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INTRODUCTION
The solid waste collection and disposal system in Grand County currently consists of both public and private entities. The Solid Waste Special Services District #1 (the District) controls landfill operations; Bob’s Sanitation (privately-owned) offers residential and commercial garbage collection; Green Solutions (privately-owned) offers a curbside recycling program; and Canyonlands Community Recycling (not-for-profit) maintains a drop-site recycling program.

Though this system has worked well for a number of years, the County is now dealing with population growth, more stringent waste regulations, increasing waste collection and disposal costs. The solid waste collection and recycling fees in this area are among the highest in the State of Utah. In light of these factors, along with improvements in recycling methods and markets, the District has decided to conduct this study to:

1. Improve recycling,
2. Find ways to increase efficiency in operations so that the district will reduce and eliminate its dependency on the Mineral lease subsidy, and
3. Investigate ways to implement Household Hazardous Waste (HHW) collection program.

In an effort to make the area’s solid waste system more efficient, cost effective, and accountable, the District retained Five Star Engineers (FSE) to perform an evaluation of the District’s operation in accordance with the attached Scope of Services and summarize findings in a report.

Study Objectives
1. Evaluate the current waste management components.
2. Identify problems and deficiencies in the current solid waste management system.
3. Identify opportunities for improvements in solid waste management.
4. Set priorities for actions to address problems and affect improvements.
5. Establish ways to measure progress.
6. Identify the resources needed to make improvements.
Figure 1: Integrated Solid Waste Management Master Plan Development Elements
Scope of Service

Review of Existing Solid Waste Programs

Review existing solid waste programs and make recommendations to improve services, increase program efficiencies, reduce cost of service, and increase waste reduction. The programs evaluated shall include the following operations:

a. Moab Landfill
b. Klondike Landfill
c. Transfer Station
d. Recycling Center

Review of Current Organizational Structure and Responsibilities

Review current organizational structure, specifically the relationship between the District, local governments, private, and non-profit entities. Make recommendations to improve organizational structure with respect to the following:

a. The waste collection contractor
b. The landfill operations contractor
c. The non-profit recycling operation
d. The curbside recycling collection contractor, and
e. Assist the District in the establishment of an interlocal agreement with residents located in San Juan County

Conduct Cost of Service Analysis

Conduct a cost of service analysis and make recommendations for a fee structure that would enable the District to operate without subsidies. Analysis shall include the following:

a. Landfill tipping fee
b. Moab landfill
c. Klondike landfill
d. Collection fees
   I. Residential waste collection
   II. Commercial waste collection
e. Recycling fees
f. Other ancillary fees (tires, contaminated soil, sludge etc)
g. Other potential revenue generating options (mandatory waste collections, mandatory recycling, special assessment, or other)
Conduct an Evaluation of the Prospect of the District Owning the Collection and Transfer Station System

Evaluate the prospect of the District owning the collection and the transfer operations. This evaluation should include:

   a. Capital cost requirements for acquisition and expansion,
   b. Operational challenges,
   c. Program operating cost,
   d. Program projected revenues, and
   e. The effect on recycling if the collection and transfer station is owned by the district.

Evaluation of Waste Reduction Options

Evaluate options for reducing the amount of waste going to landfills. Options to be considered shall include:

   a. Recycling center expansion,
   b. Curbside recycling program,
   c. Green waste recycling, and
   d. Commercial recycling.

Research Household Hazardous Waste Program

Evaluate the need to establish a household hazardous waste (HHW) collection and disposal program. Evaluation shall include the following:

   a. Estimates of diversion quantities,
   b. Estimate of Program cost,
   c. Program options and operational requirements, and
   d. Steps required to establish a HHW program.

Research Other Ancillary Programs

Research the possibilities of expansion of the following ancillary programs and provide recommendations.

   a. Sludge disposal,
   b. Contaminated soil disposal,
   c. Restaurant grease disposal, and
   d. Used motor oil collection & disposal.

Appendix A is also contains a copy of the scope of services agreement between the District and Five Star Engineers.
EXISTING SOLID WASTE PROGRAMS

Klondike Landfill

The Klondike Landfill is a permitted Municipal Solid Waste (MSW) landfill owned by the District and operated by a private contractor, KSUE Corporation (Ksue). This landfill is located at S ½ of the NW ¼ of section 14, T23 S, R 19 E.

Construction of this landfill began in 1997. This landfill receives all MSW generated in Grand County Solid Waste District and some from San Juan County. The landfill area is approximately 80 acres, and is exempted from groundwater monitoring and lining requirements because of its hydrogeology and size. The landfill received 8,235, and 9,816 tons in 2005 and 2006 respectively.

Bob’s Transfer Station is the major supplier of waste to the Klondike Landfill. The landfill is not open to the public. The landfill also accepts waste from other franchised haulers. The privately contracted landfill operator handles all landfill operations including cell construction, compaction, and cover.

The Klondike Landfill has one scale for tonnage tracking purpose. The Klondike Landfill charges $29.00 /ton fee for all waste entering the landfill including residential and commercial waste. The landfill contractor has sufficient equipment for the operation they perform.

The landfill does not have household hazardous waste collection program on site. If the public is allowed to take their waste to the landfill it will be useful to establish a satellite household hazardous waste (HHW) collection point at this landfill to store material removed from the waste. This will include the establishment of fully contained storage area, collection and disposal tracking system, and employee protective gear. The hazardous waste section of this report includes more information on this subject.

The landfill is permitted to accept some grease trap and septage waste from restaurants. District has Memorandum of Understanding (MOU) with Moab City to selectively accept septage from Moab Waste Water Treatment Plant in emergency situations.
Landfill Operations

The latest State of Utah facility inspection report shows that the landfill is in compliance with the permit requirements. Review of the landfill’s permit application and operations plan indicated that the landfill personnel and contractor employees will conduct visual waste inspections. The District provides training for its employees on how to conduct waste screening and it also require the landfill contractor to provide adequate training for contracted employees in the areas of waste screening, special waste handling, record keeping, spill control and counter measure plans, litter control, and personnel safety procedures.

The landfill receives all of its daily cover soil needs from the landfill property. The landfill daily cover appears very adequate thus litter around the landfill is minimal.

Special Waste Management

The landfill accepts special waste from Bob’s Transfer Station and the other franchised haulers. Special waste accepted at the Klondike landfill includes contaminated soil, dead animals, refrigerators (processes by Bob’s Transfer Station), medical waste, etc. State of Utah Solid waste rules require that landfills accepting special wastes to develop proper provisions for handling and disposal of special waste. These provisions shall include, where required and approved by the Executive Secretary, a separate area for disposal of the wastes, designated by appropriate signs. The plan should have a written procedure delineating how to handle, track, and store these materials. FSE strongly suggests that the District to ask the landfill Contractor (KSUE) and the haulers to have such procedures in writing, and that the District identify the authority (person) responsible for the proper tracking and management of these wastes in the organizational structure and job descriptions.

Recommendations

FSE suggests that the District should improve the following areas:

Landfill Operations

Improve the landfill operations manual, and set procedures for special waste management. Establish daily operating forms and require the operator/supervisor to fill them out accordingly at the end of each day of operation. If the form is completed electronically it should be printed out for filing purposes at the end of the day. Any deviations from the approved plan of operation should be noted in the summary section of the record.
**Quarterly Inspections**

Improve the quarterly inspection forms and ask independent qualified personnel to conduct Class I landfill quarterly inspections to prevent malfunctions, deterioration, operator errors, and/or discharges, that could cause or lead to the release of wastes or contaminated materials into the environment or create a threat to human health. These inspections should cover the following areas:

- Waste placement, compaction, and cover
- Fences
- Storm water management areas
- Roads and access roads
- Run-on/run-off controls
- Final and intermediate cover
- Litter controls
- Records

The landfill should keep a record of the quarterly inspections and place the inspection record in the daily operating record on the day of the inspection. Areas needing correction, as noted on the inspection report, should be corrected. The corrective actions should also be documented in the daily operating record.

