

# City of Midland Sanitary Landfill



## 2006 Annual Report

Facility Type: *Municipal Solid Waste*  
License Number: *9029*

Facility ID Number: *470453*  
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*and Joseph Sova, Budget Analyst*

## **THE CITY OF MIDLAND SANITARY LANDFILL**

The City of Midland Landfill functions as the final disposal site for all of Midland County's household, commercial, and non-hazardous industrial waste. The Landfill must efficiently handle the daily inflow of refuse, while maintaining customer satisfaction and safety and meeting or exceeding state and federal environmental regulations concerning landfill operations. Landfill operations are separated into the following areas: Landfill Refuse Handling, Composting, Recycling, Capital Improvements, Maintenance of Existing Facilities, Environmental Monitoring and Regulations Compliance, and Public Education.

### **LANDFILL REFUSE HANDLING OPERATIONS**

In 1996 the Landfill completed a master plan outlining future expansion and development of six new engineered cells. The first of these cells opened was Cell 14 in 1998. With an approximate size of 12 acres, Cell 14 was designed to accept 2,475,000 loose cubic yards of waste and has essentially reached full capacity. Cell 15 opened in December 2003 and has been filled to near ground level. At 11 acres in size, it has a total capacity of 4,880,000 loose cubic yards, and will accept waste for five (5) more years at current fill rates.

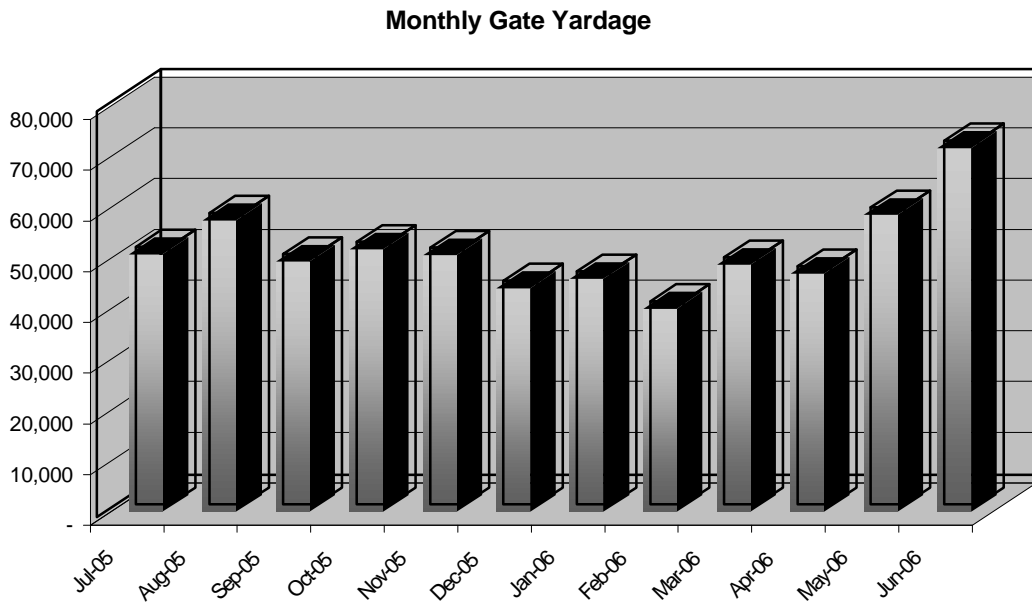
Because each cell fills over part of the previous one, Cell 16 will be built in 2007 to begin accepting waste next fall. Cell 16 will be 11 acres in size and has a design capacity of 5,554,000 loose cubic yards. Once Cell 16 has been filled to ground level Cell 15 will resume waste acceptance.

The entire area of Cells 14 through 19 will have a capacity of 33,750,000 loose cubic yards of waste, with a final closed landfill height of 150 feet above ground level. At current fill rates the site will meet the needs of Midland County for approximately 50 years.

Yardage received per month at the landfill varies with the seasons and the economic climate. Community cleaning activity increases in the spring and fall, while construction activity is strong through the summer. Rainy and winter months typically result in less outdoor activity and, ultimately, less refuse received at the Landfill. Abnormal variations in volume also impact monthly yardage received, from jobs such as contaminated soil removal in Porter Township and the demolition of the Dow Chemical Company's '47 Building' this year.

