



2022 Waste Management Facility Annual Report

City of North Battleford
Department of City Operations
1291 – 101st Street
North Battleford, SK
S9A 2Y6
March 2023

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INTRODUCTION

The City of North Battleford (the City) Annual Waste Management Facility (WMF) Report is designed to provide information to City Council, internal management, and government agencies.

The WMF accepts and disposes of domestic municipal waste as authorized by the Permit to Operate a Municipal Waste Disposal Ground (Permit to Operate) and the WMF Operations Plan. All the procedures outlined in this permit are being followed to ensure the City is within regulatory guidelines. The City is continually taking steps to reduce, reuse, recycle and recover wastes directed to the WMF.

The City's Permit to Operate Waste Disposal Grounds (Permit PO21-012) was renewed on February 1, 2021 and is in effect until January 31, 2026. Of note, Permit PO21-012 introduced a new requirement that volatile organic compounds (VOCs) be added to the annual groundwater program to establish baseline data and trends. Depending on analytical results, VOC sampling may be amended in future years once baseline conditions are established.

BACKGROUND

The WMF is located near Wearing Road, approximately 2.1 km east of Territorial Drive North. The legal land description is SW-15-44-16 W3M. A map showing the location of the WMF and current site diagram can be found in Appendix A.

The WMF design consists of four cells, constructed over the lifetime of the facility. Cell No. 1 was constructed in 1996, Cell No. 2 was constructed in 2002, and Cell No. 3 is currently being used and was constructed in 2012. Cell No. 3 was expected to have a serviceable life of nine years and provide approximately 375,000 m³ of landfill capacity. Cell No. 4 was originally projected for construction in 2030. The WMF design features a clay till liner, leachate collection system, leachate pumping station and force main to deliver leachate to the wastewater treatment plant for treatment.

The WMF operates Monday through Saturday from 08:00 to 18:00. The WMF is closed on all statutory holidays. At all times that the WMF is operational, and the main gate is open, the scale house is manned by a scale house attendant.

From the hours of 18:00 to 08:00 access to the WMF is restricted. The main gate remains closed until the scale house attendant opens it to the public. Security cameras and facility monitoring are completed at the main gate, the tool shed, and the equipment lean-to. The WMF perimeter is fenced, and weekly inspections monitor the fence integrity. There is one secondary access point to the WMF located in the northeast near

the cell stockpile. This access is secured with a chain-link gate (new in 2022) and locked to prohibit unauthorized access.

The City is the main contributor to the waste that enters the facility. Historically contributors included the Town of Battleford, the RM of North Battleford No. 437, and the RM of Battle River No. 438. In April 2018, the Town of Battleford diverted their waste to the newly constructed Loraas Transfer Station.

The WMF collection site for used oil, oil containers and filters, and antifreeze is located within the EcoCentre.

The WMF offers free disposal of compostable materials, blue bin recyclable materials, and fluorescent light bulbs and ballasts (limited quantities/week) to City residents. Blue bin recyclable materials can be disposed of into two 30-yard bins. The WMF stores some recyclables which are processed at other locations including white goods (refrigerants), metal objects, tires, empty propane canisters, grain bags, batteries, used cooking oil, antifreeze, and waste oil. Other materials that are diverted from the main pit and stored onsite include clean wood/lumber, trees/shrubs, concrete, asphalt, compostable material, clean soil, and high-quality resalable items. Clean wood/lumber is stockpiled and chipped, trees/shrubs are stockpiled and burnt, concrete and asphalt are crushed onsite for resale, and compostable material and clean soil are used for cover in the main pit. Resalable items are stored in a neat row next to the trees/shrubs pile and include items such as peddle bikes, lawn mowers, desks, bricks, and lumber.

Curbside garbage and recycling pick-up is completed by third-party contractors who monitor the contents and volumes of the bins they collect. Any non/rejected recyclable material found after sorting is baled and disposed of in the WMF main pit.

To prevent household hazardous waste from entering the WMF, the City hosts a semi--annual Household Hazardous Waste Day. Residents within the City and surrounding area can dispose of any hazardous or unknown waste at no cost.

The WMF accepts asbestos which is buried on-site in designated areas.

WMF ACCEPTED MATERIALS VOLUMES

A record of the types and volumes of waste and other materials collected are listed in Appendix B. These records also show which materials were disposed and which were diverted from the main pit at the WMF. Where available the 2022 waste volumes have been compared to the 2021 volumes to demonstrate year over year variances in waste and recycling streams.

