Brookings Master Plan

July 2023

SOLID WASTE MASTER PLAN

The City of Brookings is planning for the future of garbage, recycling and landfill services in the region. To ensure these services continue to meet the needs of residents, the City developed a solid waste master plan.

This plan evaluates the safety, effectiveness and financial stability of the City's Solid Waste operations, and identifies areas of improvement. Key findings include:

Safety

Keeping residents and employees safe is of the utmost importance to the City. The Master Plan evaluated which measures can be taken to improve safety during Solid Waste collection and landfill operations.

Input from the community highlighted the need for improved signage at the landfill and Citizens Campus. Improved outreach regarding the landfill services will help residents feel confident using these services.

Public Trust

Understanding which services are valued and used by residents is a central part of planning for a successful future.

The City values input from the public on current services and what they would like to see in the future. Two public engagement meetings were held during the Master Planning process. Residents were satisfied with the City's current Solid Waste services and are supportive of the Master Plan recommendations. Feedback received from residents on recycling education and safety at the landfill was incorporated into the Master Plan.

Financial sustainability

The City strives to provide efficient and cost-effective Solid Waste services. A financial analysis was performed to ensure these Solid Waste services are sustainable for the foreseeable future, and compared the City's rates with peer cities in the region.

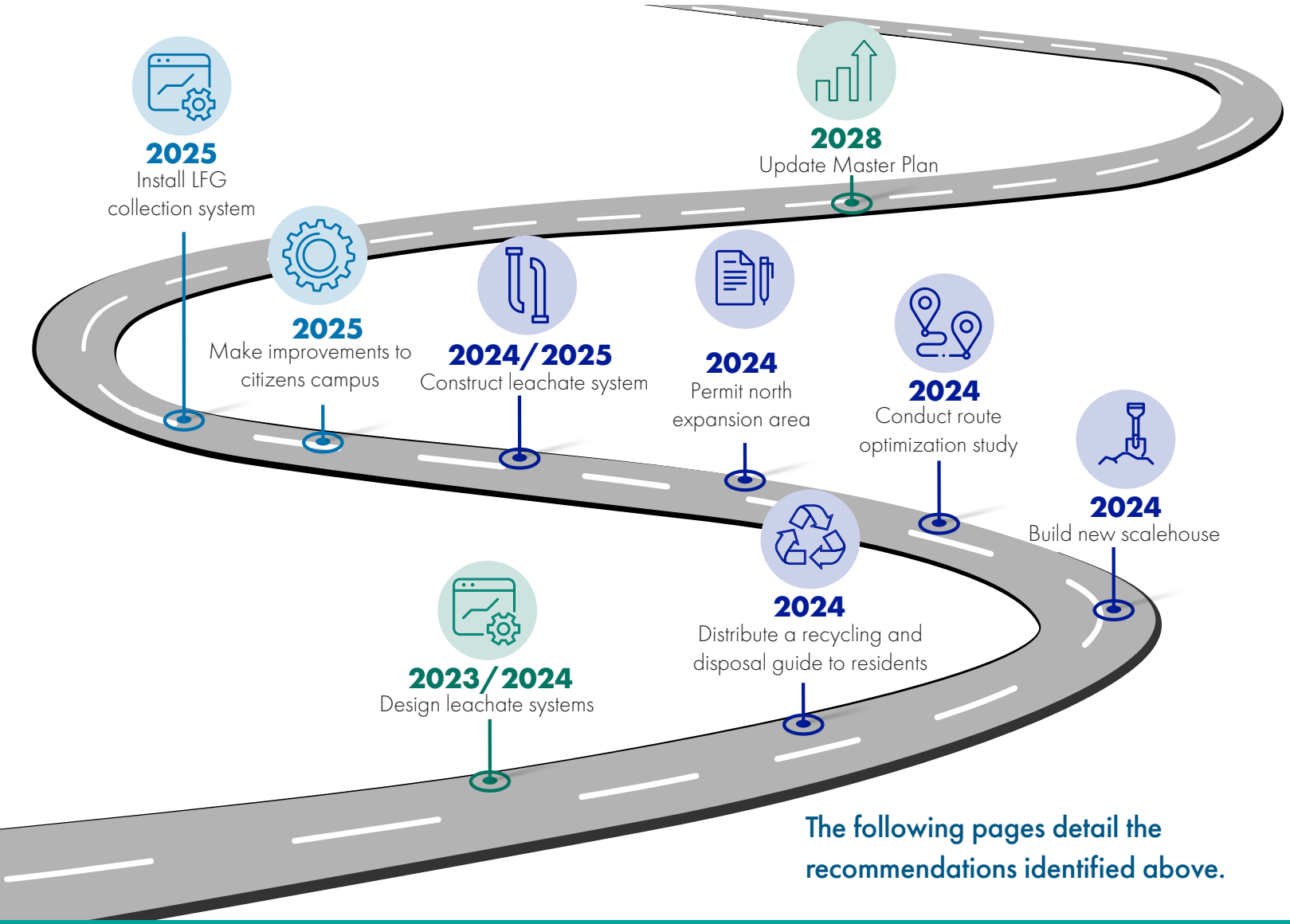
This evaluation considered whether current prices can cover costs of landfill operations and collections in the long-term.

