

Technical Document LA25019

Part 2 — Technical Requirements



Application under the Agricultural Operation Practices Act for a confined feeding operation, manure collection area, and/or manure storage facility(ies)

NRCB USE ONLY	Application number	Legal land description
<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Registration <input type="checkbox"/> Authorization <input type="checkbox"/> Amendment	<u>LA25019</u>	<u>Sec. 28-10-25 W4M</u>

APPLICATION DISCLOSURE

This information is collected under the authority of the *Agricultural Operation Practices Act* (AOPA), and is subject to the provisions of the *Freedom of Information and Protection of Privacy Act*. This information is public unless the NRCB grants a written request that certain sections remain private.

Any construction prior to obtaining an NRCB permit is an offence and is subject to enforcement action, including prosecution.

I, the applicant, or applicant's agent, have read and understand the statements above, and I acknowledge that the information provided in this application is true to the best of my knowledge.

Feb 26 / 25
Date of signing
HB of Jumbo Valley Cdn
Corporate name (if applicable)

[Redacted Signature]
Signature
MARK TSCHETTER
Print name

GENERAL INFORMATION REQUIREMENTS

Proposed facilities: list all proposed confined feeding operation facilities and their dimensions. Indicate whether any of the proposed facilities are additions to existing facilities. (attach additional pages if needed)	
Proposed facilities	Dimensions (m) (length, width, and depth)
Dairy barn (AO comment: see attached plan for layout)	285.4' - 210' [87 m x 64 m] (Part 1)
Part 1, 2, and the sand lain/storage are at ground level. In the sand storage building are 4 small pits (lift stations) each 4.3 m x 4.3 m x 3.6 m deep	260' - 110' [79.2 m x 33.5 m] (Part 2)
Sand lain/sand storage building	257' - 70' [78.3 m x 21.3 m]
Lagoon (EMS)	124x153x 3.3 m (depth)
(new proposed lagoon is already excavated but was initially planned to be used for different purposes)	

Existing facilities: list ALL existing confined feeding operation facilities and their dimensions		
Existing facilities	Dimensions (m) (length, width, and depth)	NRCB USE ONLY
AO comment: see next page		
NRCB USE ONLY		
All facilities confirmed (dimensions and use)		

Existing
facilities

Facility	Dimensions (m)	Permit
Dairy barn	65 m x 35 m	Deemed permit (converted)
Parlour	51 m x 12 m	Deemed permit
Calving barn	24 m x 24 m	Deemed permit
Replacement pens	56 m x 23 m 54 m x 6 m 57 m x 18 m 131 m x 45 m 89 m x 43 m	Deemed permit
Open shelter	48 m x 6.5 m	Deemed permit
Catch basin	7 m x 5 m x 2 m deep	Deemed permit
Concrete pad	10 m x 9 m	Deemed permit
Lagoon	61 m x 32 m x 6.5 m deep	Deemed permit (decommissioned)
Mixed poultry barn	42.7 m x 12.2 m	Approval LA17016
Broiler barn	121.9 m x 24.5 m	Approval LA16050

see below

Other existing facilities:

Permitted under Approval LA 180222:

Turkey barn (158.5 m x 24.4 m)

Calf barn (33.5 m x 15.8 m)

Facilities permitted under Authorization LA21013:

Heifer shed (174 m x 24.5 m)

Exercise pen (174 m x 30.5 m)

Catch basin (43 m x 31 m x 2.4 m)

Solid manure storage pad (152 m x 152 m)

The old dairy barn is proposed to be converted into a dry cow barn
The old lagoon will be decommissioned

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If a new facility is replacing an old facility, please explain what will happen to the old facility and when. ☐ N/A

Old dairy facility will be used for replacement heifers.
The old man lagoon will be ~~decommissioned~~ decommissioned.

Construction completion date for proposed facilities December 2023

Additional information

Livestock numbers: Complete only if livestock numbers are different from what was identified in the Part 1 application. Note: if livestock numbers increase in your Part 2 application, a new Part 1 application must be submitted which may result in a loss of priority for minimum distance separation (MDS).

Livestock category and type (Available in the Schedule 2 of the Part 2 Matters Regulation)	Permitted number	Proposed increase or decrease in number (if applicable)	Total
Dairy	300	175	475
AO comment: Jumbo Valley Colony is permitted for 250 milking cows plus associated dries and replacements. Therefore, the proposed increase amounts to 225 rather than 175 milking cows plus associated dries and replacements			
Jumbo Valley is also permitted to have (no increase of these numbers is proposed): 42,000 chicken broilers			
36,000 turkey hens			
600 chicken layers			
700 ducks			
300 geese			