WMF MAIN PIT VOLUMES

The volumes shown in Appendix B under Main Pit Volumes include all waste entering the main pit. The amount of waste disposed of in the main pit decreased from 15,262 to 11,914 tonnes. As of 2022 the estimated total material that has been deposited in the main pit is 1,022,138 m³ which represents approximately 58% of the design volume (1,750,000m³). The City of North Battleford retained Tetra Tech Canada. Inc (Tetra Tech) to complete an airspace assessment and airspace optimization as part of the WMF Master Plan. Based on the 2022 Tetra Tech Airspace Assessment and Optimization study, the current working cell (cell 3) is expected to be full in 15 to 27 years depending on above grade slope. With the construction of cell 4 the remaining life of the main pit changes to 60 to 85 years depending on above grade slope.

GENERAL WASTE

General waste entering the main pit consists of sorted domestic waste and rejected recyclables, construction and demolition waste, and carcasses. Sorted domestic waste includes waste from the curbside residential waste collection program and sorted waste brought into the WMF from residential and non-residential customers.

The amount of general waste entering the main pit decreased from 15,255 to 11,830 tonnes.

ASBESTOS

The amount of asbestos disposed of and buried in the main pit increased from 77 to 84 tonnes.

LEACHATE

The total volume of leachate pumped from the leachate collection well to the Wastewater Treatment Plant (WWTP) decreased from 16,866m³ to 9,921m³.

DIVERTED MATERIALS

The volumes/units shown in Appendix B under Diverted Materials include all materials diverted from the main pit.

SORTED CONSTRUCTION RECYCLABLES

Sorted construction recyclables consists of concrete, wood, metal, and asphalt. The amount of sorted construction recyclables decreased from 71,288 to 13,904 tonnes.

This large decrease is mainly due to the City accepting concrete and brick from the Saskatchewan Hospital demolition in 2021.

ECO-CENTRE OIL/ANTIFREEZE

The amount of oil removed from the eco-centre increased from 11,100 to 11,900 litres.

The amount of antifreeze removed increased from 800 to 1,300 litres.

8 drums of oil filters, 582 empty oil containers (20L pails), and 185 large garbage bags filled with empty oil jugs were removed.

HOUSEHOLD RECYCLABLES

The amount of household recyclables decreased from 548 to 521 tonnes.

COVER MATERIAL

Cover material consists of clean soil, compost, and vac truck clean-out.

The amount of cover material received decreased from 21,552 to 20,255 tonnes. All compost received and processed in 2022 was used as cover material. No compost was sold or used off-site.

Vac truck clean-out decreased from 889 to 232 tonnes.

COMPOST ANALYTICAL

On October 26, 2022 a composite sample of the WMF compost pile was collected and submitted to A & L Canada Laboratories of London, Ontario. The sample results were compared to the CCME guidelines for Compost Quality. Sample results are found in Appendix C.

Compost sampling results indicate that the 2022 WMF compost material was within the CCME guidelines for Category A – Unrestricted use.

OTHER RECYCLABLE MATERIAL

The WMF maintains stockpiles of recyclable materials that are used or held for processing elsewhere. The following materials were diverted from the Main Pit in 2022:

- 171 white good (refrigerants). The freon is removed by BN Metals and the remaining metal is placed in the metal pile.
- 321 tires. Tires are collected by TW Trucking for recycling.

- 86 automotive batteries. Automotive batteries are sold for recycling.
- 11.63 tonnes of resalable items were sold for reuse.

COMPACTION

Daily compaction and cover activities are recorded in the Operator logbook at the WMF.

The latest compaction survey taken at the WMF was performed as part of the Airspace Assessment and Airspace Optimization completed by Tetra Tech. Two Unmanned Aerial Vehicle (UAV) surveys were completed. The first survey was completed on May 26, 2022, and the second was completed on October 7, 2022. The landfill tonnage and the volumetric airspace consumption between these two surveys was 6,882 tonnes and 9,970m³, resulting in a waste compaction rate of 0.69 tonne/m³. The 2022 compaction rate improved from the 2021 rate of 0.60 tonne/m³. The difference in compaction may be attributed to increased accuracy and precision of the survey methodology.