**Training**

The district currently provides landfill management training for its management staff through the Solid Waste Association North America (SWANA). Training for other landfill employee is provided by the manager for solid waste related issues and the Utah Government Trust for safety issues. All facility personnel involved in management, inspections, and waste disposal operations may benefit from additional training related to the identification of containers and labels used for hazardous wastes. Hazardous waste screening classes should be offered periodically to all personnel and documentation of training should be included with the operation records for the facility. This record should be maintained with the landfill records and personnel file.

**Household Hazardous Waste**

The District is in the process of evaluating the establishment of a HHW storage area and to make the landfill inspector and the Contractor responsible for the upkeep of the area. The landfill inspection should also receive adequate training for HHW management and record keeping. These procedures should also be made part of the landfill operations manual.
**Record Keeping**
In general the District should train all employees on the need to keep sufficient and accurate records of all relevant activities. This may include records demonstrating compliance and non compliance, and records for performance measurement.

**Metrics for Measurements**
The District should establish metrics to measure landfill operations performance. The District should also provide funding based on performance.
Moab Landfill

The Moab Landfill was established in 1997 after the Moab Municipal Landfill closed. The landfill is a class IVb landfill permitted to accept Construction and Demolition (C&D) waste from the District. The landfill is located on a 40 acre piece of land.

The Moab Landfill is operated by a contractor (KSUE) under the supervision of the District, and receives waste from private waste haulers, contractors, and general citizens. The landfill has no scale. Waste entering the landfill is estimated in cubic yards at the gate. A full time district employee conducts visual screening as the waste enters the landfill. The landfill charges all waste entering the landfill at a rate of $6.00 per yard for the public and $10.00 per yard for contractors.

The District accepts construction and demolition debris in the Class IVb landfill as defined in Rule R315-301-2(10). This waste includes bricks, concrete, asphalt, rock, roofing shingles (non-asbestos), tree roots, building materials, sheet rock, remodeling or building repair, and demolition materials from pavement, houses, commercial buildings, and other structures.

Excluded wastes, include, but are not limited to, dead animals, foam insulation, asbestos (tape floor tiles, siding, shingles, etc.), contaminated soil, remediation or cleanup tanks, waste paints solvents, sealers, adhesives, small quantity generator hazardous wastes, containerized liquids, non-containerized liquids, or sludge containing free liquids (R315-303-3(1)(b)).

The state of Utah solid waste rules require class IVb landfills not to accept more than an average of 20 tons per day or to demonstrate that no waste from conditionally exempted small quantity generator of hazardous waste is accepted. Businesses generating no more than 220 lbs (100 kg) of hazardous waste per month are Conditionally Exempt Small Quantity Generator (CESQG). Grand County Solid Waste District has no program to exclude hazardous waste generated by small quantity hazardous waste generators. According to the Moab landfill annual report and the Utah Division of Solid and Hazardous Waste records, the Moab landfill received approximately 7,936 tons of C&D waste in 2005. If it is assumed that the landfill was open approximately 301 days in 2005 then the landfill received an average of 26 tons per day. Since the landfill is using conversation factor of 0.5 to convert the yards received into tonnage this value cannot be verified. Therefore, the District is advised to
closely evaluate this part of the rule and avoid violations. Exceedance of the permit limits may result penalties such as Notice of Violation and/or fines.

The Moab Landfill also receives a significant amount of waste tires from the public and from private haulers. The landfill charges $1.00 per tire if the rim size is less than 16.5 inches, $3.00 per tire if the rim size is bigger than 16.5 inches and $7.50 per cubic yard of tire if it is brought in bulk. The District then pays a tire disposal contractor to remove the tires from the landfill. The District currently subsidizes this tire disposal effort as the contractor’s removal charges are higher than landfill’s tire fees.

The Moab landfill expended approximately $228,474.97 on operations, salaries and administrative cost in 2006 and generated approximately $148,725.09 in revenues.

**Recommendations**

FSE suggests the District improve the following areas:

**Landfill Operations**

The District should improve the landfill operations manual and set procedures for all major landfill activities. Daily operating forms should be established and the operator/supervisor should fill them out accordingly at the end of each business day. If this record is completed electronically it should be printed out for filing purposes at the end of the day. Any deviations from the approved plan of operation should be noted in the summary section of the record.

**Quarterly Inspections**

Improve the quarterly inspection forms and ask independent qualified personnel to conduct Class IVb landfill quarterly inspections to prevent malfunctions and deterioration, operator errors, and discharges, which may cause or lead to the release of wastes or contaminated materials to the environment or create a threat to human health. These inspections should cover the following areas:

- Waste placement, compaction, and cover
- Fences
- Access roads
- Storm water control system
- Final and intermediate cover
- Litter controls
The landfill should continue to keep a record of the inspections and place it in the daily operating record on the day of the inspection. Areas needing correction, as noted on the inspection report, should be corrected. The corrective actions shall also be documented in the daily operating record.

**CESQHWG**

The District should establish a Conditionally Exempted Small Quantity Generators (CESQG) hazardous waste program. The program should include a District-wide education program to ensure that residents and businesses understand the differences among hazardous waste, municipal waste, and construction and demolition wastes. Pamphlets that outline acceptable and non-acceptable wastes for Class IVb landfills should be distributed throughout the District, specifically to the known contractors.

If a construction and demolition debris load from a contractor is identified with unacceptable wastes during a scale house or face inspection, the District should adopt a policy similar to following:

**First Offense**: The driver will be warned, and educated about the Construction and Demolition Debris pamphlet, and urged to pass along the information to the owner/project manager.

**Second Offense**: The owner will be notified by the Department of Environment Health and the name of the contractor will be put on the ‘Class IVb probation’ list.

**Third Offense**: The contractor will no longer be permitted to dispose of wastes in the Class IVb landfill and forced to pay the municipal waste rate.

If a construction and demolition debris load is identified with excluded wastes during or after a scale house or face inspection:

**First Offense**: The driver will be warned and educated, and the owner/project manager will be notified regarding the identification of excluded wastes. The prohibited waste will be removed from the landfill and disposed it properly at the cost of the generator.

**Second Offense**: An investigation will be conducted on the contractor, and he will need to show correct disposal practice of all
excluded wastes generated by him to the District, before he is allowed to use the landfill again.

**Training**
All facility personnel involved in management, inspections, and waste disposal operations should be trained in the identification of containers and labels used for hazardous wastes. Hazardous waste screening classes should be offered periodically to all personnel and documentation of training should be included with the operation records for the facility. This record should be maintained with the landfill records and personnel file.

**Litter Control**
The most effective control measure for windblown litter is the use of effective daily cover. Perimeter fencing and temporary workers should also be used to control litter blown by wind from the working face. Landfill site personnel should routinely clean up the perimeter of the site to prevent litter spreading outside the boundary. In extreme cases temporary workers should be hired to clean the perimeter and the affected areas.

**Waste Tires**
The District should consider adjusting the waste tire fee and stop charging the $7.50 per cubic yard fee. The Cost of Service section in this report includes the proposed tire fees.

**Storm Water**
Storm Water Discharge Permit is not required for Moab landfill. The landfill should maintain a minimum of 1-foot of cover soil (intermediate layer) on the perimeter of all existing slopes, and in areas not receiving refuse. The intermediate cover thickness should be repaired after every major storm event. If necessary, the landfill should start keeping storm water records and develop a Storm Water Pollution Prevention Plan.

**Landfill Fees**
The District should consider adjusting the Moab Landfill fee to cover operating and administrative costs. The Cost of Service section in this report includes the proposed landfill dumping fee.

**Metrics for Measurements**
The District should establish metrics to measure HHW program performance. The District should also provide funding for the HHW program based on performance.
The Recycling Center

As an alternative to using the District-operated landfills, Grand County and Moab City residents can recycle some solid wastes. Canyonlands Community Recycling (CCR) is a not-for-profit organization which provides a recycling drop-site center. It also receives recyclables from Bob’s Sanitation and Green Solutions. No fees are charged to the public or these businesses. The facility has one bailer, a storage shed and several collection containers. The facility has one employee and intermittent volunteers.