brookings
SOUTH DAKOTA

ROADMAP

The City's Solid Waste Master Plan is a roadmap for collections and landfill services. The roadmap shows anticipated timeline of key recommendations for operational and infrastructure improvements. The recommendations are described in more detail throughout the Master Plan. Recommendations developed during the Master Planning process emphasized safety, public trust, financial sustainability, and alignment with industry standards for landfill and collections services.

The following Roadmap shows the key recommendations for the next 10 years.



The following pages detail the recommendations identified above.

EXISTING SYSTEMS

HDR Engineering, Inc. has been retained by the City to develop a Solid Waste Master Plan. The Master Plan will optimize site utilization, provide a clear and efficient vision for the solid waste management system, and plan for the future of the City's solid waste.

Listed below are a few key findings of the City's current waste management practices, including collections, Landfill operations, recycling, waste diversion, and public outreach efforts. These key findings will serve as a baseline, which can then be used to identify opportunities and priorities for future waste planning.

Brookings Regional Landfill

KEY FINDINGS

45,000 people

The City's Regional Landfill serves portions of several counties, with a total of about 45,000 people. Landfill Collections serves the City with a population of approximately 23,400 people. There are 8,704 households in the City, with an average household size of 2.27 people. 56% of households are in single-family homes, 36% of households are in multifamily structures, and 8% of households are in mobile homes and other types of units.

$60 per ton

Recycling is delivered to Waste Connections, Inc. (dba Cooks Wastepaper and Recycling) at their Brookings facility, then processed at Millennium Recycling in Sioux Falls at $60/ton.

23-31% waste diverted

Between 2015 and 2021, the City diverted between 23 and 31 percent of its waste via recycling and yard waste programs.

11,000 students

South Dakota State University (SDSU) is located in the City and has a student population of approximately 11,000, so the number of full-time residents in the City fluctuates significantly by season.

35 years

The most recent Landfill Capacity and Closure Report (2021) estimated that the Landfill has a remaining life of 35 years before a permit amendment may be needed to increase the size of the landfill. The landfill has a design airspace of 7,560,273 cubic yards of waste or 3,610,030 tons. The landfill has received 50,000 to 60,000 tons of garbage annually in the past five years.

The **Landfill** accepts tires, appliances, and metals for recycling. Recyclable materials are shipped to Saber Shred Solutions and Dakota Recycling & Transport.

4,560 tons

The City provides its residents with once per week garbage and recycling collections and twice per week seasonal yard waste collections. Between September 2021 and August 2022, the City collected 4,560 tons of garbage, 811 tons of recycling, and 1,443 tons of yard waste from residents. Commercial customers, and local businesses use private haulers for garbage and recycling collection needs.

The **Citizens Campus** at the Landfill allows residents to drop off clean wood (pallets, lumber, trees, branches, and yard waste). Citizens can pick up finished compost from the Citizens Campus.

The City periodically holds **special events** to aid residents in the disposal of wastes that may not be eligible for disposal in the garbage, recycling, or yard waste bins, including spring bulky item cleanup and household hazardous waste events.

The City uses its website **www.cityofbrookings-sd.gov** and social media pages to provide education on its solid waste services.

