Technical Document LA23048

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)

NRCB USE ONLY	Application number	Legal land description
☑ Approval ☐ Registration ☐ Authorization ☐ Amendment	LA23048	SW 25-8-20 W4

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 s[redacted]ation provided in this application is true to the best of my knowledge.

21-Febr. 2024
Date of signing

[redacted]

Hejo Farms.
Corporate name (if applicable)

Johan Bennen.
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)
Sheep Facility includes the 2 barns (Lamb & Ewe and Finishing), Manure Room and Ancillary Structures	
Lambing and ewe Barn	220.54 m. X 42.57 m
finiching Barn.	110.03 m. X 28.70 m.
manure room.	9.65 m X 9.65 m.
Lagoun (EMS)	75 X 75 X 3m (deep)

Existing facilities: list **ALL** existing confined feeding operation facilities and their dimensions

Existing facilities	Dimensions (m) (length, width, and depth)	NRCB USE ONLY
No existing facilities, new CFO		

NRCB USE ONLY
Barns connected by under-roof alleyways
Feed Kitchen (34.49 m x 26.67m) + Office/Handelling (22.43m + 37.08m x 18.77m + 9.14m) attached to sheep facility, no manure

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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

Construction completion date for proposed facilities Oct 2025

Additional information

Manure Room for solid/wet manure storage/manure separator.

Solids on pivot corner for short term manure storage liquids from separator/wash water pipelined underground to lagoon - AO comment info from applicant.

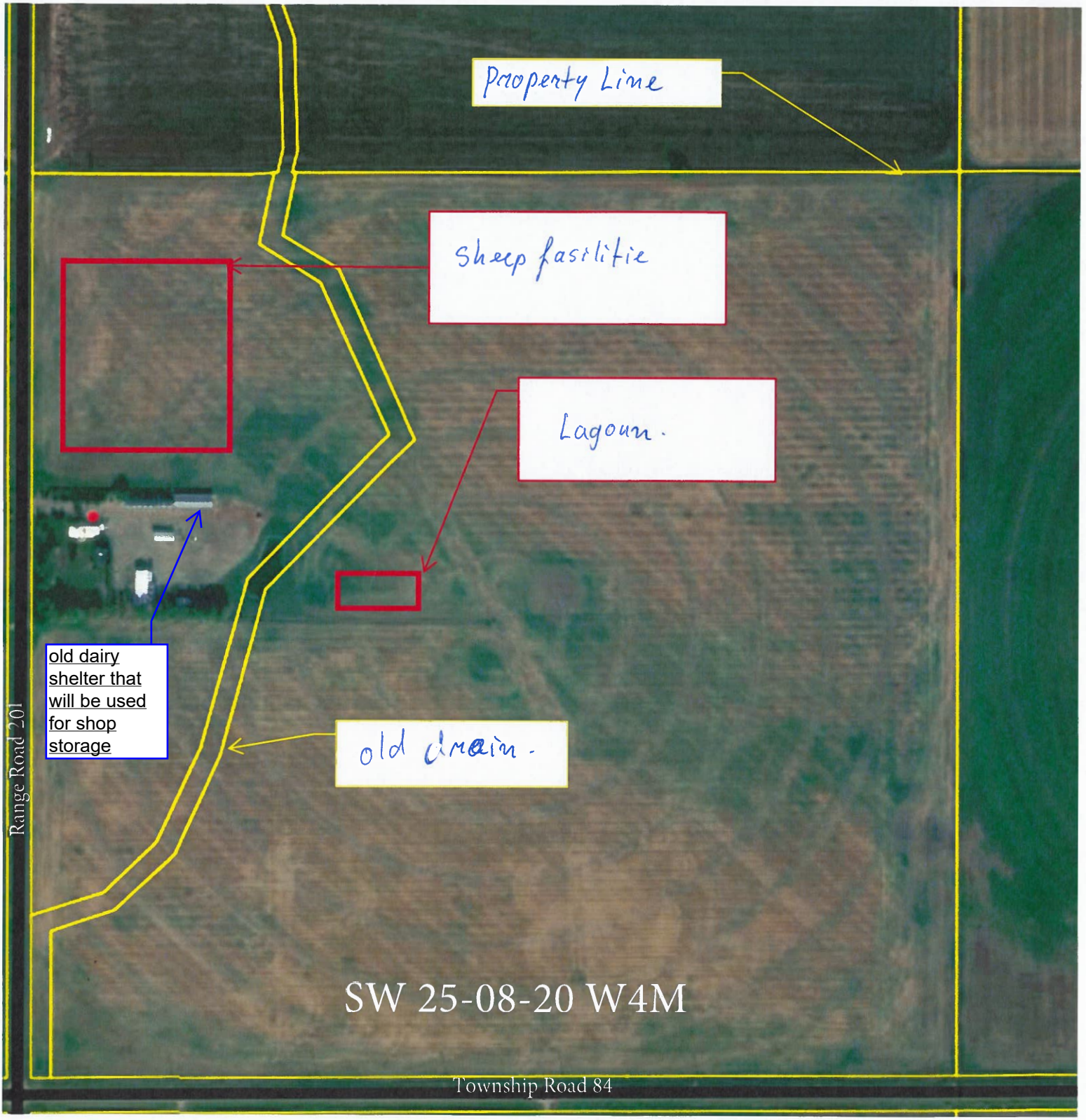
Lagoon contents will be used for pivots on 1/4 [illegible]

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**
Sheep - ewes with lambs	0	5,000	5,000
AO comment: Livestock numbers are the same as Part 1 application.			

Last updated September 11, 2023

HEJO FARMS LTD.



"old drain" was filled in previously, was not observed during site visit.

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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 Protected Areas (EPA) 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 EPA 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** EPA'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 EPA 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 EPA'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.
7. **Provide:** Water licence application number(s) _____

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 EPA under the *Water Act* for the development or activity proposed in this AOPA application.
2. **Provide**: Water license number(s) or water conveyance agreement details _____

Signed this 21 day of Febr., 2024. [redacted]
Signature of Applicant or Agent

SMRID.

150 acres for surface water rights from SMRID.

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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: _____ **Proposed 1:** Sheep fasilitie.

Proposed 2: Lagoun. **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 elevation of the floor of the lowest manure storage or collection facility above the 1:25 year flood plain or the highest known flood level?	☐ >1 m ☐ ≤ 1 m	☑ >1 m ☐ ≤ 1 m	☑ >1 m ☐ ≤ 1 m	☐ > 1 m ☐ ≤ 1 m	☒ YES ☐ NO ☐ YES with exemption	confirmed
Surface water information	How many springs are within 100 m of the manure storage facility or manure collection area?		NA	NA		☒ YES ☐ NO ☐ YES with exemption	no springs observed
	How many water wells are within 100 m of the manure storage facility or manure collection area?		NA	NA		☒ YES ☐ NO ☐ YES with exemption	no water wells on property
	What is the shortest distance from the manure collection or storage facility to a surface water body? (e.g., lake, creek, slough, seasonal)		1 KM.	1KM.		☒ YES ☐ NO ☐ YES with exemption	irrigation canal 3.4 km south of proposed lagoon
Groundwater information	What is the depth to the water table?		8,2 m.	8.2m.		☒ YES ☐ NO ☐ YES with exemption	below 12 m
	What is the depth to the groundwater resource/aquifer you draw water from?		unknow	unknow.		☒ YES ☐ NO ☐ YES with exemption	no water wells within 1 km with water data.