MASTER PLAN

In 2021 the City retained Tetra Tech to complete a Master Plan for the WMF. The purpose of this Master Plan is to have a substantial third-party review completed with recommendations made for updating of current practices and processes. The Master Plan is still ongoing.

MASTER PLAN OBJECTIVES

The Master Plan Objectives are:

- Airspace and Airspace Optimization Assessment
- Operational Review
- Landfill Gas Production Assessment
- Decommissioning and Reclamation (D&R) Plan
- Closure/Post-Closure Liabilities Analysis
- Limited Lifecycle Cost (tipping fees) Analysis
- Corporate Stewardship (carbon footprint) Assessment
- Strength, Weakness, Opportunities, Threat (SWOT) Assessment
- Equipment Lifecycle Analysis

MINISTRY OF ENVIRONMENT (MOE) COMPLIANCE

The WMF is required to comply with the conditions of the Permit to Operate and the approved Operations Plan. To maintain compliance the City is required to report

annually on the following information that is not otherwise captured within sections of this report:

- Results of Inspections identifying:
 - Perimeter fencing
 - Adequate signage
 - Surface storage pond depth and any storage pond activities (i.e., sampling and pumping to WWTP)
- A summary of unauthorized discharges
- Verifying the presence of records:
 - Dates of clean wood burns
 - Date and sign-off of annual review of Operations and Emergency response plans
- Summary of urgent/upset conditions.

SUMMARY OF INSPECTIONS

The WMF is required to have weekly and quarterly inspections. The inspections capture information on the general condition of the WMF, an estimate of stockpiled diverted materials, storm water retention pond water levels, and the main pit conditions and practices.

In 2022 there were 48 weekly inspections completed. The findings of the inspections indicated that:

- Perimeter fencing was observed in good condition in 48 of 48 inspections. The SE secondary access and front exit gates were replaced due to a vehicle break in that occurred in September.
- Surface water accumulation was observed within the northeast corner of cell 3, in the cell 3 / 4 interface zone. As a result, the surface water was sampled demonstrating leachate impact (elevated chloride), and then pumped out onto cell 3 where it could evaporate or collect within the leachate collection system. Surface water was pumped out from this location on July 5, 2022.
- Surface water was observed within the freeboard threshold in the surface storage pond. As a result, the storm water pond was sampled and then pumped to the WWTP removing approximately 10,423m³ of surface water from July 15, 2022 to September 23, 2022.
- Signage was observed in good condition in 48 of 48 inspections.

UNAUTHORIZED DISCHARGES

In the 2021 annual report the City reported that in February 2022, Watermark Consulting notified MOE to report offsite chloride migration related to historical landfill activities. Watermark completed and submitted the MOE Discharge and Discovery notification identifying Tier 2 guideline exceedances (>250 ppm chloride) for monitoring wells BH505C, BH506B, and BH520-r. There were no other unauthorized discharges in 2022.

RECORD VERIFICATION

The City tracks information for the WMF in the scale house waste tracking program TRUX, in the Daily Cover Log, through regular inspections, in the electronic file system, and in the WMF Supervisors logbook.

Table 1B is generated using the records available in TRUX and provides the City with a record of all materials entering and diverted materials exiting the WMF. Leachate volumes are provided by the WWTP.

CLEAN WOOD BURNS

On November 3, 2023, the City conducted a clean wood burn.

OPERATIONS PLAN SIGN OFF

The Operations Plan was signed off on March 31, 2022. The Emergency Response Plan is included in the Operations Plan.

SUMMARY OF URGENT/UPSET CONDITIONS

In 2022 the WMF experienced six upset conditions:

- On April 13, 2022 and November 26, 2022 the WMF had Unauthorized Asbestos Disposals.
- On September 7, 2022 the WMF had a break and enter. The secondary access gate and the front exit gate were damaged and needed to be relaced. The WMF security video shows a truck entering through the secondary access, driving on the WMF roads without stopping anywhere, and then exiting through the front gate.
- The WMF had three small pit fires and two contractor equipment fires.

MOE AUDIT

On July 26, 2022 MOE completed a regulatory audit of the WMF. The results of the audit identified nine Type I findings. A Type I finding is defined as “A confirmed non-compliance that does not pose a significant threat to human health, safety or the environment and can be easily corrected before the next audit or inspection. This will require a formal corrective action plan to be submitted to the ministry within 30 days of the auditee receiving the final report.”.

