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	LA25026	SW 32-20-22 W4M

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.

July 6 2025
Date of signing

[redacted]
Signature

Corporate name (if applicable)

Matthew Jacobsen
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)
Alley 100 4 pens total area	325 x 65
Alley 200-300 8 pens total area	325 x 130
Alley 400 4 pens total area	325 x 65
Catch Basin 100 Alley	25 x 60 x 3.5 deep
Catch Basin 200-300 Alley	30 x 125 x 3.5 deep
Catch Basin 400 Alley	25 x 60 x 3.5 deep

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

Existing facilities	Dimensions (m) (length, width, and depth)	NRCB USE ONLY

NRCB USE ONLY

Last updated September 11, 2023

Part 2 — Technical Requirements

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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 facility will be integrated into new facility. Not currently a CFO

Construction completion date for proposed facilities Phase 1 - December 31/2028 Doc 1

Additional information

Proposed pens on site map - 100, 200, 300, 400 - Phase 1 plan

Phase 2 - pens 500 - 1100 - To be determined at Later Date

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**
~~Feeder Calves~~		~~20,000~~	~~20,000~~
~~Feeders~~		~~20,000~~	~~20,000~~
Finishers		~~20,000~~ 10,000	~~20,000~~ 10,000
AO Comment: Proposed animal numbers have not changed form Part 1 application.			

NOTES:

1. BACKGROUNDER BUNKS
2. STANDPAD @ 1% FOR 3.658m ; 125mm THICKNESS
3. 945.9m TOTAL BUNK LENGTH.
4. BUNK TO BE DONE BY OTHERS.

LEGEND:

FENCELINES

GATES

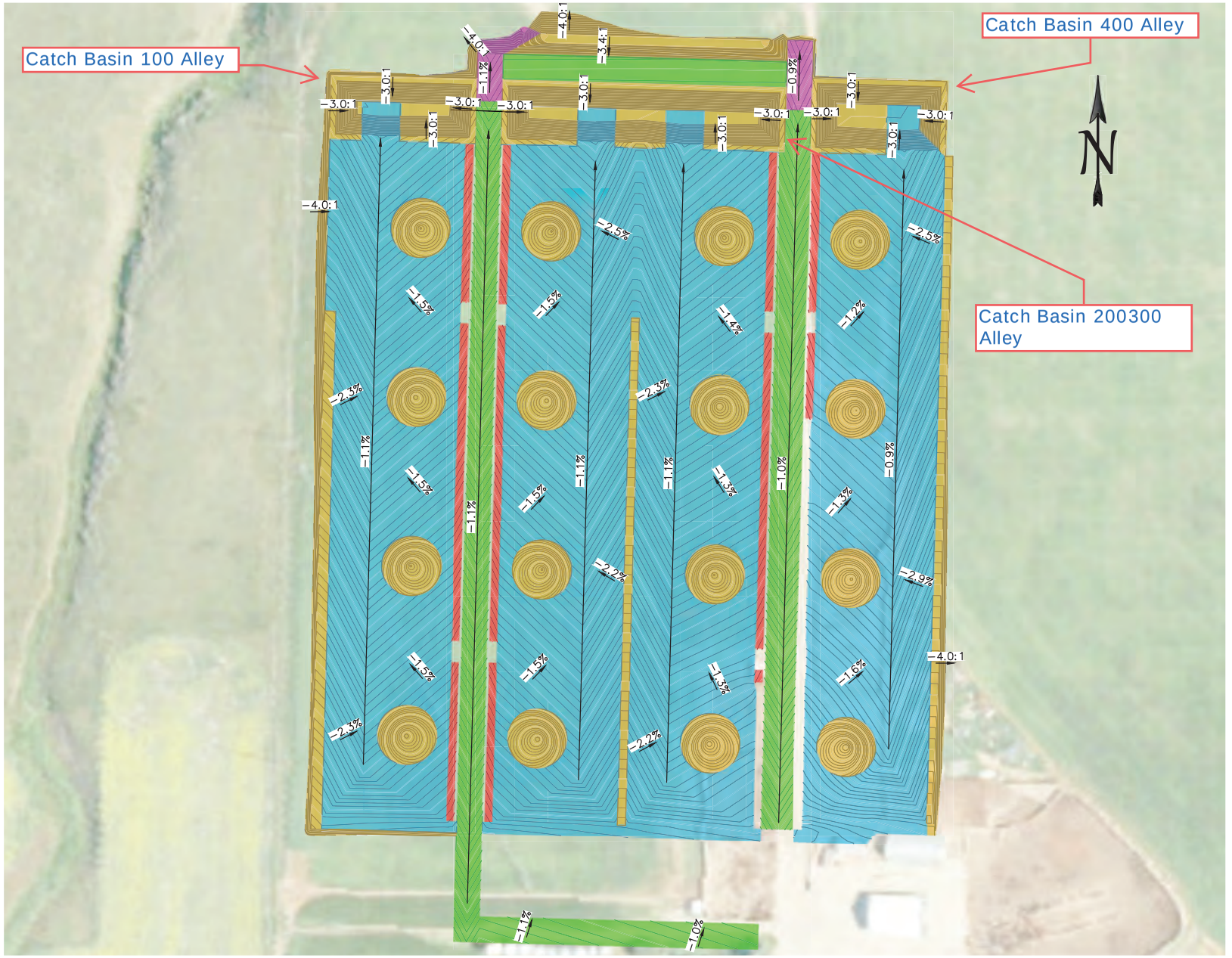
BUNKS

For Discussion Only

Dennis Dirtworx LTD

BUNK DETAIL

PROJECT NAME:	Date
BOB - FEEDLOT	FEB 2025
Drawn RENZO P.	Checked DAN D.
Scale NTS	Job No. 24134 REV-1



NOTES:

1. 2 PENS REMOVED FROM NORTH END OF 400 ALLEY TO BE BUILT IN THE FUTURE.
2. TEMPORARY EFFLUENT POND NORTH END OF 400 TO BE REMOVED IN FUTURE.
3. BORROW TO COME FROM FUTURE POND AREA. POND SURFACE INCLUDED IN TP3.

LEGEND:

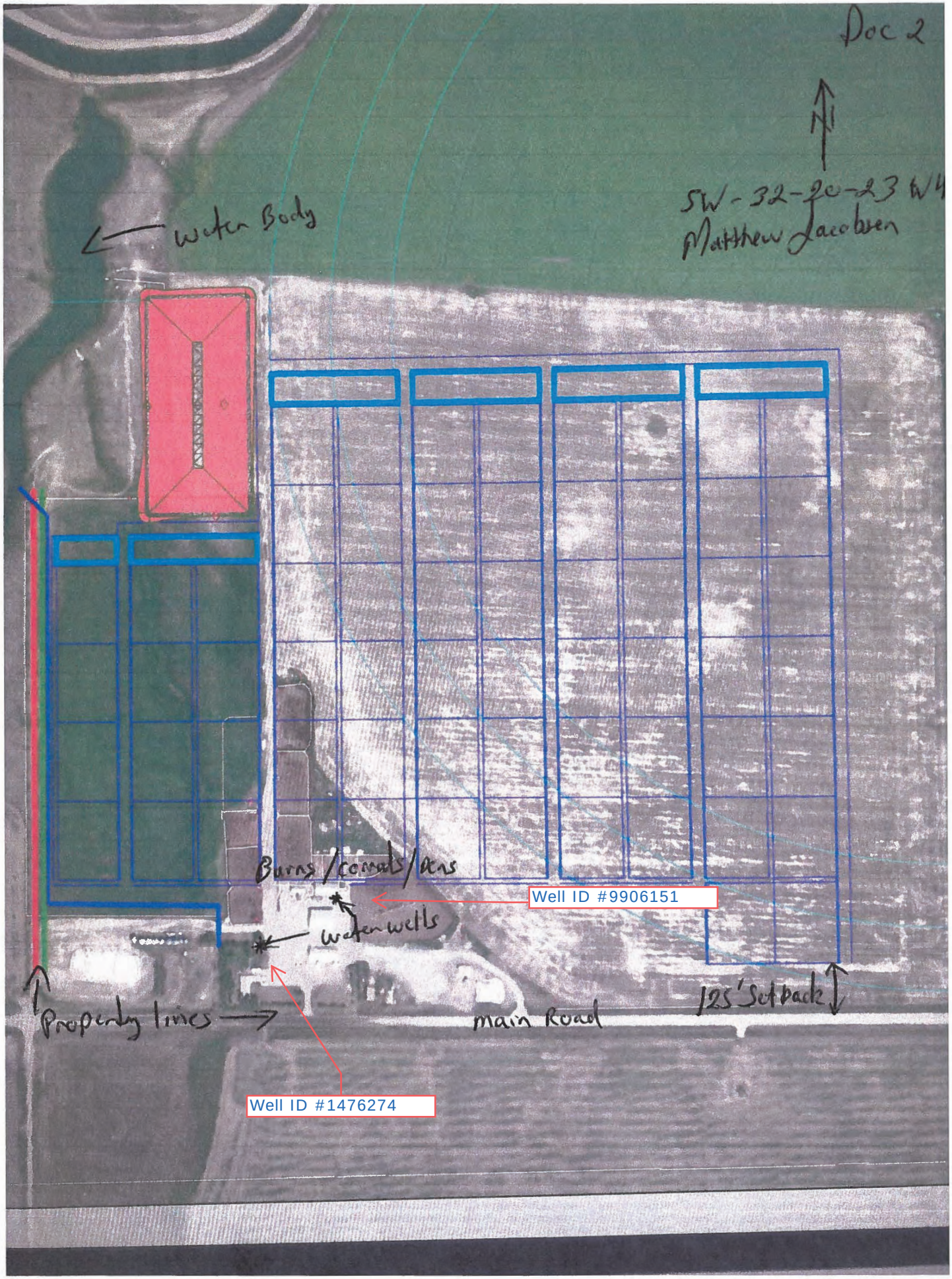
- RCC THICKNESS: 150mm
- GRAVEL THICKNESS: 200mm
- CONCRETE THICKNESS: 200mm
- RCC THICKNESS: 200mm
- ROUGH GRADE

