 – Report Background and Organization

Section 1 discusses the primary reasons an examination of the Town’s solid waste program has been undertaken; the process / approach used for conducting the analysis / evaluation; and the structure of the report presenting observations, conclusions, and recommendations.

1.1 Context and Approach

For the Town Council and other Town officials it is a priority to plan and carry out initiatives designed to protect and increase the natural attractiveness, beauty, and “livability” of Silver City. This strategy has two basic purposes: to enhance the quality of life / livability in Silver City for current residents, businesses, and institutions and to strengthen the position of the Town as a desirable destination or location for visitors and future residents / businesses / institutions. Town leaders have recognized the existing methods and equipment for managing municipal solid waste are antiquated and need to be upgraded so they are consistent with this mission. These methods and equipment rely almost totally on manual collection and handling of refuse. The challenge has been to gradually accumulate enough funds for the capital expenditures needed to modernize refuse collection equipment and operations. About \$600,000 has now been set aside for such acquisitions.

To assist Public Works Department / Sanitation Division personnel in the transition to a new, more mechanized solid waste program the Town retained a consultant to perform an operational review of the Sanitation Division. The purpose of this review was to identify measures that would increase efficiency and effectiveness in the delivery of solid waste management services (excluding recycling) to citizens, businesses, institutions, and apartment buildings in the Town. The topics addressed by the consultant are noted below:

- Refuse collection machinery and equipment;
- Routes and service delivery methods and levels;
- Collection of large / bulky items and other additional waste management services;
- Service rates;

- Performance measures to determine and document in quantitative and qualitative terms the efficiency / effectiveness of services delivery;
- Implementation tasks for each recommendation including activities, timeframes, deadlines, and responsibilities.

The Town's Public Works Director has emphasized to the consultant the importance of the following factors that should serve as guidelines for the analysis and recommendations:

- Upgrading and modernizing operations of the Sanitation Division.
- Increasing the level and efficiency of refuse collection services.
- Maximizing and diversifying the utilization and productivity of current employees.
- Expanding the types of services offered by the Sanitation Division.
- Controlling the impact on rates of proposed program improvements.
- Promoting rate equity and a closer connection between service levels / types and rates.
- Undertaking a phased implementation strategy for the recommended changes to facilitate communication with residents and businesses as well as management of the transition process to a new solid waste program.

A Draft Report containing initial results and findings from the research and analysis will be reviewed by the Town and presented at community meetings of residents and businesses. Suggested revisions and feedback will be incorporated into a Final Report for approval and adoption by the Town Council.

1.2 Information Sources and Reference Materials

The information sources and reference materials used in preparing this report for the Town included personal interviews, documents, current policies, procedures, and practices, observation of operations, and other data, items, and activities as listed below:

- Discussions with, and presentations to, members of the Town Council
- Discussions with Alex Brown, Town Manager / Finance Director; Peter Pena, Public Works Department Director; Justin Reese, Assistant Public Works Department Director; Mel Marquez, Public Works Maintenance Supervisor; Patricia Pino, Public

Works Department Secretary / Receptionist; Kariann Sokulsky, General Manager,
Southwest Solid Waste Authority

- Tour of Public Works Department maintenance and storage yard
- Tour of Town of Silver City
- Observation of refuse collection operations
- Grant County Solid Waste Authority Joint Powers Agreement
- Southwest Solid Waste Authority Methodology for Calculating Landfill Charges and Refuse Service Rates
- Joint Powers Agreement Between Southwest Solid Waste Authority and Town of Silver City
- Agreement Between Town of Silver City and Southwest Solid Waste Authority for Recycling Pick – Up, Processing, and Education
- Silver City Sanitation Fund Budgetary Details
- Southwest Solid Waste Authority Annual Operating Plan and Budget for FY 2005 (July 1, 2004 to June 30, 2005)
- Silver City Sanitation Division Call – In Log
- List of Sanitation Vehicles for Silver City
- Job Descriptions (4), Sanitation Division, Public Works Department, Town of Silver City
- Sample of residential refuse service bill
- Sample of commercial refuse service bill
- Rate structure for commercial sector
- Refuse service route maps / lists
- Data on size, number, and collection frequency of commercial refuse containers
- Personnel Manual for Town of Silver City Employees

- Agreement Between Town of Silver City and American Federation of State, County, and Municipal Employees, Council No. 18, Local No. 3370
- Safety Manual, Town of Silver City

2 – Overview of Relevant Local Characteristics and Circumstances

Section 2 describes the basic geographic, demographic, economic, institutional, and political factors that form the context for the Town's solid waste program. Section 2 also describes the general features, services, and activities of the existing solid waste program.

2.1 Town of Silver City

The Town of Silver City is located in Grant County 112 miles northwest of Las Cruces. Silver City is the governmental seat of Grant County. The Town's population is about 10,550 based on year 2000 census data. More recently, the Winter 2004 issue of *Silver City Life* magazine estimated the 2004 population at 12,500 (note: this figure may include residents from areas of unincorporated Grant County near Silver City). For purposes of projecting future population a 2% annual growth rate is assumed. The Town covers 10 square miles at an elevation of around 6,000 feet. The population density is 1,040 per square mile. U.S Highway 180 and State Road 90 run through Silver City.

Silver City is governed by a Town Council with five members. Four councilors are elected from individual districts within the Town while the fifth member is the Mayor who is elected on a Town – wide basis. The Mayor votes in cases of a tie vote among the other four Town Council members. The Town Manager also serves as the Finance Director. The Public Works Department has several divisions including the Sanitation Division, which is responsible for operating the Town's solid waste program with the exception of recycling. Recycling services are provided contractually by the Southwest Solid Waste Authority (SWSWA), as discussed in Section 2.2.

Western New Mexico University is located in Silver City. The Town is served by two newspapers, the Silver City Daily Press and the Silver City Sun News. Silver City is a conveniently located point of entry to a large number of recreational opportunities, archeological sites, and historical locations such as the Gila National Forest, Gila Cliff Dwellings National Monument, Lake Roberts, Mimbres River, Trail of Mountain Spirits Scenic Byway, City of Rocks State Park, Fort Bayard, and Pinos Altos. There are numerous festivals and community activities in Silver City that attract visitors throughout

the year, including: Tour of the Gila, Blues Festival, Rodeo, Fourth of July, Fiesta de la Olla, Labor Day Weekend, Weekend at the Galleries, and the Lighted Christmas Parade.