The findings of the audit were:

- Finding 1
 - Operations Plan that is satisfactory to the Minister, does not include all information that addresses site operation listed in section 7.4 of the PTO, including:
 - surface and groundwater management and monitoring program including compliance levels
 - remediation plan to deal with groundwater deterioration
- Finding 2
 - A list of all hazardous substances stored at the facility, and inventory records for those hazardous substances, is not maintained at the facility
- Finding 3
 - Current copy of the list and inventory records of all hazardous substances and waste dangerous goods stored at the facility is not provided to the local fire department semi-annually
- Finding 4
 - A revised or current copy of emergency response contingency plans respecting hazardous materials storage is not provided to the local fire department annually
- Finding 5
 - Product reconciliation calculations on the diesel and used oil storage tanks are not maintained
- Finding 6
 - Monthly measurements of water levels on the diesel and used oil above-ground storage tanks are not completed
- Finding 7
 - Sign alerting public to the presence of hazardous materials at the facility is not included in front gate signage
- Finding 8
 - The volume of compost material received is recorded, however, the volume of compost materials sold, given away, or used onsite is not recorded

- Finding 9
 - Annual Operating Reports do not include all information listed in section 4.0 of the permit to operate in force at the time:
 - 2019:
 - locations of fence gaps and repairs
 - weekly freeboard levels
 - 2021:
 - volume/weight of materials sold, given away, or used at the site

The City submitted a Corrective Action Plan on November 10, 2022. With the completion of the annual report and submission of the 2022 Operations Plan, the City has completed all of the corrective actions identified within the MOE regulatory audit.

GREENHOUSE GAS EMISSIONS

The City does not have an estimate for the 2022 Green House Gas (GHG) emissions at the WMF at the time this report was created but does have a revised estimate to report for 2021. The City contracted Tetra Tech to estimate and summarize GHG emissions at the WMF. In Tetra Tech’s “North Battleford 2021 GHG Report”, the WMF emitted 11.188 kt of GHG in 2021 vs the original estimate of 6.91 kt reported in the 2021 WMF Annual Report. This revised estimate is above the Federal reporting threshold of 10 kt and was reported to Environment and Climate Change Canada.

GROUNDWATER MONITORING PROGRAM

Pinter & Associates LTD (Pinter) was contracted by the City to conduct the annual groundwater monitoring program at the WMF. On March 29, 2023, a copy of the Final the 2022 Groundwater Monitoring report was forwarded to the Ministry of Environment. As part of the monitoring program, water samples are collected from eight (8) monitoring wells, the leachate collection well, and the storm water retention pond. Monitoring wells are inspected at the time of sampling for potential damage and securement. The monitoring wells are grouped according to their location relative to the main pit. Two wells are up-gradient (upstream of the groundwater flow), three wells are immediately down-gradient (downstream of the groundwater flow), and three wells are in a buried channel further down-gradient of the main pit.

The findings of the 2022 groundwater monitoring are presented below.

2022 GROUNDWATER MONITORING REPORT SUMMARY

CONDITION OF MONITORING WELLS

At the time of sampling all monitoring wells identified in the Permit to Operate were in good condition. Pinter noted all monitoring wells were protected by metal casing protectors and secure, BH521 was noted that it was secured with a locking-plug in absence of a locked casing protector.

CHLORIDE ANALYSIS

Chloride can be used an indicator for landfill leachate contamination as chloride moves un-attenuated through the subsurface. Additionally, Pinter plotted general water quality parameters on trilinear diagrams to illustrate the different water types at the WMF and compare the water quality at each monitoring well and private wells to the Leachate Collection Well chemistry.

The data indicates that water type differs between wells up-gradient of the active pit, wells immediately down-gradient of the active pit, and wells further down-gradient of the active pit (in the buried valley channel). The low chloride concentrations in the monitoring wells suggest that the leachate has not been detected in the monitoring wells, although increasing trends in chloride concentrations at BH505C and BH506B have been noted and will continue to be monitored. In 2022 chloride concentrations in BH505C increased from 235 ppm to 248 ppm. Chloride concentration in BH506B decreased from 282 ppm to 249 ppm.

Increased chloride concentrations in this area may be related to historical landfilling operations that occurred prior to the operation of the new lined cell. Historic groundwater chemistry at monitoring wells within the buried valley channel do not exhibit trending that would indicate impacts from landfill leachate. Rather, monitoring wells installed in the buried valley channel are within a different hydrostatic unit, to which attribution could be given for the difference in overall water chemistry from up-gradient wells. It is also noted that the water type at each well has been relatively consistent over time and has not changed at individual monitoring wells.