For Discussion Only

Dennis Dirtworx LTD

PROJECT SCOPE

PROJECT NAME:	Date
BOB - FEEDLOT	FEB 2025
Drawn RENZO P.	Checked DAN D.
Scale NTS	Job No. 24134 REV-1


Doc 2
N
SW-32-20-23 W4
Matthew Jacobsen
Water Body
Barns / corrals / etc
Well ID #9906151
water wells
Property lines
main Road
125' Setback
Well ID #1476274

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)

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 _____

BRID water conveyance

Signed this 6 day of July, 2025. [redacted]

Signature of Applicant or Agent

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 9906151
GoA Well Tag No. A0861
Drilling Company Well ID
Date Report Received 2019/10/18

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
NORANDEN FARMS LTD	P.O. BOX 33	ARROWWOOD	ALBERTA	CANADA	T0L 0B0

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	4	32	20	22	4				224070 TWP 205

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 50.733613 Longitude -113.024463
How Location Obtained
Phone

Elevation 909.52 m
How Elevation Obtained
Other

Drilling Information

Method of Drilling
Rotary - Mud

Type of Work
New Well

Proposed Well Use
Stock

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description
22.56		Tan Pebbly Sand & Clay
23.77		Gravel
25.91		Cemented Gravel
27.43		Yellow Clayey Shale
30.48		Brown Sandy Shale
39.62	Yes	Gray Sandstone & Shale Ledges
40.54		Dark Gray Shale
53.34	Yes	Gray Medium Grained Sandstone
54.86		Gray Shale

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 95.47 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
2019/10/02	97.29	26.30

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
54.86 m	53.34 m	2019/09/26	2019/10/02

Borehole

Diameter (cm)	From (m)	To (m)
22.23	0.00	41.15
17.15	41.15	54.86

Surface Casing (if applicable)
Size OD : cm
Wall Thickness : cm
Bottom at : m

Well Casing/Liner
Plastic
Size OD : 14.12 cm
Wall Thickness : 0.831 cm
Top at : -0.61 m
Bottom at : 53.34 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
44.20	53.34	0.318	25.40	25.40

Perforated by Saw

Annular Seal Bentonite Slurry
Placed from 0.00 m to 41.15 m
Amount 9.00 Bags

Other Seals

Type	At (m)
Welded Ring	41.15

Screen Type
Size OD : cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings
Bottom Fittings

Pack
Type
Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
PAUL STAHL

Certification No
32588A

Company Name
M&M DRILLING INC.

Copy of Well report provided to owner
Yes

Date approval holder signed
2019/10/08

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GIC Well ID 9906151
GoA Well Tag No. A0861
Drilling Company Well ID
Date Report Received 2019/10/18

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
NORANDEN FARMS LTD	P.O. BOX 33	ARROWWOOD	ALBERTA	CANADA	T0L 0B0

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	4	32	20	22	4				224070 TWP 205

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 50.733613 Longitude -113.024463
How Location Obtained
Phone

Elevation 909.52 m
How Elevation Obtained
Other

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level 71.12 cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 95.47 L/min
Recommended Pump Intake Depth (From TOC) 39.62 m
Pump Installed Depth m
Type Make H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS) Depth m
Gas Depth m
Well Disinfected Upon Completion Yes
Geophysical Log Taken
Remedial Action Taken
Submitted to ESRD
Sample Collected for Potability
Submitted to ESRD

Additional Comments on Well
TDS 600. MODERATELY SOFT WATER

Yield Test

Taken From Top of Casing
Measurement in Metric

Test Date	Start Time	Static Water Level
2019/10/02	12:15 PM	26.30 m

Method of Water Removal
Type Pump
Removal Rate 97.29 L/min
Depth Withdrawn From 51.82 m

If water removal period was < 2 hours, explain why

Depth to water level

Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
26.30	0:00	34.11
29.19	1:00	30.51
29.98	2:00	30.03
30.31	3:00	29.93
30.54	4:00	29.79
30.71	5:00	29.70
30.83	6:00	29.60
30.94	7:00	29.54
31.03	8:00	29.44
31.11	9:00	29.39
31.19	10:00	29.34
31.32	12:00	29.21
31.46	14:00	29.12
31.57	16:00	29.03
31.71	18:00	28.95
31.81	20:00	28.87
32.03	25:00	28.71
32.23	30:00	28.53
32.42	35:00	28.41
32.55	40:00	28.30
32.86	50:00	28.07
33.11	60:00	27.89
33.44	75:00	27.65
33.69	90:00	27.45
33.94	105:00	27.30
34.11	120:00	27.15

Water Diverted for Drilling

Water Source	Amount Taken		Diversion Date & Time
BOW RIVER	27276.55	L	2019/09/26 10:30 AM

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
PAUL STAHL

Certification No
32588A

Company Name
M&M DRILLING INC.

Copy of Well report provided to owner
Yes

Date approval holder signed
2019/10/08

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 1476274
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2009/09/16

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
JACOBSON, MATT	P.O. BOX 33	ARROWWOOD	ALBERTA	CA	T0L 0B0

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SW	32	20	22	4				HOUSE WELL

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 50.736100 Longitude -113.023000
How Location Obtained: Not Verified

Elevation 0.00 m
How Elevation Obtained: Not Obtained

Drilling Information

Method of Drilling
Rotary - Mud

Type of Work
New Well

Proposed Well Use
Domestic

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description
21.34		Gravelly Clay & Rocks
25.91		Gravel
27.43		Yellow Shale
28.65	Yes	Water Bearing Sandstone
33.53		Sandy Shale & Sandstone Ledges
39.01		Shale
39.62	Yes	Water Bearing Sandstone
46.94		Shale
49.38	Yes	Water Bearing Sandstone
52.12		Shale
53.34		Sandstone
57.61		Shale
62.48	Yes	Water Bearing Sandstone
67.06		Shale

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 18.18 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
2009/08/26	18.18	28.65

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
67.06 m	67.06 m	2009/09/20	2009/09/26

Borehole

Diameter (cm)	From (m)	To (m)
22.23	0.00	56.39
15.88	56.39	67.06

Surface Casing (if applicable)
Size OD : cm
Wall Thickness : cm
Bottom at : m

Well Casing/Liner
Plastic
Size OD : 14.12 cm
Wall Thickness : 0.831 cm
Top at : -0.61 m
Bottom at : 62.48 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
56.69	62.48	0.318		25.40

Perforated by Saw

Annular Seal Bentonite Chips/Tablets
Placed from 0.00 m to 56.39 m
Amount 21.00 Bags

Other Seals

Type	At (m)
Welded Ring	56.39

Screen Type
Size OD : cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings
Bottom Fittings

Pack
Type Unknown
Grain Size
Amount Unknown

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
WILLIAM PENROD

Certification No
A000187

Company Name
M&M DRILLING CO. LTD.

Copy of Well report provided to owner
Yes

Date approval holder signed
2009/08/28

Water Well Drilling Report

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

View in Imperial | Export to Excel

GIC Well ID 1476274
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2009/09/16

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
JACOBSON, MATT	P.O. BOX 33	ARROWWOOD	ALBERTA	CA	T0L 0B0

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SW	32	20	22	4				HOUSE WELL

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 50.736100 Longitude -113.023000
How Location Obtained: Not Verified

Elevation 0.00 m
How Elevation Obtained: Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level 81.28 cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 18.18 L/min
Recommended Pump Intake Depth (From TOC) 56.39 m
Pump Installed
Type
Depth m
Make
H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS)
Depth m
Gas
Depth m
Remedial Action Taken
Well Disinfected Upon Completion Yes
Geophysical Log Taken
Submitted to ESRD

Sample Collected for Potability Yes
Submitted to ESRD Yes

Additional Comments on Well

90' - 94' 10 GPM, 128' - 130' 6 GPM, 154' - 162' 6 GPM, WELL DISINFECTED UPON COMPLETION, BOREHOLE DIAMETER 8.75" FROM 0' - 185' AND 6.25" FROM 185' - 220', SEAL - 21 BAGS BENTONITE CHIPS,

Yield Test

Taken From Top of Casing
Measurement in Metric

Test Date 2009/08/26
Start Time 9:30 AM
Static Water Level 28.65 m

Method of Water Removal

Type Pump
Removal Rate 18.18 L/min
Depth Withdrawn From 60.96 m

If water removal period was < 2 hours, explain why

Depth to water level

Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
28.65	0:00	47.02
31.26	1:00	43.73
32.61	2:00	43.15
32.65	3:00	42.28
33.48	4:00	41.59
34.09	5:00	40.90
34.71	6:00	40.23
35.20	7:00	39.52
35.72	8:00	39.04
36.18	9:00	38.47
36.62	10:00	38.04
37.42	12:00	37.09
38.13	14:00	36.27
38.78	16:00	35.55
39.31	18:00	34.99
39.85	20:00	34.63
40.97	25:00	33.36
41.81	30:00	32.64
42.54	35:00	32.08
43.16	40:00	31.69
44.10	50:00	31.14
44.95	60:00	30.78
45.65	75:00	30.32
46.23	90:00	29.73
46.72	105:00	29.11
47.02	120:00	28.70

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well: WILLIAM PENROD
Certification No: A000187
Company Name: M&M DRILLING CO. LTD.
Copy of Well report provided to owner: Yes
Date approval holder signed: 2009/08/28

