3.0 OPERATIONAL ASSESSMENT AND ISSUES

3.1 INTRODUCTION

On January 28 through 30, 2003, representatives from Earth Tech and Beck met with City personnel and observed operations at the SFRSL to obtain a better understanding of current operations and to make recommendations to the City to improve the operations. An Implementation Plan, which includes many of the recommendations contained in this section, along with estimated costs and the recommended year of implementation, is presented in Section 7.0.

3.2 LANDFILL OPERATIONS OVERVIEW

The following topics are discussed regarding landfill operations and related landfill features:

- Scale-House and Traffic
- Public Drop Off Area
- Existing Landfill (Active Area)
- New Cell Development
- Daily Cover
- Miscellaneous Waste/Recyclable Storage and Treatment Areas
- Leachate Management
- Landfill Gas Management
- Surface Water Management
- Litter Control
- Landfill Equipment
- Maintenance and Office Buildings
- Hours of Operation, Staffing, and Training
- Soil Stockpiles
- Buffer Land
- Surveying

3.2.1 Scale-House and Traffic

The new scale-house and three new scales were placed in operation in January 2003. The scale-house utilizes two personnel for customer service. The Landfill Manager's office is also located at the scale-house. Two incoming scales allow for the public to use one scale and pre-tared commercial haulers to use the other, thereby expediting the weighing process and improving traffic flow. Commercial customers have a bar code for each vehicle that is preprogrammed for tare weight in the City's software program to provide efficient processing of the commercial customers. The commercial operator punches in the type of waste being hauled from a menu on a display board mounted adjacent to the commercial scale. The City verifies the commercial truck's tare weight on a periodic basis.

Based on daily scale records, approximately 700 to 1,500 vehicles use the landfill during the busiest days of summer. The fee is $10 per pickup load and $5 per carload if the gross weight of the vehicle plus the materials is less than 7,500 lbs. Otherwise, the rate charged is $13.75 per ton. The public is offered one free opportunity per year to dispose of waste during the summer months. The free disposal opportunity is part of the City's proactive cleanup program. This program is estimated to cost the City approximately $120,000 in lost revenue based on the City's projections.

The following photograph depicts the scale and road.

The scale-house is at the north entrance just inside the gate. At the gate, the two-lane entrance road flares into the various inbound and outbound lanes. During the site visit (January 2003), a long queue was not observed. However, this area could become very congested during summer peak periods and on Saturdays.

This traffic pattern to the scale is restricted by the landfill entrance road layout and traffic lanes. The general public traffic may become congested with the present system requiring checking in at the scale both coming in and out of the facility and thereby restricting access to the commercial scale. Too many vehicles may result in blocking off the entrance gate. The City has purchased an 80-acre parcel adjacent to the landfill entrance road. With the purchase of this additional parcel, we recommend that the entrance road layout be altered to improve entering and queuing at the scale-house. The entrance road should be widened to provide an additional traffic lane before the scale-house area. Widening of the road will allow vehicles better access to the incoming scales and will facilitate traffic flow during high traffic periods. This modification will consist of an additional traffic lane on the west side of the entrance road from the scale-house to the north for approximately 300 feet. The existing gate and fence will have to be relocated from its present location to north of the proposed traffic lane.

Vehicle speed can become a safety issue between the scale-house and landfill. The City has posted speed limit signs to attempt to limit vehicle speed. If these signs do not result in reducing vehicle speeds to reasonable levels, SFRSL may want to consider installation of speed bumps. However, these speed bumps can become an inconvenience to City staff and customers and a nuisance during snow removal.

The City staff stated that they plan to blacktop the segment of access road to the new cell (Cell 1) in the Expansion Area. Moreover, the access road into the new cell needs to be widened to allow for two-way traffic around the tight curves. The road improvements within Cell 1 are planned for construction in the fall of 2003. The paving will occur in 2004.

Dumpsters near the scale-house offer the public the opportunity to dispose of small quantities of materials at this location and thereby reduce some of the traffic to the working facility. This convenience is appreciated by the general public because it is efficient, safer, and a simple operation. The City should consider developing an opportunity for public drop-off customers to bypass the scale-house without going through the two-window system during high traffic time periods. One approach the City could consider would be for the scale attendants to have a pad of receipts for these transactions, this data could then be entered into the system later in the day as time allows.

3.2.2 Public Drop-Off Area

The traffic within the active landfill area is considerable. For efficient operations to occur, the amount of traffic from the public that the equipment operators and commercial haulers are subjected to should be minimized to the extent possible. We recommend an expanded public drop-off area be developed near the scale-house to minimize the need for the general public to haul their waste to the active disposal areas. This approach will be safer for the public, more convenient, and will reduce traffic within the landfill area.