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

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NRCB USE ONLY

ENVIRONMENTAL RISK SCREENING INFORMATION

Well IDs: no wells on site

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

ERST for **proposed** facilities

Facility	Groundwater score	Surface water score	File number
new CFO assumed all facilities low risk if AOPA technical requirements are met			

ERST for **existing** facilities

Facility	Groundwater score	Surface water score	File number
no existing facilities, new CFO			

Name	Johan Bennon
Address	
Legal Land Location	SW-25-08-20W4M

MDS Spreadsheet based on 2006 AOPA Regulations

Category of Livestock	Type of Livestock	Factor A	Technology Factor	MU	LSU Factor	Number of Animals	LSU
Feedlot Animals	Beef Cows/Finishers (900+ lbs)	0.700	0.700	0.910	0.4459		-
	Beef Feeders (450 - 900 lbs)	0.700	0.700	0.500	0.2450		-
	Beef Feeder Calves (<550 lbs)	0.700	0.700	0.275	0.1348		-
	Horses - PMU	0.650	0.700	1.000	0.4550		-
	Horses - Feeders > 750 lbs	0.650	0.700	1.000	0.4550		-
	Horses - Foals < 750 lbs	0.650	0.700	0.300	0.1365		-
	Mules	0.600	0.700	1.000	0.4200		-
	Donkeys	0.600	0.700	0.670	0.2814	-	-
	Bison	0.600	0.700	1.000	0.4200		-
	Other						-
Dairy (*count lactating cows only)	Free Stall – Lactating Cows with all associated dries, heifers, and calves*	0.800	1.100	2.000	1.7600		-
	Free Stall – Lactating Cows with Dry Cows only*	0.800	1.100	1.640	1.4432		-
	Free Stall – Lactating Cows only	0.800	1.100	1.400	1.2320		-
	Tie Stall – Lactating Cows only	0.800	1.000	1.400	1.1200		-
	Loose Housing – Lactating Cows only	0.800	1.000	1.400	1.1200		-
	Dry Cow	0.800	0.700	1.000	0.5600		-
	Replacements – Bred Heifers (Breeding to Calving)	0.800	0.700	0.875	0.4900		-
	Replacements - Growing Heifers (350 lbs to breeding)	0.800	0.700	0.525	0.2940		-
	Calves (< 350 lbs)	0.800	0.700	0.200	0.1120		-
	Other						-
Swine Liquid (*count sows only)	Farrow to finish *	2.000	1.100	1.780	3.9160		-
	Farrow to wean *	2.000	1.100	0.670	1.4740		-
	Farrow only *	2.000	1.100	0.530	1.1660		-
	Feeders/Boars	2.000	1.100	0.200	0.4400		-
	Growers/Roasters	2.000	1.100	0.118	0.2600		-
	Weaners	2.000	1.100	0.055	0.1210		-
	Other						-
Swine Solid (*Count sows only)	Farrow to finish *	2.000	0.800	1.780	2.8480		-
	Farrow to wean *	2.000	0.800	0.670	1.0720		-
	Farrow only *	2.000	0.800	0.530	0.8480		-
	Feeders/Boars	2.000	0.800	0.200	0.3200		-
	Growers/Roasters	2.000	0.800	0.118	0.1888		-
	Weaners	2.000	0.800	0.055	0.0880		-
	Other						-
Poultry	Chicken - Breeders - Solid	1.000	0.700	0.010	0.0070		-
	Chicken - Layers - Liquid (includes associated pullets)	2.000	1.100	0.008	0.0176		-
	Chicken - Layers - (Belt Cage)	2.000	0.700	0.008	0.0112		-
	Chicken - Layers - (Deep Pit)	2.000	0.700	0.008	0.0112		-
	Chicken - Pullets/Broilers	1.000	0.700	0.002	0.0014		-
	Turkey - Toms/Breeders	1.000	0.700	0.020	0.0140		-
	Turkey - Hens (light)	1.000	0.700	0.013	0.0091		-
	Turkey - Broilers	1.000	0.700	0.010	0.0070		-
	Ducks	1.000	0.700	0.010	0.0070		-
	Geese	1.000	0.700	0.020	0.0140		-
	Other						-
Sheep and Goats	Sheep - Ewes/Rams	0.600	0.700	0.200	0.0840		-
	Sheep - Ewes with lambs	0.600	0.700	0.250	0.1050	5,000	525.0
	Sheep - Lambs	0.600	0.700	0.050	0.0210		-
	Sheep - Feeders	0.600	0.700	0.100	0.0420		-
	Goats - Meat/Milk (per Ewe)	0.700	0.700	0.170	0.0833		-
	Goats - Nannies/Billies	0.700	0.700	0.140	0.0686		-
	Goats - Feeders	0.700	0.700	0.077	0.0377		-
	Other						-
Cervid	Elk	0.600	0.700	0.600	0.2520		-
	Deer	0.600	0.700	0.200	0.0840		-
	Other						-
Wild Boar	Feeders	2.000	0.800	0.140	0.2240	-	-
	Sow (farrowing)	2.000	0.800	0.371	0.5936		-
	Other						-
					Total		525.0

For New Operations

Dispersion Factor 1

Category	Odour Objective	Distance	
		Feet	Metres
1	41.04	1,324	404
2	54.72	1,766	538
3	68.4	2,207	673
4	109.44	3,532	1,077

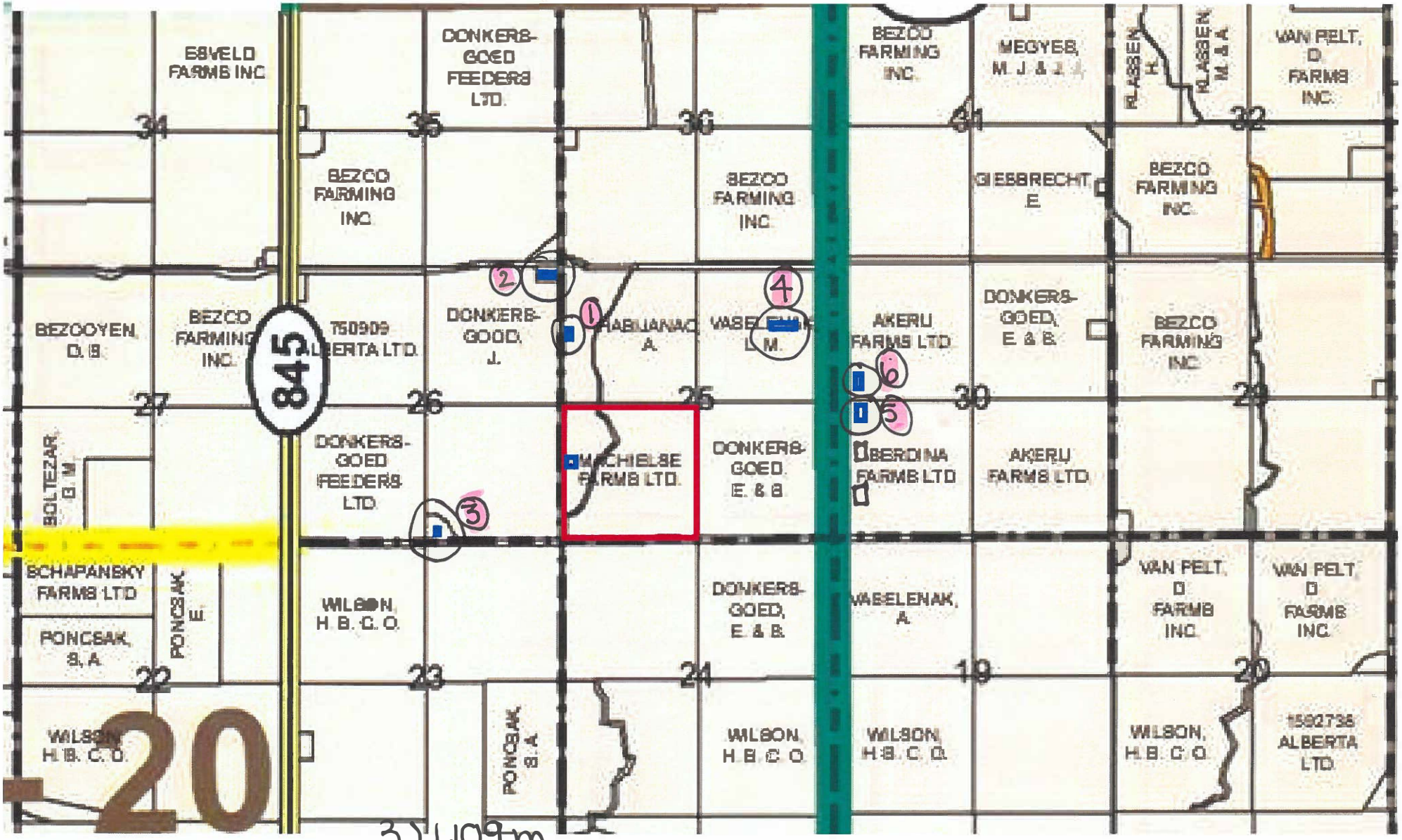
For Expanding Operations

Dispersion Factor 1

Expansion Factor 0.77

Category	Odour Objective	Distance	
		Feet	Metres
1	41.04	1,020	311
2	54.72	1,360	414
3	68.40	1,700	518
4	109.44	2,720	829

Approximate location of surrounding neighbours, not sketched to scale



1.) 603 m

2.) 868 m

3.) 1,109 m

4.) 1,000 m

(from proposed EMS)