WATER CONVEYANCE AGREEMENT
(Water under District's Water Licence)

THIS AGREEMENT is made in duplicate this 12 day of June AD 2025

Between: **BOW RIVER IRRIGATION DISTRICT**
of Box 140, Vauxhall, in the Province of Alberta
(hereinafter called the "DISTRICT") of the First Part

and

MATTHEW JACOBSEN
of P.O Box 33, Arrowwood, in the Province of Alberta
(hereinafter called the "APPLICANT") of the Second Part

WHEREAS the DISTRICT is empowered under Sections 21 of the Irrigation Districts Act to grant and enter into agreements known as Water Conveyance Agreements, and

WHEREAS the DISTRICT has amended the purpose of use of a portion of water within DISTRICT Water Licence, Priority No. 1992-02-05-11, to purposes other than irrigation and domestic use, and

WHEREAS the Alberta Environment/BRID amending agreement of April 27, 2011 gave the District the right to divert water from the Carseland Bow Headworks system, which for the purposes of this agreement are deemed to be works of the District, to supply water for any other purpose that is consistent with a water licence held by the District, and

WHEREAS the land described as SE-32-20-22-W4 (hereinafter called the "PARCEL OF LAND"), has been included in the Bow River Irrigation District under Section 84 and 85 of the Irrigation Districts Act, and

WHEREAS the APPLICANT has applied to the DISTRICT to enter into a water conveyance agreement to annually convey 95-acre feet of water for the purpose of Agriculture (Stockwatering) use on the PARCEL OF LAND, which water is part of the amended portion of the DISTRICT'S Water Licence with Priority No. 1992-02-05-11.

NOW THEREFORE subject to the terms and conditions hereinafter expressed, the parties hereto agree as follows:

1. The DISTRICT will annually make available to the APPLICANT 95-acre feet of water for the purpose of Agriculture (Stockwatering) use, to be conveyed through the irrigation works of the DISTRICT, not in a continuous flow, but as it shall be available, to a Point of Delivery off Carseland Bow Headworks System, for Agriculture (Stockwatering) purposes only and which water is to be used exclusively on the PARCEL OF LAND.

2. The APPLICANT shall be responsible for all costs to supply, install and maintain the turnout from the irrigation works of the DISTRICT at the Point of Delivery as well as the APPLICANTS water diversion and distribution system, and to make any alterations or additions necessary to the irrigation works of the DISTRICT, in order to take delivery of water. The turnout and any alterations to the DISTRICT'S works shall be designed and constructed according to the DISTRICT'S specifications and subject to the DISTRICT'S approval. The APPLICANT shall maintain the turnout to the continued satisfaction of the DISTRICT.

WATER CONVEYANCE AGREEMENT
(Water under District's Water Licence)

3. This agreement is subject to the APPLICANT obtaining and maintaining all approvals and authorizations to construct, operate and maintain his water diversion and distribution system solely at his cost.

4. The APPLICANT hereby acknowledges and agrees that the water in the irrigation system of the DISTRICT may not be potable or may not be suitable for irrigation or other purposes, and the DISTRICT makes no representation, warranty or guarantee, express or implied that the water delivered under this agreement is potable or suitable for the APPLICANT's purposes and the APPLICANT agrees to accept the water delivered in the condition in which it may be found at the Point of Delivery from time to time and to provide such testing, treatment or filtering as the APPLICANT considers necessary.

5. The APPLICANT acknowledges that the irrigation system of the DISTRICT is an open ditch system subjecting the water therein to contamination from all manner of environmental, human and animal factors beyond the control of the DISTRICT and the DISTRICT does not regulate, control or monitor the quality of the water in its system.

6. The DISTRICT shall not be liable for any claim of loss, injury or damage whatsoever arising out of the failure or inability of the DISTRICT to supply water for the purposes covered by this agreement.

7. This agreement shall constitute a yearly term from the date noted above and shall continue in full force and effect from year to year with the APPLICANT having the option of termination of this agreement subject to notice of termination in writing by Registered Mail or in person at the addresses of service listed here below, and giving a minimum of 60 days notice prior to the effective date of the termination.

BOW RIVER IRRIGATION DISTRICT
704 - 7th Avenue North, P.O. Box 140, VAUXHALL, ALBERTA T0K 2K0

8. The APPLICANT will indemnify and save harmless the DISTRICT from any and all injury and damage by reason of the seepage of water from the APPLICANT's conveyance, pumping and storage works and/or from rights of way and easements or titled lands.

9. All water diverted from the works of the DISTRICT by the APPLICANT shall be metered by the APPLICANT through an accurate water meter located at or near the Point of Delivery installed and maintained in good working order at the cost of the APPLICANT, with unrestricted access to the meter by the DISTRICT, unless an alternate method of estimating volumes is agreed upon.

10. The APPLICANT shall record and forward to the DISTRICT at its address of notice, a report of water diverted under this agreement on a regular basis as requested by the DISTRICT with an annual report being submitted to the DISTRICT no later than the 15th of October of each year.

11. The DISTRICT will invoice the APPLICANT on an annual basis and the APPLICANT shall annually pay to the DISTRICT a conveyance fee as established by DISTRICT By-Laws for each acre foot of water agreed to be annually made available to the APPLICANT as stated in Clause 1 of this agreement, regardless of whether or not the actual annual diversion and use by the APPLICANT was less than the agreed upon amount to be made available.

12. In the event the APPLICANT, in any one twelve month period, beginning November 1st of one year and ending October 31st of the following year, diverts or uses an amount of water exceeding the agreed upon amount of water to be annually made available to the APPLICANT as noted in Clause 1 of this agreement, the APPLICANT must pay double the conveyance fee as noted in Clause 11 of this agreement, for each acre foot of water diverted in excess of the agreed upon amount.

WATER CONVEYANCE AGREEMENT
(Water under District's Water Licence)

13. In addition to the sums payable under Clause 11 and Clause 12 above, the APPLICANT also agrees to pay such amounts as may be imposed from time to time pursuant to Section 132 of the Irrigation Districts Act as "penalties on arrears", which shall apply to all sums payable which have not been paid by the APPLICANT within 30 days of billing.

14. In the event, in any twelve month period, beginning November 1st of one year and ending October 31st of the following year, the DISTRICT determines that additional water over and above the agreed upon amount of water to be annually made available to the APPLICANT as noted in Clause 1of this agreement, is not available for the APPLICANT, the DISTRICT will notify the APPLICANT upon which time the APPLICANT is not allowed to withdraw more than the agreed upon amount.

15. Nothing in this agreement shall be construed as granting to or conferring upon the APPLICANT any proprietary right or interest in any works owned or operated by the DISTRICT.

16. In the event the APPLICANT sells or transfers the operations benefited by this agreement to another party and application is made to the DISTRICT to transfer this agreement to the new party, this agreement will be transferred to the new party subject to the stated purpose of use of water and location of use not changing.

17. Any change in the purpose of use of water or location of use is strictly prohibited.

18. a) Should the APPLICANT be in default of any of the covenants herein provided, the DISTRICT may, upon notice to the APPLICANT, reduce or terminate the delivery of water to the APPLICANT until such time as the APPLICANT has remedied his default.

b) The exercise by the DISTRICT of its rights under Clause 18. a) above, shall not be construed as a termination by the DISTRICT of this agreement.

THIS AGREEMENT is executed by the Parties as of the date shown on the first page of the Agreement.

[redacted]ATION DISTRICT:

[redacted]

George Thiessen
Land Administrator

J: Forms\New\WaterConveyance-Nonarden

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)

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:** Diamond 2 Feeders

Proposed 2: _____ **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	
Surface water information	How many springs are within 100 m of the manure storage facility or manure collection area?		0			☐ YES ☐ NO ☐ YES with exemption	
	How many water wells are within 100 m of the manure storage facility or manure collection area?		0			☐ YES ☐ NO ☐ YES with exemption	
	What is the shortest distance from the manure collection or storage facility to a surface water body? (e.g., lake, creek, slough, seasonal)		150m			☐ YES ☐ NO ☐ YES with exemption	
Groundwater information	What is the depth to the water table?		*1 3.9m - 5.5m			☐ YES ☐ NO ☐ YES with exemption	
	What is the depth to the groundwater resource/aquifer you draw water from?		At Surface Canal - BRID			☐ YES ☐ NO ☐ YES with exemption	

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

*1 Groundwater Condition - Tables - Roseke Engineering
Geotechnical Evaluation - Diamond Feeders LTD
Catch Basin Dimension Calculator

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)

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)	Plastic regulations
Colin Bexte	SE 31-20-22W4	500m					
Noranden Farms	NE 30-20-22 W4	950m					
Art Bird	SE 30-20-22W4	1200m					
Murray Norton	SW 29-20-22W4	1600m					

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)
Noranden Farms LTD	All 27-20-23 W4	[redacted]250 ha	irrigated		
Noranden Farms LTD	NE 30-20-22 W4	50 ha	irrigated		
Noranden Farms LTD	S1/2 15-20-24 W4	125 ha	Dark Brown		
Diamond 2 Feeders	N1/2 15-20-24 W4	125 ha	Dark Brown		
Matthew Jacobsen	N1/2, SE1/4 35-20-23 W4	160 ha	Irrigated		
			Total		

* 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)

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)

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

			NRCB USE ONLY				
Neighbour name(s)	**Legal land description**	**Distance (m)**	**Zoning (LUB) category**	**MDS category (1-4)**	**Distance (m)**	**Waiver attached (if required)**	**Meets regulations**

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

				NRCB USE ONLY	
Name of land owner(s)*	**Legal land description**	**Usable area** (ha)**	**Soil zone ***	**Usable area (ha)**	**Agreement attached (if required)**
Matthew Jacobsen	All 32-20-22 W4	202	irrigated		
Vorarden Farms LTD	All 34-20-23 W4	258	irrigated		
"	NE 20-20-22 W4	50	irrigated		
			Total		