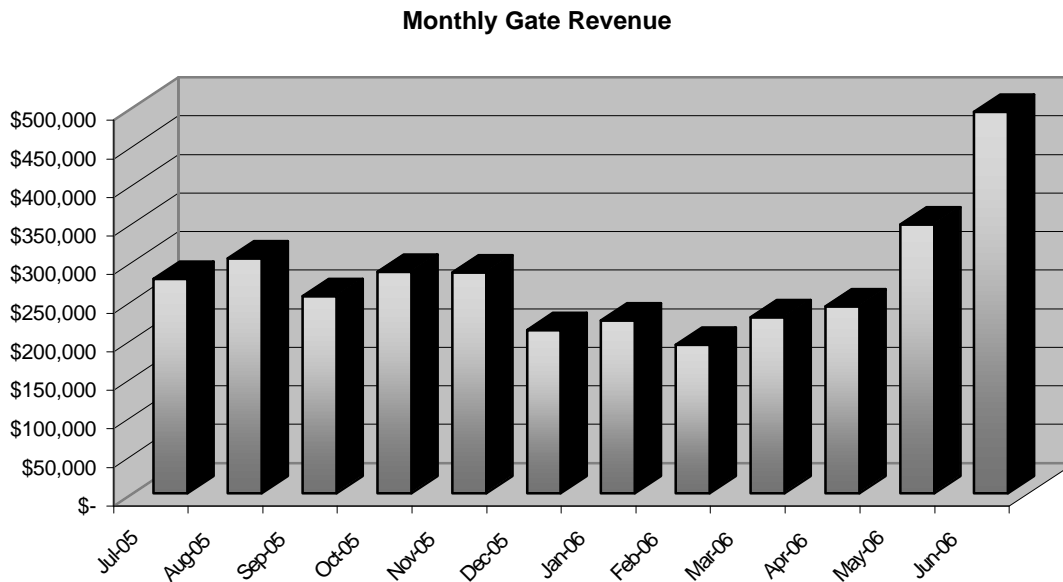
The total refuse received through the gate in fiscal year 2005/06 amounted to 615,994 loose cubic yards. This volume was brought to the landfill by more than 35,000 vehicles over the course of the year. The comparable reported yardage was 642,016 in 2004/05, hauled by over 35,000 vehicles. On an average day over 600 tons of refuse is received at the landfill. Chart-1 shows a monthly distribution of refuse yardage received at the Landfill and indicates a general slowing in the months December through February.

**Chart-1**



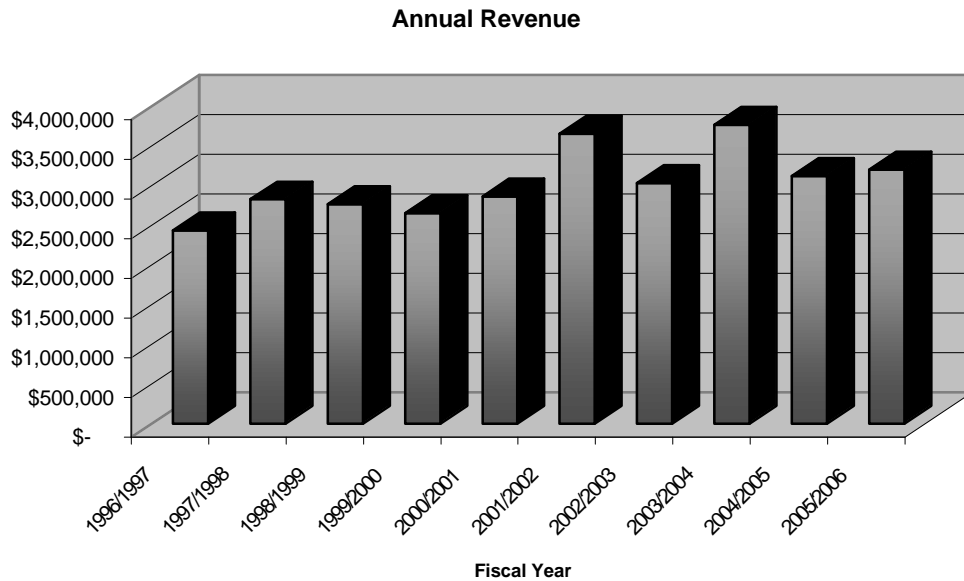
Total revenue generated in 2005/06 was \$3,350,000 compared to \$3,254,000 in 2004/05. Demolition projects at Dow Chemical Company and contaminated soils received from multiple sources in May and June 2006 resulted in maintaining above average revenue for the year. Total monthly revenue generated from the yardage received in 2005/06 is reflected in Chart-2.

