Solid Waste Division Roadmap (2023-2032)

MATANUSKA-SUSITNA BOROUGH

SOLID WASTE DIVISION OVERVIEW

The Matanuska-Susitna (Mat-Su) Borough (Borough), has a total area of 25,258 square miles and an estimated population of 107,081. The Solid Waste Division (Division) of the Borough manages waste generated by Borough residents and businesses. The primary Division responsibilities include:

- Central Landfill operations including:
  - Asbestos Cell
  - Construction and Demolition (C&D) Cell
  - Division administration offices
  - Facilities for equipment operations and maintenance (O&M)
  - Household Hazardous Waste (HHW) Processing Facility
  - Municipal Solid Waste (MSW) Cell, associated leachate and landfill gas (LFG) systems
  - Residential Waste Drop-off Wall
- A system of transfer stations and sites
  - 5 transfer stations operated by Borough employees offer waste disposal services for a fee to local residents
  - 3 transfer sites operated at contracted facilities offer limited waste disposal services for a fee to local residents
  - 4 transfer sites operated at contracted facilities or unattended offer limited waste disposal services at no cost to residents
- A community clean-up program
  - Coordinating spring clean-up services through Community Councils and an application process to the Borough
  - Composting classroom training
  - Providing abandoned vehicle removal and illegal dump clean-up services
- A recycling program providing resources for alternatives to landfilling and coordinating efforts to divert waste from disposal. The program offers free recycling drop-off at Valley Community Recycling Solutions (VCRS) and at four Borough managed transfer stations.

SERVICING

Waste Types | Residential and Commercial
Waste Processed | 77,000 tons annually
Area | 25,258 square miles
Citizens | 100,000+

TRANSFER STATIONS/SITES

Big Lake Transfer Station
Butte Transfer Station
Central Landfill
Clearwater Lodge Transfer Site
Eureka Transfer Site
Lake Louise Transfer Site
Long Rifle Lodge Transfer Site
Maclaren River Lodge Transfer Site
Point MacKenzie Transfer Site
Sutton Transfer Station
Talkeetna Transfer Station
Trapper Creek Transfer Site
Willow Transfer Station

PROGRAMS

Community Clean-up
HHW Reuse Store
Residential and Commercial Recycling

STAFF

Full Time Employees | 22
Part Time Employees | 23

Strategic initiatives

- Landfill Entrance Facility Location
- Recycling and Diversion Improvements
- Landfill Development
- Landfill Gas and Leachate Management

The Division uses an Enterprise account to fund operations, which is financially independent of the Borough's general fund. Tipping fees collected at the Division facilities are used to pay for Division activities.

CURRENT PROCESS

Current Facility

The existing site entrance at 49th State Street provides challenges due to location, space available for traffic queuing, and future growth.

PROS

- Lower cost to operate than construct new facility with improvement options

CONS

- Congestion from inbound traffic impacts public roads and emergency service vehicle access
- Scale and scale house nearing end of useful life and will take significant investment for improvements
- Additional upgrades needed to maintain facility near term
- Facility has space constraints
- Limited space to create new diversion opportunities

PROPOSED IMPROVEMENT

Construct New Facility

A conceptual layout of the new entrance road and facility is provided as **Figure 1**.

PROS

- Expanded public drop off options
- Eliminates current vehicle queuing congestion
- Allows separation of commercial and public traffic
- Opportunity to implement reuse center for C&D items
- Facility can be sized and include elements to support anticipated Borough waste growth