Hutterian Brethren Church of Jumbo Valley

Sec 28-10-25 W4

see comment on
page one

lagoon

New Dairy
barn

Old Dairy
barn

Dugout

Jumbo Valley Colony

Shop

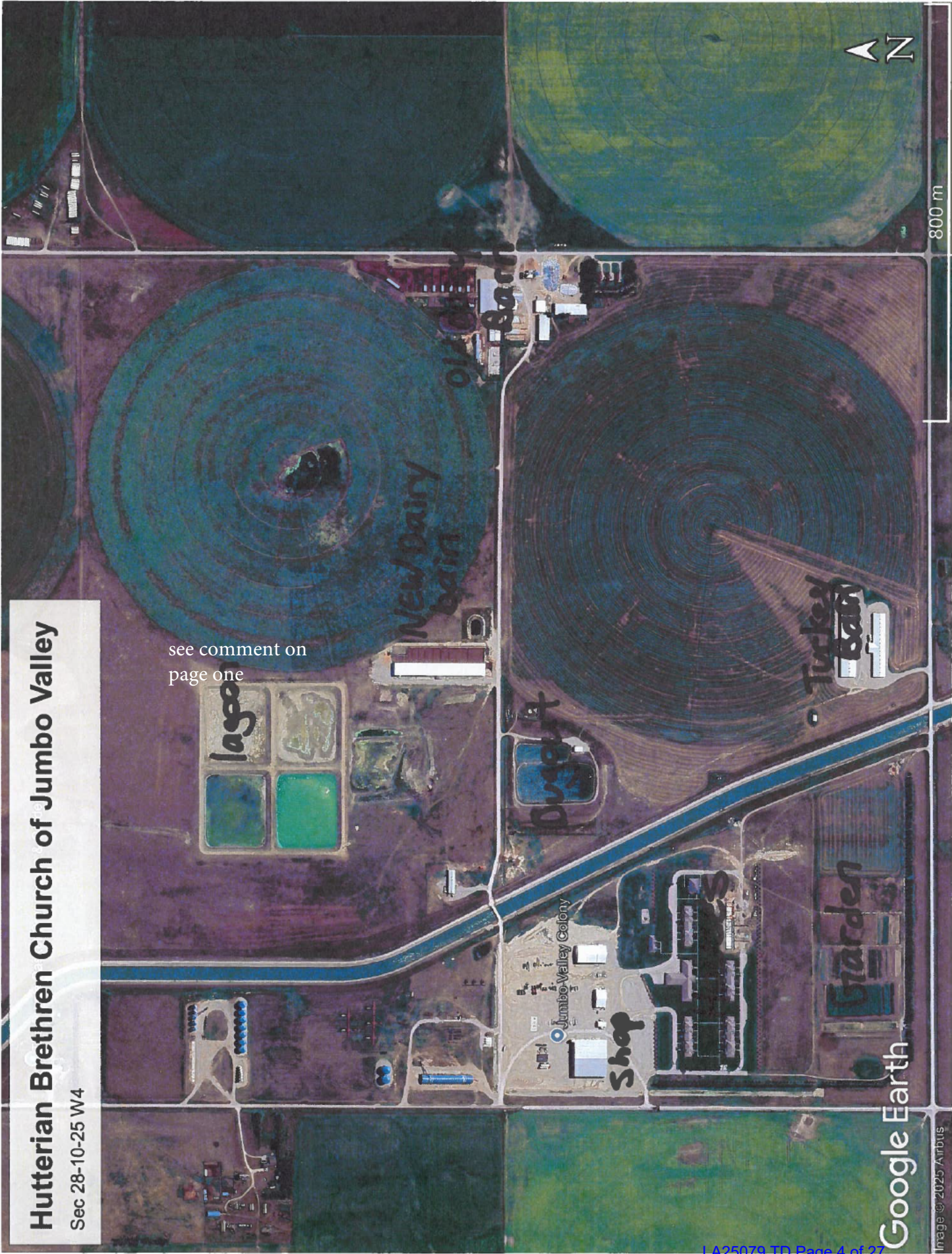
Turkey
Barn

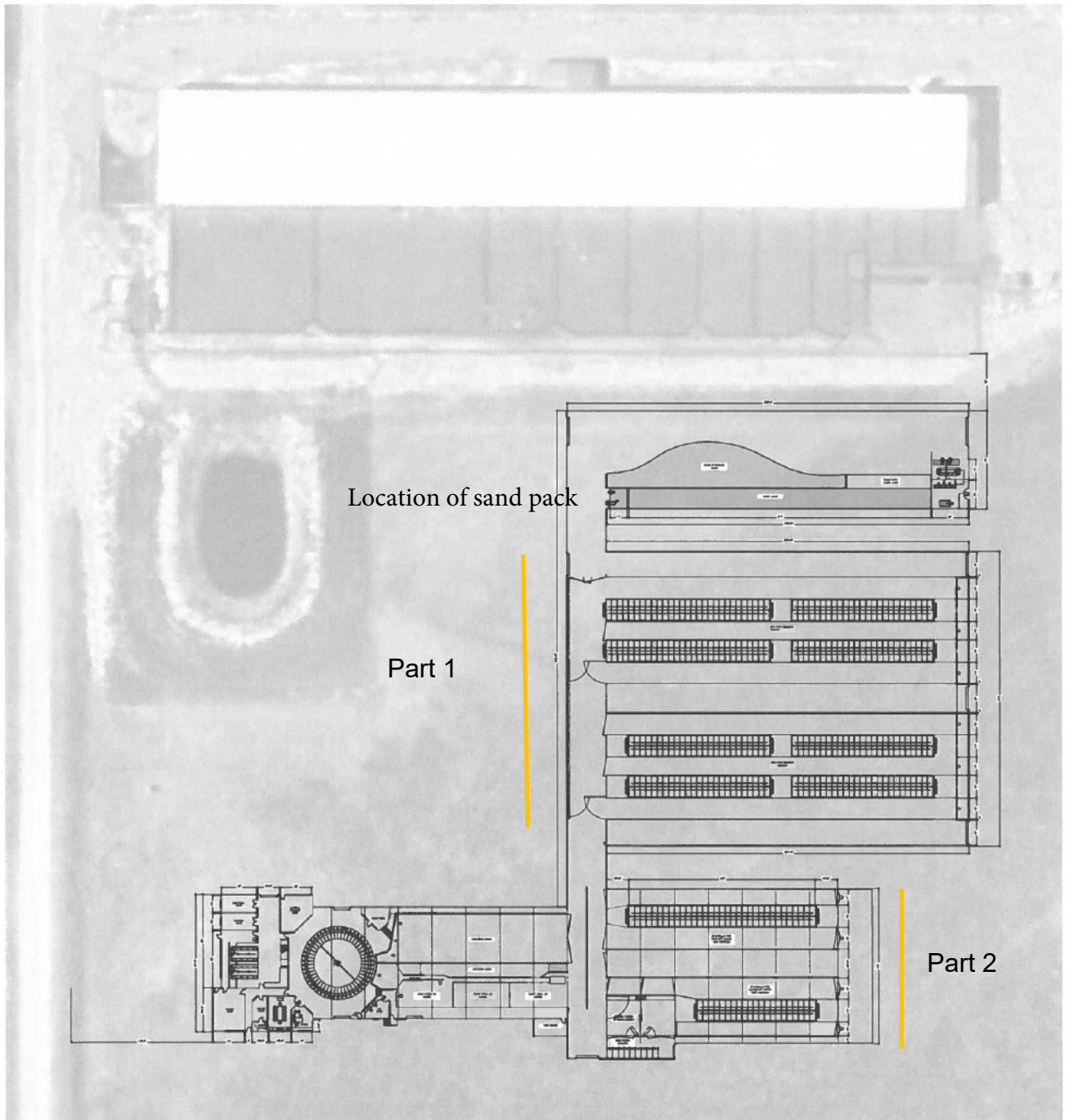
Garden

Google Earth

Image © 2025 Airbus

800 m





Part 2 — Technical Requirements

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area, and/or manure storage facility(ies)

DECLARATION AND ACKNOWLEDGMENT OF APPLICANT CONCERNING WATER ACT LICENCE

issued by Alberta Environment and Parks (AEP) for a confined feeding operation (CFO)

Date and sign one of the following four options

OPTION 1: Applying through the NRCB for both the AOPA permit and the Water Act licence

I **DO** want my water licence application coupled to my AOPA permit application.