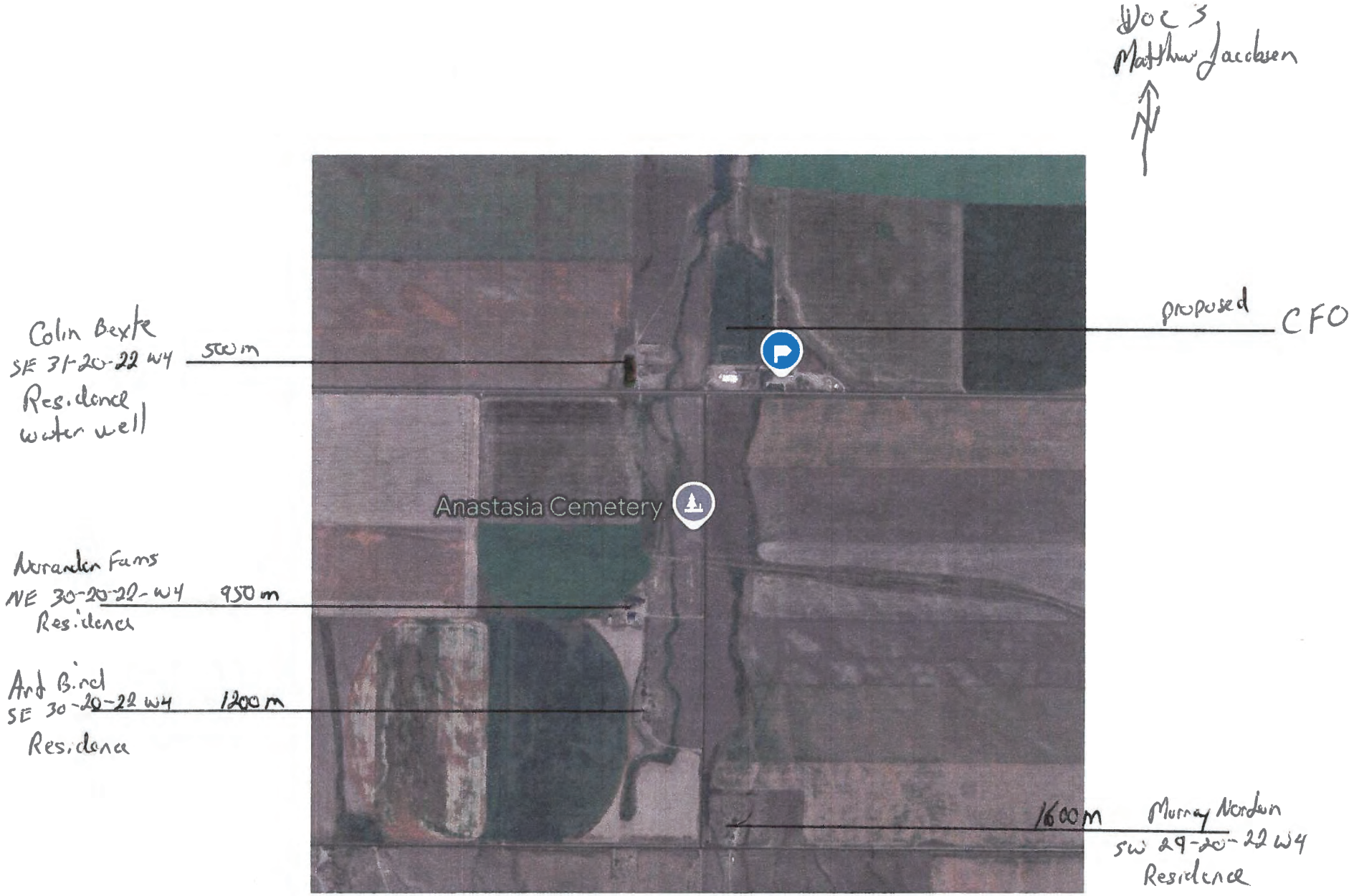
* If you are **not** the registered landowner, you must attach copies of land use agreements signed by all landowners.

** 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 September 11, 2023


Woc 3
Matthew Jacobsen
Colin Bexte
SE 31-20-22 W4
500 m
Residence
water well
proposed CFO
Anastasia Cemetery
Noranden Farms
NE 30-20-22-W4
950 m
Residence
Art Bird
SE 30-20-22 W4
1200 m
Residence
1600 m
Murray Nordin
SW 29-20-22 W4
Residence

Minimum Distance Separation (MDS) Waiver (declaration)

Applicant information NRCB application number: _____

Operator/operation name: Diamond Two Feeders Ltd.

Address: Box 144 Arrowwood AB Postal Code: T0L 0B0

Legal land location of confined feeding operation: SW 32 20 22 W4

I have requested the residence owner(s) named below to waive the required minimum distance separation (MDS) to their residence for the *Agricultural Operation Practices Act* (AOPA) permit application identified above. In making this request, I have provided the owner(s) with an opportunity to review my permit application and a copy of the Natural Resources Conservation Board (NRCB) Fact Sheet "Minimum Distance Separation (MDS) Waivers" available on the NRCB website at www.nrcb.ca. I have also explained:

- The MDS requirement set out in section 3 of the Standards and Administration Regulation of AOPA. I have advised the owner(s) that section 3(6)(a) of the Standards and Administration Regulation allows this requirement to be waived by the owners of residences, if they agree in writing to grant a waiver;
- That my proposed development does not meet the required MDS to the owner's residence; and,
- That this waiver applies only to this application as described. An increase in livestock capacity, annual manure production, level of odour production, change to the site plan or change to a facility that would increase the MDS would require a new waiver.

Following is a summary of the proposed development:

- The current scope of my confined feeding operation (CFO), including the type, number, and category of livestock, if any, is:
  2000 backgrounders Heifer / Steers
- My application for a new AOPA permit proposes the following changes to the existing livestock category, type and/or capacity at my CFO:
  10,000 head backgrounder / finisher Heifer and steer
- The proposed new CFO facility(ies), or changes to the existing CFO facilities, including manure storage, manure storage volume and any other pertinent details, if any, are (attach a site layout plan if available):

I the applicant understand that the waiver is not valid unless ALL registered owners of the residence sign this document.

Permit Applicant [redacted] Date: May 2025
Signature

Residence owner(s) to initial: [redacted] [redacted]

Minimum Distance Separation (MDS) Waiver (declaration)

Residence owner(s) information

ALL Names on land title: Samantha Bexte, Colin Bexte

Legal land location of residence(s): SE 31 - 20 - 22 - W4

Telephone number(s)[1]: [redacted] Email address(es)[1]: [redacted]

Address(es)[1] and Postal code(s)[1]: Box 161 ARROWWOOD, AB T0L 0B0

[1] ***Please note that personal contact information is for NRCB use ONLY and not publicly released***

I am/we are the legal landowner(s) of a residence(s) located at the above noted legal land location/address:

- I/we have read the NRCB Fact Sheet "Minimum Distance Separation (MDS) Waivers";
- I/we have discussed this application with the applicant and understand its potential impacts to our residence(s);
- I/we understand that the application **does not** meet the MDS requirement to my/our residence(s), under the *Agricultural Operation Practices Act* (AOPA);
- **I/we understand that this waiver is not valid unless signed by ALL parties identified on the land title as owners;**
- **I/we are not obligated to waive the MDS requirement to our residence(s)**;
- I/we understand that if I/we choose to waive the MDS requirement, I/we can revoke the waiver, by providing written notice to the NRCB approval officer, as set out in the "Minimum Distance Separation (MDS) Waivers" Fact Sheet; and
- I/we understand that this waiver is a public document.

Having considered my/our rights, I/we hereby waive the MDS requirement to my/our residence, with respect to

Application number _____.

[redacted] [redacted]

Signatures of **all** residence owner(s) on title

Samantha Bexte COLIN BEXTE

Printed names of **all** residence owner(s) on title

Date: JUNE 1 2025

Name	Matthew Jacobsen
Address	
Legal Land	
Location	SW 32-20-22 W4

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	10,000	4,459.0
	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		-
	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		4,459.0

For New Operations

Dispersion Factor	1

Category	Odour Objective	Distance Feet	Distance Metres
1	41.04	2,892	881
2	54.72	3,856	1,175
3	68.4	4,820	1,469
4	109.44	7,711	2,350

For Expanding Operations

Dispersion Factor	1
Expansion Factor	0.77

Category	Odour Objective	Distance Feet	Distance Metres
1	41.04	2,227	679
2	54.72	2,969	905
3	68.40	3,711	1,131
4	109.44	5,938	1,810

Name Matthew Jacobsen
Address 0
Legal Land
Location SW 32-20-22 W4

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)	10000.0	1250.0	1040.0	780.0	620.0
	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	0.0	0.0	0.0	0.0	0.0
	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		1,250	1040.0	780.0	620.0
	Total Acres		3,089	2569.8	1927.4	1532.0

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 - Compacted soil liner

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

Facility description / name *(as indicated on site plan)*

1. Alley 100
2. Alley 200-300
   Alley 400

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.	325	65	1.5	
2.	325	130	1.5	
3.	325	65	1.5 TOTAL CAPACITY	

☑ 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

swale through feed pens runs to effluents ponds, RCC ramps into effluent ponds to control erosion.