One way of implementing the public drop-off is to stage a series of roll-off containers at the designated location east of the scale-house. Roll-offs should be provided for tires, metals, white goods, C&D materials, and MSW. In addition, compartmentalized containers should be provided for recyclable paper and commingled containers. An asphalt paved driveway and surface to place the roll-off containers on would benefit this operation. Signage should be used to direct the public in properly separating the waste (MSW, C&D, yard waste, etc.) into specific containers. We believe that this procedure will result in better separation of waste types (see Section 3.2.3.5 for waste separation discussion) as well as improve collection of recyclables. The roll-off containers can then be hauled to the working face when full or when convenient to the operator.

Since the proposed location of this operation is outside of the current permitted area, we anticipate that a permit modification will be required from the SDDENR and from the Minnehaha County Planning Department. In order to implement this project in 2004, the permitting activities should be started as soon as possible.

Figure 4-2, which follows Section 4 of this report, identifies the location of the proposed drop-off area. Estimated costs for the public drop off area, included in the Implementation Plan (Section7.0), are based on a two-acre area with crushed stone base and asphalt surface. Also included in the budget estimate is the purchase of 30 roll-off containers. A hook truck for hauling roll-offs between the drop off area and the landfill working face is included for purchase in 2003.

3.2.3 Existing Landfill (Active Area)

Waste is currently being placed in the Active Area, which includes MSW and C&D waste. The landfill is unlined and nearing its permitted capacity. The landfill received a projected 160,000 tons of MSW and 65,000 of C&D in 2002. Since 1996, the quantities of MSW received have increased approximately 2 percent to 10 percent annually. Waste filling is accomplished using the standard approach of filling in lifts, compacting the waste during placement, and minimizing the working face.

Final cover has been placed on the northeast corner of the landfill during 2002. The final cover consisted of 18-inches of compacted clay plus 6-inches of topsoil. Timing for the subsequent phases of final cover placement is tied to waste flow and the facility's closure plan. Closure of this area is further discussed in Section 2.5, Closure/Post-Closure Care Plan Evaluation.

3.2.3.1 Emergency Cells

Two unlined emergency cells have been used for MSW disposal when access to the primary working face of the Active Area landfill was too wet or inclement weather conditions such as snow storms or windy conditions prevailed. Although volume calculations have not been performed, we believe that the remaining capacity of these areas for MSW is small. If the City chooses to, we understand from SDDENR staff that these cells can continue to be used for filling of MSW, provided that they are not expanded laterally. Remaining landfill space between and on the side-slopes of the cells is designated for C&D material as provided for in the Closure Plan (HDR, 2001b).

3.2.3.2 MSW 1998 Expansion

We understand that in the year 1998, the City placed MSW waste in a 1.8 acre unlined portion of the site located between the asbestos area and the main pre-subtitle D portion of the landfill. The City informed the SDDENR of this and asked for approval to continue placement of MSW in this area in order reach more appropriate slopes (to prevent ponding) in preparation for the interim closure. It is our understanding that the SDDENR has indicated to the City that it will only allow placement of contaminated soil or C&D material in this area.

3.2.3.3 Asbestos Area

The City has a dedicated area for MSW and asbestos disposal located north of the emergency cells. The asbestos cell was originally developed to accept asbestos waste from some major building demolition projects in the City. Having a dedicated asbestos disposal area has the benefit of isolating the location of the asbestos within the landfill. Secondly, future drilling within the existing landfill for landfill gas/leachate wells can be accomplished with less concern about encountering asbestos. The asbestos area is very accessible and is located near the scale-house.

3.2.3.4 Construction and Demolition Waste Disposal

A dedicated C&D waste disposal area is provided to accommodate building construction and demolition projects. A new C&D cell was excavated in the southern portion of the Active Area in 2002. Although survey information was not available, the C&D pit appears to be at least 50 feet deep. It is our understanding during rainy conditions access to the pit is very difficult. During those times, traffic is directed to the above grade portion of the C&D area, located east of the pit.

3.2.3.5 Waste Separation and Handling

During our site visit, it was noticed that some of the loads of C&D and MSW were mixed at the working face. Based on our observations, we recommend that more effort be made to check loads and divert all "dirty" loads to the MSW fill. Any organic material that can degrade, creating leachate or landfill gas, or would attract vectors, should be placed in the MSW cell. Any construction debris or containers that would leach volatile organics should be placed in the MSW cell or managed through the HHW or Very Small Quantity Generator (VSQG) programs. The following two photographs reflect the present concern. The first photograph actually represents the MSW working face and the second photograph is the C&D fill working face. It was visually difficult to distinguish the MSW working face from the C&D fill working face during the observation period.