Signed this ____ day of _____, 20____.

Signature of Applicant or Agent

OPTION 2: Processing the AOPA permit and Water Act licence separately

1. I (we) acknowledge that the CFO will need a new water licence from AEP under the *Water Act* for the development or activity proposed in this AOPA application.
2. I (we) request that the NRCB process the AOPA application **independently of** AEP's processing of the CFO's application for a water licence.
3. In making this request, I (we) recognize that, if this AOPA application is granted by the NRCB, the NRCB's decision will not be considered by AEP as improving or enhancing the CFO's eligibility for a water licence under the *Water Act*.
4. I (we) acknowledge that any construction or actions to populate the CFO with livestock pursuant to an AOPA permit in the absence of a *Water Act* licence will **not** be relevant to AEP's consideration of whether to grant the *Water Act* licence application.
5. I (we) acknowledge that any such construction or livestock populating will be at the CFO's sole risk if the *Water Act* licence application is denied or if the operation of the CFO is otherwise deemed to be in violation of the *Water Act*. This risk includes being required to depopulate the CFO and/or to cease further construction, or to remove "works" or "undertakings" (as defined in the *Water Act*).
6. **AS RELEVANT:** I (we) acknowledge that the CFO is located in the South Saskatchewan River Basin and that, pursuant to the *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order* [Alta. Reg. 171/2007], this basin is currently closed to new surface water allocations.

Signed this ____ day of _____, 20____.

Signature of Applicant or Agent

OPTION 3: Additional water licence not required

1. I (we) declare that the CFO will not need a new licence from AEP under the *Water Act* for the development or activity proposed in this AOPA application.

Signed this 26 day of February, 2025.

Signature of Applicant or Agent

OPTION 4: Uncertain if Water Act licence is needed: acknowledgement of risk (for existing CFOs only)

1. At this time, I (we) do not know whether a new water licence is needed from AEP under the *Water Act* for the development or activity proposed in this AOPA application.
2. If a new *Water Act* licence is needed, I (we) request that the NRCB process the AOPA application **independently of** AEP's processing of the CFO's application for a water licence.
3. In making this request, I (we) recognize that, if this AOPA application is granted by the NRCB, the NRCB's decision will not be considered by AEP as improving or enhancing the CFO's eligibility for a water licence under the *Water Act*.
4. I (we) acknowledge that any construction or actions to populate the CFO with additional livestock pursuant to an AOPA permit in the absence of a *Water Act* licence will **not** be relevant to AEP's consideration of whether to grant my *Water Act* licence application, if a new water licence is needed.
5. I (we) acknowledge that any such construction or livestock increase will be at the CFO's sole risk if the *Water Act* licence application is denied or if the operation of the CFO is otherwise deemed to be in violation of the *Water Act*. This risk includes being required to depopulate the CFO and/or to cease further construction, or to remove "works" or "undertakings" (as defined in the *Water Act*).
6. **AS RELEVANT:** I (we) acknowledge that the CFO is located in the South Saskatchewan River Basin and that, pursuant to the *Bow, Oldman and South Saskatchewan River Basin Water Allocation Order* [Alta. Reg. 171/2007], this basin is currently closed to new surface water allocations.

Signed this ____ day of _____, 20____.

Signature of Applicant or Agent

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GENERAL ENVIRONMENTAL INFORMATION

(complete this section for the worst case of the existing facility which is the closest to water bodies or water wells and for each of the proposed facilities)

Facility description / name (as indicated on site plan)

Existing: Heifer shed

Proposed 1: Dairy barn

Proposed 2: lagoon

Proposed 3: _____

Facility and environmental risk information		Facilities				NRCB USE ONLY	
		Existing	Proposed 1	Proposed 2	Proposed 3	Meets requirements	Comments
Flood plain information	What is the height of the floor of the lowest manure storage or collection facility above the 1:25 year flood plain or the highest known flood level?	<input checked="" type="checkbox"/> > 1 m <input type="checkbox"/> ≤ 1 m	<input checked="" type="checkbox"/> > 1 m <input type="checkbox"/> ≤ 1 m	<input checked="" type="checkbox"/> > 1 m <input type="checkbox"/> ≤ 1 m	<input type="checkbox"/> > 1 m <input type="checkbox"/> ≤ 1 m	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	Not located in know flood plain
Surface water information	How many springs are within 100 m of the manure storage facility or manure collection area?	<u>none</u>	<u>none</u>	<u>none</u>		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	None observed during site visit or EPA database
	How many water wells are within 100 m of the manure storage facility or manure collection area?	<u>none</u>	<u>none</u>	<u>none</u>		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	None observed during site visit or EPA database
	What is the shortest distance from the manure collection or storage facility to a surface water body? (e.g., lake, creek, slough, seasonal)		<u>494m to canal</u>	<u>395m to canal</u>		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	354 m from EMS to canal 464 m from shed to canal
Groundwater information	What is the depth to the water table?		<u>5.2 m</u>	<u>5.2 m</u>		<input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES with exemption	5.2 m See drilling report
	What is the depth to the groundwater resource/aquifer you draw water from?	<u>11.89m</u>	<u>11.89m</u>	<u>11.89m</u>		<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES with exemption	one test well was drilled. No UGR found within 79 m blg (1770010)

Additional information (attach supporting information, e.g. borehole logs, records, etc. you consider relevant to your application)

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ENVIRONMENTAL RISK SCREENING INFORMATION

ERST for **proposed** facilities

See Decision Summary LA25029 for details

Facility	Groundwater score	Surface water score	File number

ERST for **existing** facilities A risk screening was conducted in 2018. All facilities pose a low risk to surface water and groundwater

