

LETHBRIDGE WASTE AND RECYCLING CENTRE PROJECT SUMMARY

1.1 Location and Site Description

The Lethbridge Waste and Recycling Centre is located approximately in the SW ¼ 4-10-21-W4. The proposed expansion is into the SE ¼ 4-10-21-W4 and NE ¼ 4-10-21-W4. The facility property (the site) is surrounded primarily by agricultural land and coulee to the north, Highway 843 to the east, Township Road 100 to the south, and coulee and Oldman River to the west. Access to the site is from Township Road 100. A site plan is provided on Drawing 00-C-0001. The portion of the southeast and northwest quarters that are slated for future development is currently cleared, cultivated, generally drains to the east and north. Existing ground information, as shown on drawings, is based on ortho-photo data and a digital elevation model (DEM) produced in 2009.

1.2 Service Area

The Lethbridge Waste and Recycling Centre is owned by the City of Lethbridge and operated by BFI Canada under contract to the City. The facility accepts waste from the City of Lethbridge; the Nobleford, Picture Butte, Iron Springs and Coaldale Transfer Stations; and communities throughout the County of Lethbridge.

1.3 Land Use

Table 1 summarizes the ownership and current land use of adjacent land areas within 800m of the facility property.

Table 1. Land Ownership and Current Use of Areas within 800 m of the Site.

Location	Ownership	Land Use	Zoning
NE5 10-21-4	Gary G Neher and Ray Colleen Neher		Rural Agricultural
NW4 10-21-4	City of Lethbridge		Rural Agricultural
NE4 10-21-4	City of Lethbridge		Rural Agricultural
NW3 10-21-4	Tom and Gena Kotke		Rural Agricultural
SE5 10-21-4	Brett and Michelle Logue – North of Oldman River City Packers Feedlot (2003) Ltd. – South of Oldman River		Rural Agricultural
SW4 10-21-4	City of Lethbridge	Coulee and Oldman River in the west. Existing Waste and Recycling Centre Disposal Site in the east.	Rural Agricultural – Isolated Single Lot Rural Industry (discretionary use)
SE4 10-21-4	City of Lethbridge	Proposed Waste and Recycling Centre Disposal Site expansion.	Rural Agricultural – Isolated Single Lot Rural Industry (discretionary use)
SW3 10-21-4	KLC Cattle Company Ltd.		Rural Agricultural
NE32 9-21-4	West Coast Reduction Ltd. – West half of quarter section City Packers Feedlot (2003) Ltd. – East half of quarter section		Rural Agricultural; some Rural Grouped Industrial
NW33 9-21-4	City Packers Feedlot (2003) Ltd. – Northwest of canal DHS Holdings Ltd. – Southeast of canal (small area)		Rural Agricultural
NE33 9-21-4	DHS Holdings Ltd.		Rural Agricultural
NW34 9-21-4	Bernard Alexander Lastuka		Rural Agricultural

1.4 Current Facility Design and Development

The existing operation is comprised of the following components:

- Landfill office and shop;
- Weigh scale house;
- Citizen drop off area;
- Recyclable material drop off and storage area;
- Large capacity solid waste baler installed in 2008;
- Compost collection, processing, and curing area;
- Hydrocarbon Contaminated Soil (HCS) disposal cells;
- Liquid waste disposal area;
- Asbestos disposal area;
- Wood recycling area;
- Construction and demolition waste cell; and
- Stormwater Management Ponds.

1.5 Communities Served and Population

Table 2 provides a summary of communities and estimated populations served by the Waste and Recycling Centre from 2005 to 2009, as listed in the Annual Reports prepared by the City of Lethbridge.