The Recycling Center activities have been increasing since 2002 partly because of the community’s increased recycling awareness and the establishment of a curbside residential recycling service by Green Solutions. Figure 2 presents the amount of material processed by CCR since 2002. Figure 3 shows comparison of materials recycled from residential and commercial sources.

Figure 4 depicts that the recycling center’s activities increased steadily from 376 tons per year in 2002 to 604 tons per year in 2006 (60 percent increase). Though all materials collected have shown some increase, glass and cardboard are the two types of material that showed significant increase. Figure 5 shows that revenues from material sold also increased from $36,012.73 in 2002 to $43,352.63 in 2006 (17 percent). Table 1 below show the revenues and expenses of the recycling center from 2002 to 2006. However, the shipping cost also increased due to increase in material shipped out and fuel cost increases. During this period the program’s other revenues declined with the exception of donation and grants. In general, donation revenue increased except in 2005 when it was offset by revenue increase from sales of recyclables. Revenues received from grants showed a decline except in 2003 when CCR received $8,200.00 as grant.

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan-Dec 02</th>
<th>Jan-Dec 03</th>
<th>Jan-Dec 04</th>
<th>Jan-Dec 05</th>
<th>Jan-Dec 06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue from Recyclables</td>
<td>36,012.73</td>
<td>35,750.82</td>
<td>49,601.07</td>
<td>57,162.83</td>
<td>43,352.63</td>
</tr>
<tr>
<td>Total Expense</td>
<td>54,871.39</td>
<td>61,773.89</td>
<td>65,078.84</td>
<td>70,341.40</td>
<td>69,306.41</td>
</tr>
</tbody>
</table>

Table 1: Recycling Center Revenues from Sales of Recyclables and Total Expenses
This recycling program diverted 604 tons of solid waste from the landfill, which is approximately 6.15 percent of the waste landfilled in Klondike Landfill (9,816 tons) in 2006. Table 2 below shows cost per tons recycled and tons of material recycled by the recycling center from 2002 to 2006. This percentage is very small and the District has the potential to increase its recycling capacity. The value of the space saved at the Klondike Landfill is approximately $17,516 at $29.00 per ton. Therefore the cost per ton material recycled in 2006 can be calculated by using the following equation:

\[
\text{Cost per ton material recycled} = \frac{\text{Cost} - \text{Revenue} - \text{Landfill Space saved}}{\text{Tons Recycled}}
\]

\[
= \frac{$69,306.41 - $43,352.63 - $17,516.00}{604\text{tons}} = $13.97 \text{ per ton}
\]

Using the above equation the recycling cost to the community is $14.00 per ton, compared to the $29.00 per ton at Klondike landfill. As shown in table 2 recycling cost fluctuated from year to year depending on the amount of material recycled and the cost of recycling. In most cases the recycling cost was less than landfill cost except in 2003. In 2003 the cost per ton material recycled ($33.00/ton) was higher than the landfill cost, because of recycling sales revenue decline and the recycling cost increased. In 2005 the community gained $6.00 per ton recycled and this gain was due to significant increase in materials recycled. This calculation ignores the fees paid to Bob’s Sanitation and Green Solutions for collecting the material. If these fees are included in the analysis, the cost per ton recycled will be higher than shown. Although, the collection efforts are supporting this program, they are also increasing the cost per ton. As shown in this analysis, recycling cost can be very competitive if the collection cost can be eliminated or left as voluntary. Finally, public education coupled with more drop sites is an alternative way to increase recycling in the District.

In generally Utah recycling market is very weak, recently the demand for recyclable material has increased due to increased demand from Chinese market. Although this market is not immediately available for Utah, China’s involvement in the recycling market has made the Utah recycling market more stable. If the Recycling Center can keep the transportation cost low and sell the material to the highest bidder recycling cost will continue to be less than the cost of landfill if the landfilling cost is factored in. Most recycling programs in Utah are subsided by the public to avoid landfill disposal cost, closure and post closure cost, and other environmental impacts costs associates with landfill disposal.
Table 2: Cost per Ton Recycled and Tons of Material Recycled by the Recycling Center from 2002 to 2006 (Source: Canyonlands Community Recycling Report)

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan - Dec 02</th>
<th>Jan - Dec 03</th>
<th>Jan - Dec 04</th>
<th>Jan - Dec 05</th>
<th>Jan - Dec 06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue from Recyclables</td>
<td>$36,012.73</td>
<td>$35,750.82</td>
<td>$49,601.07</td>
<td>$57,162.83</td>
<td>$43,352.63</td>
</tr>
<tr>
<td>Total Expense</td>
<td>$54,871.39</td>
<td>$61,773.89</td>
<td>$65,078.84</td>
<td>$70,341.40</td>
<td>$69,306.41</td>
</tr>
<tr>
<td>Total Tons Recycled</td>
<td>376.5</td>
<td>421.87</td>
<td>440.51</td>
<td>585.525</td>
<td>603.63</td>
</tr>
<tr>
<td>Cost/ton</td>
<td>$21.00</td>
<td>$33.00</td>
<td>$6.00</td>
<td>$-6.00</td>
<td>$14.00</td>
</tr>
<tr>
<td>Total Batches Recycled</td>
<td>851</td>
<td>925</td>
<td>1,025</td>
<td>1,292</td>
<td>1,267</td>
</tr>
<tr>
<td>Bobs Cardboard Bales</td>
<td>428.25</td>
<td>527</td>
<td>587.5</td>
<td>542.5</td>
<td>519</td>
</tr>
<tr>
<td>Residential Including Green Solution</td>
<td>415</td>
<td>424</td>
<td>568</td>
<td>757</td>
<td>705</td>
</tr>
</tbody>
</table>
FIGURE 2: Comparison of Recyclable Materials Processed by CCR from 2002 to 2006.
FIGURE 3: Comparison of Material Recycled from Commercial and Residential from 2002 to 2006
FIGURE 4: Comparison of Total Material Recycled from 2002 to 2006
FIGURE 5: Comparison of Major Revenue Sources and Expenses
The Transfer Station

The most used solid waste collection option in the District area is Bob’s Sanitation, a privately-owned and operated collection and transfer station that processes residential, commercial, and industrial waste. Transfer station employees remove some materials such as recyclables and construction and demolition waste from the general waste stream. Material removed are either recycled or hauled separately to the construction and demolition landfill (Moab Landfill). All municipal wastes are transported to Klondike Landfill.

This facility does not have a household hazardous waste collection program. Medical waste from clinics and hospitals is also processed through the transfer station. The transfer station is very functional currently but needs expansion to accommodate growth and future demand in order to process construction and demolition waste if the Moab Landfill is closed.

The District should establish a drop site for household hazardous waste and used oil at the transfer station. The District and Bob’s Sanitation, along with the medical community should also establish medical waste collection and processing procedures or require Bob’s Sanitation to haul medical waste separately and directly to the Klondike landfill.

The transfer station employees should be trained on waste handling and processing, along with the potential risks associated with such operation. The training at a minimum should include safety procedures, hazardous waste identification, and blood-born pathogen training. Records of such training for each employee should be kept at the facility with personnel files.

Bob’s Sanitation should also provide protective equipment and offer immunization for the employees at the facility, including the hauling employees.
ORGANIZATIONAL STRUCTURE

The Solid Waste System structure in Grand County is somewhat unique because it consists of public entities, private enterprise, and a not-for-profit organization working together. The solid waste management program elements consists of two landfills operated by private contractor under the direction of the District, one voluntary curbside recycling program operated by Green Solutions, a drop-site recycling program operated by Canyonlands Community Recycling, and a mandated residential and commercial waste collection service for Moab City residents (contract with Bob’s Sanitation). Bob’s Sanitation also provides voluntary collection services to Grand County and nearby San Juan County. Figure 6 shows the District’s solid waste program components and relationships.