Facility	Groundwater score	Surface water score	File number

ERST related comments:

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WATER WELL AND SURFACE WATER INFORMATION

Test well 1770010 was decommissioned
Well 224504 on the SW without info about depth of UGR

Well IDs: _____

Surface water related concerns from directly affected parties or referral agencies: ☐ YES ☒ NO

Groundwater related concerns from directly affected parties or referral agencies: ☐ YES ☒ NO

Water wells ☒ N/A

If applicable, exemption for 100 m distance requirements applied: ☐ YES ☐ NO Condition required: ☐ YES ☐ NO

Surface water ☒ N/A

If applicable, exemption for 30 m distance requirements applied: ☐ YES ☐ NO Condition required: ☐ YES ☐ NO

Water Well Exemption Screening Tool ☒ N/A

Water Well ID	Preliminary Screening Score	Secondary Screening Score	Facility

Groundwater or surface water related comments:

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DISTANCE OF ANY MANURE STORAGE FACILITY (EXISTING OR PROPOSED) TO NEIGHBOURING RESIDENCES

Neighbour name(s)	Legal land description	Distance (m)	NRCB USE ONLY				
			Zoning (LUB) category	MDS category (1-4)	Distance (m)	Waiver attached (if required)	Meets regulations
Goedhart	NE-29-10-25 WHM	630	rural general	1	610 m		yes
Veenland	NE-20-10-25 WHM	969	rural general	1	737 m		yes
Ashley	NW-22-10-25 WHM	1196	rural general	1	950 m		yes

LAND BASE FOR MANURE AND COMPOST APPLICATION (complete only if an increase in livestock or manure production will occur)

Name of land owner(s)*	Legal land description	Usable area** (ha)	Soil zone ***	NRCB USE ONLY	
				Usable area (ha)	Agreement attached (if required)
HB of Jumbo Valley	S 1/2-29-10-25 WHM	124 ha	irr		
	S 1/2-27-10-25 WHM	124	irr		
	NW 27-10-25 WHM	63	irr		
	SW 2-11-25 WHM	63	irr		
	E 1/2 3-11-25 WHM	124	irr		
S1/2 29-10-25 W5		120	irr	Total	614 ha irrigated

* If you are **not** the registered landowner, you must attach copies of land use agreements signed by all landowners.

** Available manure spreading area (excluding setback areas from residences, common bodies of water, water wells, etc. as identified in Agdex 096-5 [Manure Spreading Regulations](#))

*** Brown, dark brown, black, grey wooded, or irrigated

Additional information (attach any additional information as required)

Last updated: 31 Mar 2020

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MINIMUM DISTANCE SEPARATION

Methods used to determine distance (if applicable): google earth

Margin of error (if applicable): +/- 3 m

Requirements (m): Category 1: 552 m Category 2: 736 m Category 3: 920 m Category 4: 1472 m

Technology factor: ☐ YES ☒ NO

Expansion factor: ☐ YES ☒ NO

MDS related concerns from directly affected parties or referral agencies: ☐ YES ☒ NO

LAND BASE FOR MANURE AND COMPOST APPLICATION

Land base required: 542 ha irrigated

Land base listed: 614 ha irrigated

Area not suitable: already subtracted

Available area: 614 ha irr.

Requirement met: ☒ YES ☐ NO

Land spreading agreements required: ☐ YES ☒ NO

Manure management plan: ☐ YES ☒ NO

If yes, plan is attached: ☐

PLANS

Submitted and attached construction plans: ☒ YES ☐ NO

Submitted aerial photos: ☒ YES ☐ NO

Submitted photos: ☐ YES ☒ NO

GRANDFATHERING

Already completed: ☒ YES ☐ NO ☐ N/A

If already completed, see LA16050

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ALL SIGNATURES IN FILE

☒ YES ☐ NO

DATES OF APPROVAL OFFICER SITE VISITS

February 10, 2025	

CORRESPONDENCE WITH MUNICIPALITIES AND REFERRAL AGENCIES

Date deeming letters sent: March 12, 2025

Municipality: MD of Willow Creek

☒ letter sent ☒ response received ☒ written/email ☐ verbal ☐ no comments received

Alberta Health Services: NA

☐ letter sent ☐ response received ☐ written/email ☐ verbal ☐ no comments received

Alberta Environment and Parks: ☐ N/A

☒ letter sent ☒ response received ☒ written/email ☐ verbal ☐ no comments received

Alberta Transportation: ☒ N/A

☐ letter sent ☐ response received ☐ written/email ☐ verbal ☐ no comments received

Alberta Regulatory Services: ☐ N/A

☒ letter sent ☒ response received ☒ written/email ☐ verbal ☐ no comments received

Other: LNID ☐ N/A

☒ letter sent ☒ response received ☒ written/email ☐ verbal ☐ no comments received

Other: Atco Gas and Pipelines Ltd., South Alta Rural Electrification Association Ltd., Equis Rea Ltd. ☐ N/A

☒ letter sent ☐ response received ☐ written/email ☐ verbal ☒ no comments received

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NRCB | Natural Resources Conservation Board

Application under the Agricultural Operation Practices Act for a confined feeding operation, manure collection area and/or manure storage facility(ies)

LIQUID MANURE STORAGE: Earthen manure storage (EMS): Naturally occurring protective layer

(complete a copy of this section for EACH proposed earthen liquid manure storage facility with a naturally occurring protective layer)

Facility description / name (as indicated on site plan)

1. lagoon (EMS)

2. _____

Manure storage capacity (complete a separate row of this table for each cell of the EMS)

	Length (m)	Width (m)	Total depth (m)	Depth below ground level (m)	Slope run:rise			NRCB USE ONLY	
					Inside end walls	Inside side walls	Outside walls	Calculated storage capacity (m³) (excl. 0.5 m freeboard)	Filled in lower ¼? Y/N
1.	124	153	3.3	3.3	3:1	3:1	NA		Y
2.									
TOTAL CAPACITY								44,710 m³	