Photograph of MSW Working Face, January 2003

Photograph of C&D Working Face, January 2003

Based on our observations during the assessment, we recommend that the operator limit the amount of waste pushing with the compactor from the tipping area to the working face. The dozer or track loader should be used for that activity. The compactor should be used for compacting the MSW. This reflects a typical landfill operating practice that needs improvement at most landfills.

3.2.4 New Cell Development (Expansion Area)

The first cell of the Expansion Area has been constructed. The two planned remaining tasks to be accomplished prior to using the cell are to improve the access road into the cell to provide two-way traffic, and secondly install a leachate pump, storage tank, and loadout system to serve the cell. The storage tank can be integrated into the overall leachate management plan. This work is scheduled to begin in the fall of 2003 and will be completed in 2004.

In order to facilitate use of this new cell during the first few weeks of operation, we would recommend the following:

- To protect the liner, the first lift of waste (6-10 feet) should be select, non-bulky waste. Until this first lift is placed, the Active Area will need to remain open for placement of bulky material.

- Unless the access road is improved, customers may need to queue along the south perimeter road and then enter the cell road, one at a time, as a customer leaves. It would be difficult for two vehicles to pass each other on this entrance road, particularly on the curves.

- Place a granular soil pad in the northwest corner of the cell to allow customers to enter and back into the tipping area. The pad should be a minimum 150-feet north-south and 100-feet east-west. Initially, trucks would pull in pointing south. The vehicles would then back up to the east and tip at the edge of the pad. The waste lift would first move to the east and then to the south.

3.2.5 Daily Cover

The City applies Concover at the MSW working face after each day, Monday through Friday. Concover is a commercial daily cover that uses recycled paper mixed with water and is sprayed over the waste. The application of Concover takes about 20 minutes to spray over the waste. The following photograph shows the Concover material being applied to the working face.

Photograph of Concover Being Applied to Working Face

Soil cover is applied over the waste at the end of the operations on Saturday. This weekly placement of soil is not removed and usually is intermixed with the waste. The City estimates this soil volume at 70 to 100 cubic yards with a refuse to soil ratio of about 6:1. Per the industry standard, the refuse to soil ratio should be 5:1 or greater. Thus, if the actual refuse to soil ratio is 6:1 at the landfill, the City has exceeded the industry standard. The City does not apply daily cover to the C&D working face and this is consistent with similar landfill operations because there is no concern with vectors.

It is our understanding that sometimes the Concover is not used due to maintenance problems with the equipment. When that happens, soil is used for daily cover. When operations move to the Expansion Area, it will be important to minimize the amount of clay daily cover that is used. The use of too much clay daily cover will tend to limit opportunities, or reduce efficiencies for leachate recirculation or bioreactor development, should the City decide to pursue these options in the future. We recommend that the Concover be used as alternative daily cover to the extent possible. For the weekly soil cover, granular soils should be used to the extent they are available. Consideration should also be given to using wood grindings from the compost operation as alternative daily cover (refer to Section 3.2.6.3). If clay must be used (since it is the dominate on-site material), we recommend that it be used sparingly and then stripped off or mixed into the waste prior to continuing filling.

3.2.6 Miscellaneous Waste/Recyclable Storage and Treatment Areas

3.2.6.1 White Goods

White goods are stored in a designated area. Appliances containing freon have the freon removed by City staff for subsequent freon recycling. The white goods are stored until there is a sufficient quantity for a vendor to remove the goods for recycling. The City receives revenue from the recycled goods.

3.2.6.2 Tire Storage

A designated tire storage area is provided on-site. The steel belting of the tires is removed and the tires are chipped prior to being used as a fuel source at an electrical power plant located within the region. A recycling vendor is responsible for removal of the steel belting and chipping of the tires.

3.2.6.3 Composting/Wood Grinding

The City operates a 4 ½ acre compost site at the landfill to compost yard waste. During the fall, the facility receives large quantities of leaves that require temporary storage areas, not contiguous with the compost site, to be utilized. To allow for expansion of the compost site and to accommodate the seasonal fluctuations in materials, we recommend that the site be relocated from its present location in the Active Area to a location north of the Active Area (east of the scale-house). Relocating this outside of the Active Area would provide the further benefit of reducing traffic within the landfill and allow continued development of the existing area for C&D disposal.