Liner protection

Describe how the physical integrity of the liner will be maintained

7 inches of rcc will be placed on top of clay liners

NRCB USE ONLY

Requirements met: ☐ YES ☐ NO

Last updated February 26, 2021

Part 2 — Technical Requirements

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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)

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

Compacted soil liner details

Thickness of compacted liner	1.5 (m)	Provide compacted liner details (as required) 1.5m compacted clay liner, 7inches of rcc on top of clay liner	
Soil texture	% sand	10 % silt	90 % clay
Atterberg limits	Plastic limit 10-20%	Liquid limit 20-40%	Plasticity index 10-30%
Hydraulic conductivity	Hydraulic conductivity (cm/s) 1624KG/M3		
	Describe test standard used ASTM D698		

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

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

Depth to water table: _____ Requirements met: ☐ YES ☐ NO

Depth to uppermost groundwater resource: _____ Requirements met: ☐ YES ☐ NO

ERST completed: ☐ see ERST page for details

Surface water control systems

Requirements met: ☐ YES ☐ NO Details/comments:

Compacted soil liner details

Hydraulic conductivity after adjustment: _____

Liner specification comments (e.g. compaction, moisture content, thickness):

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

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)

RUNOFF CONTROL CATCH BASIN: Compacted soil liner

*(complete a copy of this section for **EACH proposed** runoff control catch basin with a compacted soil liner)*

Facility description / name *(as indicated on site plan)*

1. Catch Basin 100 Alley
2. Catch Basin 200-300 Alley
3. Catch Basin 400 Alley

Determination of runoff area

Provide a plan and show how you calculated the area contributing to runoff for each catch basin

see attachment for catch basin Dimension calculator

Catch basin capacity

	Length (m)	Width (m)	Depth (m)	Depth below ground level (m)	Slope run:rise			NRCB USE ONLY
					Inside end walls	Inside side walls	Outside walls	Calculated storage capacity (excl. 0.5 m freeboard) (m^3)
1.	25	60	3.5	3.5	3:1	3:1		
2.	30	125	3.5	3.5	3:1	3:1		
3.	25	60	3.5	3.5	3:1	3:1		
							TOTAL CAPACITY	

Compacted soil liner details

Thickness of compacted soil liner	1.2 (m)	Provide details (as required)	
Soil texture	____ % sand	10 % silt	90 % clay
Atterberg limits	Plastic limit 20-40%	Liquid limit 10-20%	Plasticity index 10-30%
Hydraulic conductivity	Hydraulic conductivity (cm/s) 1624 (kg/ms)		
	Describe test standard used ASTM D698		

Catch Basin – Design and management requirements can be found in Technical Guideline Agdex 096-101

NRCB USE ONLY

Requirements met: ☐ YES ☐ NO

Condition required: ☐ YES ☐ NO

Report attached: ☐ YES ☐ NO

AO Comment: Catch basin calculator provided by applicant for catch basin at end of 100 alley.

Catch Basin Dimension Calculator

For more information on runoff control catch basin design consideration including liner options, catch basin protection, etc., check out the catch basin factsheet.

Name Diamond 2 Feeders 100 Alley

Land Location 32-20-22-W4

Estimating Runoff Potential

Area	Length (m)	Width (m)	Paved?	Area (m^2)
1	320	67	YES	21440.00
	Total Area			21440.00

Estimation of water runoff to be collected in the catch basin:

1929.6 m^3

68143 ft^3

424452 Imp. Gal

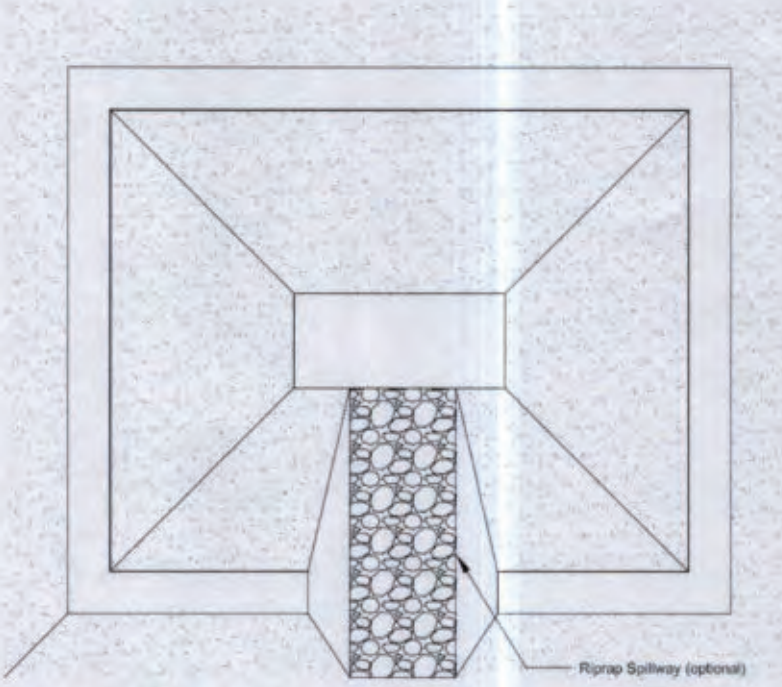
Calculating Catch Basin Volume:

Construction Dimensions

Length (m):

Width (m):

Depth (m):



Dugout /Lagoon Volume Calculator - Results

The total volume of a dugout that is 60 metres **long**, 25 metres **wide**, 3.5 metres **deep** with a **side slope** of 3, an **end slope** of 3 is

2,641 m^3	93,257 ft^3	3,454 yd^3	2,640,750 litres	580,883 Imp. gal.	697,612 US gal.

The volume of water that is 3 metres deep is:

1,953 m^3	68,970 ft^3	2,554 yd^3	1,953,000 litres	429,600 Imp. gal.	515,928 US gal.

Back to Dugout / Lagoon Volume Calculator.

Additional information is available through agricultural water specialists or on the Alberta Agriculture and Irrigation website. Agricultural Water Specialists can be contacted through the Alberta Ag-Info Centre at 310-FARM (3276).

Prepared by
Rural Water Branch
Alberta Agriculture and Irrigation
Document Last Revised/Reviewed February 23, 2012

AO Comment: Catch basin calculator provided by applicant for catch basin at end of 200-300 alley.

Catch Basin Dimension Calculator

For more information on runoff control catch basin design consideration including liner options, catch basin protection, etc., check out the catch basin factsheet.

Name Diamond 2 Feeders 2-300 Alley

Land Location 32-20-22-W4

Estimating Runoff Potential

Area	Length (m)	Width (m)	Paved?	Area (m^2)
1	320	129	YES	41280.00
	Total Area			41280.00

Estimation of water runoff to be collected in the catch basin:

3715.2 m^3

131201 ft^3

817229 Imp. Gal

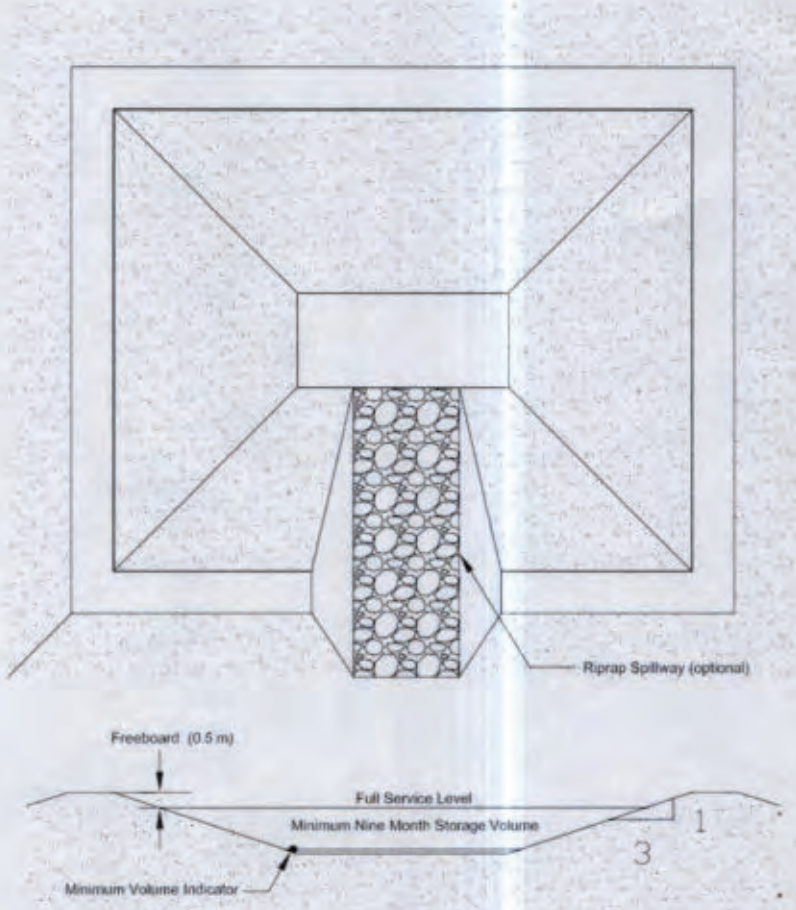
Calculating Catch Basin Volume:

Construction Dimensions

Length (m):

Width (m):

Depth (m):



Dugout /Lagoon Volume Calculator - Results

The total volume of a dugout that is 125 metres **long**, 30 metres **wide**, 3.5 metres **deep** with a **side slope** of 3, an **end slope** of 3 is

7,943 m^3	280,513 ft^3	10,389 yd^3	7,943,250 litres	1,747,270 Imp. gal.	2,098,385 US gal.

The volume of water that is 3 metres deep is:

6,183 m^3	218,351 ft^3	8,087 yd^3	6,183,000 litres	1,360,069 Imp. gal.	1,633,376 US gal.

Back to Dugout / Lagoon Volume Calculator.

Additional information is available through agricultural water specialists or on the Alberta Agriculture and Irrigation website. Agricultural Water Specialists can be contacted through the Alberta Ag-Info Centre at 310-FARM (3276).