Table 2. Communities and Populations Served

Service Area	Population				
	2005	2006	2007	2008	2009
City of Lethbridge	77,202	78,713	81,692	83,960	85,492
County of Lethbridge	9,930	9,930	9,930	9,930	10,302
Village of Barons	295	294	294	294	297
Village of Nobleford	679	676	676	676	877
Village of Picture Butte	1,610	1,701	1,701	1,701	1,592
Town of Coaldale	5,941	6,104	6,104	6,104	6,943
Village of Coalhurst	1,493	1,493	1,493	1,493	1,810
Regional District of East Kootenay	15,000	15,000	15,000	15,000	10,810
County of Vulcan	3,778	3,778	3,778	3,778	3,830
Town of Vulcan		1,762	1,762	1,762	1,940
Town of Fort MacLeod	2,990	2,990	2,990	2,990	3,709
Town of Taber		7,671	7,671	7,671	7,821
County of Taber	13,683	6,012	6,012	6,012	6,714
Siksika Nation	900	900	900	900	3,709
Total	133,501	137,024	140,003	142,271	145,846

1.6 Site Tonnage

Table 3 summarizes waste types and volumes received at the facility from 2005 to 2009. This data has been recorded by the facility operators and reported in the Annual Reports prepared by the City of Lethbridge.

Table 3. Summary of Waste Types and Volumes Received

Waste Type	Volume of Waste Received (tonnes)				
	2006	2007	2008	2009	2010
Class II Landfill	123,195	140,258	144,489	136,053	128,332
Class III Landfill	2,145	1,218	3,073	4,477	3,312
Soil	19,037	23,958	45,581	17,806	72,028
Liquid Waste	1,151	1,180	1,535	1,977	1,766
Recyclables	5,707	5,883	4,090	3,528	3,118
Composting Area	-	-	-	756	878
Total	151,235	172,497	198,768	164,597	209,434

1.7 Current Regulatory Standards – Landfill Design Implications

The Lethbridge Waste and Recycling Centre operates in accordance with Alberta Environment Standards for Landfills in Alberta, February 2010 (the Standards) and under the Alberta Environment Approval No. 19028-01-00, valid from October 25, 2006 to October 25, 2016 (the Approval). An Amending Approval No. 19028-01-01 dated December 8, 2008 was issued to permit design and construction of surface water management infrastructure. The Approval provides the Terms and Conditions according to which the landfill must be constructed, operated, and reclaimed.

The Standards and the Approval will shape landfill development of the proposed future development at the Lethbridge Waste and Recycling Centre.

Table 4. Summary of Regulatory Requirements for Landfills

Requirements	Details
Siting Criteria	<p>The new waste footprint of a laterally expanding landfill shall not be in a ravine, coulee or gully, there is less than 30 m of material with a hydraulic conductivity greater than 1E-8 m/s from liner bottom to an exceptional aquifer, or have material within 10 meters of the liner bottom including fractured non-porous bedrock or karst features.</p> <p>Cells of a laterally expanding landfill situated on a location where there is 5 meters thick clayey deposit of 1E-8 m/s below the liner bottom or a minimum of 3 meters of equivalent or better to the above clayey deposit may have one or may layers with a hydraulic conductivity (HC) greater that 1E-6 m/s if they are less than 0.5 m thick and do not extend beyond compliance boundary</p>
Groundwater Monitoring Wells	<p>Construct groundwater monitoring wells that are:</p> <ul style="list-style-type: none"> • Minimum spacing of 200m between groundwater monitoring wells as measured along the compliance boundary; and • At locations that provide an accurate representation of up-gradient and down-gradient groundwater quality. • Monitor wells shall be at least 20 metres inside the property boundary of the landfill and at least 10 metres , and no more than 60 metres from the waste footprint.
Surface Water Control	<p>Run-on and run-off control systems and surface water retention ponds (minimum two ponds) to collect and control flow for events up to at least the peak discharge from a 1 in 25 year, 24 hour rainfall event.</p>
Setbacks	<ul style="list-style-type: none"> • Waste footprint minimum of 100m from land subject to slope failure. • Waste footprint minimum of 300m from natural area that permanently contains water such as a lake, river or creek. • Waste footprint minimum of 300m from man-made surface feature that permanently contains water such as irrigation canal, drainage ditch, but not road-side ditch or dugout. Note that this setback requirement may be relaxed by Alberta Environment. • Waste footprint minimum of 450m from residences.
Liner	<p>Clay liner with hydraulic conductivity of less than 1×10^{-9} m/s to minimum thickness of 1 m, measured perpendicular to the slope or a composite liner constructed with a geomembrane placed directly on the surface of a clay liner not less than 0.6 metres thick and achieving a hydraulic conductivity of less than 1×10^{-9} m/s</p>
Leachate Pond	<p>Leachate pond to store and manage leachate from the cells, constructed with a prepared clay subgrade overlaid with a liner system consisting of primary geomembrane liner, a secondary geomembrane liner and a secondary leachate collection system.,</p>
Leachate Management	<p>Leachate level to be less than or equal to 0.3 m above the lowest part of the liner surface not including sumps or leachate pipe trenches.</p> <p>Leachate to be measured monthly, volume removed to be recorded, and composite samples to be taken prior to removal of leachate.</p>
Final Cover	<p>Final cover to consist of barrier of:</p> <ul style="list-style-type: none"> • at least 0.6m of clay meeting a hydraulic conductivity of 1×10^{-7} m/s; • minimum of 0.35m of subsoil overlying the clay barrier layer; • minimum of 0.2m of topsoil overlying the subsoil layer; • maximum slope of 30%; and • contoured to prevent water pooling over cell. <p>Commence closure no later than six months after the landfill reaches the final design elevation or if no waste is disposed at the landfill for a period of six consecutive months.</p>
Post-Closure Care	<p>Post-closure care required for a minimum of 25 years and to continue as long as groundwater, landfill gas and leachate monitoring results exceed performance standards.</p>
Monitoring Programs	<p>Surface water, groundwater, leachate, landfill gas</p>
Operations Plan	<p>Waste acceptance policies and procedures, policies and procedure for wastes requiring special handling, nuisance management operating procedures, emergency response plan, environmental monitoring systems, reporting procedures, site safety plan to direct and monitor operation to be consistent with design.</p>
Record Keeping	<p>Operating record, including waste handling, survey, as-built records, current design and operations plan, annual groundwater monitoring and annual reports.</p>