Silver City's work force is 13,174 with 11,495 employed for an unemployment rate of close to 11% (figures for November, 2003 from Winter, 2004 issue of *Silver City Life*). Thirty percent of the Town's work force is employed in the educational, health, and social service fields. The next two largest employment categories are retail trade with 12 % of the work force and agriculture / forestry / fishing / hunting / mining with 10 % of the work force. Manufacturing accounts for a comparatively small portion of the work force at 3 %. Major employers in the area include Phelps Dodge Mining Company, Gila Regional Medical Center, Western New Mexico University, Silver Consolidated Schools, Fort Bayard Medical Center, Wal – Mart Super Center, Cobre Consolidated Schools, James Hamilton Construction, U.S. Forest Service, and the Town of Silver City itself.

2.2 Solid Waste Management Program

Provision of solid waste collection and disposal services in Silver City is the operational responsibility of the Public Works Department's Sanitation Division. Sanitation Division operations are considered a Proprietary or Enterprise Fund in Silver City meaning that the Division is financed and operated in a manner similar to a private business. Sanitation Division funds are intended to be self – generating and provide enough revenue to cover costs. All revenue and expenses associated with the Sanitation Division are within the Sanitation Fund.

Single – family homes ("the residential sector") receive weekly household garbage service. Such service is provided to approximately 3,337 single – family residences at the uniform rate of \$12.92 / month (plus gross receipts tax), according to billing records maintained by the Town. The rate combines a fee for actual collection service (\$7.87 per month, per residence) plus a fee based on the amount of waste disposed (\$5.05 per month, per residence). Businesses, institutions, and apartment buildings ("the commercial sector") are also provided with solid waste collection service. Service is provided to approximately 526 commercial sector generators, based on data from the Sanitation Division. Some generators have their own dumpsters while others do not. Commercial rates are variable and depend on the amount of refuse collected and the frequency of collection per week.

Trash from Silver City is disposed at the Southwest Regional Landfill located approximately 5.5 miles south from the center of the Town at 318 Ridge Road. The landfill is operated by the Southwest Solid Waste Authority, an entity created by a Joint Powers Agreement between seven jurisdictions – Grant County, Hidalgo County, Town of Silver City, Village of Hurley, Village of Santa Clara, City of Lordsburg, and the City of Bayard. The tipping fee at the landfill is \$43 / ton. Under a Grant County policy, Silver City residents are able to dispose of one ton per month free – of – charge if they haul it

directly to the landfill. The SWSWA charges the Town of Silver City for disposing of the trash brought to the landfill by residents under this policy.

For calendar year 2004 a total of 28,040 tons of waste were disposed at the landfill by all the participating jurisdictions. Silver City accounted for 8,995 tons of this total or 32%. Silver City's disposed tonnage comes from the following sources (2004 figures):

- Sanitation Division residential routes: 2,971 tons
- Sanitation Division commercial routes: 3,321 tons
- **Subtotal:** **6,292 tons**
- Self – hauling by residents: 2,213 tons
- Other Town operations (not Sanitation Division): 490 tons
- **TOTAL:** **8,995 tons**

It is noted that some refuse from within the Town of Silver City is being hauled directly to the landfill by business or institutional generators, contractors, and others who pay the disposal costs themselves. However, the quantity of waste being handled in this manner is unknown. The focus of this report is the Town's Sanitation Division, which collects 6,292 tons per year (121 tons per month or 20 tons per day over the present 6 – day work week). This amounts to 70 % of the disposed tonnage generated by the Town. Since recycling services are provided by the SWSWA, not the Sanitation Division, consideration of recycling was not part of the consultant's scope of work.

3 – Observations and Analysis

Section 3 considers operational factors of the Town's solid waste program including but not limited to the following: refuse collection equipment types and condition; crew size; refuse collection methods; collection frequency; number and size of routes.

3.1 Refuse Collection Machinery and Equipment

3.1.1 Existing Conditions

Six vehicles are used for refuse collection in Silver City, as follows:

- One (1) 1990 GMC 7000 Packer Rear Loader – 20 cubic yard capacity

- One (1) 1990 GM Volvo Packer Rear Loader – 32 cubic yard capacity
- Two (2) 1997 Chevy C – 8500 Packer Rear Loaders – 25 cubic yard capacity
- Two (2) 1997 Ford F – 450 Super Duty Side Loaders – 13 cubic yard capacity

The two 13 cubic yard capacity vehicles are commonly referred to as “burros” by Town employees. The burro trucks have a 1 – person crew while the remaining packer trucks have 2 – person and sometimes 3 – person crews (driver plus collector[s]).

There is no program for the separate collection, recovery, and processing of yard waste into either mulch or compost. Yard waste is set out as refuse by residents.

Standardized refuse containers are not provided by the Town for either residential or commercial customers. Of the 526 commercial accounts 170 have metal dumpsters. The total number of dumpsters for these 170 accounts is 206, indicating that most accounts have one dumpster on site. Dumpster size ranges from 1 to 6 cubic yards in capacity. However, of the 206 dumpsters 182 are in the 1 to 3 cubic yard range, as follows: 1 cubic yard – 3 dumpsters; 2 cubic yard – 63 dumpsters; 3 cubic yard – 116 dumpsters.

Given the small size and number of most commercial dumpsters, and the lack of standardized containers for the remainder of the commercial sector, it is not surprising that 234 commercial accounts have their refuse picked up more than once per week. Even with the available commercial dumpsters a driver has to maneuver a truck into position so the dumpster can be attached to the lift mechanism and emptied. Waste collection in the Town is thus highly labor – intensive in both the residential and commercial sectors.



**Commercial Trash Set Out For Collection; “Burro” Refuse Truck;
Rear-Loading Refuse Truck**

3.1.2 Key Issues, Concerns, Problems

All of the trucks have reached the end of their useful life and are subject to frequent breakdowns. Replacement parts have been difficult to obtain in a timely manner because of the distant locations of the truck manufacturers. Thus all six trucks are not necessarily available for service at the same time, subjecting the functional vehicles to extra duty and increasing their vulnerability to mechanical or structural problems. In addition, the four largest trucks are not necessarily dedicated to specific routes but are used wherever and however they are needed on a particular day.