The District’s current objective is to improve the solid waste management including the organizational structure to deal with current and future challenges, and make it more efficient, cost effective, and accountable. The current structure, though working, divides the system responsibilities to several entities including the District, a private contractor, a not-for-profit organization, and Moab City. The District has control over the landfills but has limited or no control over collection activities and recycling programs. Appendix B includes some district structure documents.

Landfill fees are set up by the district, collection fees are negotiated between Moab City and Bob’s Sanitation, while recycling fees are setup by a private contractor. Canyonlands Community Recycling does not charge fees for any materials they receive. The solid waste collection fees charged by Bob’s Sanitation and the recycling collection fees charged by Green Solution ($15.00) are among the highest in the State of Utah. This is because the system is small, some residents in the District pay no solid waste service fees because they don’t formally use the services, and the solid waste system control is too divided or fractured to be effective. Such a system encourages, inefficiency, illegal dumping, less public participation, and high cost of services.

The solid waste system organizational structure needs improvements so that the District has some control over the solid waste operations, and cost of services to encourage efficiency and public health improvement.

FSE suggest that the District should adopt a new and more transparent organizational structure that will make the role of each player very clear.
If necessary the District should sign agreements or memorandums of understanding with Moab City, the County, and the Canyonlands Community Recycling to clarify their roles. FSE also proposes that the District consider the organizational structure shown in figure 7 or similar structure to streamline the system.
Figure 6: Grand County Solid Waste Program Current Organizational Structure
Figure 7: Proposed Solid Waste Management Structure for Solid Waste Management in Grand County.
WASTE REDUCTION PLANS

In addition to the District-run landfills, Grand County has several independent waste reduction programs. These include a voluntary curbside recycling program run by private haulers, drop-site recycling program run by Canyonlands Community Recycling (CCR), and commercial recycling program run by a private hauler (Bob’s Sanitation). The District’s objective is to focus on waste reduction to conserve natural resources and save landfill space.

This section is intended to evaluate the community’s ability to increase waste reduction through various existing recycling programs and determine if the District can improve and expand the existing waste reduction programs, and evaluate the feasibility of establishing new programs such as composting, and commercial recycling programs. This document evaluates the existing programs and stream-lines them so that the programs will support each other. The document also assesses the effectiveness of these programs by examining:

• Cost,
• Participation level,
• Waste reduction potential,
• Program convenience, and
• Public perception.

In general waste reduction methods are divided into three basic types: source reduction, reuse, and recycling.

Source reduction is any action that reduces the amount of waste exiting a process. According to the EPA, “source reduction” means consuming and throwing away less. It includes:

• Purchasing durable, long-lasting goods.
• Seeking products and packaging that are free of toxics.
• Redesigning products to use fewer raw materials in production, have a longer life, or be used again after its original use.

Source reduction actually prevents the generation of waste in the first place, so it is the most preferred method of waste management and goes a long way towards protecting the environment.

Reuse is reusing items by repairing them, donating them to charity and community groups, or selling them to reduce waste. Reusing products,
when possible, is better than recycling because the item does not need to be reprocessed before it can be used again.

**Recycling** is the use, reuse, or reclamation of a waste, either on or off site, after it is generated. Recycling methods include:

- Using or reusing a waste as a substitute for a commercial product.
- Reusing a waste in order to delay the purchase of new products.
- Removing contaminants from a waste to allow its reuse.
- Reclaiming useful constituents from within a waste material.

**Recycling Program Potential**

To examine the community’s existing recycling programs we make the following assumptions: the District’s waste generation rate and waste composition is equal to the national average. Figure 8 shows 2005 national average waste composition before recycling.

The EPA reported that the average individual MSW generation rate is 4.5 pounds per person per day. Grand County’s total population during 2005 was approximately 8,826 individuals (Source: Utah Populations Estimates Committee). Assuming that the county population waste generation rate is the same as national average the County would have generated approximately \((4.54 \times 8,826 \times 365 /2000)\) 7,313 tons of waste. The State of Utah records show that the Klondike County landfilled approximately 8,235 tons of municipal solid waste during 2005 calendar year. In addition, the Canyonlands Community Recycling program data also shows that the county recycled approximately 596 tons of material. When combined Grand County generated approximately 8,821 tons of solid waste. This generation estimate is higher than the national average by 20 percent. This increase may be due to tourism activities, or due to waste which is coming from neighboring San Juan County.

The existing recycling programs recycle the following materials:

1. Clear Glass
2. Brown and Green Glass
3. Newspaper
4. Cardboard
5. Office pack paper
6. Sorted white ledger paper
7. Aluminum
8. Steel Cans
9. #1 Plastic
**FIGURE 8**: 2005 National Municipal Solid Waste Composition Average
Based on the waste composition data and the material recycled by county residents, the Grand County has the potential to recycle up to 48 percent of the county's solid waste excluding plastic. If it is assumed that 50 percent of the community will be involved in recycling, the District can remove up to 24 percents of its waste stream from the landfill. Using the 2005 data and assuming only 50 percent of the community involvement in recycling, the District can divert up to 2,117 tons of waste from the landfill compared to the 596 tons recycled in 2005.

**Green Solutions**

This privately owned and operated recycling service collects co-mingled recyclables from residential facilities and from some businesses. The residential charge for a week’s curbside collection is $10.00 per month. The collected material is transferred to Canyonlands Community Recycling Center and is sorted by Green Solutions staff. Canyonlands Community Recycling Center will bail and ship this material to a buyer. The cost of shipping and bailing is paid by Canyonlands Community Recycling program, but they will keep the revenue generated from sales of the material.

**Bob’s Sanitation**

Bob’s Sanitation also collects cardboard from businesses and has a limited drop-site facility at the transfer station for metals and aluminum. The cardboard collected from the businesses by Bob’s Sanitation is transferred to the Canyonlands Community Recycling Center. Canyonlands Community Recycling Center will bail and ship this material to a buyer. The cost of shipping and bailing is paid by the Canyonlands Community Recycling program but the organization keeps the revenue generated from sales of recycling material.

**Canyonlands Community Recycling**

Canyonlands Community Recycling (CCR) is a not-for-profit organization operating a recycling program with one centrally located drop-site. This drop-site is located at 1000E Sand Flats Road. CCR offers a variety of recycling programs for Grand County. The Recycling Center accepts recyclables from the public and the private haulers. CCR processes the material, bails, markets, keeps records and organizes the delivery of the material to its final destination.
Revenues
Canyonlands Community Recycling receives support from the public by way of membership fees, private donations, fund raising activities, newsletter subscription, and grants. The CCR also receives some revenue from sales of recyclable materials. Table 3 shows the program’s sources of funding during the last five years.

Table 3: Canyonlands Community Recycling Program Source of Income

<table>
<thead>
<tr>
<th>Fund Source</th>
<th>Jan - Dec 02</th>
<th>Jan - Dec 03</th>
<th>Jan - Dec 04</th>
<th>Jan - Dec 05</th>
<th>Jan - Dec 06</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale of Recyclables</td>
<td>36,012.73</td>
<td>35,750.82</td>
<td>49,601.07</td>
<td>57,162.83</td>
<td>43,352.63</td>
<td>221,880.08</td>
</tr>
<tr>
<td>Donations</td>
<td>8,505.39</td>
<td>12,327.87</td>
<td>10,510.79</td>
<td>6,100.00</td>
<td>33,208.08</td>
<td>70,652.13</td>
</tr>
<tr>
<td>Fund Raisers</td>
<td>0.00</td>
<td>1,317.50</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1,317.50</td>
</tr>
<tr>
<td>Memberships</td>
<td>1,718.60</td>
<td>1,038.10</td>
<td>358.95</td>
<td>105.00</td>
<td>421.50</td>
<td>3,642.15</td>
</tr>
<tr>
<td>Retail Sales Tax</td>
<td>0.00</td>
<td>197.49</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>197.49</td>
</tr>
<tr>
<td>Newsletter</td>
<td>92.00</td>
<td>116.00</td>
<td>24.00</td>
<td>16.00</td>
<td>28.00</td>
<td>276.00</td>
</tr>
<tr>
<td>Refundable Sales Tax</td>
<td>0.00</td>
<td>0.00</td>
<td>43.97</td>
<td>0.00</td>
<td>34.75</td>
<td>78.72</td>
</tr>
<tr>
<td>Cost Recov - Membership</td>
<td>311.40</td>
<td>190.90</td>
<td>67.05</td>
<td>4.00</td>
<td>75.50</td>
<td>648.85</td>
</tr>
<tr>
<td>Grants</td>
<td>3,000.00</td>
<td>8,200.00</td>
<td>3,000.00</td>
<td>2,000.00</td>
<td>1,000.00</td>
<td>17,200.00</td>
</tr>
<tr>
<td>Interest Income</td>
<td>85.94</td>
<td>38.33</td>
<td>16.27</td>
<td>13.77</td>
<td>81.93</td>
<td>236.24</td>
</tr>
<tr>
<td>Other Income</td>
<td>276.84</td>
<td>207.64</td>
<td>315.96</td>
<td>841.92</td>
<td>268.26</td>
<td>1,910.62</td>
</tr>
<tr>
<td><strong>Total Income</strong></td>
<td><strong>$50,002.90</strong></td>
<td><strong>$59,384.65</strong></td>
<td><strong>$63,938.06</strong></td>
<td><strong>$66,243.52</strong></td>
<td><strong>$78,470.65</strong></td>
<td><strong>$318,039.78</strong></td>
</tr>
</tbody>
</table>