Prepared by
Rural Water Branch
Alberta Agriculture and Irrigation
Document Last Revised/Reviewed February 23, 2012

AO Comment: Catch basin calculator provided by applicant for catch basin at end of 400 alley.

Catch Basin Dimension Calculator

For more information on runoff control catch basin design consideration including liner options, catch basin protection, etc., check out the catch basin factsheet.

Name Diamond 2 Feeders 4-500 Alley

Land Location 32-20-22-W4

Estimating Runoff Potential

Area	Length (m)	Width (m)	Paved?	Area (m^2)
1	480	129	YES	61920.00
	Total Area			61920.00

Estimation of water runoff to be collected in the catch basin:

5572.8 m^3

196802 ft^3

1225844 Imp. Gal

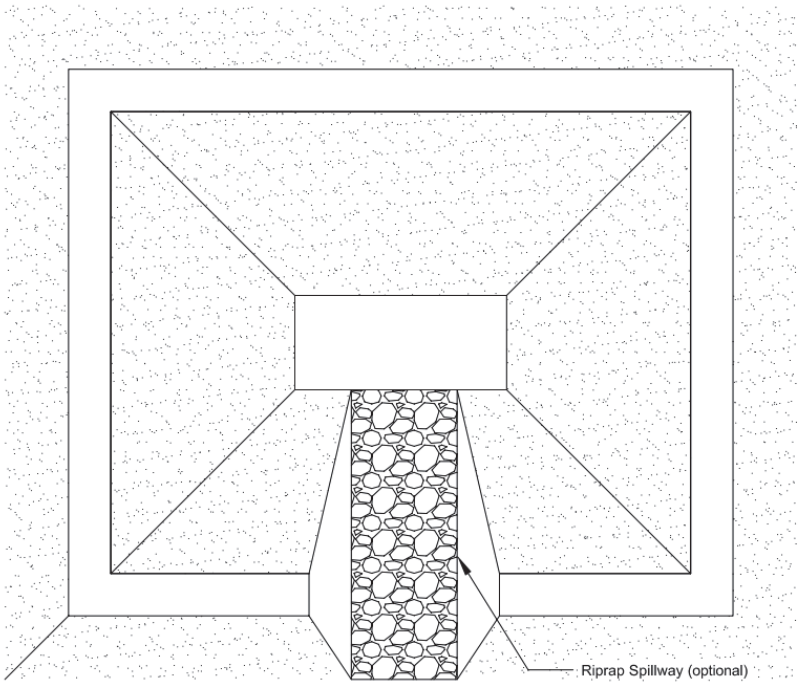
Calculating Catch Basin Volume:

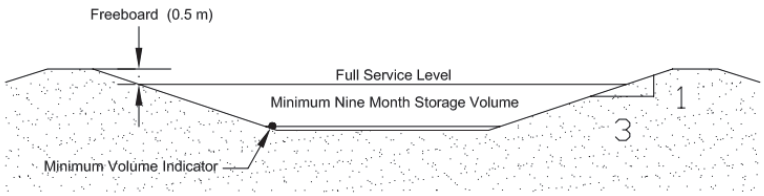
Construction Dimensions

Length (m):

Width (m):

Depth (m):





ROSEKE ENGINEERING

GEOTECHNICAL EVALUATION

Diamond Feeders Ltd. Feedlot Expansion
Vulcan County, AB

Prepared For:
Diamond Two Feeders Ltd.
224070 Township Road 205
Vulcan County, AB

Prepared By:
Roseke Engineering Ltd.
3614 – 18 Avenue N.
Lethbridge, AB T1H 5S7

Table of Contents

1 Introduction

This project consists of the construction of a new freshwater pond, effluent pond, and livestock pens at the Diamond Two Feeders feedlot at 224070 Township Road 205 in Vulcan County, AB. The planned development location is existing pasture / cropland at SW-32-20-22-W4. At the time of drilling, the site was vacant with some vegetation and was generally sloping north / northwest.

The intent of this geotechnical investigation was to confirm the subsurface conditions at the site in order to confirm soil suitability for impervious liner and berm construction, and to perform in-situ hydraulic permeability testing. A site plan, including borehole locations, is included as Appendix B of this report.

2 Scope of Work

The scope of work for this geotechnical evaluation consisted of the drilling of six (6) boreholes and seven (7) test pits, a laboratory testing program to assist in soil classification and determination of engineering properties, in-situ hydraulic permeability testing, and this report which summarizes the recommendations for the proposed expansion.

3 Geotechnical Work

The fieldwork for the geotechnical investigation was performed on May 3, 2024 to assess subsurface conditions at the site. A drill rig utilizing a 150 mm solid stem continuous flight auger from Chilako Drilling Services Ltd. of Coaldale, AB was used for drilling operations. A mechanical excavator supplied by Diamond Two Feeders was used for test pitting operations. Roseke (REL)'s field representative was Mr. Christopher Allard, C.E.T. Boreholes were advanced at select locations within the proposed expansion footprint to depths of 6.1 m and test pits were advanced to depths ranging from 2.3 m to 3.5 m.

Field operations and sampling were completed under the supervision of REL's field representative. Soil samples were collected at 0.75 m intervals. The encountered subsurface soils were logged in the field using visual and tactile methods, and samples were placed in labelled plastic bags for transport, laboratory testing, and future reference. Open boreholes and test pits were checked for groundwater and general stability prior to backfilling.

BH002, BH005, and BH006 were outfitted with a 25 mm diameter polyvinyl chloride (PVC) standpipe in order to determine the static groundwater elevation at the site. BH001, BH003, and BH004 were outfitted with a machine slotted 51 mm PVC monitoring well installed at the depths of anticipated liner material to conduct field permeability testing.

Borehole logs summarizing soil and groundwater stratigraphy, conditions, and test information are located in Appendix A.

Physical laboratory testing, including moisture content and Atterberg limits analysis was performed on the collected soil samples to determine engineering properties of the site's soils. Moisture content testing was completed on all retrieved soil samples. Moisture content analysis, Atterberg limits analysis, and standard Proctor testing were conducted on collected samples. Results are presented on the attached borehole logs in Appendix B.

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4 Soil Stratigraphy

It should be noted that geological conditions are innately variable. At the time of preparation of this report, information on subsurface stratigraphy was available only at discreet borehole / test pit locations. In order to develop recommendations from this information, it is necessary to make some assumptions concerning conditions other than at the borehole / test pit locations. Adequate field reviews should be provided during construction to check that these assumptions are reasonable.

The general subsurface conditions at the site consisted predominantly of a surficial layer of topsoil, underlain by clay and/or clay till in descending order. The following sections provide a summary of the soils encountered in the borehole logs. The subsurface conditions encountered are summarized in the attached borehole logs in Appendix A.

4.1 Topsoil

A layer of topsoil was encountered at the surface of all the boreholes and test pits and ranged in thickness from approximately 100 mm to 200 mm.

4.2 Clay

Clay was encountered beneath the topsoil in all boreholes / test pits, except for TP005, and ranged to depths of approximately 0.5 m to 1.2 m. The clay layer contained rootlets and phosphate staining. The clay was described as silty with some sand and was soft to very stiff, damp to moist, medium to high plastic, and brown. The Atterberg limits for the clay were:

Borehole ID	Depth (m)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
BH003	0.6	44.5	20.9	23.6
BH005	0.6	62.0	23.2	38.8
TP002	0.9	40.8	22.4	18.4
TP006	0.6	31.6	17.6	14.0

4.3 Clay Till

Clay till was encountered beneath the clay and/or topsoil in all boreholes / test pits and was present to the maximum depth in all boreholes / test pits. The clay till was described as silty with some to a trace of sand and a trace of gravel, stiff to hard, moist to wet, medium plastic with high plastic inclusions, and olive brown. White precipitates, oxide staining, coal specks, and interbedded seams of sand and lenzie silts were noted throughout the clay till. The Atterberg limits for the clay till were:

Borehole ID	Depth (m)	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (PI)
BH001	3.7	50.4	22.6	27.8
BH003	3.7	42.4	16.5	26.0
BH004	4.5	33.9	14.8	19.2
TP001	3.1	36.4	18.5	17.9
TP002	1.8	48.4	21.2	27.1

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5 Groundwater Conditions

At the time of drilling, no seepage and/or sloughing was encountered in any of the boreholes. Although some moisture was present throughout the clay layer, no significant moisture was encountered during the drilling.

The depth to groundwater was measured 10 days after drilling, shortly before which time a rainfall event had been recorded. The follow table summarizes the groundwater monitoring data.

Borehole ID	Depth of Standpipe Below Ground Surface (m)	Depth to Groundwater from Ground Surface (m)
BH002	6.1	5.5
BH005	6.1	3.5
BH006	6.1	3.9

It appears that groundwater should not impact this development, however, groundwater levels should be monitored prior to development. It should be noted that soil moisture and groundwater levels at the site may fluctuate in response to climatic events.

6 Recommendations

The following recommendations are based on borehole / test pit information and are intended to assist designers. Recommendations should not be construed as providing instructions to contractors, who should form their own opinions about site conditions. It is possible that subsurface conditions beyond the borehole / test pit locations may vary from those observed. If significant variations are found before or during construction, REL should be contacted so that we can reassess our findings, if necessary.

All recommendations presented in this report are based on the assumption that an adequate level of monitoring will be provided during construction and that all construction will be carried out by suitably qualified contractors, experienced in earthworks construction. An adequate level of monitoring is considered to be:

- For earthworks, full-time monitoring and compaction testing.

All such monitoring should be carried out by suitably qualified persons, independent of the contractor. One of the purposes of providing an adequate level of monitoring is to check those recommendations, based on information collected at discreet borehole locations, are applicable to other areas of the site.