Surface water control systems

Describe the run-on and runoff control system

Naturally occurring protective layer details

Thickness of naturally occurring protective layer	<u>3.1</u> (m)	Provide details (as required)		
Soil texture	<u>23</u> % sand	<u>47</u> % silt	<u>30</u> % clay	
Hydraulic conductivity - naturally occurring protective layer	Depth and type of soil tested <u>9.2</u> <u>Till</u>	Hydraulic conductivity (cm/s) <u>1.8×10^{-8}</u>	Describe test standard used <u>Falling head test</u>	

Additional information (attach copies of soil test reports)

NRCB USE ONLY

Requirements met: ☒ YES ☐ NO
Condition required: ☐ YES ☒ NO
Report attached: ☒ YES ☐ NO

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Liquid manure storage volume calculator attached: ☒ YES ☐ NO

Depth to water table: 5.2 m

Requirements met: ☒ YES ☐ NO

Depth to uppermost groundwater resource: _____

Requirements met: ☒ YES ☐ NO

Comments: No UGR identified. Below water table

ERST completed: ☒ see ERST page for details

Surface water control systems

Requirements met: ☒ YES ☐ NO

Details/comments:

Naturally occurring protective layer details

Layer specification comments (e.g. description of the layer texture, layer thickness/depth and the methodology used to collect this information such as sand lenses, number, and location of boreholes):

Shallow bedrock. Water table encountered at a depth of 5.2 m below ground level

Leakage detection system required: ☐ YES ☒ NO

If yes, please explain why.

Liquid Manure Storage Volume Calculator

Construction Dimensions of Liquid Manure Storage

* Only cells in blue can be changed.

	Metric	Imperial Units
Size of Liquid Manure Storage		
Total Length* ₄	124.0 m	407 ft
Total Width* ₄	153.0 m	502 ft
Total Depth* ₄	3.3 m	11 ft
Design Capacity Depth	2.80 m	9 ft
End Slope* ₄	3 run:rise	3 run:rise
Side Slope* ₄	3 run:rise	3 run:rise
Length of Bottom	104.2	
Width of Bottom	133.2	
Total Capacity @ top of Bank	53,989 m³	Total Capacity (@tob) 1,906,613 ft ³ 11,875,971 Imp. Gal.
Design Capacity of Liquid Manure Storage (freeboard level)		
Length (design capacity depth)	121.0 m	397 ft
Width (design capacity depth)	150.0 m	492 ft
Total Depth	3.3 m	11 ft
Design Capacity Depth	2.80 m	9 ft
End Slope	3 run:rise	3 run:rise
Side Slope	3 run:rise	3 run:rise
Design Capacity (freeboard level)	44,710 m³	1,578,901 ft³ 9,834,712 Imp. Gal.
Surface Area of Liquid Manure	18,150 m ²	195,365 ft ²

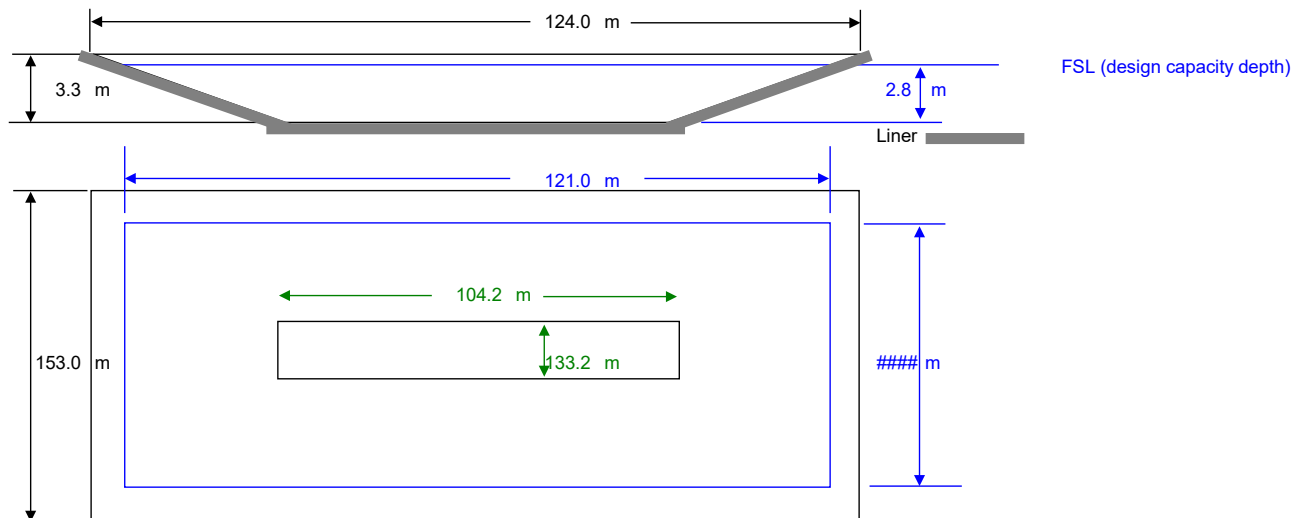
CFO Name ₁ Jumbo
Land Location ₁

Type of Livestock ₂
Free Stall: Lactating Cow Only
Annual manure production / hd 36.0 m³/hd
9 month manure production / hd 27.00 m³/hd

Number of Livestock ₃ 475 head

Minimum Liquid Manure Storage Volume Required
12,825 m³** 452,911 ft³
79,885 Imp. Gal.

** Design capacity of liquid manure storage should be equal to, or greater than, minimum storage volume required.



Lines in Black - Overall liquid manure storage dimensions
Lines in Blue - Design capacity depth dimensions (excludes freeboard)

NTS - Not To Scale

16 January 2025

J Lobbezoo Engineering & Consulting Services Ltd.

PO Box 96, Monarch, AB T0L1M0

JLECS File: P24078

Hutterian Brethren Church of Jumbo Valley

PO Box 730

Fort Macleod, Alberta T0L 0Z0

Attention: Mr. Tim Tschetter

**Re: Geotechnical Review and Evaluation
 NRCB Permitting of Existing Lagoon Cell
 NW-28-010-25-W4M, near Granum, Alberta**

As requested, J Lobbezoo Engineering & Consulting Services Ltd. (JLECS) has carried out a geotechnical review and evaluation of the above-captioned site relative to the required protection of the groundwater resource, as required by the Agricultural Operation Practices Act, AB Reg. 267/2001 (hereinafter referred to as "AOPA"). This letter describes the site soil conditions to support a permit application related to the permitting of an existing lagoon cell for manure storage (refer to Figure 1, attached). The existing lagoon cell was constructed in about 2008 as a fourth cell associated with a sanitary lagoon system which services the Jumbo Valley Colony, and has reportedly never been used for that purpose. Accordingly, the intent is to repurpose the redundant lagoon cell for manure storage.