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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
A. HABIGANAC	NW 25-8-20 W4	603 m	RA *	1	603 m	X	✓
Donkersgoed.	NE 26-8-20 W4	868 m.	RA	1	865 m	X	✓
Donkersgoed	SE 26-8-20 W4	1109 m.	RA	1	1110 m	X	✓
WASELENAK.	NE 25-8-20. W4	1206 m.	RA	1	1000 m	X	✓

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)
Hejo Farms	SW 25-8-20 W4	150	irrigatie	140 acres	N/A
Hejo Farms	NW 18-8-18 W4	150	"	150 acres	N/A
		Total		290 acres	

* 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)

Name Johan Bennon
Address 0
Legal Land
Location SW-25-08-20W4M

Landbase Requirements (hectares) based on 2006 AOPA requirements

Category of Livestock	Type of Livestock	Number of Animals	Dark Brown & Brown (ha)	Grey Wooded (ha)	Black (ha)	Irrigated (ha)
Feedlot Animals	Cows/Finishers (900+ lbs)	0.0	0.0	0.0	0.0	0.0
	Feeders (450 - 900 lbs)	0.0	0.0	0.0	0.0	0.0
	Feeder Calves (<550 lbs)	0.0	0.0	0.0	0.0	0.0
	Horses - PMU	0.0	0.0	0.0	0.0	0.0
	Horses - Feeders > 750 lbs	0.0	0.0	0.0	0.0	0.0
	Horses - Foals < 750 lbs	0.0	0.0	0.0	0.0	0.0
	Mules	0.0	0.0	0.0	0.0	0.0
	Donkeys	0.0	0.0	0.0	0.0	0.0
	Bison	0.0	0.0	0.0	0.0	0.0
	Other	0.0				
Dairy (*count lactating cows only)	Free Stall – Lactating Cows with all associated dries, heifers, and calves*	0.0	0.0	0.0	0.0	0.0
	Free Stall – Lactating Cows with Dry Cows only *	0.0	0.0	0.0	0.0	0.0
	Free Stall – Lactating Cows only*	0.0	0.0	0.0	0.0	0.0
	Tie Stall – Lactating Cows only	0.0	0.0	0.0	0.0	0.0
	Loose Housing – Lactating Cows only	0.0	0.0	0.0	0.0	0.0
	Dry Cow (Solid manure)	0.0	0.0	0.0	0.0	0.0
	Dry Cow (Liquid manure)	0.0	0.0	0.0	0.0	0.0
	Replacements – Bred Heifers (Breeding to Calving)	0.0	0.0	0.0	0.0	0.0
	Replacements - Growing Heifers (350 lbs to breeding)	0.0	0.0	0.0	0.0	0.0
	Calves (< 350 lbs)	0.0	0.0	0.0	0.0	0.0
	Other	0.0				
Swine Liquid (*count sows only)	Farrow to finish *	0.0	0.0	0.0	0.0	0.0
	Farrow to wean *	0.0	0.0	0.0	0.0	0.0
	Farrow only *	0.0	0.0	0.0	0.0	0.0
	Feeders/Boars	0.0	0.0	0.0	0.0	0.0
	Growers/Roasters	0.0	0.0	0.0	0.0	0.0
	Weaners	0.0	0.0	0.0	0.0	0.0
	Other	0.0				
Swine Solid (*Count sows only)	Farrow to finish *	0.0	0.0	0.0	0.0	0.0
	Farrow to wean *	0.0	0.0	0.0	0.0	0.0
	Farrow only *	0.0	0.0	0.0	0.0	0.0
	Feeders/Boars	0.0	0.0	0.0	0.0	0.0
	Growers/Roasters	0.0	0.0	0.0	0.0	0.0
	Weaners	0.0	0.0	0.0	0.0	0.0
		0.0				
Poultry	Chicken - Breeders - Solid	0.0	0.0	0.0	0.0	0.0
	Chicken - Layers - Liquid (includes associated pullets)	0.0	0.0	0.0	0.0	0.0
	Chicken - Layers - (Belt Cage)	0.0	0.0	0.0	0.0	0.0
	Chicken - Layers - (Deep Pit)	0.0	0.0	0.0	0.0	0.0
	Chicken - Pullets/Broilers	0.0	0.0	0.0	0.0	0.0
	Turkey - Toms/Breeders	0.0	0.0	0.0	0.0	0.0
	Turkey - Hens (light)	0.0	0.0	0.0	0.0	0.0
	Turkey - Broilers	0.0	0.0	0.0	0.0	0.0
	Ducks	0.0	0.0	0.0	0.0	0.0
	Geese	0.0	0.0	0.0	0.0	0.0
	Other	0.0				
Goats and Sheep	Sheep - Ewes/Rams	0.0	0.0	0.0	0.0	0.0
	Sheep - Ewes with lambs	5000.0	205.5	172.0	128.0	103.0
	Sheep - Lambs	0.0	0.0	0.0	0.0	0.0
	Sheep - Feeders	0.0	0.0	0.0	0.0	0.0
	Goats - Meat/Milk (per Ewe)	0.0	0.0	0.0	0.0	0.0
	Goats - Nannies/Billies	0.0	0.0	0.0	0.0	0.0
	Goats - Feeders	0.0	0.0	0.0	0.0	0.0
	Other	0.0				
Cervid	Elk	0.0	0.0	0.0	0.0	0.0
	Deer	0.0	0.0	0.0	0.0	0.0
	Other	0.0				
Wild Boar	Feeders	0.0	0.0	0.0	0.0	0.0
	Sow (farrowing)	0.0	0.0	0.0	0.0	0.0
	Other	0.0				
	Total Hectares		206	172.0	128.0	103.0
	Total Acres		508	425.0	316.3	254.5

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NRCB USE ONLY

MINIMUM DISTANCE SEPARATION

Methods used to determine distance (if applicable): Google Earth

Margin of error (if applicable): +/- 2 m

Requirements (m): Category 1: 404 Category 2: 538 Category 3: 673 Category 4: 1077