Surface water quality from the storm water retention pond was different then the leachate water quality and chloride concentrations were significantly lower than leachate (42 ppm compared to 1,560 ppm respectively).

VOC ANALYSIS

VOCs were monitored in mid and down gradient monitoring wells including: BH505C-r, BH505C, BH506B, BH519, BH520-r, and BH522, and in the Storm Water Retention Pond (Only Benzene, toluene, ethyl benzene, xylene, fractions 1 and 2 hydrocarbons, and oil and grease) and Leachate Collection Well.

VOC exceedances were noted in monitoring wells BH519 for cis-1,2-Dichloroethene (10 ppb) and Vinyl Chloride (5.45 ppb), and in monitoring well BH520r for 1,2-Dichlorobenzene (1.45 ppb), cis-1,2-Dichloroethene (7.7 ppb) and Vinyl Chloride (2.01 ppb).

VOC exceedances were noted in the Leachate Collection Well for chlorobenzene (4.85 ppb), and 1,4-Dichlorobenzene (4.62 ppb).

NEIGHBOURING DOMESTIC WELLS

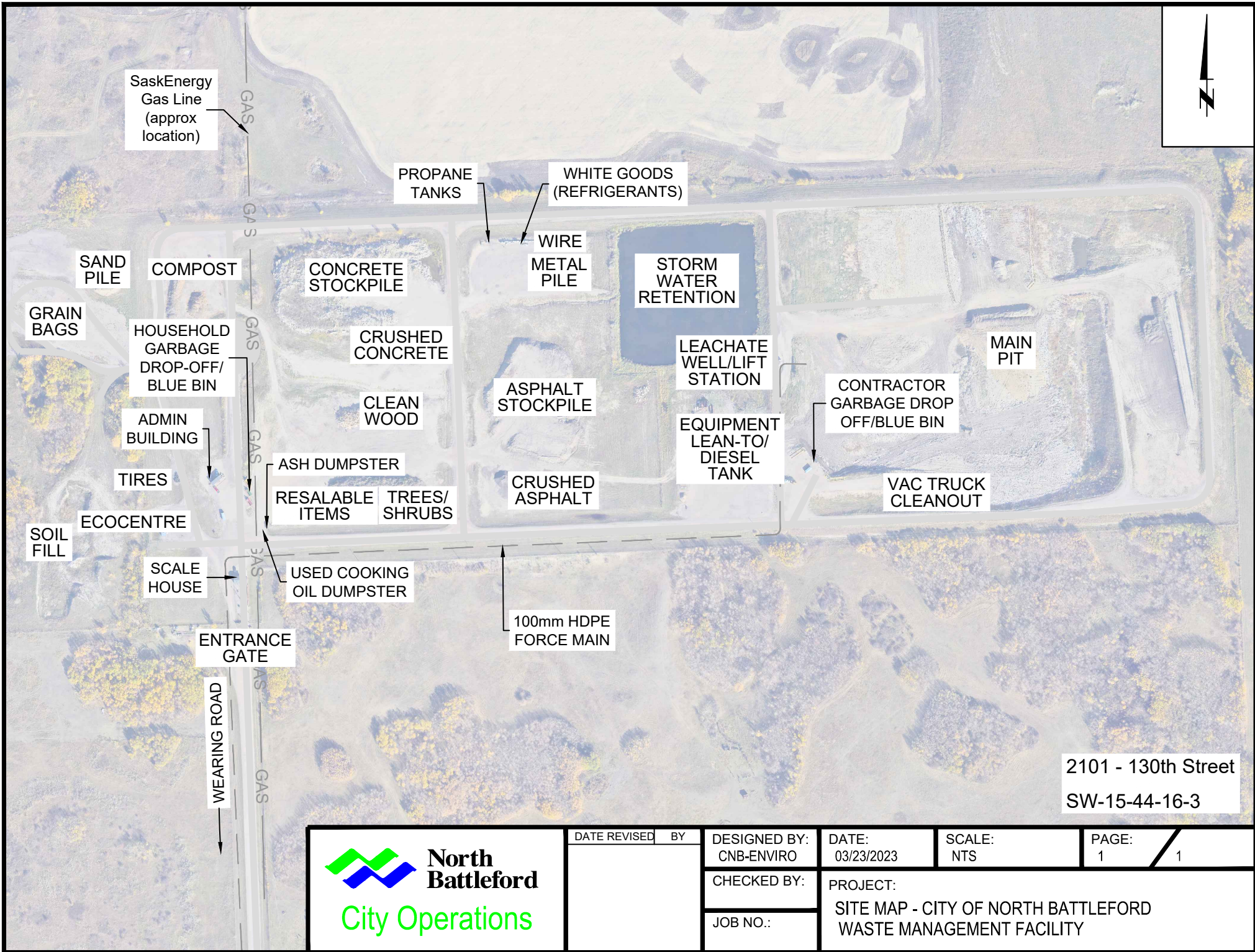
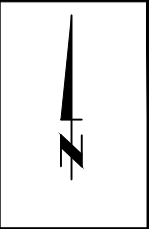
Water chemistry at up-gradient domestic well KB1 and surface water from KB Dugout indicate that they are not influenced by groundwater from the WMF. Domestic well BB1, which is downgradient of the Site, does not have elevated chloride concentrations and is installed at a deeper elevation than the buried valley channel which indicates that BB1 has not been influenced by groundwater from the WMF.