As shown in Table 3 and Figures 9 and 10, the Canyonlands Community Recycling program obtains more than 50 percent of its funds from sales of recyclables. In 2006, the organization received 55 percent of its funds from sales of recyclables and 42 percent from grants, while the combined funds from all other sources was 3 percent.
FIGURE 9: Canyonlands Community Recycling Major Revenue Sources from 2002 to 2006
FIGURE 10: Canyonlands Community Recycling 2006 Percent Revenue Sources
Expenses
The CCR program expenses are shown in Table 4. The table shows that the most significant expenses are payroll and freight.

Table 4: Canyonlands Community Recycling Program Expenses

<table>
<thead>
<tr>
<th>Type of Expense</th>
<th>Jan - Dec 02</th>
<th>Jan - Dec 03</th>
<th>Jan - Dec 04</th>
<th>Jan - Dec 05</th>
<th>Jan - Dec 06</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bldg - Supplies &amp; Maint</td>
<td>0.00</td>
<td>0.00</td>
<td>39.94</td>
<td>0.00</td>
<td>0.00</td>
<td>39.94</td>
</tr>
<tr>
<td>Bldgs &amp; Grounds</td>
<td>0.00</td>
<td>1,571.21</td>
<td>598.87</td>
<td>69.85</td>
<td>0.00</td>
<td>2,239.93</td>
</tr>
<tr>
<td>Equip - Supplies &amp; Maint</td>
<td>0.00</td>
<td>508.66</td>
<td>1,766.51</td>
<td>1,805.20</td>
<td>897.29</td>
<td>4,977.66</td>
</tr>
<tr>
<td>Freight</td>
<td>9,524.40</td>
<td>11,615.00</td>
<td>10,443.00</td>
<td>15,084.00</td>
<td>12,800.00</td>
<td>59,466.40</td>
</tr>
<tr>
<td>Fuel</td>
<td>658.62</td>
<td>612.69</td>
<td>937.80</td>
<td>1,108.52</td>
<td>1,556.85</td>
<td>4,874.48</td>
</tr>
<tr>
<td>Insurance</td>
<td>4,514.07</td>
<td>4,741.78</td>
<td>4,933.90</td>
<td>5,936.77</td>
<td>5,118.27</td>
<td>25,244.79</td>
</tr>
<tr>
<td>Safety</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>59.34</td>
<td>129.47</td>
<td>188.81</td>
</tr>
<tr>
<td>Special Dept. Supplies</td>
<td>1,715.87</td>
<td>1,806.06</td>
<td>2,337.13</td>
<td>2,943.69</td>
<td>2,377.54</td>
<td>11,180.29</td>
</tr>
<tr>
<td>Capital Outlay</td>
<td>0.00</td>
<td>-950.85</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>-950.85</td>
</tr>
<tr>
<td>Refundable Tax Paid</td>
<td>16.03</td>
<td>43.97</td>
<td>42.22</td>
<td>34.75</td>
<td>59.68</td>
<td>196.65</td>
</tr>
<tr>
<td>Newsletter Production</td>
<td>512.53</td>
<td>2,049.23</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>2,561.76</td>
</tr>
<tr>
<td>Memberships Products</td>
<td>35.64</td>
<td>553.03</td>
<td>0.00</td>
<td>20.00</td>
<td>11.91</td>
<td>620.58</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0.00</td>
<td>1,100.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>1,100.00</td>
</tr>
<tr>
<td>Office Supplies</td>
<td>981.58</td>
<td>463.73</td>
<td>1,100.26</td>
<td>391.51</td>
<td>1,353.69</td>
<td>4,290.77</td>
</tr>
<tr>
<td>Payroll Expenses</td>
<td>32,385.05</td>
<td>31,939.55</td>
<td>38,238.95</td>
<td>41,583.74</td>
<td>43,540.06</td>
<td>187,687.35</td>
</tr>
<tr>
<td>Subscription/Memberships</td>
<td>175.00</td>
<td>143.75</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>618.75</td>
</tr>
<tr>
<td>Telephone</td>
<td>684.18</td>
<td>626.99</td>
<td>698.18</td>
<td>637.23</td>
<td>657.61</td>
<td>3,304.19</td>
</tr>
<tr>
<td>Depreciation Expense</td>
<td>2,474.00</td>
<td>2,570.00</td>
<td>1,977.00</td>
<td>0.00</td>
<td>0.00</td>
<td>7,021.00</td>
</tr>
<tr>
<td>Utilities</td>
<td>894.42</td>
<td>1,275.45</td>
<td>1,630.41</td>
<td>1,334.42</td>
<td>1,454.13</td>
<td>6,588.83</td>
</tr>
<tr>
<td>Other Expenses</td>
<td>300.00</td>
<td>583.85</td>
<td>234.67</td>
<td>-767.62</td>
<td>-799.79</td>
<td>-448.89</td>
</tr>
<tr>
<td>Fund Raising Expenses</td>
<td>0.00</td>
<td>519.79</td>
<td>0.00</td>
<td>0.00</td>
<td>49.70</td>
<td>569.49</td>
</tr>
<tr>
<td>Post-Fire Reinventory</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total Expense</td>
<td>$ 54,871.39</td>
<td>$ 61,773.89</td>
<td>$ 65,078.84</td>
<td>$ 70,341.40</td>
<td>$ 69,306.41</td>
<td>$ 321,371.93</td>
</tr>
</tbody>
</table>
Recommendations

The District has the potential to increase recycling and it should make the effort to increase recycling through:

1. Increasing public education,
2. Making recycling more accessible,
3. Making recycling affordable,
4. Establishing organizational frame work to monitor recycling activities, and
5. Setting recycling goals.

Curbside Recycling

Current voluntary curbside recycling program is very expensive, and difficult to expand at the current rate of $10.00 per month. However, the District should increase public education and plan to engage county-wide curbside recycling program in the future, possibly 2012. The District should also exercise the option of receiving county-wide curbside recycling collection, processing and marketing bid to examine the viability of such a program before 2012.

Recycling Drop-site

In communities where curbside collection is not financially feasible, drop-off programs offer an alternative for recycling. Although the cost is often less expensive than curbside programs, a drop-off center still requires a considerable investment of time and money. Neighborhood drop-sites with very strong public education programs can be successful if the community uses such program. The best way to do this is to increase public education about recycling through school age children, scout groups, the retired community, the business community and etc. Studies have shown that public education increases the success of drop-sites.