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: 254 acres

Land base listed: 300 acres

Area not suitable: 10 acres

Available area 290 acres 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

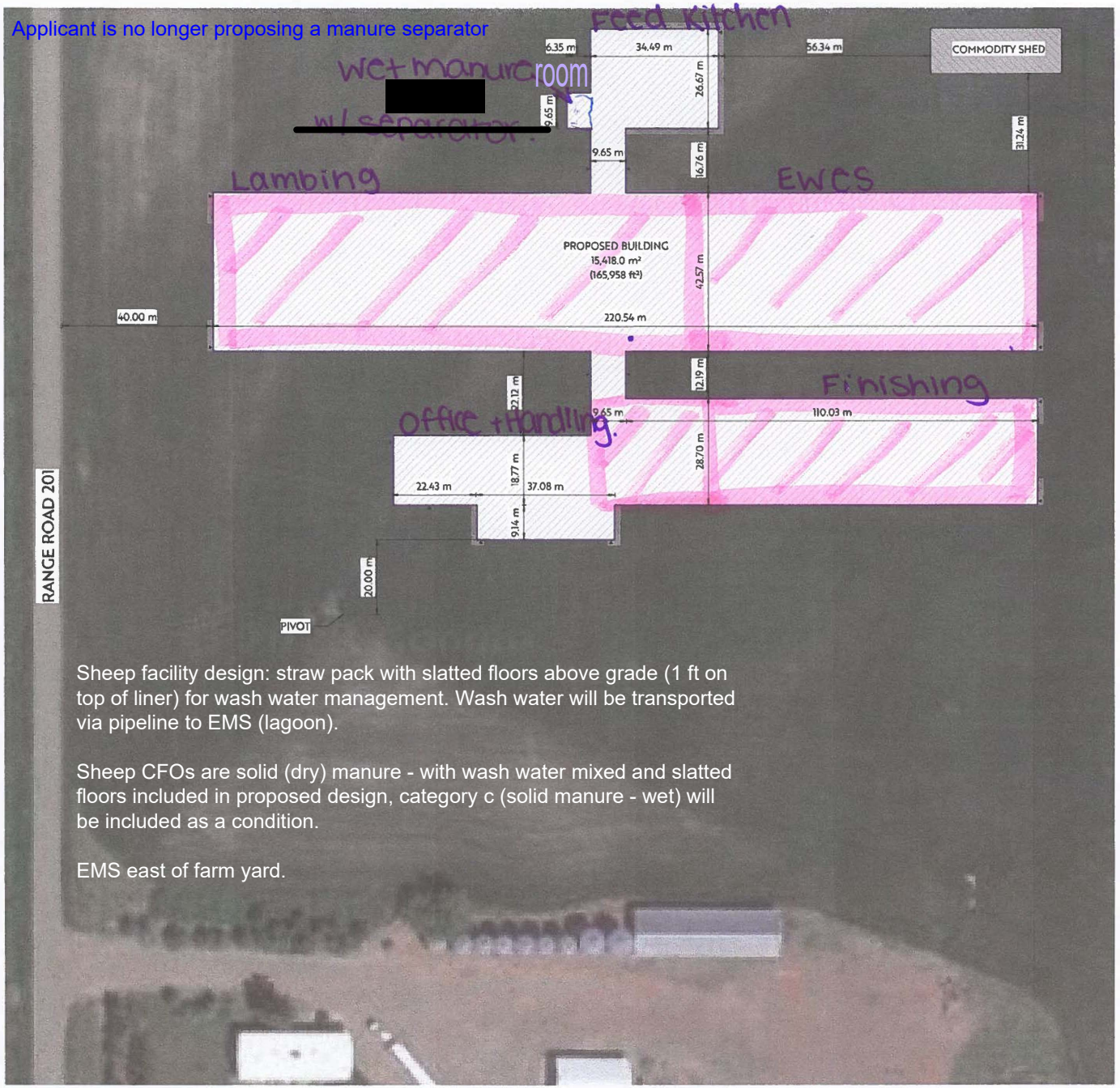
Submitted photos: ☐ YES ☒ NO

GRANDFATHERING

Already completed: ☐ YES ☐ NO ☒ N/A

If already completed, see _____

Applicant is no longer proposing a manure separator



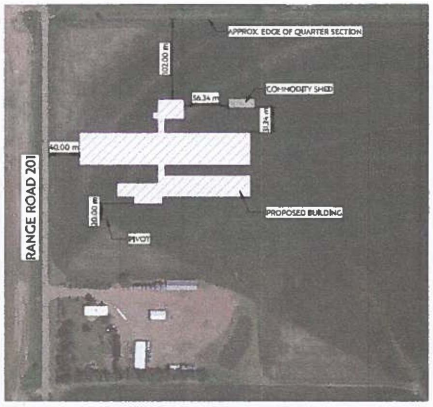
Sheep facility design: straw pack with slatted floors above grade (1 ft on top of liner) for wash water management. Wash water will be transported via pipeline to EMS (lagoon).

Sheep CFOs are solid (dry) manure - with wash water mixed and slatted floors included in proposed design, category c (solid manure - wet) will be included as a condition.

EMS east of farm yard.

NOTES CONCERNING BUILDING LOCATION

1. THIS SITE PLAN IS BASED ON INFORMATION PROVIDED BY THE OWNER, AND NOT A SURVEY OR ACTUAL SITE MEASUREMENTS. IT IS IMPERATIVE TO RE-VERIFY BEFORE START OF CONSTRUCTION OF ANY UNKNOWN FEATURES ON THIS OR THE ADJACENT SITES THAT MIGHT IMPACT ON THE PROJECT EITHER DURING CONSTRUCTION OR FUTURE USE.
2. THE 'NORTH' ORIENTATION REFERS TO NOMINAL NORTH RATHER THAN TRUE OR MAGNETIC NORTH.
3. ANY DIMENSIONS THAT SHOW THE LOCATION OF EXISTING FEATURES ARE APPROXIMATE ONLY, AND ARE TO BE CONFIRMED BEFORE CONSTRUCTION START AS REQUIRED BY A CERTIFIED ALBERTA LAND SURVEYOR.
4. LANDSCAPING IS SUBJECT TO CHANGE.



2 Keyplan A101 1:3000

VISUAL SCALE 1:3000

slated floors.

* under ground pipeline to lagoon.

1 Site Plan A101 1:600

VISUAL SCALE 1:600

PRELIMINARY

NOT FOR CONSTRUCTION

aggregate design studio ltd.

EAGLE BUILDERS

Hejo Farms
Sheep Barn
Lethbridge County, Alberta
12-30-8-19 W4

NO.	DESCRIPTION	DATE
D	ISSUED FOR PRELIMINARY REVIEW	2023-01-09
E	ISSUED FOR PRELIMINARY REVIEW	2024-01-19

Project No: A23563
Date: 2024-01-19 12:58:20 PM
Drawn by: JC, AS
Checked by: JC
Sheet Name:

Site Plan Overall

A101

NRCB USE ONLY

ALL SIGNATURES IN FILE ☒ YES ☐ NO

DATES OF APPROVAL OFFICER SITE VISITS

February 21, 2024	

CORRESPONDENCE WITH MUNICIPALITIES AND REFERRAL AGENCIES

Date deeming letters sent: March 6, 2024

Municipality: Lethbridge County

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

Alberta Health Services: ☒ N/A

☐ 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: ATCO Gas, SMRID ☐ N/A

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

Other: Lethbridge Rural Water Association ☐ N/A

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

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)

SOLID MANURE, COMPOST, & COMPOSTING MATERIALS: Barns, feedlots, & storage facilities - Concrete liner

*(complete a copy of this section for **EACH** barn, feedlot, and storage facility for solid manure, composting materials, or compost with a concrete liner)*

Facility description / name *(as indicated on site plan)* 1. Lambing and Ewe Barn.
2. finishing Barn.
3. manure room

Manure storage capacity

	Length (m)	Width (m)	Depth below grade to the bottom of the liner (m)	**NRCB USE ONLY** Estimated storage capacity (m^3)
1.	220.54 ~~X 42.57~~	42.57	0	
2.	110.03	28.70	0	
			TOTAL CAPACITY	
3. 9.65 9.65		9.65 9.65	0	

☒ I plan to use a short-term solid manure storage (STMS) as part of my manure storage and handling plan for this CFO. The AOPA requirements for STMS are set out in the NRCB Short-Term Solid Manure Storage Requirements Fact Sheet.

Surface water control systems

Describe the run-on and runoff control system

under Roof.

under roof, barn is to be constructed above grade, slatted floors 1 foot top of concrete liner

Liner protection

Describe how the physical integrity of the liner will be maintained

check for cracks.

NRCB USE ONLY
Requirements met: ☒ YES ☐ NO

Last updated February 26, 2021

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)

SOLID MANURE, COMPOST, & COMPOSTING MATERIALS: Barns, feedlots, & storage facilities - Concrete liner (cont.)

Concrete liner details

Concrete thickness 4 inch -	Method of sulphate protection: type 50
Concrete strength MPA 32 -	Concrete reinforcement size and spacing rebar 10 mm spaced 12 inch o.c.

Concrete requirements can be found in Technical Guideline Agdex 096-93
Guideline minimums:
Solid manure: 25MPa (D)
Solid manure (wet): 30MPa (C)
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
Report attached:	☐ YES ☒ NO

Additional information *(attach as required)*

NRCB USE ONLY

Nine month manure storage volume requirements met ☐ YES ☒ YES With STMS ☐ NO

Depth to water table: below 12 m Requirements met: ☒ YES ☐ NO

Depth to Uppermost groundwater resource: unknown Requirements met: ☒ YES ☐ NO

ERST completed: ☒ see ERST page for details UGR depth unknown - no wells within proposed CFO, no water observed within 12 m of drilling, EMS proposed 2 m

Surface water control systems

Requirements met: ☒ YES ☐ NO Details/comments:

Concrete liner details

Condition requiring category C (solid manure, wet) at minimum (see Approval LA23048) - sheep are typically category D (solid manure), applicant proposing slatted floors for wash water disposal to EMS

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

Last updated February 26, 2021

lagoon is proposed to be used for wash water

Liquid Manure Storage Volume Calculator

Construction Dimensions of Liquid Manure Storage

*** Only cells in blue can be changed.**

Overall Dimensions of Liquid Manure Storage			Liquid MS Dimensions
Total Length*[4]	75.0	m	246 ft
Total Width*[4]	75.0	m	246 ft
Total Depth*[4]	3.0	m	10 ft
Design Capacity Depth	*2.50*	m	8 ft
End Slope*[4]	3	run:rise	3 run:rise
Side Slope*[4]	3	run:rise	3 run:rise
Length of Bottom	57.0	m	187 ft
Width of Bottom	57.0	m	187 ft
			Total Capacity (@tob)
Total Capacity @ top of Bank	*13,149*	m^3	*464,353* ft^3
			2,892,375 Imp. Gal.