Less than half of the commercial generators have dumpsters for containment of refuse. This means many businesses are setting out small quantities of trash in plastic bags, boxes, or in some other manner. The majority of those generators with dumpsters have small ones with either a 2 or 3 – cubic yard capacity. These factors lead to frequent collection service and a large expenditure of labor time. Crews must pick up individual bags of garbage from businesses and place them manually into the rear – loading packer trucks or burro vehicles. They must also maneuver the rear – loading packer trucks and / or the dumpsters so the dumpsters can be emptied mechanically into the packer trucks.

On the residential side trash is also set out in a variety of ways, sometimes with containers and sometimes not. The containers themselves are not uniform. There is no planned connection between the way the trucks operate mechanically and the placement of refuse for pickup. Collectors manually retrieve waste in the manner it is set out and place it in the truck. When there are large amounts of refuse set out, and / or on unpaved burro routes when the driver / collector must make special efforts to maneuver the truck into position for each residence, the inherent inefficiencies and time – consuming aspects of the refuse collection operation are magnified even more.

In addition, it is understood from discussions with the Public Works Department Maintenance Supervisor that the compaction units on all six of the collection vehicles are not as effective as they used to be. This means that the manufactured capacities of the trucks are not being achieved, resulting in a series of negative impacts on operating efficiency: the amount of trash the trucks can carry is reduced; fewer generators can be serviced; the trucks fill up faster; more trips to the landfill are required; actual time on the routes is interrupted; the routes take progressively more time and effort to complete.

3.2 Routes and Service Delivery Methods and Levels

3.2.1 Existing Conditions

Trash is picked up Monday through Saturday in Silver City. There are a total of 20 collection routes covered in six days – four routes are covered Monday, Tuesday, Thursday, and Friday while two routes are covered on Wednesday and Saturday. The days with four routes consist of residential packer, residential burro, commercial packer and commercial burro routes. The days with two routes consist of commercial packer and commercial burro routes.

Residential routes consist of single – family homes. Commercial routes consist of a variety of waste sources such as restaurants, schools, banks, churches, doctor’s offices, hotels / motels, gas stations, auto repair shops, barber shops, car dealerships, trailer and mobile home parks, and apartment buildings. Governmental and institutional generators are also considered part of the commercial sector such as the US Forest Service Warehouse, Post Office, State of New Mexico offices, Grant County offices, Town of Silver City offices / facilities / operations, and Gila Regional Medical Center.

3.2.2 Key Issues, Concerns, Problems

As indicated in Section 3.1, the large number of routes is a direct result of the following characteristics of the Town’s solid waste handling system:

- The age and poor condition of the collection vehicles;

- The lack of standardized containers throughout the residential and commercial sectors;
- The reliance on manual methods of picking up and placing refuse into the collection vehicles;
- The amount of time spent servicing each pickup on the routes; and,
- The limited capacity of the collection vehicles, which means they are interrupting their time on the route to drive back and forth to the landfill at least twice daily.

Each of these inefficiencies in the key elements of the solid waste program adds up to a broader system inefficiency and loss of labor productivity and effectiveness.

3.3 Collection of Large / Bulky Items and Additional Waste Management Services

3.3.1 Existing Conditions

The Sanitation Division currently does not perform collection and removal of large / bulky items such as furniture or appliances. Collection of branches is done by the Street Division of the Public Works Department using dump trucks.

3.3.2 Key Issues, Concerns, Problems

There have been numerous requests from residents for collection of large / bulky items. However, the inefficient manner in which trash is handled means that drivers / collectors are dedicated fully to the regular pickup routes and are not available for special services. Also, none of the six collection vehicles, which have all reached the end of their effective life as demonstrated by frequent mechanical breakdowns, are suitable for the collection of large / bulky items.

Inefficient refuse collection equipment and operations mean crews must make extra efforts to deliver a basic level of refuse removal service. This prevents the allocation of resources toward the implementation of other desirable services such as periodic collection of large / bulky items, litter patrols and clean – ups, neighborhood beautification projects, special recycling activities, household hazardous waste collection events, and regular pickup of yard waste. A modernized and more efficient refuse collection operation would put the Sanitation Division in a position to potentially provide some of the services just mentioned.

3.4 Service Rates

3.4.1 Existing Conditions – Residential Sector

The monthly rate for weekly Town garbage collection from single – family residences is \$12.92 plus gross receipts tax. There are two components in the \$12.92 charge – one component covers the costs of actually delivering the collection service to households while the other component relates to the landfill tipping fees charged to the Town for disposal of the collected refuse. The service portion is \$7.87 / month. It is understood this amount pays for refuse collection by Town crews and residential recycling collection by the SWSWA. The disposal fee portion is \$5.05 / month. This equates to each single – family home paying for 235 pounds / month per household to be disposed, or 54 pounds / week per household, based on the current landfill tipping fee of \$43 / ton:

$$\begin{aligned} & \mathbf{\$5.05 / \$43 \times 2000 \text{ pounds} =} \\ & \mathbf{235 \text{ pounds per month} / 4.33 \text{ weeks}} \\ & \mathbf{= 54 \text{ pounds per week}} \end{aligned}$$

Also included with the disposal portion of the rate is the opportunity for any resident to self – haul waste to the landfill. The current limit is 2000 pounds a month. If a resident was to truly maximize their privilege and dispose of 2000 pounds every month in addition to the weekly collected set – out of 54 pounds per week, they would realize a disposal rate of \$4.52 per ton:

$$\begin{aligned} & \mathbf{(54 \text{ pounds per week} \times 52 \text{ weeks}) + (2000 \times 12 \text{ months}) = 26,808 \text{ pounds} / 2000 =} \\ & \mathbf{13.4 \text{ tons}; then } (\$5.05 \times 12 \text{ months}) / 13.4 \text{ tons} = \mathbf{\$4.52 \text{ per ton}} \end{aligned}$$

3.4.2 Existing Conditions – Commercial Sector

The monthly rate for commercial garbage collection (including multi – family buildings) is set based on the amount of waste collected and the frequency of collection. The formula to compute the collection cost is:

$$\mathbf{\text{total cubic yards} \times \text{weekly collection frequency} \times 4.33 \text{ (weeks per month)} \times \mathbf{\$5.61}}$$

In addition to the collection or service fee portion of the rate, the disposal fee is computed based on the volume of trash collected. Calculation of the disposal cost starts with the following formula:

$$\begin{aligned} & \mathbf{\text{volume of garbage} \times \text{the number of pickups per week} \times 4.33} \\ & \mathbf{= \text{total cubic yards picked up per month}} \end{aligned}$$

Total cubic yards are then multiplied by 175 pounds per cubic yard to arrive at the tonnage. The total tonnage is then multiplied by the current tip fee of \$43 per ton. Cubic yards of generated trash used to calculate the collection fee are either based on the size and number of containers a business presently uses, or in the case of most businesses are estimated based on the number of trash bags generated weekly. The Town has approximately 526 commercial customers and of those only 170 customers utilize containers for the storage of solid waste. At the present time the Town does not provide commercial generators with refuse containers nor is it required by Town code / ordinance that refuse be containerized in either the residential or commercial sectors.