6.1 Trench Excavations

Excavations should be carried out in accordance with the Alberta Occupational Health and Safety (OH&S) Regulations. For this project, the depth for the majority of the excavations is assumed to be less than 3.0 m below existing ground surface. Excavations to deeper depths may require special considerations. The following recommendations notwithstanding, the responsibility of trench and all excavation cutslopes resides with the Contractor and should take into consideration site-specific conditions concerning soil stratigraphy and groundwater. All excavations should be reviewed by a geotechnical engineer prior to personnel working within the base of the excavation.

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Temporary excavations within the firm to stiff clay and clay till soils which are to be deeper than 1.5 m should have the sides shored and braced or the slopes should be cut back no steeper than 1.0 horizontal to 1.0 vertical (1H:1V)

Flatter sideslopes may be required in some areas if groundwater is encountered. In these instances, the excavation configuration design should be reviewed by experienced personnel, prior to allowing personnel to enter the base of the excavation.

Any encountered groundwater seepage should be directed towards sumps for removal. Conventional construction sump pumps should be capable of groundwater control.

Temporary surcharge loads, such as spill piles, should not be allowed within a distance equal to the depth of the excavation from an unsupported excavation face or 3.0 m, whichever is greater, while mobile equipment should be kept back at least 3.0 m. All excavation sideslopes should be checked regularly for signs of sloughing, especially after rainfall periods. Small earth falls from the sideslopes are a potential source of danger to workmen and must be guarded against.

6.2 Facility Design

General recommendations are provided for the construction of the proposed ponds. For more detailed recommendations concerning pond construction, refer to Section 6.3.

Based on the results of the testing and our experience, the medium to high plastic clay / clay till is considered suitable to use as a clay liner and meets AOPA requirements. It is considered acceptable to reuse other materials, if encountered, for berm construction provided that a minimum 1.2 m thick compacted clay liner is maintained on the inside face of the ponds.

At all times, clay liner material should be visually inspected during placement to isolate any inclusions of silt or sand material which should be separated and removed from the clay liner area.

The compacted clay liner should extend across the pond bases, as well as up the sideslopes for this development with a minimum thickness of 1 m on the pond bottom and 1.2 m on the sideslopes, to allow for weathering, variations in actual thickness, and pockets of poor quality material. The interior slopes should be no steeper than 3 horizontal to 1 vertical (3:1). The exterior slopes of the berms may range from 2.5:1 to 4:1.

Further recommendations regarding shallow foundations are presented in Appendix D.

6.3 Freshwater / Effluent Pond Construction

Final design of this project should consider, in detail, the subgrade preparation of the proposed ponds so that the base of the ponds are founded on competent materials. As noted above, interbedded seams of silt and sand were noted throughout the clay till, therefore thoroughly mixing and blending all liner material will be critical for the long term performance of the natural material as an impermeable liner.

All surficial vegetation, topsoil, and any organic material within the proposed pond areas should be stripped and removed. Following this removal, the area may be graded for pond construction.

A minimum 300 mm subgrade preparation should be conducted prior to installation of clay liner, including scarifying the subgrade soil, moisture conditioning, and recompacting to a minimum of 98% of Standard Proctor Maximum Dry Density (SPMDD) with moisture content of 0% to +2% of Optimum Moisture Content (OMC). Select engineered fill should be used for liner and should be placed in lifts of no greater than 150 mm compacted thickness, uniformly mixed

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and compacted to a density of 98% of SPMDD at ±2% of OMC. The subgrade surface below the compacted clay liner should be relatively level to control liner thickness, and proof-rolled to provide a proper base for compacting the first liner lift to the specified density. General recommendations for compaction can be found in Appendix D. Proof-rolling should be supervised by experienced geotechnical personnel, specific requirements and methods for proof-rolling should be prepared during construction in consultation with REL.

It is important for the pond berm to be well constructed to avoid settlement, slumping, and erosion; and to provide good support for liners, erosion protection, and vehicles. Subgrade preparation comprises removal of topsoil and any soft, compressible soils from the berm area, and compacting the scarified surface to at least 98% of SPMDD. Fill lifts for berm construction should be level, uniform, and horizontally parallel. The pond berm backfill materials should be moisture conditioned to within ±2% of OMC values and compacted to 98% of SPMDD in lifts not exceeding 150 mm in compacted thickness. As discussed above, any excavated low plastic clay or silty / sandy material not suitable as a liner may be used for the core and outer shell of the berms.

A remolded clay liner should be constructed by placing controlled local clay soils up to the design elevation or thickness on the bottom of the ponds and interior slopes of the berms. The clay liner soils should be moisture conditioned to the compaction standards noted above. At the completion of compaction, at final design grade, the pond bases should be proof-rolled using a relatively large smooth-drum roller. This smooth rolled surface provides a much smoother base, which greatly reduces the surface area for water absorption and swelling.

In areas where an interior clay liner is being placed on an existing slope, it is important to specify that a system of 'notching' the existing subgrade be implemented. This notching technique ensures a good bond between the clay liner and adjacent material to minimize the risk of developing a failure plane parallel to the interior slope face.

It is recommended to fill the ponds as soon as possible following completion of construction to prevent excessive drying and cracking of the clay liner. It is recommended to develop a construction Quality Assurance Control Plan (QACP) before construction, such that construction quality is monitored and maintained throughout the construction process.

6.4 Liner Materials and Compaction

Impervious liner material should consist of a low to medium plastic clay not containing organics or deleterious materials and should be compacted to the compaction standard specified in section 6.3. Further requirements for select engineered fill can be found in Appendix D

Low to medium plastic clay is generally considered suitable for use as general engineered fill. It should be free of organic and deleterious material.

Backfill density testing should be utilized to ensure the backfill compaction and moisture is sufficient wherever backfill is placed.

6.5 Estimated Shrinkage Factors

Results of the field density testing conducted as well as topsoil depths measured in the test pit is included in the attached table. Based on the results of the field and laboratory testing, estimated shrinkage factors are included in the attached table. The estimated shrinkage of the site soils ranged from 17.5% to 24.9% and averaged 22.7%. Given the variability, of the in-site moisture content of the existing site soils, a shrinkage factor of between 17% to 24% is recommended.

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3614 – 18th Avenue North
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7 Closure

We trust that this report meets your current requirements, and we are pleased to provide assistance in the completion of this project. Please do not hesitate to contact me if you have any comments, questions, or concerns.

Respectfully submitted by:

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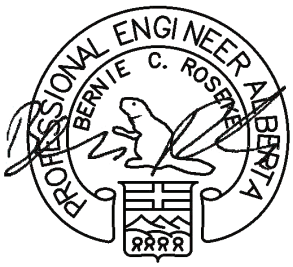

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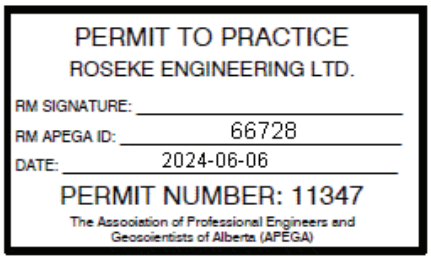
06 June 2024



Appendix A – BOREHOLE LOGS

TERMS USED ON BOREHOLE LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on 0.075mm sieve): Includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as inferred from laboratory or in situ tests.

DESCRIPTIVE TERM	RELATIVE DENSITY	N (blows per 0.3m)
Very Loose	0 TO 20%	0 to 4
Loose	20 TO 40%	4 to 10
Compact	40 TO 75%	10 to 30
Dense	75 TO 90%	30 to 50
Very Dense	90 TO 100%	greater than 50

The number of blows, N, on a 51mm O.D. split spoon sampler of a 63.5kg weight falling 0.76m, required to drive the sampler a distance of 0.3m from 0.15m to 0.45m.

FINE GRAINED SOILS (major portion passing 0.075mm sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as estimated from laboratory or in situ tests.

DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH (KPA)
Very Soft	Less than 25
Soft	25 to 50
Firm	50 to 100
Stiff	100 to 200
Very Stiff	200 to 400
Hard	Greater than 400

NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil.

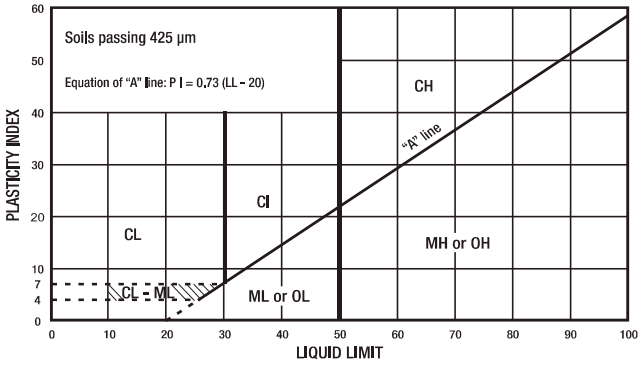
GENERAL DESCRIPTIVE TERMS

Slickensided - having inclined planes of weakness that are slick and glossy in appearance.
Fissured - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated - composed of thin layers of varying colour and texture.
Interbedded - composed of alternate layers of different soil types.
Calcareous - containing appreciable quantities of calcium carbonate.;
Well graded - having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly graded - predominantly of one grain size, or having a range of sizes with some intermediate size missing.