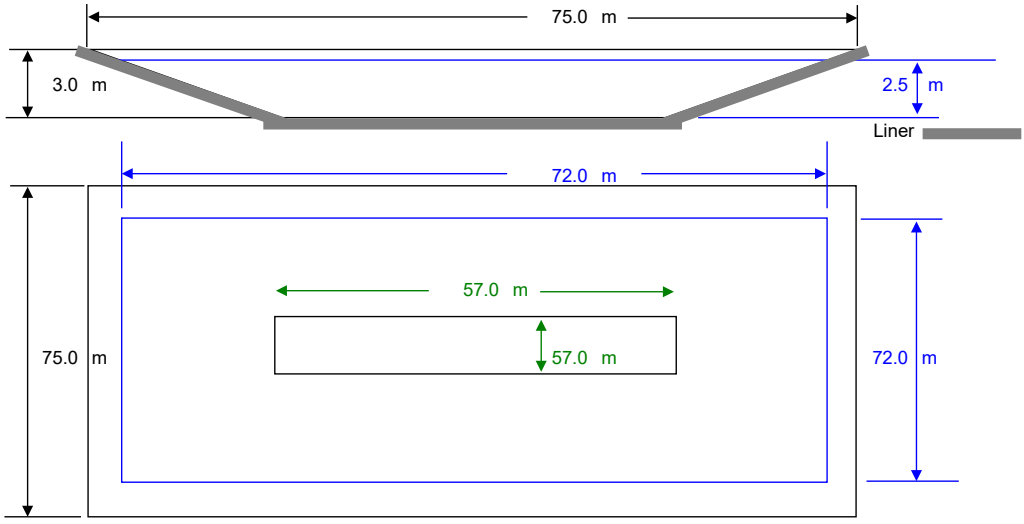
Design Capacity of Liquid Manure Storage (freeboard level)			Design Capacity (freeboard level)
Length (design capacity depth)	72.0	m	236 ft
Width (design capacity depth)	72.0	m	236 ft
Total Depth	*3.0*	m	*10* ft
Design Capacity Depth	2.50	m	8 ft
End Slope	3	run:rise	3 run:rise
Side Slope	3	run:rise	3 run:rise
Design Capacity (freeboard level)	**10,448**	m^3	**368,950** ft^3
			2,298,128 Imp. Gal.
level)	*5,184*	m^2	*55,800* ft^2

CFO Name [1]	(Enter CFO Name Here)
Land Location [1]	

Type(s) of Livestock [2]	Number of Livestock	Annual Manure Production (m^3/hd)
N/A		0.0
N/A		0.0
N/A	0	0.0
N/A	0	0.0
		Total manure Production (m^3/yr)

Minimum 9 Month Liquid Manure Storage Volume Required			
-	m^3 **	-	ft^3
		-	Imp. Gal.

** Design capacity of liquid manure storage should be equal to, or greater than, minimum 9 month liquid manure storage volume required.



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

NTS - Not To Scale

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 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 (m^3) (excl. 0.5 m freeboard)	Filled in lower ¼? Y/N
1.	75	75	3	2.5 m	3:1	3:1	3:1	10,448	Y
2.									
							TOTAL CAPACITY	10,448	

Surface water control systems

Describe the run-on and runoff control system

B ½ m Burm.

1/2 m berm around the EMS to divert run-on / run -off

Naturally occurring protective layer details

Thickness of naturally occurring protective layer	26 (m)	Provide details (as required): see attached report	
Soil texture	34 % sand	48 % silt	17 % clay
Hydraulic conductivity - naturally occurring protective layer	Depth and type of soil tested: 3.9 m clay	Hydraulic conductivity (cm/s): 1.5 X 10^{-7}	Describe test standard used: modified falling head test.

Additional information *(attach copies of soil test reports)*

NRCB USE ONLY

Requirements met: ☒ YES ☐ NO

Condition required: ☒ YES ☐ NO

Report attached: ☒ YES ☐ NO

NRCB USE ONLY

Liquid manure storage volume calculator attached: ☒ YES ☐ NO

Depth to water table: below 12 m Requirements met: ☒ YES ☐ NO

Depth to uppermost groundwater resource: unknown Requirements met: ☒ YES ☐ NO

Comments:

no water wells on site or within 1 km radius that have water well data to calculate UGR. Unknown, drilling reports showed water was not observed within the 12 m of drilling - EMS proposed only 3 m.

ERST completed: ☒ see ERST page for details

Surface water control systems

Requirements met: ☒ YES ☐ NO Details/comments:

1/2 m berm around the perimeter of the EMS to divert run-on / run-off. EMS constructed to have the pipeline from the sheep facility to fill in the bottom 1/4 of EMS.

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):

relatively uniform, sand lensing deeper than the proposed depth of EMS. no water encountered throughout the drilling depths of 12 m

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

15 February 2024

WSP File: CA0022671.6721 / BX30775

3102 – 12 Avenue South
Lethbridge, Alberta T1H 5V1
T: +1 403 327-7474
www.wsp.com

Hejo Farms Ltd.
PO Box 491
Coaldale, Alberta T1M 1N5

Attention: Johan Bennen

Re: Geotechnical Review and Evaluation
NRCB Permitting of Proposed Manure Storage Lagoon
SW-25-008-20-W4M, near Coaldale, Alberta

As requested, WSP E&I Canada Limited (WSP) 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 site soil conditions to support a permit application related to proposed liquid manure storage lagoon to be located in the northwest area of SW-25-008-20-W4M (refer to Figure 1, attached).

In order to demonstrate the suitability of the naturally existing soils for consideration as a naturally occurring protective layer to the groundwater, four boreholes were advanced at the site on January 2, 2024. The boreholes were advanced at the approximate locations denoted as JB1-24 to JB4-24 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 ranging between 11.6 m and 12.0 m below existing grades. The boreholes were logged by Larry Delong of Chilako Drilling Services.

In general, the natural mineral soils encountered within the boreholes consisted of a thin lacustrine silty clay layer which was underlain by clay till. While minor groundwater accumulation was noted during the drilling in JB2-24 at approximately 8.2 m depth, no groundwater resource (as defined by the AOPA) was identified within the 12 m investigation depth at the proposed lagoon site.

Samples of soil collected from the screened zone of boreholes JB1-24 to JB4-24 were subjected to laboratory grain size (i.e., hydrometer) analyses. The results (attached) indicate a textural breakdown of approximately:

Table 1: Soil Textural Analyses

Borehole/Depth	% Gravel	% Sand	% Silt	% Clay
JB1-24 / 9.0-10.5m	1	34	48	17
JB2-24 / 9.0-10.5m	1	35	46	18
JB3-24 / 9.0-10.5m	0	35	45	20
JB4-24 / 9.0-10.5m	0	30	52	18

To measure the *in situ* permeability of the subsurface soils, a 50 mm diameter PVC monitoring well was constructed in borehole JB1-24. The test well was screened from 7.7 m to 11.6 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 three-hour water drop of 0.84 m was determined.

To calculate the permeability of the screened portion of the clay till 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, of 1.5×10^{-7} cm/s at JB1-24.

Using the measured permeability of the clay stratum, the 3.9 m of clay screened at JB1-24 is estimated to represent the equivalent of approximately 26 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 liquid manure storage (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 proposed development at the site, it is WSP's opinion that the naturally occurring materials at the site satisfy the AOPA requirements for permitting the proposed liquid manure storage lagoon at this location.

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

Yours truly,

WSP E&I Canada Limited

15 Feb 2024

PROFESSIONAL ENGINEER ALBERTA JOHN P. LOBBEZOO ID 110450

John Lobbezoo, P.Eng.
Principal Geotechnical Engineer

Reviewed by:
Kevin Spencer, P.Eng., M.Eng.
Sr. Associate, Geotechnical Engineer

PERMIT TO PRACTICE
WSP E&I CANADA LIMITED
RM SIGNATURE: _____
RM APEGA ID #: 110450
DATE: 15 Feb 2024
PERMIT NUMBER: P004546
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Attachments
- Figure 1 Borehole Locations
- In Situ Permeability Test Calculations
- Hydrometer Tests
- Soil Profile and Parent Material Description, Chilako Drilling Services