CONCLUSION


The WMF accepts and disposes of domestic municipal waste as authorized by the Permit to Operate a Municipal Waste Disposal Ground. All the procedures outlined in this permit and in the Operations Plan are being followed to ensure the City is within regulatory compliance. In 2022, the City of North Battleford continued to decrease volumes of waste entering the main pit through increased recycling. These total volumes have shown to be steadily decreasing over the years.

The City of North Battleford continues to work towards diverting more recyclable and reusable material from the main pit of in 2023.

APPENDIX A: SITE MAP



2101 - 130th Street
SW-15-44-16-3

	DATE REVISED	BY	DESIGNED BY:	DATE:	SCALE:	PAGE:
			CNB-ENVIRO	03/23/2023	NTS	1 / 1
			CHECKED BY:	PROJECT:		
		JOB NO.:	SITE MAP - CITY OF NORTH BATTLEFORD WASTE MANAGEMENT FACILITY			

APPENDIX B: TABLES

Table 1B - WMF ACCEPTED MATERIALS VOLUMES		
Main Pit Volumes	Total	Unit
GENERAL WASTE	11829.9	tonne
Sorted Domestic and Rejected Recyclables	7777.3	
Construction and Demolition	4052.2	
Carcasses	0.3	
ASBESTOS	84.2	tonne
	84.2	
	Total	11914.1
LEACHATE ¹	9921.1	m ³
	9921.1	
¹ Leachate is pumped to the Wastewater Treatment Plant		
DIVERTED MATERIALS		
SORTED CONSTRUCTION RECYCLABLES		
	13904.0	tonne
Concrete, wood, metal, asphalt	13904.0	
ECO-CENTRE OIL/ANTIFREEZE		
	13200.0	L
Oil	11900.0	
Antifreeze	1300.0	
HOUSEHOLD RECYCLABLES		
	520.9	tonne
Curbside Program	485.0	
WMF	35.9	
COVER MATERIAL		
	20254.6	tonne
Clean Soil	19266.1	
Compost	757.0	
Vac Truck Clean-Out	231.6	
OTHER RECYCLABLE MATERIAL		
	578.0	units
Tires	321.0	
White Goods (refrigerants)	171.0	
Batteries Outbound	86.0	
Resalable Items Outbound (\$125/tonne - \$6 minimum)	11.6	tonne

APPENDIX C: COMPOST ANALYTICAL

Appendix C: Compost Analytical				
Parameter	City of North Battleford WMF Compost Sample Results	CCME Guidelines		
		Category A	Category B	
		Max Concentration within Product (mg/kg dry weight)	Max Concentration within Product (mg/kg dry weight)	Max Cumulative Additions to Soil (kg/ha)
Arsenic	3.7	13	75	15
Cobalt	6.61	34	150	30
Chromium	70.25	210	**	**
Copper	15.85	400	**	**
Molybdenum	BDL	5	20	4
Nickel	46.06	62	180	36
Selenium	BDL	2	14	2.8
Zinc	90.75	700	1850	370
Cadmium	BDL	3	20	4
Mercury	BDL	0.8	5	1
Lead	12.32	150	500	100
**	= Limits for copper and chromium are not established in the Trade Memorandum.			