Therefore FSE recommends that the District expand the activities of Canyonlands Community Recycling by:

1. Establishing additional drop-sites at more convenient public locations that are easily accessible,
2. Marking the containers clearly,
3. Increasing recycling public education, and
4. Increasing financial support to CCR.
**Commercial Recycling**
Commercial recycling can play a significant role in reaching the District’s goal of increasing recycling. For example with good public education through the Chamber of Commerce, service organizations (Lions, Rotary Club, etc.), free waste audit from the recycling center, and recognition programs, the commercial waste reduction can be increased. Businesses are already paying for their solid waste collection services by volume. Therefore, if the public education program can demonstrate the advantage of recycling and the cost reduction associated with recycling, businesses may support recycling. Furthermore it is easy to source separate commercial waste. The public education should also provide educational materials such as employee training, evaluation sheets, and procurement information for businesses.

**Metrics for Measurements**
The solid waste management system should receive copy of the recycling program data at the end of every year to measure recycling performance. The District should also provide funding for the recycling program based on performance. The data should include tons of materials recycled, type of material recycled, source, revenue collected from recyclable, and estimated cost of per ton recycled.

**Public Education**
The District should aim to increase recycling through public education. CCR may be recruited to develop and disperse public education material. The District should also establish a public education program to educate the public on issues such as landfill programs, household hazardous waste, and composting. Therefore, this plan recommends the establishment of a public education program aimed at boosting recycling either through CCR or independent of CCR.

**Organizational Structure**
The current organizational program needs improvement. Specially, the District should consider restructuring its organization to include a recycling program and define the following:

- The role of the solid waste program in recycling,
- The role of CCR, and
- The role of the curbside recycling program.

The District should also establish a recycling program coordinator position before 2009, and start advocating for waste reduction. FSE also
suggests that Grand County Solid Waste District adopt the following recycling organizational structure before 2010.
FIGURE 11: Proposed Organizational Structure for Recycling
The Grand County Solid Waste District has a Municipal Solid Waste landfill (MSW landfill, or Class I landfill, or Klondike Landfill) and a Construction and Demolition landfill (CD landfill, or Class IV landfill, or Moab Landfill). The State of Utah encourages communities with MSW landfills to establish Household Hazardous Waste (HHW) collection and exclusion programs to protect the groundwater beneath the landfill. The State also requires class IVb landfills accepting more than 20 tons per day to demonstrate that hazardous waste generated by conditionally exempt small quantity generator is not accepted at the landfill.

Household Hazardous Waste

The District has a limited household hazardous waste program and has done limited tracking of the quantity of hazardous waste received at the two landfills, or removed from the working face by the landfill employees.

Common household chemicals can be hazardous waste if the waste is corrosive, toxic, or ignitable. Residential MSW contain products, such as paints, cleaners, oils, batteries, and pesticides that contain potentially hazardous ingredients which require special care when they are collected and stored. Certain types of HHW have the potential to cause physical injury to sanitation workers, contaminate storm water and the groundwater beneath the landfill, collection points, and transfer stations. Federal law allows disposal of HHW with the Municipal Solid Waste (MSW). While the dangers of such disposal methods might not be immediately obvious, the improper disposal of these wastes can pollute the environment and pose a threat to human health.

Many communities in Utah offer a variety of options for convenient and safe management of HHW. Although the state of Utah solid waste rules allow for the disposal of these materials with the municipal solid waste, the establishment of HHW collection and proper disposal is also encouraged. Proper disposal prevents pollution that could endanger human health and the environment.

The following list shows common household items containing potentially hazardous ingredients that might be found in garages, basements, or other storage spaces in homes.
### Cleaning Products
- Oven cleaners
- Drain cleaners
- Wood and metal cleaners and polishes
- Toilet cleaners
- Tub, tile, shower cleaners
- Bleach (laundry)
- Pool chemicals

### Indoor Pesticides
- Ant sprays and baits
- Cockroach sprays and baits
- Flea repellents and shampoos
- Bug sprays
- Houseplant insecticides
- Moth repellents
- Mouse and rat poisons and baits

### Automotive Products
- Motor oil
- Fuel additives
- Carburetor and fuel injection cleaners
- Air conditioning refrigerants
- Starter fluids
- Automotive batteries
- Transmission and brake fluid
- Antifreeze

### Workshop/Painting Supplies
- Adhesives and glues
- Furniture strippers
- Oil or enamel based paint
- Stains and finishes
- Paint thinners and turpentine
- Paint strippers and removers
- Photographic chemicals
- Fixatives and other solvents

### Lawn and Garden Products
- Herbicides
- Insecticides
- Fungicides/wood preservatives

### Miscellaneous
- Batteries
- Mercury thermostats or thermometers
- Fluorescent light bulbs
- Driveway sealer

### HHW Diversion Options
To increase the HHW diversion the District should establish HHW collection points at very convenient points and increase public education. The education program should also advocate and encourage reduction, reuse, recycle, and proper disposal of HHW.

### Collection Points
This plan encourages the District to establish a Household Hazardous Waste collection and exclusion program. The effectiveness of any HHW collection program hinges on the effectiveness of the community’s MSW
public education program and the convenience of the collection points. The District may establish collection point(s) at any or all of these points:

1. The Canyonlands Community Recycling Center,
2. Bobs Transfer Station, and
3. Moab Landfill

Currently the CCR center is the best places because:

1. The public is already familiar with the activities of the facility and it can easily expand its program to include accepting HHW from residents,

2. CCR has an established public education program and can assist the District to develop hazardous waste public education program,

3. As part of its public education program CCR can also assist the District in develop an exclusion program for conditionally exempt small quantity generators,

4. CCR already keeps recycling records and can expand this record keeping program to include HHW collection quantities,

5. CCR may have to provide additional employee training, and

6. CCR may have to arrange shipping and final disposal

Bob’s Sanitation can also establish a collection point at its Transfer Station and train its employees to recognize and separate HHW from the MSW before it is shipped it to the Klondike Landfill or Moab Landfill. This will require Bob’s Sanitation to establish a verifiable employee training program and record keeping. However, the potential risk involved in this program is very high, especially if an employee is injured. The District can still benefit from a limited collection program at the Transfer Station. This means that the public visiting the Transfer Station will be allowed to drop their HHW at the facility and the employees will be instructed to remove HHW from the waste stream at their convenience.

The Moab Landfill is a Class IVb landfill, if accepting more than 20 tons of construction and demolition waste per day the landfill is required to establish a hazardous waste exclusion program from conditionally exempt small quantity generators. To maintain compliance with the
construction and demolition waste landfill permit, the District should evaluate a plan to develop a plan to exclude conditional exempt waste from the Moab C&D Landfill. This program may include educational pamphlets; waste inspections at the landfill, construction permit conditions, commercial waste collector education material and permitting process, etc. The District should also consider developing plans to assist Conditionally Exempted Small Quantity Generators (CESQG) to properly dispose their hazardous waste so that it will be removed from the Moab landfill waste stream. The landfill may also consider establish limited collection and storage program at the landfill site and remove hazardous materials from the waste stream.

Reduction
The District should improve public education and encourage reduction of HHW generation and encourage residents to consider reducing the purchase of products that contain hazardous ingredients. The District should also educate the public about the use of alternative methods or products—without hazardous ingredients—for some common household needs.

Reuse
The District should improve public education, encourage reuse of HHW such as paint, and provide outlets for reuse and exchange.

Disposal and Collection
To avoid the potential risks associated with household hazardous wastes, the District should assist the collection and disposal of products with potentially hazardous substances. The District should also provide tips for individuals to follow in their own homes to recognize HHW and the District should also inform the public the locations for HHW collection.

Improvements required
The District needs to establish a household hazardous waste collection and storage facility at the Recycling Center, the Moab Landfill, and at the Bob’s Sanitation Transfer Station. The improvements needed to establish a working HHW program include the establishment of fully contained storage area (see Figure 12), collection and disposal tracking system, funds for disposal, and employee protective gear. The District also needs to develop HHW education program to inform the public regarding what HHW materials are, how to separate them, and where to discard them.
The CCR Center can help the District establish the HHW education program. Table 5 below shows the cost of establishing and operating HHW program.