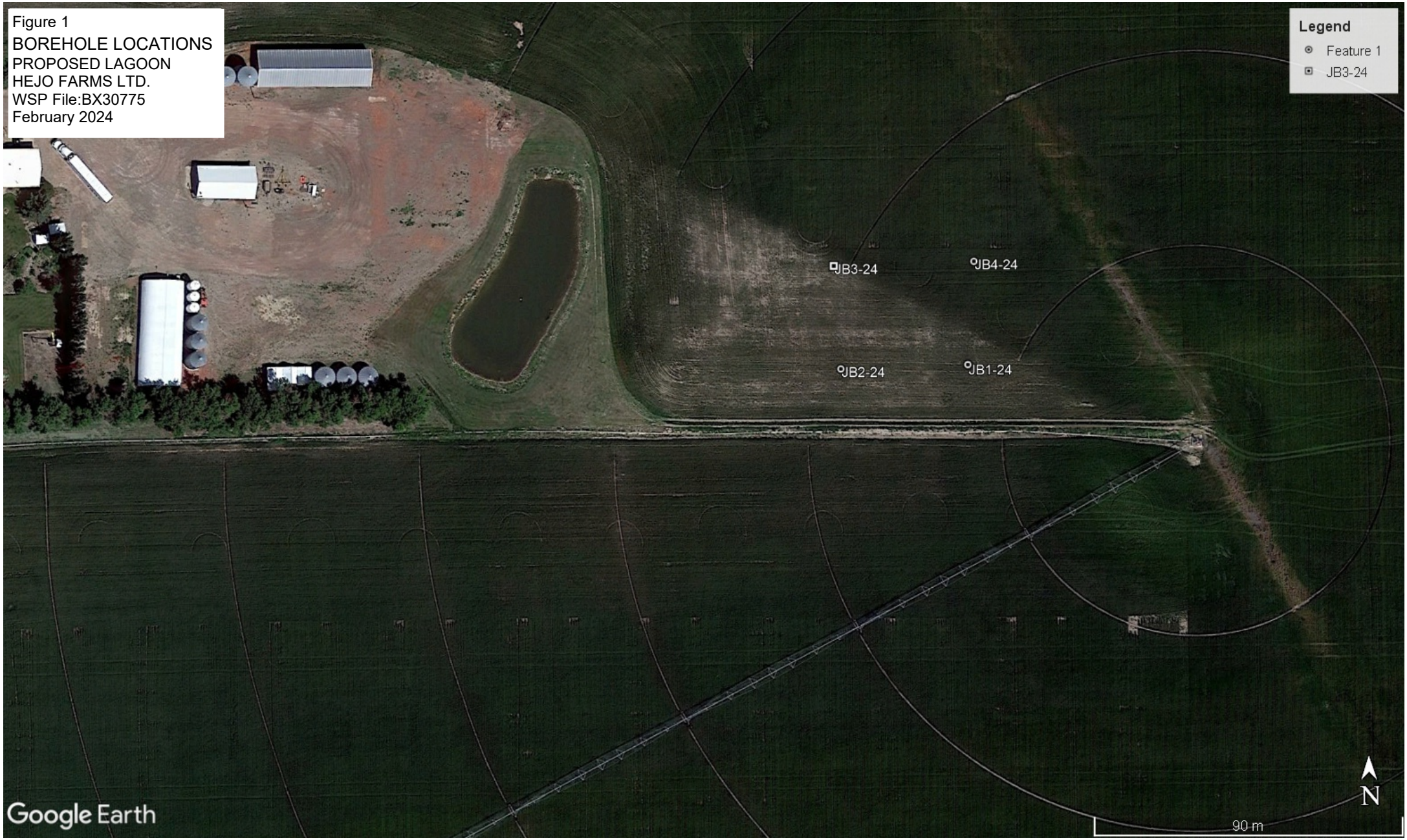


Figure 1
BOREHOLE LOCATIONS
PROPOSED LAGOON
HEJO FARMS LTD.
WSP File:BX30775
February 2024
Legend
Feature 1
JB3-24
JB3-24
JB4-24
JB2-24
JB1-24
Google Earth
N
90 m

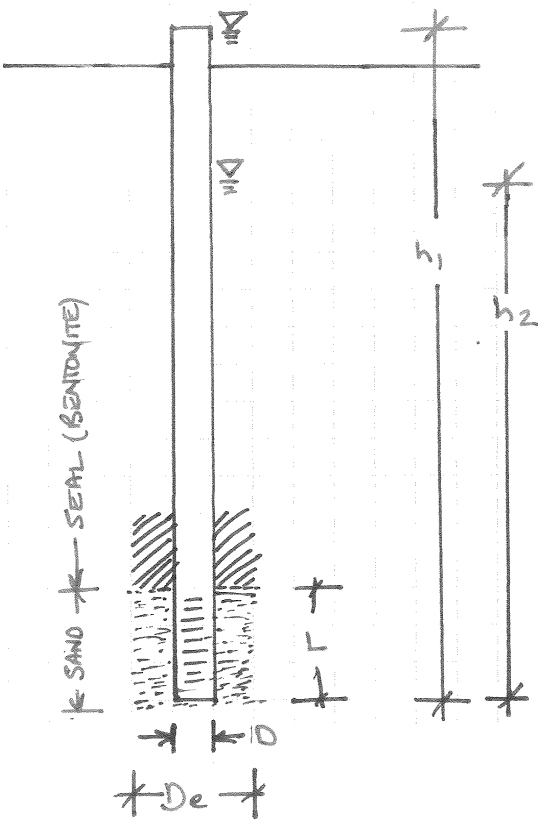
JB1-24

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)



JB1-24 - Hejo Farms

WSP File: BX30775

INPUT VARIABLES

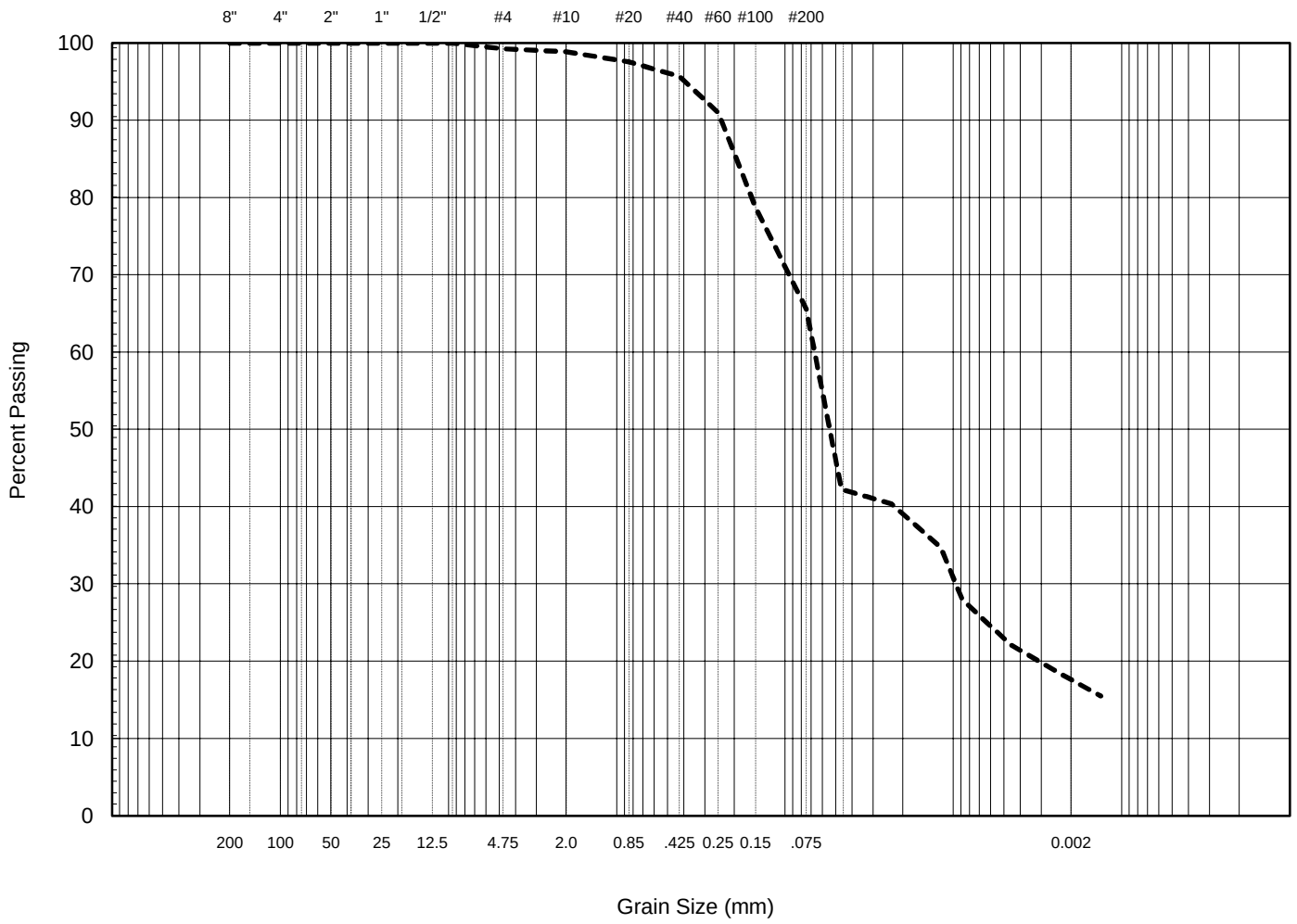
Terms	Value	Definition
D	0.0520	diameter of standpipe (m)
De	0.1500	diameter of borehole (m)
L	3.90	length of sand section (m)
h1	12.10	initial height of water above base of hole (m)
h2	11.26	final height of water above base of hole (m)
t	3.0	time of test (h)

k_s = 1.5E-07 cm/sec

HYDROMETER TEST

WSP Environment & Infrastructure Solutions

COBBLES	GRAVEL		SAND			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Summary