The previous discussion on rates is based in part on the current landfill tipping fee of \$43 per ton. It is noted that if the tipping fee increases in the future then service rates may also increase.

3.4.3 Key Issues, Concerns, Problems

In the residential sector particularly, there is little correlation between the level and type of refuse collection service and the rates. Generators are paying the same flat monthly rate regardless of how much garbage they put out for collection; whether the garbage is containerized, bagged, boxed, or set out in some other manner; or where the collection point location is and how accessible / convenient it is for Town crews to pick up the waste.



A similar situation exists in the commercial sector because most accounts do not have trash bins or dumpsters. For those that do there is an objective basis for determining the appropriate service rate based on the calculations presented above. For the majority of businesses the volume of trash put out for collection must be estimated by the generator, Town staff, or both in order to derive a rate. Commercial businesses that have

Commercial Trash Set Out for Collection

chosen to purchase a container for the storing and collection of solid waste offer a reliable starting point for rate calculation. This is because the amount of refuse, by volume and / or weight, set out weekly for collection can be reasonably quantified based on the size and number of containers serviced. It is more difficult to measure the weekly amount of waste collected for disposal from commercial customers without containers.

In summary, if standardized, uniform containers were used throughout the residential and commercial sectors for refuse storage / collection there would be a much stronger and clearer connection between the level and types of services provided and the rates for such services. The lack of containers also contributes to the operational inefficiency of residential and commercial refuse collection by making it highly time – consuming and labor – intensive.

4 – Conclusions and Recommendations

4.0 Introduction and Overview

In considering solid waste system alternatives for the Town of Silver City there are several key program factors or variables to emphasize:

- Collection vehicles
- Refuse containers
- Service uniformity and standards
- Operational efficiency
- Capital costs
- Town role / responsibilities
- Customer behavior / responsibilities
- Employee attitude, morale, satisfaction
- Policy impacts
- Public communication / outreach needs

A critical program element in a solid waste program is the type of trucks used to collect refuse in the residential and commercial sectors. Presently in Silver City, trash set out for collection in bags or boxes is picked up manually and placed into the vehicles. Trash containers are also picked up and emptied manually. The exception is commercial accounts with their own dumpsters. In those cases the dumpster is manually connected to a lift mechanism at the back of the refuse truck, lifted, emptied, returned to the ground, manually unhooked from the truck and then relocated.

4.01 Basic Collection Vehicle Alternatives

To collect garbage from both the residential and commercial sectors there are proven refuse truck alternatives for the Town to consider that can have a significantly positive impact on the operational efficiency and productivity of the Sanitation Division.

For the residential sector (single – family homes) the two basic refuse vehicle options are either fully automated or semi – automated trucks that are widely available in

different sizes, capacities, and operational features. Both are typically loaded from the side.

With a semi – automated truck the container is manually positioned so it can be lifted and unloaded by a mechanism that is part of the truck itself. This requires the driver or another person to move the container into position for unloading. With a fully automated truck there is a mechanism extending outward from the side of the truck that picks up the container, empties it into the truck body, and then places it back down on the street. A fully automated refuse vehicle is designed to be operated by one person for maximum efficiency since it does not require the driver or another employee to leave the vehicle to manually place a trash container into the unloading mechanism.

For the commercial sector there are front – loading trucks that are also widely available for picking up trash. These trucks have two prongs on either side of the front of the vehicle that extend outward. The prongs are inserted into “sleeves” on the sides of a dumpster, the dumpster is lifted up, emptied into the main portion of the truck, and then placed back on the ground. Properly placed dumpsters can be serviced in a fully automated manner by a one – person crew (the driver) who does not have to leave the truck.

4.1 Solid Waste System Options / Scenarios

There are three basic solid waste management system options or scenarios for the Town to consider that differ according to the variable factors noted above, with particular emphasis on the kind of refuse truck utilized. Those scenarios are described as follows:

4.1.1 Option / Scenario 1 – Improved Current Program

- Replace existing collection truck fleet with similar but new, more reliable and durable vehicles.
- Maintain manual waste handling methods.
- Initial capital outlay estimate is \$510,000 for purchasing two 25 – cubic yard, rear – loading packer trucks and two 15 – cubic yard, side – loading packer trucks. Lowest capital costs of three options / scenarios.
- No container purchases involved.
- Comparatively easy to implement.
- No behavior changes by customers needed.

- Public communication / outreach effort not required.
- Does not result in uniform, basic service levels.
- Efficiency and productivity gains will be minimal.
- Ability of Sanitation Division to implement other services is limited.

4.1.2 Option / Scenario 2 – Modified New Program

- Fully automated residential refuse collection.
- Semi – automated and manual commercial refuse collection with rear – loading trucks.
- Initial capital outlay estimate is between \$682,000 and \$768,000 to purchase the following equipment: around 4,200 carts for storing residential trash; two new vehicles for fully automated collection of residential refuse (larger truck has 25 to 32 cubic yard capacity, smaller truck has 12 to 15 cubic yard capacity); one 25 – cubic yard, rear – loading packer truck with manual tipper for picking up and emptying trash containers (similar to method currently used), OR one 25 – cubic yard, rear – loading and side – loading packer truck with automated arm.
- All residential refuse must be in containers.
- Carts provided for residences – standard size is 65 – gallon capacity.
- Carts must be placed properly in street on collection day.
- Carts or dumpsters provided to businesses on request by Town.
- Some behavior change for businesses that choose to use containers.
- Initial capital outlay higher than Option / Scenario 1.
- Public communication / outreach necessary.
- Will lead to some increased operating efficiencies, higher labor productivity, better working conditions, and more positive employee morale.
- Ability of Sanitation Division to implement other services will be somewhat improved.