Figure 4-2, which follows Section 4 of this report, shows the proposed relocated compost site on 10 acres north of the Active Area. Sufficient area is available to the north and east to expand the operations as necessary to meet future composting needs. Estimated costs for relocating the compost site are included in the Implementation Plan (Section 7.0) for year 2004. Costs are based on 10 acres of grading and general site preparation. Costs do not include paved surfaces.

Relocating the compost site will require a permit modification from the SDDENR and from the County Planning Department. Permitting for these activities should provide for the potential future expansion of these areas. In order to implement this project in 2004, the permitting activities should be started as soon as possible.

The tub grinder, which is shared with Brookings, is used to grind the brush to be subsequently composted. The compost and wood grindings are available to the public free of charge. Wood grindings can make suitable alternative daily cover. If the City is interested in using this material for daily cover, a modification to the solid waste permit may be necessary.

The City staff indicated the tub grinder has some limitations regarding capacity. It is our understanding that the grinder will process tree limbs no larger than 6-inches in diameter. In the past year, the City has accepted approximately 2,000 tons of material that was too large for processing by this equipment. The City obtained bids for outsourcing the grinding of this material that ranged from $10,000 to $14,000 (approximately $5 to $7 per ton, assuming 2,000 tons). A larger tub grinder capable of processing materials larger than six inches in diameter would likely cost more than $250,000 depending on size, horsepower, and other accessories. In addition, operation and maintenance costs for this equipment range from $5 to $10 per ton of material processed. Assuming that the 2,000 tons of material is a reasonable annual estimate for the City, the purchase of a larger tub grinder to process this limited amount of material is not recommended. The City will be better served by outsourcing the processing of this larger sized material on an as-needed basis.

3.2.6.4 Petroleum Contaminated Soils Treatment

Petroleum contaminated soils (PCS) are segregated and placed in a designated area on-site. The soils are spread in a thin layer and disced to allow the volatile organic compounds in the soils to be released to the atmosphere. These soils are periodically disced until the contaminant levels in the soils are within regulatory compliance limits. These treated soils are then used for daily cover purposes in the landfill.

The current location for PCS treatment appears adequate. As the Expansion Area is developed, the future location for PCS treatment could be in various delineated sites on the Active or Expansion Areas that are accessible to the haulers.

Based on discussions with landfill staff, the disc used for the PCS is not adequate and should be replaced with a heavier disc to improve operations. Although we did not observe this operation, we believe that a heavy-duty disc would assist in these activities. The heavy soil types and quantity of material handled necessitate heavy-duty equipment. Considering the relatively low cost of a disc, we believe that replacement of the existing disc with a heavier one is a practical solution.

3.2.6.5 Deer Disposal Area

An unlined area on-site has been excavated and designated for deer carcass disposal. The concern with Chronic Wasting Disease (CWD) has resulted in meat processing plants needing to dispose of the deer carcasses. In the past, these carcasses were sent to a rendering plant. Approximately 25,000 deer carcasses were disposed in the designated area during the past hunting season in 2002. The deer disposal area has been surveyed by the City and is indicated on site activity maps. The area is located in the northwest corner of the Expansion Site, which happens to coincide with future Cell 15 (the last cell to be developed in the Expansion Area). Current projections indicate Cell 15 to be developed in 2036.

Over the past several years, a number of states have been addressing the disposal of deer due to the concern over CWD. The trend in some states, such as practiced in Wisconsin, is to dispose of the deer in a MSW landfill. Other states, such as South Dakota, prefer to dispose of carcasses separately in unlined monofills. Currently there is much unknown about CWD, but research is advancing at a rapid rate. For now, the City should continue with the disposal of carcasses within the future Cell 15 area. Between the present time and development of Cell 15, it is likely that further advances will be made in our knowledge of CWD and of the best available measures to deal with these issues.

If future research supports the disposal of carcasses by other means (i.e. disposal in MSW cell, or rendering), we recommend that use of the designated disposal site be stopped so that it can be developed as future Cell 15. At this time, we are unable to predict whether or not this will be possible.

3.2.7 Leachate Management

The existing Active Area does not have a conventional leachate collection system along its base. Although not under any State mandate, the City is proactively studying ways to pump leachate from the Active Area in order to reduce head (mounding) of leachate in the waste. Cell development in the Expansion area includes a leachate collection system designed to limit the head at the base of the cells to 12 inches or less.

A tank storage and truck loadout facility for leachate is planned for construction in 2003/2004. This facility will be used to manage leachate collected from the Expansion Area and potentially from a future extraction system in the Active Area.