**Chart-2**



Yearly revenue generated from refuse received at the Landfill is shown in Chart-3, comparing the years 1996/97 through 2005/06. Revenue growth is difficult to forecast because a major portion of the annual landfill revenue is demolition material of existing structures and refuse generated from new construction. Each of these items is directly affected by the economy in Midland County. Contaminated soil volumes are also unpredictable and have a significant impact on revenue. Contaminated soil volume is the cause for abnormal revenue increases in 2001/02 and 2003/04 fiscal years. The general trend is increasing revenue about \$50,000 per fiscal year, even with a reduction in the disposal fee per cubic yard in late 2003.

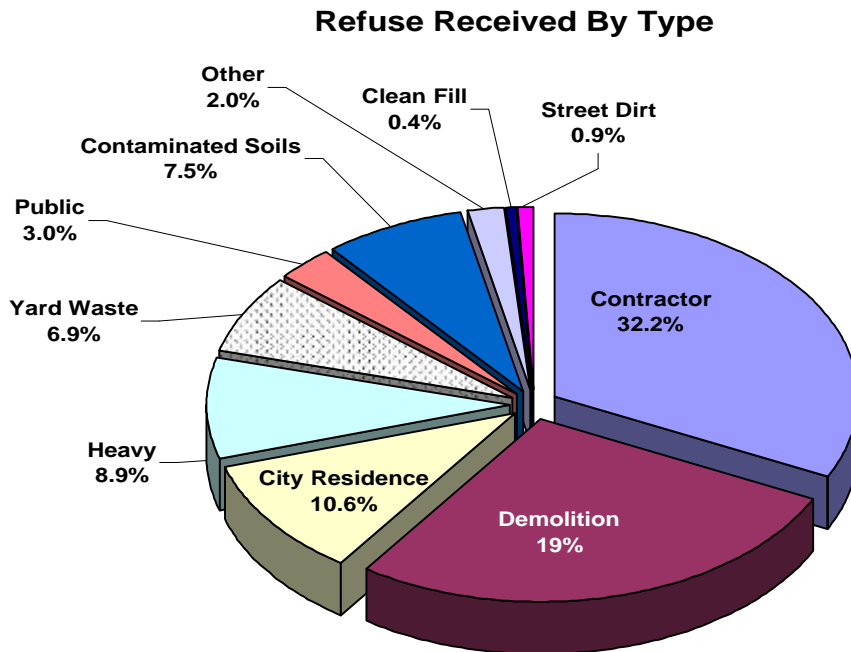
**Chart-3**



There are many types of refuse received at the Landfill every day. General municipal solid waste (City Residence and Contractor) made up a total of 42.8% (10.6% and 32.2%, respectively) of all yardage received in 2005/06. Demolition and construction waste made up 19% of the waste stream, down from 32% in 2004/05. Heavy item collection brought to the landfill by the City of Midland Department of Public Services accounted for 8.9% of waste received. The largest change in refuse volume and revenue was contaminated soils, which increased from a typical volume of 15,384 cubic yards in 2004/05 to 33,622 cubic yards in 2005/06 to. These soils accounted for 7.5% of the annual yardage received, compared with 3.7% last year. The balance of refuse received included public (3.0%), street dirt (0.9%), clean fill (0.4%), and all others (Appliances, Medical Waste, Tires, Wastewater, Water) together making up 2.0% of the total yardage for the year.

Chart-4 shows a breakout of each major type of refuse and its associated percentage contribution to total yards received.

**Chart-4**



Much of the refuse received at the landfill is in the form of loose cubic yardage. It is estimated that the incoming refuse can be reduced to one-third of its original volume using a specialized compactor. The compactor is also designed to minimize airborne debris, which is a concern to property owners adjacent to the landfill property.

Landfill staff is required each day to observe the refuse loads being brought to the landfill and care must be given to keep sharp items from puncturing the geosynthetic liner of the cell, which could allow waste liquids to leach from the containment area. Continued special handling of contaminated soils, medical waste, and asbestos is also the responsibility of landfill staff.

Gates are open Monday through Friday 8 a.m. to 4 p.m. and from 8:30 a.m. to 12:00 p.m. on Saturdays during the months of March through November.