Rear – Loading Truck with Manual Tipper



Rear – Loading & Side – Loading
Truck with Automated Arm

4.1.3 Option / Scenario 3 – Significantly New Program

- Fully automated residential refuse collection (two new trucks).
- Fully automated commercial refuse collection with front – loading trucks for most accounts (one new truck, one used truck less than five years old).
- Historic Downtown District to be serviced with semi – automated approach using carts and side – loading residential truck.
- All refuse must be placed in containers provided and owned by Town.
- Carts distributed to residences – standard size is 65 – gallon capacity.
- All commercial accounts receive a waste audit by Town personnel to determine the appropriate container size, number of containers, location of container(s) for pickup, and collection frequency.
- Dumpsters and carts (Historic Downtown District) provided for businesses based on waste audit results.

- Carts, dumpsters to be placed in convenient, accessible locations as designated.
- Extensive public communication / outreach is essential.
- Will yield best results regarding increased operating efficiencies, higher labor productivity, better working conditions, and more positive employee morale.
- Ability of Sanitation Division to implement other services will be greatly improved.
- Highest capital expenditures. Initial capital outlay estimate is presented in the table below.

Table 1: Option / Scenario 3 – Estimated Equipment Costs

Equipment	Quantity	Cost per Unit	Total Cost
Residential Carts – 35, 65, & 95 gallon capacity	4,200	\$ 45 to 55	\$ 203,600
Commercial Dumpsters – 1 to 6 cubic yards in capacity	425	\$ 320 to 630	\$ 176,000
Automated Residential Trucks – 25 to 32 & 12 to 15 cubic yard capacity	2	\$ 175,000	\$ 350,000
Front – Load Commercial Trucks – 30 to 35 cubic yard capacity	2	\$ 150,000 (new) & 75,000 (used)	\$ 225,000
Lift Truck – for container distribution & bulky waste pickup	1	\$ 45,000	\$ 45,000
Total Cost			\$ 999,600

4.2 Recommended Solid Waste System Option / Scenario

As discussed in Section 1.1, the Town of Silver City is committed to programs and policies that contribute to a higher quality living and business environment in the Town. As part of this overall effort an analysis was conducted of the solid waste management services delivered to the residential and commercial sectors by the Sanitation Division of the Town's Public Works Department. The purpose of the analysis was to identify a course of action for the Sanitation Division that would achieve the following objectives:

- Upgrading and modernizing of equipment used in refuse handling and collection;
- Increasing the efficiency of refuse handling and collection operations;
- Maximizing the utilization and productivity of employees;
- Expanding the kinds of solid waste services offered; and,

- Establishing a clear connection between how much trash a customer generates, the refuse handling and collection service they are provided, and the cost for that service.

The strongest and best opportunity for accomplishing these objectives is with implementation of Option / Scenario 3 as presented above in Section 4.1.3. The program features resulting from adoption of this option / scenario will introduce significant changes to the Town's solid waste services – automated refuse pickup trucks, standardized containers, a uniform and consistent service level, a more balanced allocation of responsibilities between the Sanitation Division, residents, and businesses, and better working conditions for employees. Additional program features of Option / Scenario 3 for the residential and commercial sectors are discussed in greater detail below.

4.2.1 Residential Sector

Standardized Trash Carts

Standardized trash carts that can be picked up by a fully automated truck would be provided for all single – family residences by the Town. Carts will be available in three sizes or capacities – 35, 65, and 95 gallons. One 65 – gallon cart per household collected weekly would define the basic service level and associated rate for single – family residences. Rates will vary depending on the size and number of carts used at a residence. The 95 – gallon cart can also be available on request but at a higher rate. The 35 – gallon cart is primarily available to elderly citizens on request who may have difficulty handling a larger container. Extra containers at each size level would be available at an additional charge per month. Residents would be sent an informational survey / response card to determine their cart preferences either as part of the normal billing procedure or as a separate mailing. Households will have a “trial period” of three to six months with the cart they initially selected to determine if they want a different cart and / or an additional one.

Placement of Carts for Collection

Under an automated collection system residents are responsible for not blocking the area where the trash cart is set out for pickup with their cars or other objects. They are required to place the cart(s) off the sidewalk in the street near the curb, or in a location that is conveniently accessible to the collection vehicle without any special maneuvering being needed to pick up and empty the cart(s). Residences on burro routes will be required to bring their containers to a central point close to the nearest main, paved street so the collection vehicle can handle all containers at the same location without having to drive to each house and make a special stop. All residential trash must be placed into containers provided by the Town.

4.2.2 Commercial Sector

Standardized Trash Containers

Most commercial customers will be provided with one or more dumpsters ranging in size (capacity) from 1 to 6 cubic yards. The emphasis is on siting larger dumpsters to reduce collection frequency. In the Downtown Historic District the use of dumpsters and a front – loading refuse truck are not feasible due to space constraints, narrow streets, high curbs, parked cars, and pedestrian traffic. Instead, in this area 95 – gallon wheeled carts also used for residences (as discussed in Section 4.2.1) will be placed for storage of trash. They are to be serviced with a residential automated truck using a two – person crew (see Section 4.1.3).

Where necessary, desirable, or feasible from an operational perspective, more than one dumpster can be located at a given site. The intention is to provide one or more containers in order to maximize refuse containment, given the space and logistical circumstances at each account. This strategy is intended to reduce collection frequency, expand route size (more accounts per route), cut down on the amount of time it takes to complete routes, and decrease the overall number of routes.

The dumpsters will be equipped with locks. It shall be the responsibility of the customer to lock the dumpsters when they are not in use and to make sure they are open on collection day.

Existing commercial refuse containers that are structurally sound and functional shall be retro – fitted with sleeves on each side so they can be picked up and emptied by a front – end loading truck. This determination will be made during the site visit / waste audit. The retro – fitting is to be done by Town personnel.

Commercial customers are responsible for insuring their dumpsters remain in a location that is conveniently accessible and does not require special maneuvering to service. The location is to be agreed upon based on discussions between the customer and Town representatives during the site visit / waste audit (see next item). All trash must be put in containers (dumpsters or 95 gallon carts) provided by the Town. Businesses / institutions using dumpsters will have a “trial period” of three to six months with the dumpster they initially selected to determine if they want a different and / or an additional one.