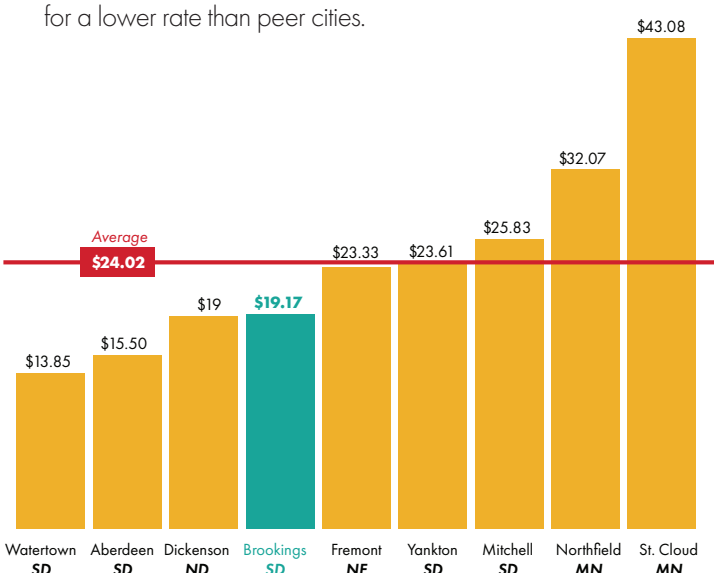
COMPARING COSTS

The City asked HDR to evaluate how its solid waste collection and operations costs compare to peer cities in the region. A report compared the City's garbage collection and landfill disposal rates to nine cities and one county across South Dakota, North Dakota, Minnesota, Iowa and Nebraska. This effort found that the City provides enhanced Solid Waste services at a lower-than-average price.

KEY FINDINGS

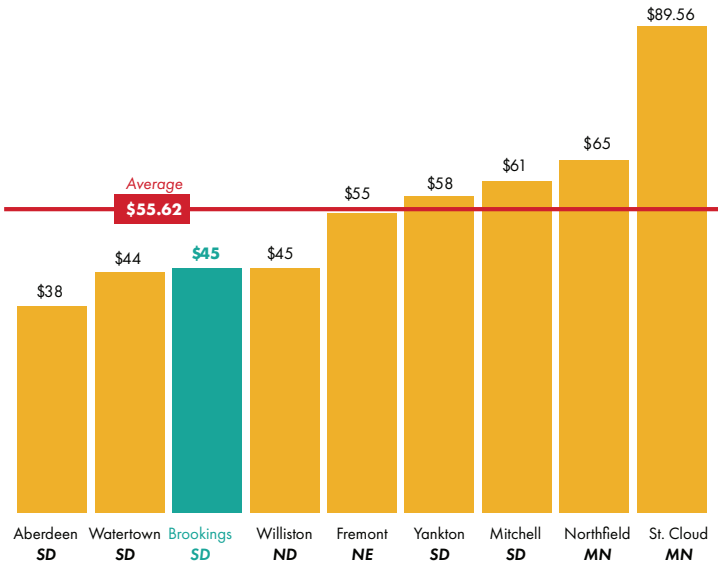
Collections

Brookings residents pay $18 plus tax per month for garbage, recycling and yard waste collections. Twice weekly yard waste collection is an enhanced level of service greater than the industry standard and for a lower rate than peer cities.



Landfill

Brookings residents pay $45 per ton to dispose of most types of waste.



LANDFILL DESIGN & OPERATIONS

As part of the City's Solid Waste Master Plan, the current landfill operations were evaluated for potential efficiency opportunities. Several recommendations specific to the landfill cells (a cell is a lined waste placement area, within the landfill) could extend the landfill's useful life (known in the industry as landfill airspace) and allow the City to maintain high-quality solid waste services while protecting the environment and public health.