Further discussion of leachate management options and recommendations are addressed in Section 4.9 of this report.

3.2.8 Landfill Gas Management

The Active Area does not have a landfill gas collection and control system nor was it required to under current air quality regulations. Based on discussions with site personnel and field observations, the landfill has not had odor problems typical of a MSW landfill. Usually landfills the size of SFRSL has active landfill gas extraction systems to control odor and gas migration, and to comply with state and federal regulations. Recent results of Teir 2 sampling (conducted in July 2003) indicate that the SFRSL is under, but very close to the trigger level of 50 Mg/yr of NMOC. Calculations indicate that SFRSL may exceed the 50 Mg/yr threshold in the year 2004, thus requiring collection and control of landfill gas. Recommendations for landfill gas management are discussed in Section 4.10 of this report.

According to site personnel, there is approximately 12.5 million cubic yards of MSW and C&D waste in the existing landfill. The approximate landfill dimensions are 40 ft. below grade and 80 to 90 ft. above grade. There are no landfill gas probes. Typically, landfill gas probes are placed at least on each side of the landfill and extending to the base of the landfill or to the water table, whichever is shallower. For larger landfills, multiple gas probes are installed along each side. The purpose of the gas probes is to monitor for gas migration. Landfill gas can migrate through the soils especially where sand or gravel seams or pockets exist. We recommend that the City install landfill gas probes and monitor them quarterly as part of the facility's landfill monitoring program.

3.2.9 Surface Water Management

Surface water on the landfill is routed around the perimeter to the south to a sedimentation pond. Although significant problems were not encountered during our site visits, it was difficult to determine if positive drainage was being provided in some areas. It is our understanding that excessive surface water run-on to the C&D area occurred during heavy rain events in 2003. It appears that the ditch system between the Active and Expansion Areas is not fully functional. We recommend that a comprehensive surface water management plan be developed for the entire site in conjunction with an updated closure plan. To accomplish this, an updated site topographic survey will be required. Additional discussion concerning this is included in Section 2.5.5, Closure Design Issues.

Water in contact with MSW when the new cell begins operation will need to be treated as leachate. Best management practices should continue to be followed for both the Active Area and the Expansion Area.

3.2.10 Litter Control

Control of blowing litter is a problem at most landfills, and SFRSL is no exception. Historically, SFRSL staff have expended significant time and effort responding to neighbor's complaints of blowing litter. Combinations of occurrences contribute to problem litter. Besides the wind, it is primarily related to size and operator control at the working face. The transition of MSW operations from the Active Area to the Expansion Area, and other operational changes should improve the landfill staff's ability to control litter.

Perhaps the biggest positive effect on litter control will be implementation of the public drop off area near the scale-house (refer to Section 3.2.2). Providing the public drop off will significantly reduce the amount of traffic at the working face. This will give the landfill operator much more control over the size of the working face and will help him to better direct the tipping of commercial loads.

Litter problems become worse when filling higher portions of the landfill. During development, it is important to dedicate more protected, generally lower, portions of the landfill for filling during very windy periods.

Temporary fencing near the working face is quite effective in controlling wind blown litter. Most common are a series of portable metal or wood framed fences similar to "backstops" at a ballfield. These are typically a minimum of 16 feet high and are moved into place as needed by the landfill heavy equipment. Other types of temporary fencing, such as construction fencing, are commonly used. However, the fence is shorter, labor intensive to set up, and is generally not as effective as the higher "backstop" type of litter fence.

As evidenced during our site visit, the perimeter chain link fence and perimeter shelterbelts are effective in preventing a large amount of litter from blowing off-site. However, picking up these areas is very labor intensive. The City has indicated their desire to purchase a litter vacuum to assist in these efforts. Our experience at other landfills is that litter-vacs work well and are cost effective. Even at facilities smaller than SFRSL, they have been a good investment. In the Implementation Plan (Section 7.0), purchase of a litter-vac is indicated on the equipment list in 2004.

3.2.11 Landfill Equipment

The City staff provided a comprehensive list of landfill equipment including heavy equipment, light equipment, trucks, and an equipment evaluation chart from the City's accountant. Also provided was a 5-year equipment replacement schedule and projected costs. Preliminary review reflects this plan appears complete and consistent with accepted replacement practices.