While the existing lagoon cell was constructed with a compacted clay liner (in general accordance with Alberta Environment's publication "Design and Construction of Liners for Municipal Wastewater Stabilization Ponds"), construction records related to the existing lagoon construction were not available. Accordingly, in order to demonstrate the suitability of the naturally existing soils for consideration as a naturally occurring protective layer to the groundwater resource, four boreholes were advanced at the site on December 11, 2024. The boreholes were advanced at the approximate locations denoted as JC1-24 to JC4-24 on Figure 1, attached.

The boreholes were advanced by a truck-mounted drill rig owned and operated by Chilako Drilling Services and extended to depths of 7.4 m to 12.0 m below the existing grade. The boreholes were logged by Larry Delong of Chilako Drilling Services.

In general, the natural mineral soils encountered in the boreholes consisted of a thin layer of fluvial and lacustrine loam soils (comprised of silt, sand & clay) overlying soft mudstone bedrock below about 2.6 m to 3.0 m depth (below natural grade). It is understood that the lagoon was constructed by excavating the overburden soils, and replacing with compacted clay. While minor perched groundwater (seepage) was noted at 5.2 m depth (below the top of berm) in borehole JC4-24, no groundwater resource (as defined by the AOPA) was encountered within the 12.0 m investigation depth at this site.

Samples of soil collected from the screened zones of boreholes JC1-24 as well as samples from similar depths at the other boreholes were all subjected to grain size analyses, which was carried out by Down to Earth Laboratories in Lethbridge, Alberta. The lab report is attached, for reference. The results indicate a soil texture breakdown of:

Table 1: Soil Texture Analyses

Borehole/Depth	% Sand	% Silt	% Clay
JC1-24 / 4.5 – 6.0 m	24	56	20
JC2-24 / 6.0 – 7.5 m	20	44	36
JC3-24 / 4.5 – 6.0 m	13	45	42
JC4-24 / 6.8 – 7.5 m	35	45	20
<i>Average:</i>	<i>23</i>	<i>47</i>	<i>30</i>

To measure the *in situ* permeability of the subsurface soils, a 50 mm diameter PVC monitoring well was constructed in borehole JC1-24. The test well was screened from 4.3 m to 7.4 m depth. Well saturation of the 50 mm diameter monitoring well was carried out by filling the monitoring well to the top for several consecutive days. After several days of testing, a 24-hour water drop of 0.45 m determined for test well JC1-24.

To calculate the permeability of the screened portion of the clay strata at the test well location, a modified falling head test (as outlined in the USBR Engineering Geology Field Manual Volume 2 [2001]) was used. The input variables and output data are outlined on the attached In Situ Permeability Test report. The results of the permeability testing indicate an *in situ* hydraulic conductivity (k_s) values of 1.8×10^{-8} cm/s.

Using the measured permeability of the subsurface strata at this site, the 3.1 m mudstone screened at test hole JC1-24 is estimated to represent the equivalent of over 100 m of naturally occurring materials having a hydraulic conductivity of 1×10^{-6} cm/s (the reference standard in AOPA). This represents natural material protection in excess of the minimum requirements outlined by the AOPA for lagoons (minimum 10 m, Section 9.5-a).

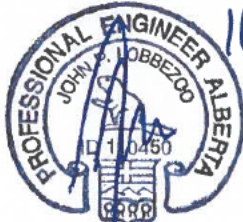
Conclusion

Based on the results of the current investigation, permeability testing, and our understanding of the site and development at the site, it is JLECS's opinion that the naturally occurring materials at the site satisfy the AOPA requirements for permitting the existing lagoon and pens at this location, and that the naturally occurring materials also satisfy the AOPA requirements for permitting a proposed catch basin at the site, if proposed.

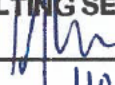
We trust that this report satisfies your present requirements. Should you have any questions, please contact the undersigned at your convenience.

Yours truly,

J Lobbezoo Engineering & Consulting Services Ltd.



John Lobbezoo, P.Eng.
Principal Geotechnical Engineer

PERMIT TO PRACTICE	
J LOBBEZOO ENGINEERING & CONSULTING SERVICES LTD.	
RM SIGNATURE:	
RM APEGA ID #:	110450
DATE:	16 Jan 2025
PERMIT NUMBER: P016456	
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)	

Attachments

- Figure 1 Borehole Locations
- In Situ Permeability Test Calculations
- Down to Earth Soil Texture Results
- Soil Profile and Parent Material Description, Chilako Drilling Services



Figure 1: Site Layout & Borehole Locations

JC1-24

In Situ Permeability Test

Modified Falling Head Permeability Equation

$$K_s = \frac{r^2}{2\ell\Delta t} \left[\frac{\sinh^{-1} \frac{\ell}{r_e}}{2} \ln \left[\frac{2H_1 - \ell}{2H_2 - \ell} \right] - \ln \left[\frac{2H_1H_2 - \ell H_2}{2H_1H_2 - \ell H_1} \right] \right]$$

taken from USBR Engineering Geology Field Manual Volume 2 (2001)

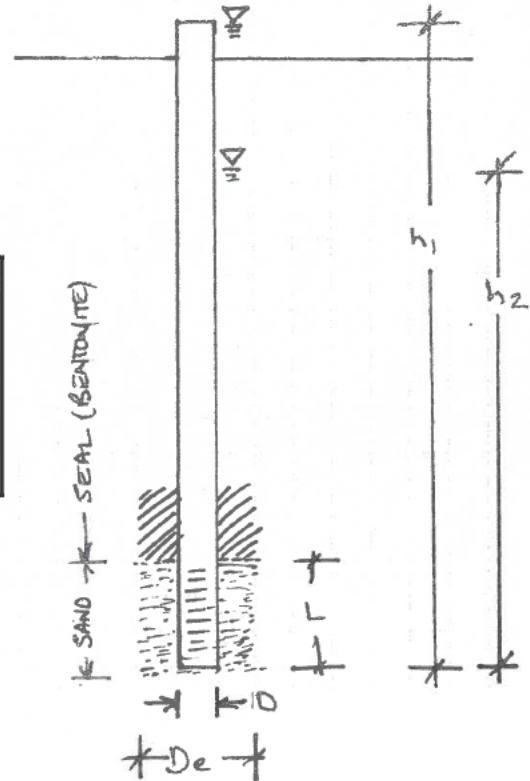
JC1-24 - Hutterian Brethren Church of Jumbo Valley