RECOMMENDATIONS

Cell design

Industry standards, best practices and regulations have changed since the landfill opened in 1993. Changing the design of cells to reflect these can have a positive effect on landfill systems. These changes include:

- Put cells closer together by reducing the size of berms separating the cells
- Fill waste to the edge of the permitted boundary of the landfill to increase the amount of garbage that can be placed in the landfill
- Modify the leachate drainage structures, leading to more efficient drainage (Leachate is surface water that comes into contact with garbage. It must be collected, treated and cleaned before being released into the environment)
- Eliminate the use of protective soil cover, keeping in line with best practices

Planning for the future

Changing the order landfill cells are opened and closed will make better use of available space. Recommendations include:

- Prioritize 'filling in the bowl' when possible
- Permit the north expansion area in the near-term
- Maintain the compost area in its current location
- Phase closures on east and west sideslopes after those areas have settled
- Install a final cover access road
- Develop a flexible end use for the site to accommodate the City's needs at the time of closure
- Compact garbage at the landfill more densely to meet industry standards
- Replace equipment at end of life and purchase backup equipment to allow landfill operations to continue without interruptions

Litter control

To better control litter and keep the environment around the landfill cleaner, the master plan recommends:

- Add fencing to collect windblown litter
- Rent or purchase litter picking equipment
- Change the waste-pushing direction depending on winds
- Add policies to enforce tarping or covering loads that come into the landfill to reduce windblown litter

Adopting these changes may increase the life of the landfill site by 2.6 years (an estimated $1 million value)

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SURFACE WATER AT THE LANDFILL

Surface water that comes into contact with garbage (through rain or snow) in a landfill is called leachate. This water can absorb chemicals and contaminants from waste. It must be treated and cleaned before being released into the environment.

A leachate planning report was created as part of the Solid Waste Master Planning process.

CURRENT SYSTEMS

Leachate at the landfill is currently pumped out of the landfill cell and held in two underground storage tanks. From there, it is either pumped into a spray truck and recirculated through the garbage in the landfill or hauled by trucks to the wastewater treatment plant (WWTP).

FUTURE PLANS

To better manage leachate at the landfill, the City is planning to add an underground sewer line that will carry the liquid directly to the WWTP. This will reduce the number of trucks hauling leachate. It's also a cost-effective solution, with minimal costs required after the line is constructed. This option will be able to manage leachate for the life of the landfill and is scalable for potential future expansion.

2023/2024

Complete full design of the leachate forcemain with connection to the city sewer, with flow towards the Brookings Municipal Utilities WWTP.

2024/2025

Install the leachate forcemain, lift station, and piping to the existing leachate tanks.

2030

Install new leachate tank (this year may move over time, based on site needs).

RECOMMENDATIONS

Install a direct connection to the wastewater treatment plant for life-of-site leachate management.

A new aboveground tank should be included in the 10-year capital improvement plan to offer the site a location for pre-treatment (if needed) and additional storage capacity.

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LANDFILL GAS COLLECTION

As part of the Solid Waste Master Planning process, the City has evaluated the potential for future collection, control and mitigation of landfill gas (LFG). All landfills generate LFG as materials decompose and break down. LFG is a mix of methane, carbon dioxide, and other gases.

All landfills are required by law to estimate how much LFG their facility produces. If a facility produces LFG above a certain threshold, it is required by law to install a gas collection system. The gas that's collected by these systems is sometimes used for energy.

KEY FINDINGS

Gas collection system

The landfill doesn't produce enough LFG to require a gas collection system under current EPA regulations. A model predicts the landfill won't need a gas collection system for 20 years.

However, there can be benefits to installing these systems, such as odor mitigation and settlement issues, even if not required by law.

Passive ventilation

Passive vents are a relatively low-tech and simple solution to mitigate LFG. They provide a path for gases to leave the waste mass (the garbage that makes up the landfill).

If vents are not provided, the LFG can get trapped in the landfill, where it will eventually force its way out through the path of least resistance. This can cause settlement and odor issues.

RECOMMENDATIONS

- **Install a passive gas venting system.**
- **Incorporate vents into the landfill design for future cells to allow LFG to safely leave the waste mass.**

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COLLECTIONS REPORT FINDINGS

A Collection Services Analysis Report evaluated the efficiency and effectiveness of the City's waste collection processes. Field observations and data were used to determine the current state of collections and develop recommendations on how to improve processes. Collection Services means the collection of garbage, recycling, and yard waste curbside from the City residents. The City owns the trucks and carts, and city employees operate the collection routes. The City provides garbage, recycling and yard waste collection services to around 6,000 households.

KEY FINDINGS

On the road

All collections are done with seven trucks. The primary vehicles are automated side loader trucks (meaning the driver does not need to exit the truck to empty carts). Two older trucks are used as a back-up.