City staff had indicated a need for a larger compactor to improve waste density. Many similar and larger landfill operations are using larger compactors to maximize density and thereby save landfill space. The City is planning to purchase a new compactor with a 120,000-lb. rating. The compactor will provide improved waste compaction compared to the present equipment and will extend the landfill's site life through better compaction. We recommend that City proceed with the purchase of this larger compactor. Upon purchase of a new compactor, we recommend the existing compactor be retained and used for the management of construction and demolition materials in the C&D disposal area. It is our opinion that the SFRSL handles sufficient quantity of C&D and MSW, in separate areas, to warrant two compactors. It is also advantageous in that one compactor can be used as a backup in case the other compactor is down for maintenance or repair.

The other heavy equipment seems to be sufficient to operate the landfill. Maintenance service agreements are in place for the dozers, scrapers, hauler/loader to cover oil changes, 1,000-hour, 2,000-hour, etc. maintenance. Estimated equipment usage was reported to be 2,200 hours/year for the dozers and compactors and 1,500 hours/year for the scrapers. Butler Equipment (local Caterpillar dealership) located in Sioux Falls has a service agreement with the City for the landfill equipment, including preventative maintenance. This firm was reported to provide prompt service and thereby minimizes downtime of equipment.

Costs for fuel, parts, preventative maintenance, and repairs should be characterized on a per unit basis by dividing these costs by the machine hours (or miles) during a given period (e.g., year). Expenses can then be tracked to determine the cost per hour. This cost per hour should then be benchmarked to assess equipment maintenance costs, and tracked over time. The operating costs for the heavy equipment should be compared to the industry benchmarks of $25 to $35 per hour for compactors, $25 to $45 per hour for dozers, and $50 to $60 per ton for scrapers. These benchmarks are derived from the review of other heavy equipment operating costs used at landfills throughout the United States and applies to equipment of an age of three to seven years, maximum operating hours of 10,000 hours, and includes repairs and maintenance but excludes fuel and fluids.

Operating and maintenance costs for the City's compactor, dozers, and scrapers were reviewed for the time period of February 2002 through September 2003. Hourly costs were less than $10 per hour for each piece of equipment excluding fuel. All five pieces of equipment have been operated for 3 years or less by the City. Continued monitoring of costs is recommended as the total operating hours for the equipment continues to increase.

A variety of other comparatively minor equipment used at SFRSL (i.e. trucks, forklift, soil disc, etc.) are included on the City's 5-year equipment replacement schedule and/or are recommended. A listing of these and the other major equipment is included on the Implementation Plan included in Section 7.0 of this report. This listing includes a description of each piece of equipment, the proposed year for replacement, and the estimated cost. Further discussion regarding landfill equipment is included in Section 4.11, Future Manpower and Equipment.

3.2.12 Maintenance and Office Buildings

The existing buildings consist of a relatively new maintenance/office building and two older pole barns.

The maintenance/office building has heated and unheated areas for performing routine maintenance on equipment and vehicles. The truck with the Concover equipment for daily cover application is stored in the maintenance building. Sufficient office space, a break room, and a storage area for supplies are also provided. We recommend that the City consider relocating the Landfill Manager's office from the scale-house to the maintenance/office building to provide closer access between the Landfill Manager, the superintendent, and other landfill staff. The current Landfill Manager's office in the scale-house could be converted to file storage or possibly a break room.

The larger pole barn is in relatively good condition and can continue to be used for vehicle and equipment storage. The smaller pole barn could be relocated and used for compost equipment storage, if it is cost effective to relocate. The City should discuss this relocation with a local contractor to assess the cost to relocate the building. The smaller pole barn is located near the emergency cell. If the small pole barn is removed or relocated, this area could be used for other uses such as demolition waste placement or landfill support functions.

Based on discussions with City staff and a review of the City's landfill equipment, an additional Equipment/Maintenance Building would be beneficial. We recommend the design and construction of a five to six bay building to store and maintain the equipment. Figure 4-2 (following Section 4) shows the location of the proposed Equipment/Maintenance Building. A five bay facility with an area for garage, possibly office space, and loft for storage would be approximately 80 feet by 130 feet. This assumes 16-foot wide garage doors, four-foot space between doors, and a 30-foot wide garage/storage area. It is critical that the surface of the floor be designed to handle heavy equipment and facilitates the cleaning of the equipment. The City should also consider installing an overhead crane for equipment maintenance. The extent of heavy equipment and supplies on-site justifies this new building based on similar size landfill operations. We recommend the actual building size and features be determined during final design that includes further programming of City needs. During final design, the City should consider including a conference/meeting room for staff meetings, training, and meetings with landfill managers and supervisors.