**Table 5: The Cost of Establishing and Operating HHW Program**

<table>
<thead>
<tr>
<th>Improvements Type</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three storage containers</td>
<td>$30,000.00</td>
</tr>
<tr>
<td>HHW education Program</td>
<td>$10,000.00</td>
</tr>
<tr>
<td>Training</td>
<td>$5,000.00 in 5 years</td>
</tr>
<tr>
<td>Protective Equipment</td>
<td>$5,000.00 in 5 years</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$50,000.00</strong></td>
</tr>
</tbody>
</table>

In addition to improvements the District should also plan for annual disposal cost of approximately $15,000.00 per year.

**Recommendation**

**HHW for Moab C&D Landfill**
The District should develop hazardous waste exclusion program for Moab landfill to:

- Improve public awareness,
- Improve the storage area,
- Train employees,
- Provide employee protective gears, and
- Develop effective tracking system.

The District should also establish household hazardous waste storage unit at the Klondike landfill.

**Canyonlands Community Recycling**
The District should increase funds for the HHW program established for the Recycling center to:

- Improve public awareness of the HHW program,
- Provide material storage container, and
- Develop an effective tracking system.

The District should also try to reach conditionally exempt small quantity generators through the Recycling Center Public Education Program and encourage them to dispose of their waste properly and:

- Develop a fee for CESQG hazardous waste,
- Develop education material and awareness program, and
• Develop a tracking system.

**Metrics for Measurements**
The District should establish metrics to measure HHW performance and the District should provide funding for the program based on performance.

The parameters to be measure should include:

1. Quantity of hazardous waste diverted,
2. Shipping records,
3. Final disposal records,
4. The establishment of an effective public education program,
5. Distribution of public education materials,
6. Safety records,
7. Permitting of Construction and Demolition waste haulers, and
8. Education and training of CD waste haulers.

*FIGURE 12:* Typical Household Hazardous Waste Containment Units.
COST OF SERVICE ANALYSIS

The costs of solid waste management services have risen steadily over the past decade. For example landfill disposal cost in the state of Utah ranges from $21.00 per to $29.00 per ton and will continue to rise. The District is trying to control municipal solid waste costs through a variety of measures which includes restructuring of waste services and encouraging waste reduction activities. However, making solid decisions and developing cost-effective waste management strategies can be difficult without complete cost information.

The District uses various ways to finance its solid waste management program including subsidy from the mineral lease. This method of solid waste financing can obscure the true cost of the system. This Cost of Service Analysis section, along with the compiled detailed, cost information from the District Solid waste service, can serve as a decision-making tool. Understanding the costs involved with municipal solid waste management will enable the District to:

1. Make informed decisions about various programs,

2. Identify opportunities for streamlining services, and

3. Facilitate cost-saving efforts and better plan for the future.

This Cost of Service Analysis section is intended to account for all the resources used or committed, for municipal solid waste management in order to present a complete picture of the municipal solid waste management costs on an ongoing basis. This section includes all associated costs, and considers the waste management system as if it was an enterprise fund. This section also presents the benefits and potential problems associated with pricing the service, as well as accounting for all fixed costs, operating costs, and reserves required to operate a viable solid waste enterprise fund. However, this section does not address social costs, environmental externalities, and political costs that cannot be measured currently. Appendix C contains a spreadsheet designed to calculate solid waste tipping fees for Grand County’s landfills.
Fixed Costs
Fixed costs include; building, equipment, vehicles, and other durable and significant capital expense that can depreciate over time.

Operating Cost
Operating costs include: salaries and wages, power and fuel, supplies, repairs and maintenances, executive management, legal services, data processing, billing, closure and post-closure, and retirement benefits.

Reserves
Reserve funds include: funds for future solid waste facilities such as a new landfill site and transfer station, as well as some limited reserves for compliance to deal with possible environmental remediation and or new legal requirements.

Advantages
The advantages of an enterprise fund are listed below:

- Ensures efficient and sustainable solid waste programs
- Establishes true program cost, thus, if the county wants to contract the service cost is very clear,
- Budgeted expenses equal to revenues,
- Easy to evaluate program costs and eliminates unsustainable programs,
- Provides incentives for pay-as-you throw programs,
- Allows the community to decide which programs to fund, or not fund,
- Sets tipping fee and rates for each service,
- Supports program budgeting,
- Allows managers to evaluate program performance,
- Provide managers with a tool to prioritize program on funding needs,
- Provides funding mechanism for new facilities
• Determines actual program cost and allows services to be priced accurately,
• Can be used as a tool to decide whether to privatize or not,
• Fosters efficiency,
• Justifies expenditures, and
• Provides mechanism to compare community municipal solid waste management cost to other communities.

Disadvantages
The following items can negatively impact cost of service analyses of enterprise fund:

• Incomplete records,
• Lack of time and resources,
• Use of grants such as mineral lease
• Lack of political support,

Landfill Revenue and Expenses Analysis
The District receives revenue from landfill charges. In 2006 the Klondike Landfill generated approximately $264,981.07 while the Moab Landfill generated approximately $148,725.09. If it is assumed that the administration, salaries, and benefits are divided equally between the landfills since the two landfills receive approximately the same amount of waste Klondike expended approximately $242,574.18 while the Moab Landfill expended approximately $228,474.97. Figure 13 shows that the revenue and expenditure comparison of the two landfills. This analysis show that either the Moab Landfill is not charging enough or the Moab landfill expenditure is very high.

The District currently receives $200,000.00 mineral lease fund from county per year from Grand County which may not be available in the future. For that reason the district needs to plan and adjust the landfill disposal fees to cover its expenses.
FIGURE 13: Comparison of Revenue and Expenditure between Moab land fill and Klondike Landfill
This District also receives a significant amount of waste tires at the Moab Landfill from the public and private haulers. The landfill charges $1.00 per tire if the rim size is less than 16”, $3.00 per tire if the rim size is bigger than 16” and $7.50 per cubic yard of tire if it is brought in bulk. The District then pays a tire disposal contractor to remove the tires at a higher cost. Hence, the District currently subsidizes the disposal of tires.

The District does not have HHW collection program. The Moab Landfill which is Class IVb landfill is also receiving more than 20 tons of C&D waste per day. Therefore it is important that District establish HHW. This program will cost approximately $25,000.00 per year.

**Recommendations**

FSE suggests that the District improve the following Cost of Service elements:

**Enterprise Fund**

The District currently has an enterprise funds but this fund receives some assistance from the Mineral Lease Fund through the County and it is not self sufficient. Therefore, FSE suggests that the District to establish a true enterprise fund for the Solid Waste Management fund and:

- Set program goals and objectives,
- Restructure the solid waste program,
- Update the disposal fee on as needed basis
- Save funds for future transfer station, and
- Establish recycling funds within the solid waste fund,

**Metrics for Measurements**

The District should establish metrics to measure the enterprise fund performance.

**Proposed Landfill Fee Adjustment**

To reduce the amount of subsidy that the District receives from the mineral lease fund, FSE recommends that the district adjust the Moab landfill fees. Table 6 and 7 below show the proposed fee adjustments for Moab landfill and waste tires.

FSE also recommends the adjustment of the tire fees, and charging a fee that is equitable so that this program will pay for itself. FSE also recommends that the tire fee should be by the tire not by yard. Table 8 shows the proposed fee for schedule for Moab landfill.
### Table 6: Proposed Fee Schedule for Moab Landfill

<table>
<thead>
<tr>
<th>Fee Type</th>
<th>Current</th>
<th>Model</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public min.</td>
<td>$6.00</td>
<td>$10.80</td>
<td>$10.00</td>
</tr>
<tr>
<td>Contractors</td>
<td>$10.00</td>
<td>$18.00</td>
<td>$18.00</td>
</tr>
</tbody>
</table>

### Table 7: Proposed Fee for Tire Disposal

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>Recommended Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rim size less than 16”</td>
<td>$1.50</td>
</tr>
<tr>
<td>Rim size bigger than 16”</td>
<td>$4.50</td>
</tr>
</tbody>
</table>
ALTERNATIVE ANALYSIS

The objective of this section is to develop a cost-based alternative analysis to assist the District in make informed decisions. The spreadsheets in Appendix D were used to evaluate the costs of procuring and operating the landfill and collection systems. FSE was asked to evaluate the following three alternatives for landfill operations.

a. Private Own and Operated
b. Do nothing (District Own and Private Operated)
c. District Own and Operated

Operating cost data for these options are obtained from the existing operations and then projected for the next 5 years using a 3 percent increase in operating cost and revenue generation. The results of the alternative analyses are compared to determine the best option for the District.