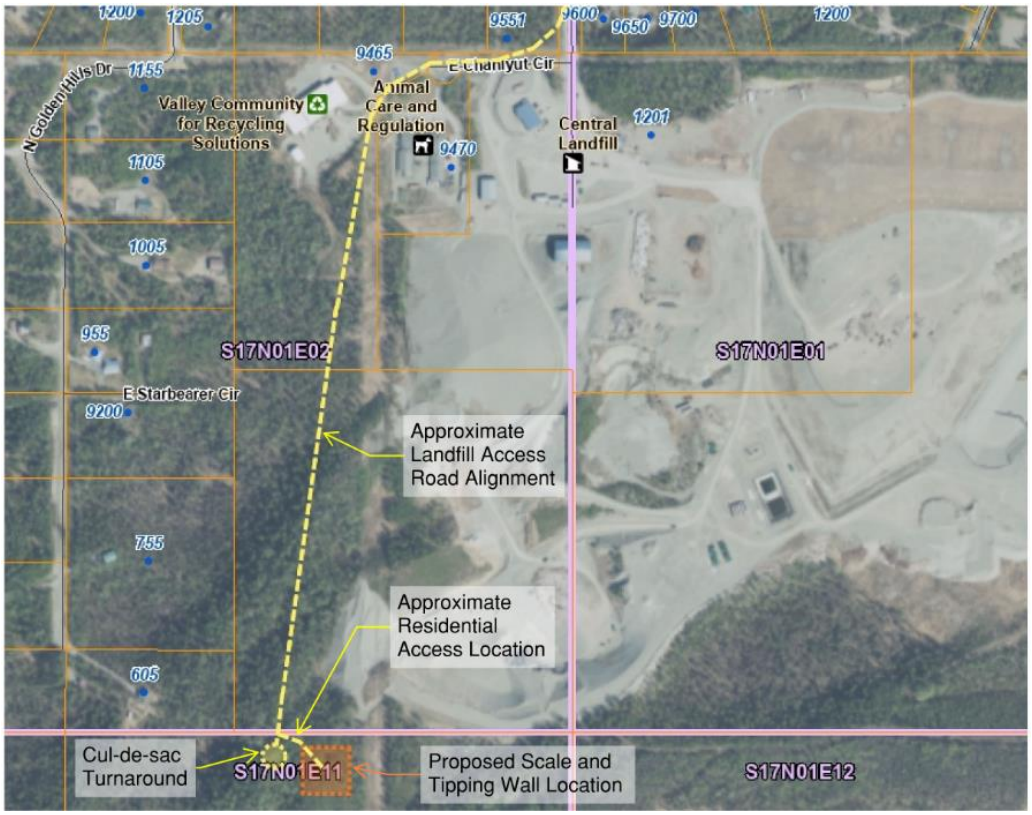
CONS

- Construction implementation cost

COST BREAKDOWN

FY2023 New Road Construction | $1.5M
FY2024 Tipping Facility | $3.5M

Figure 1: Central Landfill New Entrance Facility Layout



Recycling and Diversion Improvements with New Facility

Background Information | Recycling

Recycling is the process of collecting and separating materials that would otherwise be thrown away as trash to reduce, reuse, and recycle. The Borough partners with VCRS, Talkeetna Recycling Works, Mid-Valley Recycling, Willow Area Community Organization, and Recycle Sutton to enhance recycling

CURRENT PROCESS

Recycling and Diversion

Current program allows residents to divert recyclable materials from waste stream.

PROS

- Low cost to Borough residents

CONS

- Limited drop-off options
- Limited revenue generation options
- Limited space to add additional recycling options

IMPROVEMENT OPTION

Future Recycling Infrastructure

Construct new facility(ies) to allow residents to easily recycle such as tipping floor, reuse center, and/or recycling center.

PROS

- Expanded drop off options
- Increases waste diversion from landfill

CONS

- Implementation and ongoing O&M cost

IMPROVEMENT OPTION

Increase Composting

Composting is the process of breaking down organic material into compost.