JLECS File: P24078

INPUT VARIABLES

Terms	Value	Definition
D	0.0520	diameter of standpipe (m)
De	0.1500	diameter of borehole (m)
L	3.10	length of sand section (m)
h1	8.00	initial height of water above base of hole (m)
h2	7.55	final height of water above base of hole (m)
t	24.0	time of test (h)

$$k_s = 1.8E-08 \text{ cm/sec}$$





Down To Earth Labs Inc.

The Science of Higher Yields

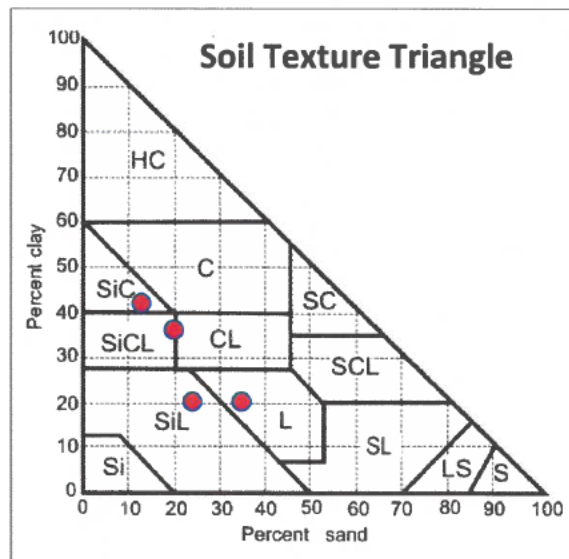
J. Lobbezoo Engineering +
Consulting Services
Box 96
Monarch, Alberta T0L 1M0

Report #: 201894
Report Date: 2025-01-13
Received: 2025-01-09
Completed: 2025-01-13
Test Done: ST

Project :
Jumbo Colony
PO:

3510 6th Ave North
Lethbridge, AB T1H 5C3
403-328-1133
www.downtoearthlabs.com
info@downtoearthlabs.com

Sample ID:		250109O002	250109O003	250109O004	250109O005
Cust. Sample ID:		JC1-24	JC2-24	JC3-24	JC4-24
Analyte	Units	4.5-6	6-7.5	4.5-6	6.8-7.5
Sand	%	24.1	20.1	13.0	35.0
Silt	%	55.9	43.9	45.0	45.0
Clay	%	20.0	36.0	42.0	20.0
Soil Texture	-	Silt Loam	Clay Loam	Silty Clay	Loam



Raygan Boyce - Chemist

CHILAKO DRILLING SERVICES LTD

Box 942 Coaldale, Alberta, T1M 1M8
(403) 345-3710

SOIL PROFILE AND PARENT MATERIAL DESCRIPTION

Site Location: NW28-10-25W4, Jumbo Valley

Date: 11-Dec-24

Hole #	Location	Depth	Texture	Moisture	Geological	Sample	Remarks
JC1-24	0332365	0-0.15	CL	D	Topsoil		
	5525200	0.15-0.6	FSCl	D	Lac/Fluv		
		0.6-1.5	FSL	D	Lac/Fluv		Some gravel
		1.5-2.6	CL	D	Lac/Fluv		Some gravel
		2.6-7.4	SiS/MS	D	Bedrock	4.5-6.0	Soft siltstone/mudstone, gray 50mm H.C. Well installed to 7.4m BGS Screen: 7.4-4.4m Sand: 7.4-4.3m Bentonite: 4.3-0.0m Stickup: 0.6m Hole Diameter: 0.15m
	~2m above bottom of lagoon						
JC2-24	0332368	0-0.15	FSCl	D	Topsoil		
	5525296	0.15-2.7	FSCl	D	Lac/Fluv		Trace gravel
		2.7-12.0	SiS/MS	D	Bedrock	6.0-7.5	Soft siltstone/mudstone, gray
	~3m above bottom of lagoon						
JC3-24	0332228	0-0.15	CL	D	Topsoil		
	5525331	0.15-1.5	SiC	D	Lac		V. Stiff, med plastic, brown
		1.5-2.5	CL-C	M	Till	1.5-2.5	V. Stiff, med plastic, dark brown
		2.5-3.0	FSL-FSCl	Sat	Till	2.5-3.0	Sat on top of bedrock
		3.0-12.0	SiS/MS	D	Bedrock	4.5-6.0	Soft siltstone/mudstone, gray
	~1m above bottom of lagoon						
JC4-24	0332212	0-3.6	CL-C	M	Fill		
	5525181	3.6-4.6	C	M	Fill		
	Between	4.6-5.2	CL	VM	Till		Stiff, med plastic, brown
	Lagoon	5.2-6.0	FSL-FSCl	Sat	Till		Soft, free water
	Cells	6.0-6.8	CL	M	Till		Stiff, low plastic, trace gravel, some sand
		6.8-9.2	SiS/MS	D	Bedrock	6.8-7.5	Soft siltstone/mudstone, gray
Native material removed and clay liner installed below bottom of lagoon							
No visible lagoon seepage							

Legend: L Loam
C Clay
S Sand
Gr. Gravel
Si Silt
F Fine (sand)
VF Very Fine (sand)

Eg. VFSCl = Very Fine Sandy Clay Loam

Part 2 – Technical Requirements

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

NRCB USE ONLY	
LIQUID MANURE STORAGE VOLUME CALCULATOR (if applicable)	
Facility 1	
Name / description New EMS	Capacity 44,710 m ³
Facility 2	
Name / description	Capacity
Facility 3	
Name / description	Capacity
Facility 4	
Name / description	Capacity
TOTAL CAPACITY	44,710 m ³
REQUIRED 9 MONTH STORAGE CAPACITY	12,825 m ³
MEETS THE REQUIREMENTS FOR A MINIMUM OF 9 MONTHS STORAGE	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