### **COMPOST OPERATIONS**

Each year the landfill receives over 13,000 yards of yard waste, 40,000 yards of leaves, and 20,000 yards of brush. From this inflow the landfill is able to produce over 20,000 cubic yards of quality compost.

Over the past several years the compost operation at the landfill has been facilitated by the use of a large grinder. The grinder takes the yard waste, leaves, and brush and grinds them into small particles, which helps to speed up the decomposition of the material. The extra-long conveyor belt attached to the grinder allows the compost to be piled in taller mounds, saving compost pad

space. The compost piles are turned and mixed when the temperature of the material falls below or rises above the desired temperature range of 110° – 140° Fahrenheit. The grinding, maintaining proper moisture, and periodic turning and mixing of the compost material allows the compost to be fully processed and ready for screening in a matter of three or four months.

Screening is accomplished using the Erin Star screener. Finished, fine compost passes through the screen while larger impurities and brush which has not fully decomposed are separated for further composting. All compost generated at the landfill had been used on site as vegetative and topsoil cover for cell capping projects. Compost has also been used to add nutrients to landfill-owned grounds whose topsoil was removed for use in previous construction projects.

This spring Landfill staff received bids to purchase finished, screened compost from the City. The value of keeping the material for improvement of soils at the site was greater than the price offered for purchase, so the sale was not pursued. However, unscreened raw materials of grass and leaves were ground and sold to two buyers based on the same bid request. This saved sorely needed compost pad space and eliminated time and cost of materials processing and handling.

## **RECYCLING OPERATIONS**

The City of Midland Landfill continues to promote the recycling of as many materials as possible on site. Appliances are received daily from residents and many of them contain Freon, which has to be removed before the items can be recycled. In 2005/06 over 1,000 appliances were received, had the Freon removed, and the scrap metal recycled. Scrap metal from other sources is also separated at the landfill's scrap metal collection pad and recycled. In addition to scrap metal the landfill receives and recycles car batteries, clean concrete and asphalt, grass, leaves and brush.

Tires continue to be accepted at the landfill for disposal. In 2005/06 the landfill received 1,506 tires, down from 2,805 tires in 2004/05. During recycling collection events this year nearly 2,500 tires were collected to be shredded for use as fuel in Michigan industry.

The City of Midland Landfill again served as the site of the Midland County Household Hazardous Waste Materials Collections. This program allows Midland County and City residents to dispose of household hazardous materials, such as paint, pesticides, herbicides, and motor fueling and lubrication products. The collection of these hazardous materials is held in the landfill's maintenance building, whereby residents can conveniently drive in, unload into segregated bins, and drive out. During the five collections this year over 300 barrels of waste were collected and safely disposed.

## CAPITAL IMPROVEMENTS

**Equipment Purchases** - Two major pieces of equipment were purchased this year; 1) a Bomag



1172RB garbage compactor and 2) a Scarab 718 compost windrow turner. The 1172 compactor is the second Bomag purchased following a three year lease, and has performed very well. Both units are used in the daily operation. The compactor uses the large steel 'teeth' shown at left to shred and crush garbage to make the most efficient use possible of landfill cell space.

Landfill staff also researched compost windrow turners to improve the quality and efficiency of the composting operation. A windrow turner capable of processing piles 7' tall and 18' wide was purchased at the end of the fiscal year. The unit shown at right is the Scarab

Manufacturing machine powered by a 525 horsepower John Deere engine. It can shred yard waste and thoroughly mix the grass and leaves to allow optimal decomposition. The ability to shred eliminates



running the material through the older grinder unit, extending its useful life for wood waste grinding. Due to the vastly improved efficiency of turning windrows, finished compost material will be more uniform, better product requiring less time and cost to complete.

**Residential Drop-off Area** - The residential waste disposal area is an elevated asphalt pad where residential customers can conveniently drop off refuse without entering the landfill cell. This has improved efficiency for these customers and reduced small vehicle traffic in the heavy equipment operating area. Construction was completed in fall 2005. Residents have expressed very positive comments about the new area and its ease of use, especially in poor weather.

**Gas Extraction** - A major capital project under consideration is the installation of an active landfill gas extraction system for conversion to energy. This is routinely done at larger landfills to generate a revenue source from decomposition by-products. The City of Midland site is nearing the refuse volume in place necessary to make a landfill gas to energy project financially viable. In spring 2006 the Landfill's consultant presented initial research to City Council

identifying potential for large long term revenue, after an investment, to install the gas collection system and convert the gas to a saleable product, either purified methane gas or electricity.