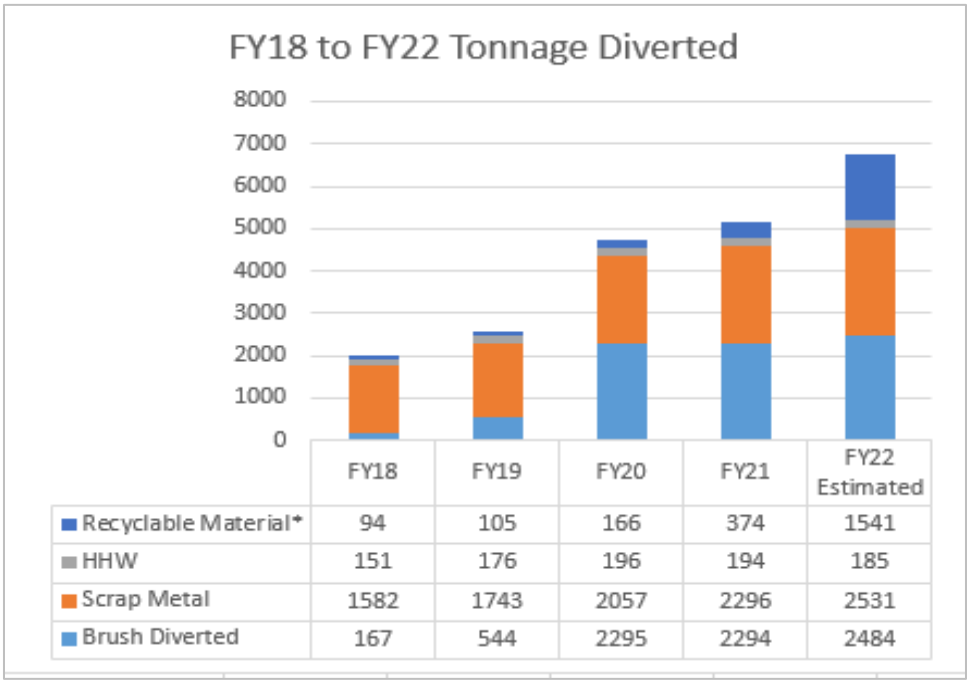
PROS

- Good for many agricultural uses
- Classes provided by the Borough

CONS

- Additional O&M costs

Figure 2: MSB FY18 to FY22 Tonnage Diverted



	FY18	FY19	FY20	FY21	FY22 Estimated
Recyclable Material*	94	105	166	374	1541
HHW	151	176	196	194	185
Scrap Metal	1582	1743	2057	2296	2531
Brush Diverted	167	544	2295	2294	2484

Landfill Development

Ongoing construction projects are needed to maintain compliance with the Landfill's Alaska Department of Environmental Conservation (ADEC) permit and to continue operating the facility, specifically cell excavation, construction, and closure (including expansion of the GCCS). Future planned projects include the following:

Cell 2B/3 Closure

Installation of landfill gas wells and landfill closure to meet permit and regulations

BUDGETED COSTS
FY2025 | $4.5M

Cell 5 Construction

Design, planning, and construction of future Cell 5 required to meet disposal needs

BUDGETED COSTS
FY2028/2029 | $4.5M

Cell 4 Closure

Installation of landfill gas wells and landfill closure to meet permit and regulations

BUDGETED COSTS
FY2032/2033 | $4M

Cell Excavation

Prior to Cell 5 construction, approximately 500,000 cubic yards of excavation is required that can provide aggregate commodities of gravel, sand, and other soil. The C&D cell requires immediate excavation. Future Landfill development requires ongoing cell excavation.

SOIL TYPES

- Gravel can be used at the Landfill as part of cell construction or can be marketed to the Road Service Areas (RSA)
- Sand can be used for liner or cover construction
- Fine grained soils can be used for daily, intermediate, and final cover
- Topsoil can be stripped and reused onsite

BUDGETED COSTS
FY2023-FY2025 C&D and Cell 5 Excavation | $2.1M Contractor

Background Information | Landfill Gas (LFG) and Leachate

Landfill gas is the byproduct of waste decomposition. LFG is primarily comprised of methane (approximately 50 percent), carbon dioxide (approximately 50 percent), and small amounts of non-methane organic compounds. The gas collection and control system (GCCS) was installed in 2020, which included vertical gas collection wells within Cells 1 and 2A and an enclosed flare by the leachate lagoons. In addition, horizontal gas laterals were installed in 2021 at the base of Cell 4 prior to waste filling operations.

Leachate is the liquid formed when precipitation filters through waste in a cell. The Landfill currently generates about 3 to 4 million gallons of leachate annually.

CURRENT PROCESS

Self-Haul Leachate Offsite

Leachate is hauled offsite to Anchorage Water & Wastewater Utility (AWWU) for disposal.

PROS

- Recently reduced costs by 35% annually by modifying an existing tanker truck and completing hauling in-house

CONS

- Existing hauling equipment retrofitted; ongoing hauling will likely require new equipment
- Future wastewater treatment regulations may require alternative leachate management operations

IMPROVEMENT OPTION

Step 1 Leachate Recirculation

Implement leachate recirculation onsite. Permit application submitted in June 2022.