Part 2 — Technical Requirements

Application under the Agricultural Operation Practices Act for a confined feeding operation, manure collection area and/or manure storage facility(ies)

LIQUID MANURE COLLECTION AND/OR STORAGE: In-barn - Concrete liner

(complete a copy of this section for **EACH** proposed in-barn liquid manure storage facility with a concrete liner)

Facility description / name (as indicated on site plan)

1. Dairy barn 1
2. Dairy barn 2
3. Sand lane/Sand storage + Pit

Manure storage capacity (use one row in the table for **EACH** in-barn storage. Attach additional pages if you require more rows)

	Length ^{Feet} (m)	Width ^{Feet} (m)	Total depth ^{Feet} (m)	Depth below ground level (m)	NRCB USE ONLY Calculated storage capacity (m ³)
1.	285.4 87 m	210 64 m		0	
2.	260 79.2 m	110 33.5 m		0	
3.	257 78.3 m	70 21.3 m	12	0	
TOTAL CAPACITY					9 mth together with EMS

In the sand storage building are 4 lift stations (pits). Each 4.3 m x 4.3 m x 3.6 m deep)

Concrete liner details

Scrape alleys or unslatted portions of barn floors (if applicable)	Concrete thickness 8 inch		Method of sulphate protection Type 50	
	Concrete strength 32 mpa		Concrete reinforcement size and spacing 10 mm 16" o/c	
In-barn manure pit floors	Concrete thickness 8 inch		Method of sulphate protection Type 50	
	Concrete strength 32 mpa		Concrete reinforcement size and spacing 10 mm 16" o/c	
In-barn manure pit walls	Concrete thickness 8 inch		Method of sulphate protection Type 50	
	Concrete strength 32 mpa	Horizontal reinforcement size and spacing 10 mm 16" o/c	Vertical reinforcement size and spacing 10 mm 16" o/c	

Part 2 — Technical Requirements



NRCB | Natural Resources
Conservation Board

Application under the *Agricultural Operation Practices Act* for a confined feeding operation, manure collection area and/or manure storage facility(ies)

LIQUID MANURE COLLECTION AND/OR STORAGE: In-barn - Concrete liner (cont.)

Describe how the joints at the junction of the pit walls, pit floors and any other joints will be sealed

Double water stop

Describe sealing practices for piping, etc. that penetrates the liner

silkaflex

Concrete requirements can be found in Technical Guideline Agdex 096-93

Guideline minimums:

Solid manure (wet): 30MPa (C)

Liquid manure: 32MPa (B)

Category A is required to be engineered

Method of sulphate protection:

Type 50 or Type 10 with fly ash or equivalent

NRCB USE ONLY

Requirements met: ☒ YES ☐ NO

Condition required: ☒ YES ☐ NO

Additional information

NRCB USE ONLY

Liquid manure storage volume calculator attached: ☒ YES ☐ NO

Depth to water table: 5.2 m

Requirements met: ☒ YES ☐ NO

Depth to uppermost groundwater resource: None identified

Requirements met: ☒ YES ☐ NO

ERST completed: ☒ see ERST page for details

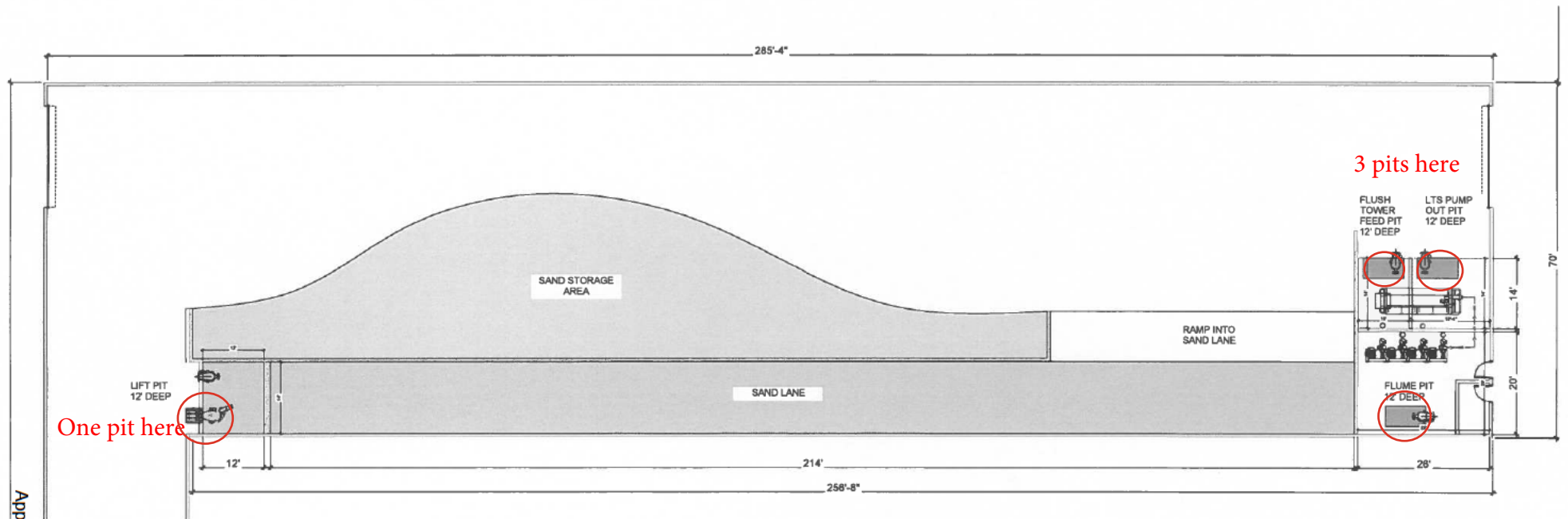
Concrete liner requirements

Leakage detection system required: ☐ YES ☒ NO If yes, please explain why

Last updated: 31 Mar 2020

Page ____ of ____

NRCB USE ONLY



sand lain

Part 1

Part 2