D10 =	#N/A	mm	**Gravel**	1	**%**
D30 =	0.0098	mm	**Sand**	34	**%**
D60 =	0.0681	mm	**Silt**	48	**%**
Cu =	#N/A		**Clay**	17	**%**
Cc =	#N/A				

Project No: BX30775
Hole No: JB1-24
Depth (m): 9.0-10.5

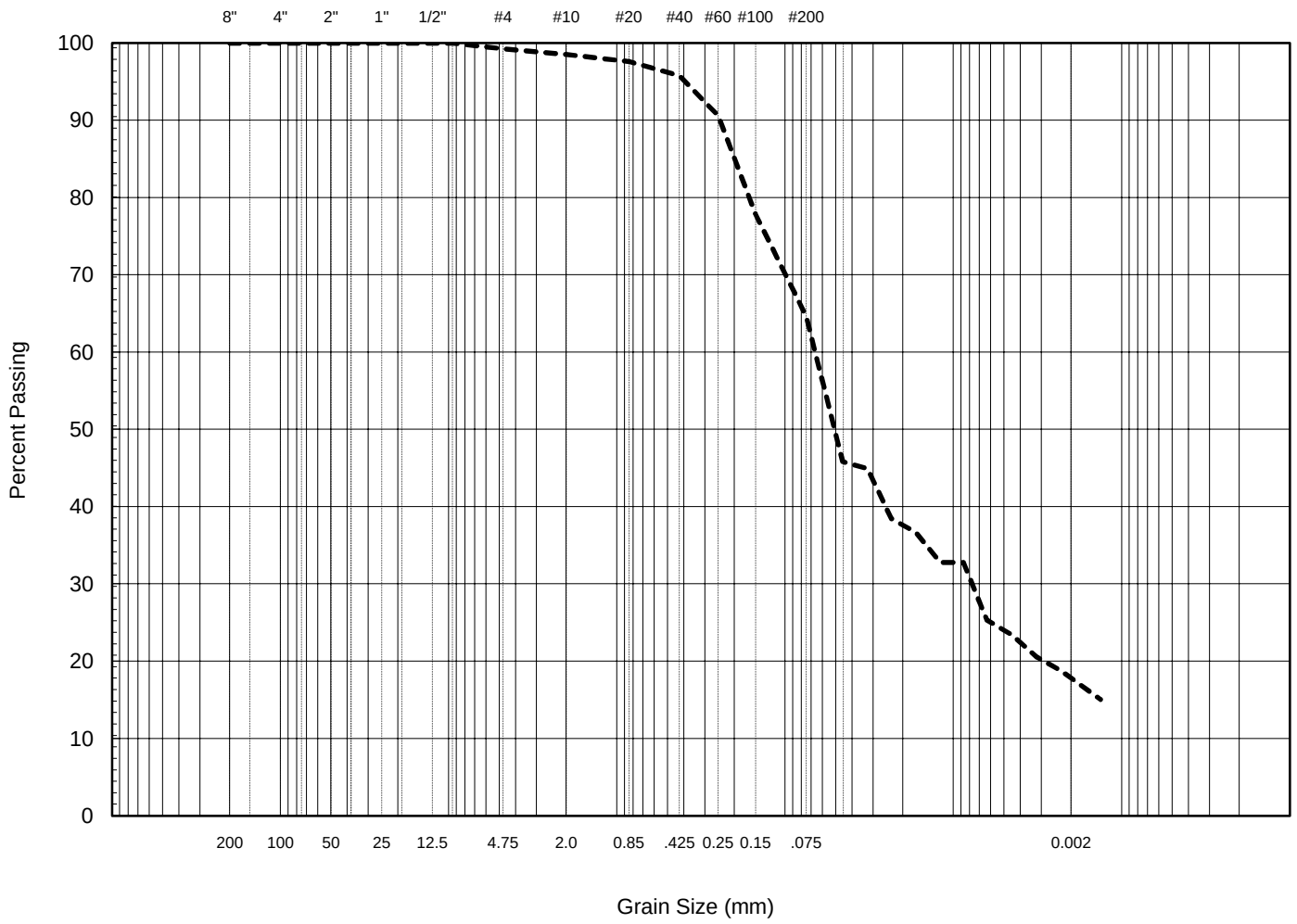
Client: J. Bennan
Sample: Sample # 3
Date: February 8, 2024

Tech: CA

HYDROMETER TEST

WSP Environment & Infrastructure Solutions

COBBLES	GRAVEL		SAND			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Summary

D10 =	#N/A	mm	**Gravel**	1	**%**
D30 =	0.0099	mm	**Sand**	35	**%**
D60 =	0.0677	mm	**Silt**	46	**%**
Cu =	#N/A		**Clay**	18	**%**
Cc =	#N/A				

Project No: BX30775
Hole No: JB2-24
Depth (m): 9.5-10.5

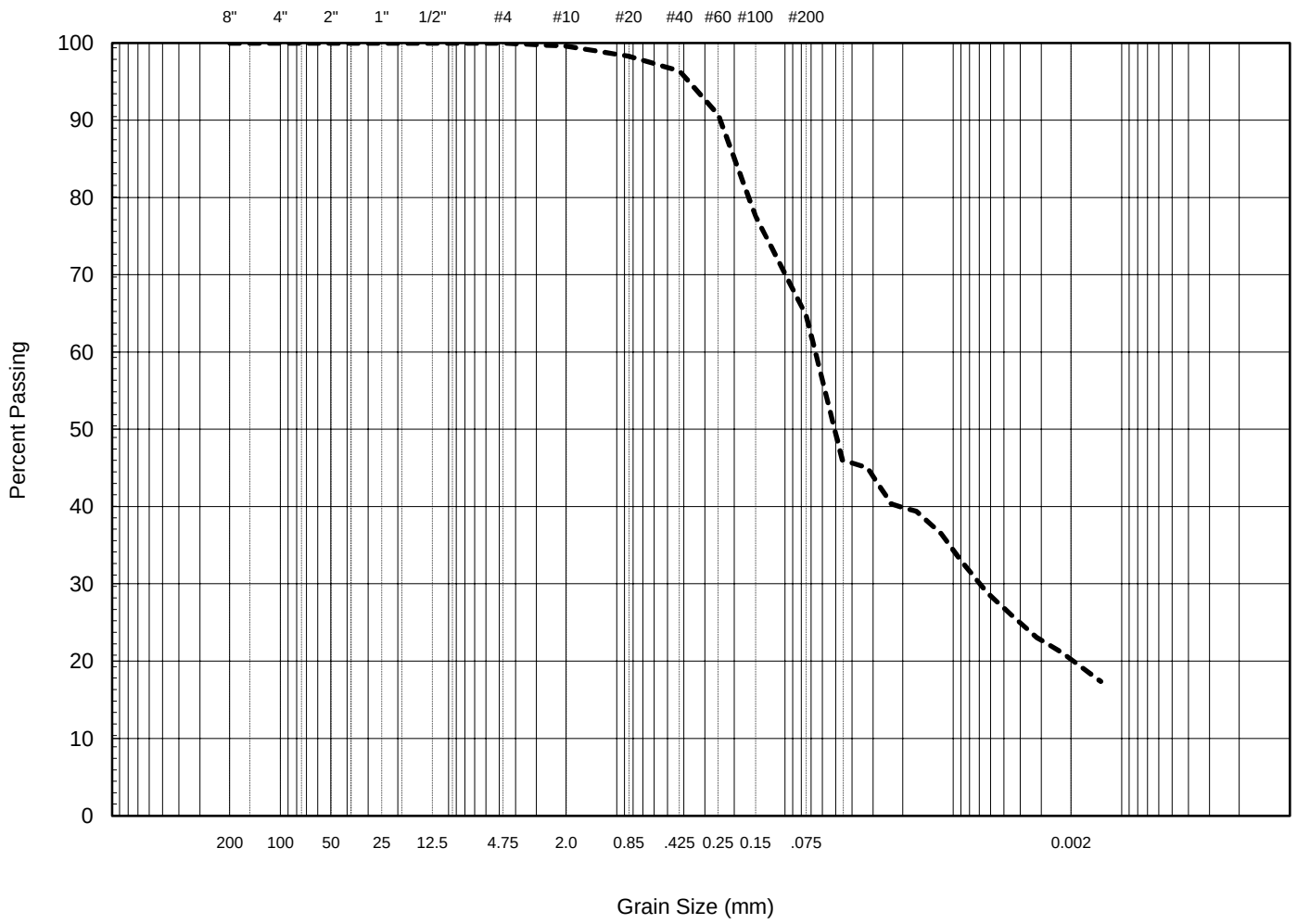
Client: J. Bennan
Sample: Sample # 3
Date: February 8, 2024