3.2.13 Hours Of Operation, Staffing, and Training

The SFRSL is open to the public from 8:00 a.m. to 4:30 p.m. during the fall, winter, and spring, and 7:30 a.m. to 5:15 p.m. Monday through Saturday during the summer months. The landfill is closed on New Year's Day, Fourth of July, Thanksgiving, and Christmas. The City is considering closing the landfill on Memorial Day and Labor Day. The commercial haulers have expressed some concerns about being closed on these holidays. However, most landfills are closed on major holidays, such as Memorial Day and Labor Day.

Six operators and four service workers report to an Operations Manager. The City also plans to add another equipment operator when the new compactor arrives. The operators work four 10-hour days, from 7:30 a.m. to 6:00 p.m. Wednesday and Thursday are overlap days. This approach is used at other similar facilities and generally results in offering an efficient staffing approach if the overlap day is generally a high volume, high traffic time period.

The service workers shift is reported to be 7 a.m. to 3:30 p.m., five days per week. Staff arrives early to fuel equipment and then do odd jobs as needed with equipment or around the landfill. They also may staff the scale-house. A part-time litter picker and part-time laborer for Freon removal reports to the Operations Manager. They work 20-30 hours per week. At the scale-house, two full time attendants, one part-time attendant, and a technical clerk, report to the Landfill Manager.

Overall, staffing appears to be appropriate for a facility of this size at this time. Additional staff may be required over the next few years as leachate and landfill gas management systems at the landfill come online and recycling efforts are improved. It is anticipated that one person will be dedicated to operate and maintain the landfill gas extraction and leachate collection systems for the Active Area. Based on projected volumes, a person half time will be needed to haul leachate to the City's water reclamation plant. When the landfill gas system is operating in the Expansion Area, staffing needs should be reviewed to determine if additional manpower will be needed. If a gas to energy project is implemented in the future, additional staffing may be necessary depending on the type and scope of the project.

The City has compiled a document of standard operating procedures and has a program in place to train staff and keep the procedures updated as necessary. Based on our observations during the operational assessment, landfill staff appeared well trained in their duties and only one specific area of additional training was identified. Scale-house staff should undergo further training to better differentiate between MSW and C&D materials (refer to Section 3.2.3.5, Waste Separation and Handling) so that these materials can be directed to the correct disposal area. If the City wishes to supplement on-site training, it could provide additional opportunity to operators and managers to attend continuing education courses such as those offered by the Solid Waste Association of North America (SWANA). Perhaps the most useful informal training for operators would be to provide opportunities for staff to visit other similar sized, well-operated landfills in order to network and observe how other facilities deal with similar issues.

3.2.14 Soil Stockpiles

A substantial soil stockpile exists on the Expansion Area. The landfill will need some soils for final cover and daily cover, but there appears to be a major soil surplus. The U.S. Army Corps of Engineers was interested in soils for the flood improvement project in Sioux Falls. It appears to provide an opportunity for the City to share the soil resources and reduce the City's future cost to relocate the stockpile as cell development occurs in the stockpile area. Additional discussion on soil needs, stockpiles, and quantities is provided in Section 4.4, Soil Storage and Usage.

3.2.15 Buffer Land

The City owns considerable acreage surrounding the landfill operations. This property serves as a buffer zone, shelter belt, future landfill area, or future related support areas. We understand that purchase of additional properties by the City is underway. Additional discussion and recommendations concerning buffer land is included in Section 4.8, Land Acquisition and Buffer Areas.

Management of the City's properties for landfill related operations and buffer zone is an important function. Some buffer area is currently rented to farmers for crops and other areas are kept in a natural state for wildlife habitat. The following discusses the advantages and disadvantages with these buffer zone management practices.

3.2.15.1 Farming the Buffer Areas

The City can farm all or some of the buffer areas through rental of the property to farmers or farming the property using City staff and equipment. The City does not appear to have the staff or farming equipment to properly farm these areas. Therefore, rental of the property appears to be the more prudent approach. The advantages with such an approach are the City receives an income from the property, the farmer maintains the property, and weeds are controlled. The disadvantages are the City loses some control over the property. Depending upon the crop, the City may have a difficult time picking windblown paper from the property, thereby creating problems with windblown paper, and straining relationships with the public and renter. Therefore, the income from the property rental must be offset by the disadvantages in controlling windblown paper.

3.2.15.2 Planting Native Vegetation

A second management option is to plant sorghum or native vegetation such as prairie grasses, flowers, or other plants that can benefit wildlife. The advantages are the City maintains full control of the buffer lands for management and control of windblown paper. The maintenance of the native species is generally low thereby minimizing the City's investment. Wildlife benefits from these areas are the providing of an important food source, nesting habitat, and provide year-round wildlife habitat.