**Bioreactor** - Also under consideration is the feasibility of a leachate recirculation or bioreactor landfill system. A bioreactor system is a newer technology for rapid refuse decomposition. Its benefits are rapid gas generation for extraction, and rapid waste settling for placement of new refuse in the same space material had previously been placed. This extends site life, reduces waste liquid being pumped to the Waste Water Treatment Plant, and controls odors through active collection. Consultants presented analysis of the potential for this major operational change and have met with City staff and MDEQ to discuss its potential. In addition to reducing liability in the future, leachate recirculation generates landfill gas more quickly. Increased gas generation allows earlier revenue return on the gas extraction system discussed in the previous section. The design of Cell 16 is being modified for MDEQ approval to include leachate recirculation capability when constructed in 2007.

**Culvert Ditches** – Landfill staff completed a ditch enclosure project this year. The enclosure allowed for easier access for maintenance of grounds, redirected large volumes of storm water to appropriate ponds for controlled release to County ditches, and prepared the site for future increased flows due to closed cell runoff. Three feet diameter tiles made of high density polyethylene (HDPE) were buried and ditches reshaped to flow to the desired location.

**Waste Oil Burner** – The Landfill maintenance building cold storage area has been transformed by the installation of a new waste oil burner. The many pieces of heavy equipment generate hundreds of gallons of used oil each year which were previously hauled away as waste. The service garage at the Department of Public Services also generates hundreds of gallons per year, which are now removed by Landfill staff. The used oil is stored in tanks all summer for beneficial reuse heating the 60' x 100' structure in the winter. In addition to adding comfort for operators, daily buildup of snow and frozen mud can be removed once thawed in the heated bays. Removing buildup is especially beneficial for track equipment, such as the bulldozer and excavator, in reducing wear and tracks jumping off the final drive gears. A small energy savings is also realized by not having to plug in block heaters for equipment stored indoors.

## **MAINTENANCE OF EXISTING FACILITIES**

The landfill is visited each year by tens of thousands of vehicles delivering refuse. Roadways must continually be maintained for a smooth transition from pavement to gravel and dirt roads. Landfill staff and temporary employees pick up blowing papers on a daily basis, repair landfill grounds areas and mend fences. Dust is kept to a minimum with the help of a water tanker truck which, during very dry seasons, is used to water landfill roads several times per day. Staff has also begun use of dust control mixtures with a chemical base called lignin. Lignin mixtures have a long lasting dust reduction effect, similar to brine on a gravel road. Mowing grass of the landfill grounds and trimming of trees helps to make the landfill as aesthetically pleasing as possible. Staff also maintains a flower bed at the entrance to the site to improve the site's appearance.

## **ENVIRONMENTAL MONITORING AND REGULATIONS COMPLIANCE**

Engineering consultants provide testing and analysis services of groundwater and landfill gas. The tests insure proper containment of waste liquid and gases from the site to nearby residences. This quarterly testing has resulted in no statistically relevant levels exceeded for 2005/06.

Landfill staff continues to work with the MDEQ to insure compliance with personal and environmental health laws. Contractors installed deeper groundwater monitoring wells around the older cells at the request of the MDEQ. Landfill consultants have also increased testing frequency at certain wells, again at the request of MDEQ.

## **PUBLIC EDUCATION**

Landfill staff continues to support the public schools in our area. Educational brochures have been printed for adults as well as children. In coordination with their spring session about earth science school children toured the landfill and then received compost kits to take with them. Staff completed the recycling loop with a hands-on project of growing a flower in our recycled compost dirt, and created a teacher's packet with suggested projects. The landfill gave out approximately 500 compost kits, which included a ruler, a cup of compost dirt, a seed packet, a colorful brochure, crayons and activity pages.



## **GOALS SUMMARY FOR 2006/07**

- ? Achieve design change approval from MDEQ for Cell 16 leachate recirculation;
- ? Initiate Cell 16 construction in spring 2007 for operational startup in fall 2007;
- ? Investigate construction and demolition debris cell construction possibility to extend site life, improve gas generation for collection, and reduce waste disposal costs; and
- ? Initiate a landfill gas to energy design for potential installation in 2008.