Landfills

The Grand County Solid Waste District currently directs two landfills. Both landfills are operated by private contractor. To evaluate the landfill under the same four alternatives stated above the following assumptions were made:

1. Current operating cost for the landfills reflects a public owned and privately operated system.
2. To examine private owned alternative FSE assumed that the District is willing to transfer the landfill at no cost to private ownership.
3. The expected rate of return for private ownership is 10 percent.
4. The district wishes to establish HHW program at a cost of $25,000.00 per year in the next 5 years.
5. District operated landfills will require leasing or purchasing additional landfill equipments.
6. District operated landfills will require hiring more employees to operate the equipment.
7. Current operating procedure and hours will remain the same.
8. The District wants to operate the landfills as an enterprise fund. This means tipping fees will cover all expenses and the District will eliminate the $200,000.00 grant from the budget.
After taking into consideration the above assumptions FSE developed spreadsheets to compare the three alternatives. Table 8 summarized the results of the evaluation.

**Table 8: Comparison of the Three Landfill Alternatives**

<table>
<thead>
<tr>
<th>Description</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Private Owned and Operated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Expenses</td>
<td>$649,719.74</td>
<td>$668,386.33</td>
<td>$687,612.92</td>
<td>$707,416.31</td>
<td>$727,813.80</td>
</tr>
<tr>
<td>Net Income After Fee Adjustment</td>
<td>$(59,065.43)</td>
<td>$(60,012.39)</td>
<td>$(60,987.77)</td>
<td>$(61,992.40)</td>
<td>$(63,027.17)</td>
</tr>
<tr>
<td><strong>B. Current - District Owned and Private Operated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Expenses</td>
<td>$590,654.31</td>
<td>$607,623.94</td>
<td>$625,102.66</td>
<td>$643,105.74</td>
<td>$661,648.91</td>
</tr>
<tr>
<td>Net Income After Fee Adjustment</td>
<td>$-</td>
<td>$750.00</td>
<td>$1,522.50</td>
<td>$2,318.18</td>
<td>$3,137.72</td>
</tr>
<tr>
<td><strong>C. District Owned and Operated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Expenses</td>
<td>$581,320.98</td>
<td>$594,510.61</td>
<td>$608,095.93</td>
<td>$622,088.80</td>
<td>$636,501.47</td>
</tr>
<tr>
<td>Net Income After Fee Adjustment</td>
<td>$9,333.33</td>
<td>$13,863.33</td>
<td>$18,529.23</td>
<td>$23,335.11</td>
<td>$28,285.16</td>
</tr>
</tbody>
</table>

Based on the presented data, the Public Owned and Operated Alternative is the best option. The second best alternative is the current system which is also public owned but privately operated. The difference between the private owned and operated and public owned and private operated is the profit margin or return on investment. This analysis used a conservative 10 percent rate of return.

**Collection**

The current collection system is owned and operated by a private business (Bob’s Sanitation) but it is for sale and the District has the opportunity to purchase the collection system or allow another private
entity to purchase the system. Bob’s Sanitation has exclusive right to
collect residential and commercial waste from the Moab City. Waste
collection is not mandatory for the unincorporated areas of the county.
FSE was asked to evaluate the following four alternatives for collection
operations.

a. New Private Own and Operated
b. District Own and Private Operated
c. District Own and Operated
d. Current Private Owned and Operated

To evaluate the collection system under the same four alternatives the
following assumptions were made.

1. Current operating cost for the collection system under private
ownership is still valid under public ownership or another
privately owned business.
2. New private ownership would prefer to pay off the business
value in 10 years.
3. The District would prefer to pay off the business value in 10
years.
4. Interest rate for the new private owner to finance the loan is 10
percent.
5. The District will finance the half of the business value at 5
percent.
6. All alternatives would need additional money for management
salary.
7. In the next 5 years the collection system and the transfer
station will need to replace some of the equipment and included
in the analysis the new depreciation expenses of the new
equipment.
8. District operated collection system will not require to hire more
employees to operate the collection system.
9. Current operating procedure and hours will remain the same.
10. Grand County and the Moab City both are willing to give the
new owner the exclusive right to collect garbage.
11. The County is willing to make garbage collection mandatory for
everyone within the district
12. The revenue from the County will go up by 20 percent after the
County mandates garbage collection

Table 9 summarized the results of FSE’s evaluation.
### Table 9: Comparison of the Four Collection and Transfer Station Alternatives

#### A. New Private Owned and Operated

<table>
<thead>
<tr>
<th>Description</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Revenue</td>
<td>$1,650,153.83</td>
<td>$1,699,658.45</td>
<td>$1,750,648.20</td>
<td>$1,803,167.65</td>
<td>$1,857,262.68</td>
</tr>
<tr>
<td>Total Expenses</td>
<td>$1,662,833.74</td>
<td>$1,718,236.39</td>
<td>$1,755,926.12</td>
<td>$1,795,441.54</td>
<td>$1,851,155.76</td>
</tr>
<tr>
<td>Net Income</td>
<td>$(12,679.90)</td>
<td>$(28,577.94)</td>
<td>$(37,777.91)</td>
<td>$(40,773.89)</td>
<td>$(52,393.08)</td>
</tr>
</tbody>
</table>

#### B. District Owned and Private Operated*

<table>
<thead>
<tr>
<th>Description</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$1,650,153.83</td>
<td>$1,699,658.45</td>
<td>$1,750,648.20</td>
<td>$1,803,167.65</td>
<td>$1,857,262.68</td>
</tr>
<tr>
<td>Total Expenses</td>
<td>$1,580,330.93</td>
<td>$1,635,733.58</td>
<td>$1,673,423.31</td>
<td>$1,712,938.73</td>
<td>$1,768,652.95</td>
</tr>
<tr>
<td>Net Income</td>
<td>$69,822.91</td>
<td>$53,924.87</td>
<td>$44,724.89</td>
<td>$41,728.92</td>
<td>$30,109.73</td>
</tr>
</tbody>
</table>

#### C. District Owned and Operated*

<table>
<thead>
<tr>
<th>Description</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$1,650,153.83</td>
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<td>$44,724.89</td>
<td>$41,728.92</td>
<td>$30,109.73</td>
</tr>
</tbody>
</table>

#### D. Current Private Owned

<table>
<thead>
<tr>
<th>Description</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$1,650,153.83</td>
<td>$1,699,658.45</td>
<td>$1,750,648.20</td>
<td>$1,803,167.65</td>
<td>$1,857,262.68</td>
</tr>
<tr>
<td>Total Expenses</td>
<td>$1,440,088.34</td>
<td>$1,495,490.99</td>
<td>$1,533,180.72</td>
<td>$1,572,696.14</td>
<td>$1,628,410.36</td>
</tr>
<tr>
<td>Net Income</td>
<td>$210,065.49</td>
<td>$194,167.46</td>
<td>$184,967.48</td>
<td>$181,971.51</td>
<td>$170,352.32</td>
</tr>
</tbody>
</table>

*Alternatives B and C are the same because alternative B assumes that the District can hire private operator to operate the collection system at a cost equal to what the District would pay for Management and Administration.
**Recommendations**

Based on the results of the alternative analysis and the assumptions made to screen the alternatives FSE recommends that the District consider:

1. Purchasing the landfill equipment and operating the landfills. FSE also suggests that the District obtain more accurate equipment acquisition, maintenance, and personnel costs.
2. Acquiring the collection business from Bob’s Sanitation, Inc, and consolidating staff.
3. Closing the Moab Landfill after the District purchases the collection system.
4. Review solid waste collection fees and make adjustment if needed.