Some landfill owners have partnered with conservation and hunting organizations to assist in the development of such habitat as a public relations and environment conservation project.

3.2.16 Surveying

Based on our site visits, discussions with City staff, and our review of documents concerning this site, it is evident that development and use of an updated site survey database has been deficient in the past. Current survey information is extremely helpful for the daily operations of a landfill and is a requirement for design drawings and site investigations.

We recommend that an aerial survey be conducted for entire site on an annual basis. The map developed from this survey should include topographic contours (2-foot maximum) as well as site features normally depicted from aerial surveys such as roads, buildings, fences, stockpiles, etc.

As the Active Area reaches final grades, it is important to provide adequate grade staking for the operator to reference during placement of waste. At a minimum, grade stakes should be placed on an established grid system that corresponds with the approved closure plan. It is our opinion that the current closure plan is not adequate for this purpose and we recommend that an updated plan be prepared. The drawings for the closure plan should be detailed enough to be used for closure construction and for staking of the final grades.

Monitoring well and soil boring locations should also become part of the survey database and should be updated as needed. It was discovered during recent fieldwork by Earth Tech staff that certain monitoring wells were not present in the field at the relative locations indicated on the site map provided for our use. Further, the recent survey of new monitoring wells installed in 2003 included elevation of the top of outer casing, not the inner casing as is required for consistent and accurate measurement of water levels. These findings raise doubt as to the validity of the existing monitoring well survey data, particularly since the data was likely gathered over a period of many years. We recommend that all monitoring points be re-surveyed during one event to assure that the survey data accurate. The northing and easting coordinates should be obtained to within typical map accuracy standards. The elevation of the monitoring wells must be determined at the top of the inner casing (with the cap removed) to an accuracy of 0.01 feet.

3.3 SUMMARY AND RECOMMENDATIONS

Overall the SFRSL and its operations appear to be operated relatively efficiently as compared to similar type and size landfills. Working face equipment operation and airspace utilization was efficiently utilized during our site visit. Moreover, it appeared based on our review of available information and data that record keeping practices for equipment and personnel had improved over the last 12 to 18 months.

To improve the facility's overall operations, the following is a summary of our key recommendations:

- Reconfigure the entrance road at the scale-house and upgrade the road from the scale-house to the working face to facilitate traffic flow.

- Develop a public drop-off area near the scale-house to minimize the need for the public to haul their waste to the landfill disposal area.

- Modify the present standard operating procedures to minimize the quantities of non-construction and demolition materials (i.e., organics) being deposited in the unlined C&D disposal area.

- Upgrade the access road by widening the road for two-way semi-truck traffic for the gravel segment to Cell 1. This improvement is being implemented in 2003. Paving the perimeter access road is recommended for 2004.

- Move the compost area from its present location to an area east of the scale-house to allow more space for composting and to allow continued development of the C&D area. Consider using wood grindings from this operation for alternative daily cover. Outsource the processing (grinding) of wood that is too big to be processed by the City's existing tub grinder.

- Move forward with the design and implementation of a leachate collection system to ensure best management practices. In particular, a leachate storage and loadout facility will be constructed for Cell 1 in 2003 and 2004.

- Install landfill gas monitoring probes around the perimeter of the landfill and monitor them as part of the facility's monitoring program.

- Develop a comprehensive surface water management plan for the entire site in conjunction with an updated closure plan.

- Move forward with the purchase of an additional, larger compactor for the MSW area to increase waste density and maximize the landfill site life.

- Proceed with the proposed equipment items identified in the Capital Improvements Program and the Implementation Plan (Section 7.0) to maintain efficient operations.

- Continue to monitor the cost effectiveness of the present landfill equipment maintenance service agreement by benchmarking the per hour operating costs for the various types of heavy equipment over the next 12 to 24 months.

- Move forward with the design and building of a new equipment/maintenance building to ensure optimal space for the maintenance and storage of all the landfill equipment.

- Consider relocating the Landfill Manager's office to the existing maintenance/office building to provide closer access between the Landfill Manager and landfill superintendent.

- Continue to communicate with the U.S. Army Corps of Engineers to have the Corps use about 1 million cubic yards of surplus soil from the landfill stockpile for the flood control project in Sioux Falls.

- Continue with the adjacent property acquisition program to ensure an adequate buffer zone for future landfill expansion and landfill support facilities.

- Contract annual aerial surveys of the site and provide adequate survey control and closure plans to site personnel. Update surveys of monitoring wells to required accuracy standards.