Waste Audit

To determine the correct size, number, and location of dumpsters at commercial generators a waste audit should be performed for each generator. The audit is designed to gather information for making decisions about the following factors: container size, number of containers, container location, and frequency of pickup. With the exception of

restaurants, the emphasis will be on siting larger dumpsters that do not have to be serviced frequently. Since food waste can be heavy and pose sanitation problems, restaurants should have smaller dumpsters that are collected more frequently.

4.2.3 Lift Truck

A sturdy truck will be needed for the initial and subsequent periodic distribution of carts and dumpsters to residential and commercial customers. This truck would have a mechanical lift gate at the rear of the truck bed enabling it to off – load and pick up carts / dumpsters. When not being used for this purpose the lift truck can be dedicated to collection of large / bulky items. Such collection could be available on an “on – call” basis at regularly scheduled times throughout the year. After a sufficient number of service requests have been made the Sanitation Division would communicate when collection will occur.

4.2.4 Yard Waste

To maximize the life and operational efficiency of the new residential collection vehicles it is desirable that yard waste be kept out of the normal trash generated by residences. Yard waste takes up valuable space in carts and trucks. Garbage can be more fully compacted by the truck if yard waste is not present. However, there would need to be equipment for storing and collecting the material and then transporting it to a site for grinding, mulching / composting, and reuse as a soil amendment. At the present time there is a chipping / mulching program operated by the SWSWA near the entrance to the Southwest Regional Landfill. It is not clear how much additional material this operation could handle or whether it could process a broad range of yard waste materials.

A separate yard waste recovery service would entail extra capital expenditures for the Town reflected ultimately in higher rates. Since separate yard waste recovery is not essential it is difficult to justify the extra costs for such a service when substantial expenses are going to be incurred in transitioning to an automated trash collection system. Therefore it is recommended that at least initially yard waste be handled as refuse in the residential sector but there should also be an effort to examine the feasibility of a yard waste recovery program.

The feasibility of separate yard waste recovery depends on the ability of the chipping / mulching program operated by the SWSWA to process, store, and use larger and more varied quantities of yard waste than it currently does. The Town and the SWSWA should discuss this topic. Other considerations relevant to addressing the feasibility of a yard waste recovery program are the following:

- A campaign to promote the practice of backyard composting jointly supported by the Town and SWSWA.

- Drop – off locations for yard waste using roll – off bins from the SWSWA and / or dumpsters from the Town.
- Incorporating some kinds of yard waste into a large / bulky item collection program.
- Labor – intensive collection of yard waste using one of the existing rear – loading packer trucks and manual removal of plastic bags at the SWSWA chipping / mulching site.

4.3 Service Rates

4.3.1 Introduction

The current budgeted expenditures of the Sanitation Division have been reviewed. Acquisition of containers and trucks for automated refuse collection should increase productivity. Considering these factors, it is anticipated there will be an overall savings to the Town's solid waste management system. Existing residential and commercial rates are based on two components, as discussed in Sections 3.4.1 and 3.4.2 – a cost for the actual collection of refuse and a cost related to the disposal of refuse at the SWSWA landfill based on the prevailing tipping fee of \$43 / ton. Under the new automated refuse collection system the Town will provide containers for residences (carts) and businesses (dumpsters). This means adding another component to the rates for the provision of such containers.

To promote rate stability and continuity it is recommended a phased approach be taken to the implementation of a revised rate structure. With this approach the collection or service portion of the rates would be maintained at current levels for both the automated cart and front – load container programs servicing the residential and commercial sectors respectively. The disposal and container portions of the rates will be adjusted according to the weekly amount of trash set out for collection and the size / number of containers used. Additional adjustments to the rates would then be reviewed when the new residential and commercial refuse collection programs are fully in place and the final distribution of containers achieved.

4.3.2 Assumptions

The recommended refuse collection service accounts with fewer is the case with the program which relies on manual labor and “hand the routes, retrieve refuse and then place it into old compaction mechanisms



automated will serve more personnel than existing extensive picking” to drive from the street, vehicles whose are worn down.

The required operating crew will be reduced from eight to four. Three of those **Automated, Side – Loading**

Residential Refuse Truck

will be full – time route drivers while the fourth person will either supervise or “float” to fill in for vacations or drive the container delivery truck. The remaining employees that currently collect garbage would be available for reassignment to other solid waste services the Sanitation Division will now be in a position to implement. The automated equipment will increase collection productivity, which is the amount of carts or containers collected per hour. For example, a low estimate for residential cart collection is 65 carts an hour.



Depending on the weekly trash volume and accessibility to the container, most commercial customers will be serviced by a front – load container collection system. The front – load truck has the ability to collect up to 8 cubic yard yards or 10,000 pounds of waste with one lift, thus reducing the frequency of collection due to limitations on container size and weight. Front – load collection systems also eliminate the need for a utility worker to spot the truck while backing up or to hook the container for

**Automated, Front – Loading
Commercial Refuse Truck**

unloading. The driver simply “stabs” the container with the forks, lifts and empties the dumpster into the truck, and puts the container back into place. If the dumpster is placed in its designated location by the generator there is no need for a two – person crew or for the driver to get out of the truck. Total lift time is less than 45 seconds compared to 1 to 5 minutes for the rear – loading vehicles now used by the Town. The rear – loading vehicles necessitate an employee to manually position a bin for emptying or pick up individual bags of trash and place them into the truck. This will no longer have to be done with the recommended commercial refuse collection program combining

standardized dumpsters with the automated, front – loading trucks. With the new program productivity should at least double from the present rate.

4.3.3 Equipment Costs



**95, 65, and 35 Gallon
Residential Refuse Carts**

The costs for the automated refuse collection system will be the collection vehicles and the containers. Projected costs for

two new automated, residential refuse trucks, one new commercial front – loader and one used front – loader (back – up vehicle) will be approximately \$575,000. With regular maintenance, the new trucks should have a ten – year life.

Roll carts used primarily for residential refuse storage / collection are approximately \$45 to \$55 each, including delivery to all residential customers. The carts typically come in three size (capacity) ranges (or variations thereof) – 30 to 35 gallons, 60 to 65 gallons, and 90 to 95 gallons. Most manufacturers offer a ten – year warranty. The 65 – gallon cart is being recommended as the standard size for single – family residences in Silver City. The smallest cart would be used by households that do not generate a large amount of waste or by older citizens who may have difficulty maneuvering the 65 – gallon cart. The 95 – gallon carts could be used by larger residential generators. They will also be used by commercial businesses in the Downtown Historic District where space is limited and it will be difficult to site dumpsters and service them with a front – loading truck. An estimated 4,200 carts would be purchased at a total cost of \$204,000.