LETHBRIDGE WASTE AND RECYCLING CENTRE

Environmental Design Criteria

2.1 Landfill Containment System

Liner Design

Composite clay liner consisting of re-compacted clayey material meeting a hydraulic conductivity of 1×10^{-9} m/s, 0.6 metres thick overlay with a 60 HDPE geomembrane liner

Leachate Collection

System designed to maintain a maximum head on the liner of 300mm

Leachate will be collected and re-circulated to enhance landfill gas production or removed to an approved waste treatment facility or

2.2 Stormwater Management

All offsite surface water run-on from off site will be diverted away from the active portions of the facility,

All run-off from active portions of the facility will be diverted to stormwater retention facilities. The retention facilities will retain at a minimum the run-off water volume resulting from a 1 in 25 year – 24 hour duration rainfall event.

Preparation and implementation of a detailed Surface Water Monitoring Program

Prior to release from the retention facility the water will be tested to determine compliance with surface water discharge criteria.

2.3 Groundwater Monitoring

Preparation and implementation of a detailed Groundwater Monitoring Program to monitor the performance of the landfill containment system.

Groundwater monitoring network with monitor wells located at a minimum of 200 metres apart.

Groundwater samples collected. Groundwater samples will be collected twice per year for analysis and interpretation by a professional registered with APEGGA.

2.4 Subsurface Landfill Gas Monitoring

A subsurface landfill gas monitoring program to monitor for the potential of subsurface migration of landfill gas.

LETHBRIDGE WASTE AND RECYCLING CENTRE MASTER PLAN

3.1 Master Plan

The landfill development is an important component of an Integrated Waste Management Plan. The components of an Integrated Waste Management Plan include:

- collection,
- recycling,
- composting,
- residuals disposal,

A landfill is important due to the fact that even when alternative waste disposal technologies are utilized such as thermal destruction, anaerobic digestion, gasification etc, there are residuals that must go to landfill.

The Master Plan development for the Lethbridge Waste and Recycling Centre is considering the following components and activities.

- Meeting the goal of providing a facility that will provide safe and economical landfill disposal capacity to meet the long term disposal needs of the Lethbridge region for a minimum of 50 years. This criterion will require expansion of the existing site.
- Provide facilities for composting of yard and organic wastes,
- Provide facilities for the recycling of construction wastes, in particular concrete and asphalt;
- Provide facilities for the collection of recyclable materials; scrap metal, scrap tires, etc.
- Leachate management;
- Gas management;
- The Master Plan will investigate and assess the status of existing and emerging alternative waste disposal technologies such as incineration, gasification, anaerobic digestion.
- Provide an end use design concept for the use of the site once landfill activities have been terminated.