Tech: CA

HYDROMETER TEST

WSP Environment & Infrastructure Solutions

COBBLES	GRAVEL		SAND			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Summary					
D10 =	#N/A	mm	**Gravel**	0	**%**
D30 =	0.0070	mm	**Sand**	35	**%**
D60 =	0.0676	mm	**Silt**	45	**%**
Cu =	#N/A		**Clay**	20	**%**
Cc =	#N/A				

Project No: BX30775
Hole No: JB3-24
Depth (m): 9.0-10.5

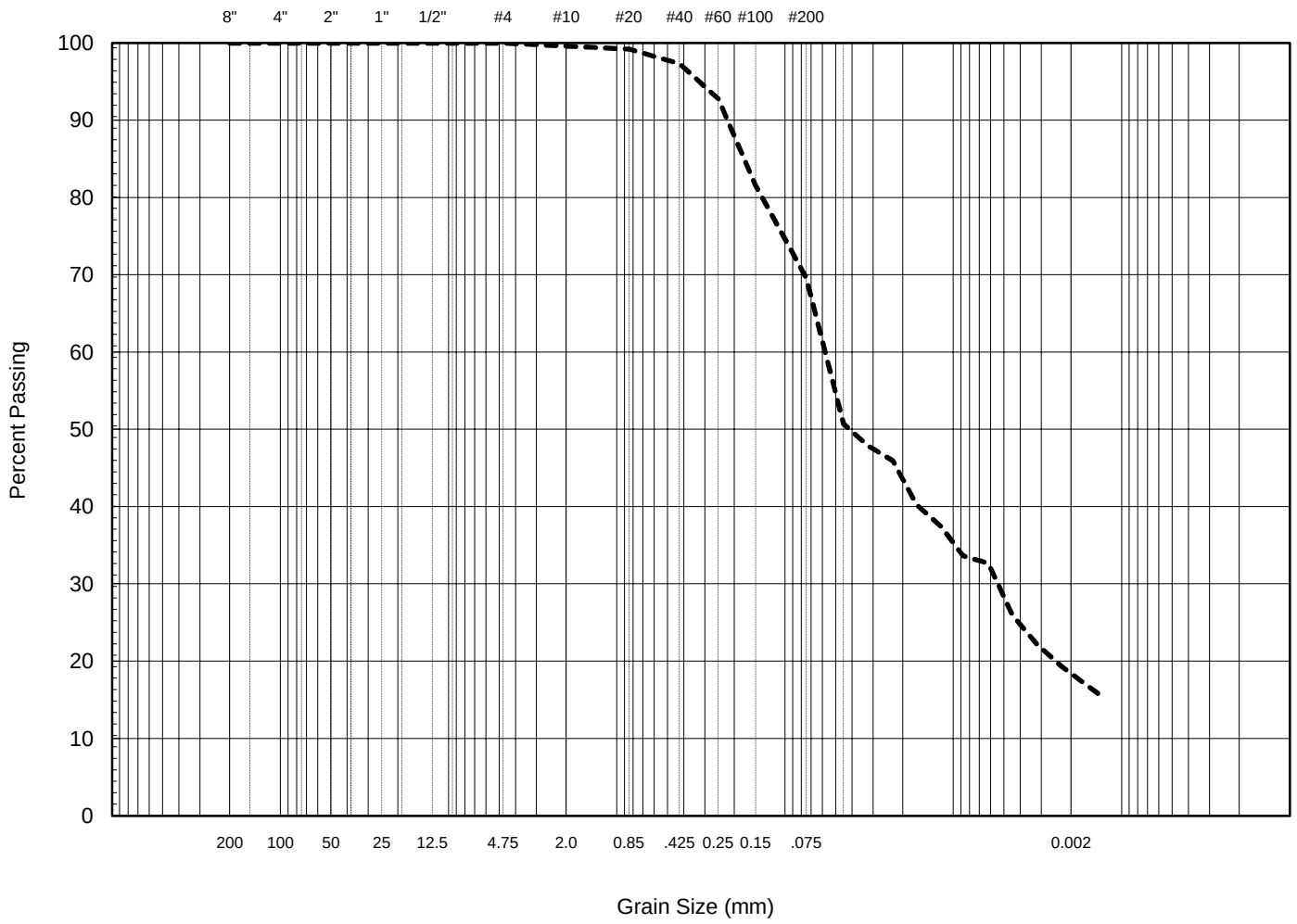
Client: J. Bennan
Sample: Sample # 1
Date: February 8, 2024

Tech: CA

HYDROMETER TEST

WSP Environment & Infrastructure Solutions

COBBLES	GRAVEL		SAND			SILT	CLAY
	Coarse	Fine	C	M	F		



Remarks:

Summary

D10 =	#N/A	mm	**Gravel**	0	**%**
D30 =	0.0055	mm	**Sand**	30	**%**
D60 =	0.0597	mm	**Silt**	52	**%**
Cu =	#N/A		**Clay**	18	**%**
Cc =	#N/A				

Project No: BX30775
Hole No: JB4-24
Depth (m): 9.0-10.5

Client: J. Bennan
Sample: Sample # 2
Date: February 8, 2024

Tech: CA

CHILAKO DRILLING SERVICES LTD

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

SOIL PROFILE AND PARENT MATERIAL DESCRIPTION

Site Location: SW25-8-20W4, Hejo Farms (Johan Bennen) Date: 2-Jan-24

Hole #	Location	Depth	Texture	Moisture	Geological	Sample	Remarks
JB1-24	0384841	0-0.15	CL	M	Topsoil		
	5503531	0.15-0.8	CL-SiCL	M	Lac		V. Firm, med plastic, brown
		0.8-6.4	CL	M	Till		Stiff, med plastic, brown
		6.4-7.6	CL	M	Till		Stiff, med plastic, brown, oxidized
		7.6		Sat			Sat sand streaks
		7.6-8.5	CL-C	M	Till		Stiff, med plastic, brown
		8.5-11.6	CL-C	M	Till	9.0-10.5	Stiff, med plastic, dark brown
							50mm H.C. Well installed to 11.6m BGS
							Screen: 11.6-8.6m
							Sand: 11.6-7.7m
							Bentonite: 7.7-0.0m
							Stickup: 0.5m
							Hole Diameter: 0.15m
JB2-24	0384803	0-0.15	CL	M	Topsoil		
	5503531	0.15-0.7	CL-SiCL	M	Lac		V. Firm, med plastic, brown
		0.7-6.2	CL	M	Till		Stiff, med plastic, brown
		6.2-8.2	CL-C	M	Till		Stiff, med plastic, brown, oxidized
		8.2-9.3	CL	M	Till		Sat Sand lensing, water in test hole
		9.3-12.0	CL-C	M	Till	9.5-10.5	Stiff, med plastic, dark brown
JB3-24	0384803	0-0.15	CL	M	Topsoil		
	5503561	0.15-0.8	CL-SiCL	M	Lac		V. Firm, med plastic, brown
		0.8-4.0	CL	M	Till		V. Firm, med plastic, brown
		4.0-5.0	CL	M	Till		V. Firm, med plastic, yellow brown, some oxidation
		5.0-10.5	CL-C	M	Till	9.0-10.5	Stiff, med plastic, brown, some oxidation
		10.5-12.0	CL-C	M	Till		Stiff, med plastic, oxidized, VM sand streaks
JB4-24	0384843	0-0.15	CL	M	Topsoil		
	5503561	0.15-0.75	CL-SiCL	M	Lac		
		0.75-4.5	CL	M	Till		V. Firm, med plastic, brown
		4.5-6.2	CL	M	Till	4.0-4.5	V. Firm, med plastic, brown, M sand streaks
		6.2-8.1	CL	M	Till		Firm, med plastic, brown, sat sand streaks
		8.1-12.0	CL-C	M	Till	9.0-10.5	Stiff, med plastic, brown

Legend:

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