Containers ranging in size from 1 cubic yard up to 6 cubic yards would be distributed to businesses and other commercial customers such as institutions and apartment buildings. A one yard container costs approximately \$320 and the six yard container has a price tag of \$630. Total projected cost for commercial containers is \$176,000.



**Dumpster Used for
Commercial Accounts and
Emptied with Front – Loading
Truck**

Typical

Prior to distribution of containers all commercial accounts would have a waste audit to determine the appropriate container size / number and collection frequency based on the quantity of refuse generated weekly. This process is termed “right – sizing and right – servicing”.



**Flat – Bed Truck for Container Distribution
and On-Call Collection of Bulky Waste**

In addition to the refuse collection trucks and storage containers, the Town would also purchase a flat – bed delivery truck equipped with a mechanical lift – gate to transport carts and dumpsters. This truck would also be used for on – call bulky waste collection. The bulky waste program would allow residents to get rid of refrigerators, stoves, furniture, and other items deemed too big for regular curbside pickup.

4.3.4 Residential Sector Rates

For single – family residences, the collection service portion of their overall monthly rate will remain unchanged from the current charge of \$7.87 per month. The disposal portion of the rate, now at \$5.05 per month, will be adjusted depending on the size of roller cart selected by each resident. Base level service will be the 65 – gallon cart. Those residential customers subscribing to the 65 – gallon cart service level will see an increase of \$0.85 per month from their current rate. Customers who utilize the smaller 35 – gallon roller cart will see a decrease in their bill of \$0.40 per month due to the reduction of waste set out for collection. Customers who need greater capacity than the 65 gallons a week can choose the 95 – gallon roller cart. These customers will see an increase of \$2.15 per month. A five – year payment schedule for the carts is planned. The table below details the components of the proposed residential rate structure (assuming one cart per household) based on the following formula:

Total Monthly Residential Rate =

Disposal Fee (variable) + Cart Fee (variable) + Service Fee (\$7.87 / month)

**Table 2: Proposed Initial Residential Rate Structure
(\$ per Month)**

Roller Cart Volume	Disposal Fee	Roller Cart Fee	Service Fee	FULL RATE
35 gallon	\$ 3.85	\$ 0.80	\$7.87	\$12.52
65 gallon	\$ 5.05	\$ 0.85	\$7.87	\$13.77
95 gallon	\$ 6.25	\$ 0.95	\$7.87	\$15.07

The assumptions and calculations for the proposed residential refuse service rates are discussed below.

- Assume 70% of single – family homes use 65 gallon refuse cart, 15% use 35 gallon cart, and 15% use 95 gallon cart.
- Assumed weekly quantities of normal residential trash contained in 35, 65, and 95 gallon carts are,
 - 35 gallon cart – 41 pounds X 4.33 weeks = 178 pounds per month
 - 65 gallon cart – 54 pounds X 4.33 weeks = 235 pounds per month
 - 95 gallon cart – 67 pounds X 4.33 weeks = 290 pounds per month

The current monthly rate for weekly Town garbage collection from single – family residences is \$12.92 plus gross receipts tax. There are two components in the \$12.92 charge. One component covers the costs of actually delivering and providing the collection service to households. The other component relates to the landfill tipping fee (\$43 / ton) charged to the Town for disposal of the collected refuse. The service fee portion is \$7.87 per month. It is understood this amount pays for refuse collection by Town crews and residential recycling collection by the Southwest Solid Waste Authority. The disposal fee portion is \$5.05. This equates to each single – family home paying for 235 pounds / month to be disposed, or 54 pounds / week, as follows:

$$\begin{aligned}
 &\mathbf{\$5.05 \div \$43 \times 2000 \text{ pounds} = 235 \text{ pounds per month}} \\
 &\mathbf{\div 4.33 \text{ weeks per month} = 54 \text{ pounds per week}}
 \end{aligned}$$

Under the new automated residential refuse collection system, the service fee portion of the monthly rate will remain unchanged from the \$7.87 charge since the same level of labor is involved in emptying all three cart sizes. The disposal portion of the rate, now at a flat \$5.05 per month, will be adjusted depending on the size of roller cart used. Base service level will be weekly collection of one 65 gallon cart. There will also be a “rental

fee” on the cart paid by each customer. Thus the total rate is made up of the service fee + disposal fee + cart fee.

Calculation of the disposal fee portion of the rate for use of a 35 gallon cart and 95 gallon cart is as follows:

- **35 gallon cart**

$\$43 \text{ per ton tipping fee} \div 2000 \text{ pounds per ton} = \$0.0215 \text{ per pound} \times 178 \text{ pounds per month disposed} = \$3.83 \text{ per month disposal fee rounded up to } \3.85

- **95 gallon cart**

$\$43 \text{ per ton tipping fee} \div 2000 \text{ pounds per ton} = \$0.0215 \text{ per pound} \times 290 \text{ pounds per month disposed} = \$6.23 \text{ per month disposal fee rounded up to } \6.25

4.3.5 Commercial Sector Rates

In the commercial sector the current method of charging for collection service and garbage disposal by the volume of waste (cubic yards) collected will be utilized. The monthly rate for a given commercial generator is made up of the following components:

Total Monthly Commercial Rate =

Disposal Fee (variable) + Dumpster Fee (variable) + Service Fee (variable)

Where,

- **Disposal Fee is based on amount of refuse collected**
- **Dumpster Fee is based on size and number of dumpsters used**
- **Service Fee is based on amount of refuse collected and collection frequency per week**

However, the disposal fee and service fee portions of the rate – that is, the cost per collected cubic yard – cannot be calculated until waste audits for all commercial accounts have been completed. The audits will determine the dumpster size (that is, the capacity or volume in cubic yards) that is most suitable for an account, along with the number of dumpsters, their location, and the frequency of collection per week. The cost of service delivery is based on the distribution of these factors (dumpster size, number, and collection frequency) across all the accounts and the labor time needed to pick up refuse at each “stop” or account.