Miles traveled

The five primary trucks are tracked with GPS. In 2022, these vehicles traveled nearly 44,000 miles. This is the equivalent of nearly two times around the earth.

Aging fleet

The City's collection fleet is aging, which leads to more maintenance costs and time off the road. Since 2019, the City has spent nearly $300,000 on truck maintenance. Much of the specialized repair work must be outsourced.

Yard waste collection

Twice a week yard waste collection, when in season, adds extra work for employees and increased wear and tear on the vehicles.

Variable routes

The collection routes aren't set and rely on a driver's judgement, memory and expertise. This can cause issues when other drivers have to fill in or a truck is out of service.

Replacement schedule

The current vehicle replacement schedule extends the life of trucks past the industry standard of five to seven years. Brookings' collection carts are also older than the typical lifespan for a collections cart (10–15 years).

COLLECTIONS REPORT RECOMMENDATIONS

A Collection Services Analysis Report evaluated the efficiency and effectiveness of the City's waste collection processes. Field observations and data were used to develop recommendations on how to improve collections processes. HDR personnel also interviewed the City's collection staff to understand day-to-day operations and workflow. The recommendations are based on industry best practices and the City's unique needs.

RECOMMENDATIONS

Maintenance improvements

Expand the preventative maintenance schedule for garbage trucks and add additional technicians to the City's maintenance staff.

Truck replacement

Replace collection trucks every 7 years.

Cart replacement

Establish a schedule for replacing garbage carts.

Route analysis

Conduct a Route Optimization Study to improve route efficiency.

Add capacity

Add an additional truck and driver to collections fleet.

FINANCIAL ANALYSIS

The City completed a thorough financial evaluation of the costs to collect waste and operate the landfill. This analysis determined whether the current rates paid by residents are enough to support operations and expenses – both now and in the future.

After examining the financial picture, and considering recommendations from other areas of the Solid Waste Master Plan, the below determinations were made.

KEY FINDINGS

Collections rate evaluation

The City's existing collections capitol improvement plan (CIP) was estimated to cost around $2.6 million over the next 10 years. Implementing the Master Plan's recommendations, like more frequently replacing vehicles, would increase the CIP cost to $5.5 million over 10 years.

Landfill rate evaluation

The City's existing landfill CIP was estimated to cost $14.8 million over the next 10 years. Implementing the proposed changes would increase the cost to $22.0 million over 10 years.

Increased rates

The current rates for collections and landfill tipping fees need to be evaluated annually to ensure the rate charged is keeping pace with costs and inflation, and to ensure waste services are financially sound for the next decade.

RECOMMENDATIONS

For collection

The service cost for residential collection of garbage, recycling, and yard waste needs to be increased. Currently, the cost per household is $18/month, excluding tax. This is well below the regional average.

At the landfill

Tipping fees at the landfill need to increase to cover operations, equipment costs and landfill expansion over the next 10 years. Residents currently pay $45/ton to dispose most types of waste at the landfill. Increasing the tipping fee would increase revenues.

Continued analysis

Update and review the financial model on an annual basis.

INCREASING DIVERSION RATES

As part of the Master Planning effort, it was determined approximately 30% of the City's waste stream was diverted from the landfill. More diversion can extend the useful life of a landfill by saving space. The City's current diversion rate through curbside collection is below the national average.

Diversion occurs when materials are recycled or reused instead of going to the landfill. It includes recycling, yard waste, household hazardous materials, electronics, and other materials.

U.S. Diversion Rate is 50%

City of Brookings Diversion Rate (curbside) is 30%

RECOMMENDATIONS

Many of the recommendations to increase the City's diversion rate center on public education. City residents can help increase diversion by learning about which materials can be recycled, recycling at the curb, and putting yard waste into the correct bin. Specific solutions are listed below.

Helpful guide

Create, print and distribute a disposal guide every other year to provide a helpful visual reminder and 'put-on-the-fridge'-type document for easy reference

Wayfinding

Improve signage at the landfill to ease the experience for residents

Social Media

Develop easy-to-understand, reusable content about diversion to be distributed on the City's social media platforms

Regular Distribution

Establish a regular feature, such as "Trash Tuesday," on social media accounts to share information with residents

Annual report

Prepare an annual Solid Waste Master Plan report to evaluate progress toward the City's goals