PROS

- Reduce leachate volume to be hauled offsite (thereby reducing road miles)
- Promote waste settlement to recapture airspace
- Increase landfill gas generation for reuse

CONS

- Implementation cost
- Ongoing O&M costs

COST CONSIDERATION

- Less costly than trucking

CURRENT PROCESS

GCCS Operations with Flaring LFG

Existing GCCS installed onsite

PROS

- Currently, about 160 standard cubic feet per minute (scfm) of LFG is collected and flared
- Managing LFG collected onsite, controlling offsite migration

CONS

- Permit requires expansion of GCCS
- Landfill gas is not being beneficially used

COST BREAKDOWN

FY2023/2024 Cell 2A and C&D Well Installation | $500K

IMPROVEMENT OPTION

Step 2 Leachate Evaporation

Implement leachate evaporation onsite and utilize LFG collected as a fuel source for the system.

PROS

- Cost savings from natural gas
- Utilizing collected LFG
- Environmentally proven technology to reduce leachate volume requiring disposal
- Volume reduction of approximately 90%
- Concentrate can be recirculated if implemented
- No longer depend on AWWU

CONS

- Air permitting and odor control requirements
- Cost of implementation and infrastructure
- Ongoing O&M costs
- Costs are approximately $0.08/gal (2020$) using LFG produced onsite as fuel source

COST BREAKDOWN

FY2025/2026 | $4.5M

Capital Improvement Budget

Several capital improvement projects have been discussed above and **Table 1** provides the comprehensive projects and estimated costs anticipated over the next 10 years.

Table 1: Borough 10-year Capital Improvement Budget

Year	CIP Projections	Estimated Cost	Description
Annual	Misc. Capital	$4,000,000 (over 10 years)	$400k annually for general maintenance needs, transfer site management, container repair/replace, small equipment, vehicle replacements, etc.
2022-2025	Gravel Removal	$2,040,000 (ARP funding)	Gravel removal program combined with road traction material for road service areas (RSAs) to generate cost savings.
2023	Operations Building	$375,000 (one-time)	The 25-year-old existing building requires numerous upgrades to meet regulations. Propose to replace this building with a new portable structure that can be used for the next 20+ years. The new structure would provide needed bathrooms and improved sanitary conditions while meeting ADA and OSHA requirements.
2023	Water Well Pumping Station	$30,000 (one-time)	Installation of water well for Admin building and current front entrance.
2023/24	LFG Wells	$500,000 (one time*)	Cell 2A LFG well installation required by ADEC permit; Future wells to be installed in conjunction with cell closures.
2023/24	Entrance Road and Facility Improvement	$1,500,000 (one-time) $3,500,000 (ARP funding)	The existing landfill entrance uses the public street as a queuing line to enter the Landfill, which creates a problem for emergency vehicles, residential access to homes, and access to the Animal Shelter and recycling center. Phase 1 will build a new road entrance and place queuing within the landfill. Phase 2 will include the new tipping facility will be sized for growth, add a tipping floor, replace the existing scales and scale house, which are at the end of life, add recycling and reuse opportunities.
2025/26	Leachate Evaporation System	$4,500,000 (ARP funding)	The cost for transport is rising and AWWU may restrict future disposal. The most cost-effective alternative solution is evaporation combined with recirculation.
2025	Cell 2B and 3 Closure	$4,500,000 (one time)	Installation of landfill gas wells and landfill closure to meet regulations.
2027/28	Maintenance Building	$3,500,000 (one time)	Construction of maintenance building to perform maintenance and repair on all internal equipment.
2028/29	Cell 5	$4,500,000 (recurring with each cell)	Design, planning, and construction of future Cell 5 required to meet disposal needs.
2032/33	Cell 4 Closure	$4,000,000 (recurring with each cell)	Installation of landfill gas wells and landfill closure to meet regulations.

Conclusion

There are several opportunities available for the Division to improve overall operations while also recognizing financial benefits. These opportunities are detailed above and summarized below:

Landfill Entrance Facility	Relocate the facility entrance to reduce landfill queuing issues as well as providing new infrastructure that can meet the future needs of the Borough
Leachate Recirculation	Incorporate recirculation into landfill operations to increase waste degradation and settlement as well as reduce leachate hauling needs
Leachate Evaporation	Investigate the potential of using LFG as energy source for leachate evaporation as the GCCS expands and the LFG rate is confirmed
Recycling and Diversion	Continue developing waste diversion programs to remove materials from landfill disposal
Capital Improvements	Continue investments into Borough facility improvements to meet regulatory needs while improving overall function