As noted in the formula above, also included in the overall rate is the cost of the container. Monthly fees for the container will depend on the size and number of the container(s) at each generator – the larger the container, the higher the monthly rate. A five – year payment schedule for the dumpsters is planned. The table below details the projected monthly cost of the container based on its purchase price, assuming a business has one dumpster:

Table 3: Monthly Cost of Commercial Dumpsters

Container Volume	Container Costs	Container Fee / Month
1 cu. yard	\$ 320	\$ 5.35
1.5 cu. yards	\$ 376	\$ 6.25
2 cu. yards	\$ 396	\$ 6.60
3 cu. yards	\$ 476	\$ 7.95
4 cu. yards	\$ 543	\$ 9.05
6 cu. yards	\$ 630	\$ 10.50

Some commercial customers currently have their own refuse container that is compatible with the existing rear – loading trucks. These containers will be examined and those that are in good condition could be retrofitted with sleeves so they can be emptied with the new front – loading trucks. In such cases no container fee will be charged. Commercial customers may also choose to get a new dumpster from the Town. Containers that have excessive rust are not considered to be in good condition since their durability is limited. Other bins with an excessive front slope, even if they were fitted with sleeves, cannot be emptied by a front – loading refuse vehicle.

4.3.5 Rates for Businesses in Downtown Historic District

As discussed in Sections 4.1.3 and 4.2.2 above, businesses in the Downtown Historic District will use 95 – gallon carts for refuse storage. The carts will be serviced using a residential automated collection vehicle with a two – person crew. These businesses would also receive a site visit / waste audit to determine how many carts they need and what the collection frequency should be. If a business in this area uses one 95 – gallon cart that is emptied weekly their monthly rate would be the same as for a single – family residence, noted below (from Section 4.3.4):

Roller Cart Volume	Disposal Fee	Roller Cart Fee	Service Fee	FULL RATE
(1) 95 gal. capacity	\$ 6.25 per mo.	\$ 0.95 per mo.	\$7.87 per mo.	\$15.07 per mo.

If a cart is emptied twice weekly an additional service fee charge is added into the rate along with an additional disposal fee charge. Since the initial service fee charge

includes SWSWA recycling pickup, additional service fees would be reduced by the amount that is allocated for recycling. If more than one cart is used the monthly rate increases by the cart fee plus the disposal fee and service fee according to the number of times per week the carts are collected.

It is noted that the previous discussion on rates is based on the current landfill tipping fee of \$43 / ton. Rates are subject to periodic adjustments in response to tipping fee increases and / or inflation.

4.4 Equipment Funding Strategy

Equipment for the automated refuse collection system will be acquired through a low – interest loan. The table below (previously presented above as Table 1) details the estimated cost of the collection equipment at the time this report was prepared.

Table 4: Estimated Equipment Costs

Equipment	Quantity	Cost per Unit	Total Cost
Residential Carts (35, 65, and 95 gallon capacity)	4,200	\$ 45 to 55	\$ 203,600
Commercial Dumpsters (1 to 6 cubic yards in capacity)	425	\$ 320 to 630	\$ 176,000
Automated Residential Trucks	2	\$ 175,000	\$ 350,000
Front – Load Commercial Trucks	2	\$ 150,000 (new) & 75,000 (used)	\$ 225,000
Lift Truck (for container distribution & bulky waste pickup)	1	\$ 45,000	\$ 45,000
Total Cost			\$ 999,600

The purchase of the solid waste collection equipment qualifies for the low – interest loans available through the State of New Mexico’s Public Project Revolving Fund (PPRF). The cost of these assets can be repaid through the rates over their useful life. This approach allows the Town to preserve its cash position. Interest rates currently available through the PPRF are around 3.5% for a 7 – year note. Silver City will borrow an estimated \$999,600 for the trucks and containers. Annual payments would be around \$160,000 or \$12,700 per month.

The Town has set aside \$600,000 for solid waste program capital acquisitions that will be used to defray the annual payments on the equipment note. Revenue collected from the monthly residential cart and commercial dumpster fees will also be applied to the note. The table that follows details the payment schedule of the 7 – year note.

Table 5: Payment Schedule for State Loan

	Year							
	2005-6	2006-7	2007-8	2008-9	2009-10	2010-11	2011-12	2012-13
Beginning Fund Balance (less PPRF note) plus container fees	600,000	600,000 (160,000)	516,000 (160,000)	432,000 (160,000)	348,000 (160,000)	264,000 (160,000)	180,000 (160,000)	96,000 (160,000)
		76,000	76,000	76,000	76,000	76,000	76,000	76,000
Ending Fund Balance		\$516,000	\$432,000	\$348,000	\$264,000	\$180,000	\$96,000	\$12,000

Assumptions:

- a/ Total value of the note is \$999,600
- b/ Projected interest rate on the note from the PPRF is 4%
- c/ Payments are made at the beginning of the period
- d/ Annual cart rental revenue is \$40,800 (4,000 carts x \$0.85 per month x 12 months)
- e/ Annual dumpster rental revenue is \$35,200 (\$176,000 projected container cost divided by 5 years)

4.5 Additional Services

Once the new solid waste program has been rolled out the Sanitation Division will be able to re – assign employees formerly dedicated to refuse collection because of the labor savings associated with the automated system. Three recommended activities that are consistent with the Town Council’s mission of enhancing the livability and appeal of Silver City are on – call collection of large / bulky items, regular litter patrols and clean – ups, and periodic neighborhood beautification projects.

Examples of large / bulky items that cannot or should not be collected with regular refuse vehicles because they are too big or may damage the equipment are the following: refrigerators, freezers, stoves, dishwashers, water heaters, furnaces, barbeques, furniture, bicycles, mattresses, vacuum cleaners, toys, power yard equipment, carpeting. Some large / bulky items may qualify as scrap metals and could be recycled through the SWSWA.

The Town is also encouraged to undertake an aggressive litter removal and clean – up campaign that would focus at first on those places where litter has already accumulated. Once this has been accomplished, the Sanitation Division would be responsible for maintaining the common areas of the Town. These services may be supplemented by community clean – ups organized, publicized, and conducted by the Sanitation Division on a neighborhood by neighborhood basis. Commercial dumpsters and the front – loading trucks can be used for these events.

When the additional services described above are in place and functional, the Town should review the rationale for paying the disposal fees incurred by residents that self – haul garbage to the SWSWA landfill. The availability of such services should substantially reduce the need for self – hauling by residents.

4.6 Performance Measures

to be completed

5 – Implementation of Recommendations

to be completed