MODIFIED UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
COARSE-GRAINED SOILS More than 50% retained on 75 µm sieve*	GRAVELS 50% or more of coarse fraction retained on 4.75 mm sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines: Less than 5% Pass 75 µm sieve; More than 12% Pass 75 µm sieve; 5% to 12% Pass 75 µm sieve. GW, GP, SW, SP GM, GC, SM, SC Borderline Classification requiring use of dual symbols. $C_U = D_{60} / D_{10}$ Greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Not meeting both criteria for GW
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits plot below "A" line or plasticity index less than 4
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits plot above "A" line or plasticity index greater than 7
	SANDS More than 50% of coarse fraction passes 4.75 mm sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines	$C_U = D_{60}/D_{10}$ Greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			SP	Poorly graded sands and gravelly sands, little or no fines	Not meeting both criteria for SW
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures	Atterberg limits plot below "A" line or plasticity index less than 4
			SC	Clayey sands, sand-clay mixtures	Atterberg limits plot above "A" line or plasticity index greater than 7
FINE-GRAINED SOILS (by behavior) 50% or more passes 75 µm sieve*	SILTS Liquid limit <50		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands of slight plasticity	For classification of fine-grained soils and fine fraction of coarse-grained soils.
	SILTS Liquid limit >50		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts	
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit <30		CL	Inorganic clays of low plasticity, gravelly clays, sandy clays, silty clays, lean clays	
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit 30-50		CI	Inorganic clays of medium plasticity, silty clays	
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit >50		CH	Inorganic clays of high plasticity, fat clays	
	ORGANIC SILTS AND CLAYS Liquid limit <50		OL	Organic silts and organic silty clays of low plasticity	
	ORGANIC SILTS AND CLAYS Liquid limit >50		OH	Organic clays of medium to high plasticity	
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils	

PLASTICITY CHART



*Based on the material passing the 75 mm sieve
Reference: ASTM Designation D2487, for identification procedure see D2488. USC as modified by PFRA

SOIL COMPONENTS

FRACTION	SIEVE SIZE PASSING	SIEVE SIZE RETAINED	DEFINING RANGES OF PERCENTAGE BY MASS OF MINOR COMPONENTS: PERCENTAGE	DESCRIPTOR
GRAVEL				
coarse	75 mm	19 mm	>35 %	"and"
fine	19 mm	4.75 mm	21 to 35 %	"y-adjective"
SAND				
coarse	4.75 mm	2.00 mm	10 to 20 %	"some"
medium	2.00 mm	425 µm		
fine	425 µm	75 µm	>0 to 10 %	"trace"
SILT (non plastic) or CLAY (plastic)	75 µm		as above but by behavior	

OVERSIZE MATERIAL

Rounded or subrounded

COBBLES	75 mm to 300 mm
BOULDERS	> 300 mm

Not rounded

ROCK FRAGMENTS	>75 mm
ROCKS	> 0.76 cubic metre in volume

Project: Feedlot Expansion		BOREHOLE NO: **BH001**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Solid Stem Auger	ELEVATION:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) / ■ N-VALUE ■ (20 40 60 80) / ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) / ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	WELL INSTALLATION	Elevation (m)
0		Topsoil (150 mm)								
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets		B1						
1		Clay Till - silty, some sand, trace gravel, very stiff, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B2						
2				B3						
3				B4						
				B5						
4				B6						
5				B7						
		- interbedded sand seams								
6				B8						
		End of borehole at 6.1 m, no sloughing or seepage. Monitoring well installed to 5.03 m.								
7										
8										
9										
10										

LOGGED BY: CA	COMPLETION DEPTH: 6.10 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **BH002**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Solid Stem Auger	ELEVATION:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ / ■ N-VALUE ■ / ◆ UNCONF. SHEAR STR. (kPa) ◆ / ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil (150 mm)								
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets		B1						
1										
		Clay Till - silty, some sand, trace gravel, very stiff to hard, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B2						
2				B3						
				B4						
3										
				B5						
4										
				B6						
5										
	▼			B7						
6										
				B8						
		End of borehole at 6.1 m, no sloughing or seepage. Standpipe installed to 6.1 m. Groundwater depth as noted when monitored on May 13, 2024.								
7										
8										
9										
10										

LOGGED BY: CA	COMPLETION DEPTH: 5.03 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **BH003**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Solid Stem Auger	ELEVATION:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) ■ N-VALUE ■ (20 40 60 80) ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	WELL INSTALLATION	Elevation (m)
0		Topsoil (100 mm)								
		Clay - silty, some sand, soft to stiff, damp to moist, medium to high plastic, brown, rootlets		B1						
1				B2						
		Clay Till - silty, some sand, trace gravel, very stiff to hard, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B3						
2										
				B4						
3										
				B5						
4										
				B6						
5										
				B7						
6										
				B8						
		End of borehole at 6.1 m, no sloughing or seepage. Monitoring well installed to 5.49 m.								
7										
8										
9										
10										

LOGGED BY: CA	COMPLETION DEPTH: 5.03 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **BH004**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Solid Stem Auger	ELEVATION:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) / ■ N-VALUE ■ (20 40 60 80) / ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) / ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	WELL INSTALLATION	Elevation (m)
0		Topsoil (150 mm)								
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets		B1						
1		Clay Till - silty, some sand, trace gravel, very stiff to hard, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B2						
2				B3						
3				B4						
				B5						
4				B6						
5				B7						
6				B8						
		End of borehole at 6.1 m, no sloughing or seepage. Monitoring well installed to 6.1 m.								
7										
8										
9										
10										

LOGGED BY: CA	COMPLETION DEPTH: 5.03 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **BH005**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Solid Stem Auger	ELEVATION:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID 20 40 60 80	▲ VANE SHEAR (kPa) ▲ 100 200 300 400 ■ N-VALUE ■ 20 40 60 80 ◆ UNCONF. SHEAR STR. (kPa) ◆ 100 200 300 400 ● 0.5 x POCKETPEN. (kPa) ● 100 200 300 400	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil (100 mm)								
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets		B1						
1		Clay Till - silty, some sand, trace gravel, very stiff to hard, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B2						
		- very moist, interbedded seams of sand								
2		- hard, moist		B3						
				B4						
3										
				B5						
4										
				B6						
5										
				B7						
6				B8						
		End of borehole at 6.1 m, no sloughing or seepage. Standpipe installed to 6.1 m. Groundwater depth as noted when monitored on May 13, 2024.								
7										
8										
9										
10										

LOGGED BY: CA	COMPLETION DEPTH: 5.03 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **BH006**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Solid Stem Auger	ELEVATION:

SAMPLE TYPE: SHELBY TUBE | CORE SAMPLE | SPT SAMPLE | GRAB SAMPLE | NO RECOVERY

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m) Water Level	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID 20 40 60 80	▲ VANE SHEAR (kPa) ▲ 100 200 300 400 ■ N-VALUE ■ 20 40 60 80 ◆ UNCONF. SHEAR STR. (kPa) ◆ 100 200 300 400 ● 0.5 x POCKETPEN. (kPa) ● 100 200 300 400	OTHER DATA	SLOTTED PIEZOMETER	Elevation (m)
0		Topsoil (100 mm)								
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets		B1						
1										
		Clay Till - silty, some sand, trace gravel, stiff to very, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B2						
2				B3						
				B4						
3										
				B5						
4										
				B6						
5										
				B7						
		- sandy, wet								
6				B8						
		End of borehole at 6.1 m, no sloughing or seepage. Standpipe installed to 6.1 m. Groundwater depth as noted when monitored on May 13, 2024.								
7										
8										
9										
10										

LOGGED BY: CA	COMPLETION DEPTH: 5.03 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **TP001**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Mechanical Excavator	ELEVATION:

SAMPLE TYPE ■ SHELBY TUBE ◪ CORE SAMPLE ☒ SPT SAMPLE ▤ GRAB SAMPLE ▥ NO RECOVERY

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) ■ N-VALUE ■ (20 40 60 80) ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	Elevation (m)
0		Topsoil (200 mm)							
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets		B1					
1		Clay Till - silty, some sand, trace gravel, stiff, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B2					
2									
3				B3					
		End of test pit at 3.2 m, no sloughing or seepage.							
4									
5									
6									

LOGGED BY: CA	COMPLETION DEPTH: 3.20 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **TP002**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Mechanical Excavator	ELEVATION:

SAMPLE TYPE ■ SHELBY TUBE ◪ CORE SAMPLE ☒ SPT SAMPLE ▤ GRAB SAMPLE ▥ NO RECOVERY

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) ■ N-VALUE ■ (20 40 60 80) ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	Elevation (m)
0		Topsoil (150 mm)							
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets							
1		Clay Till - silty, some sand, trace gravel, stiff, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B1					
2				B2					
3				B3					
		End of test pit at 3.5 m, no sloughing or seepage.							
4									
5									
6									

LOGGED BY: CA	COMPLETION DEPTH: 3.50 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **TP003**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Mechanical Excavator	ELEVATION:

SAMPLE TYPE ■ SHELBY TUBE ◪ CORE SAMPLE ☒ SPT SAMPLE ▤ GRAB SAMPLE ▥ NO RECOVERY

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) ■ N-VALUE ■ (20 40 60 80) ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	Elevation (m)
0		Topsoil (150 mm)							
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets							
1		Clay Till - silty, some sand, trace gravel, stiff, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B1					
2				B2					
3		End of test pit at 3.2 m, no sloughing or seepage.							
4									
5									
6									

LOGGED BY: CA	COMPLETION DEPTH: 3.20 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **TP004**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Mechanical Excavator	ELEVATION:

SAMPLE TYPE ■ SHELBY TUBE ◪ CORE SAMPLE ☒ SPT SAMPLE ▤ GRAB SAMPLE ▥ NO RECOVERY

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) / ■ N-VALUE ■ (20 40 60 80) / ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) / ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	Elevation (m)
0		Topsoil (200 mm)							
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets	▤	B1		●			
1		Clay Till - silty, some sand, trace gravel, stiff, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions							
2			▤	B2		●			
		End of test pit at 2.7 m, no sloughing or seepage.							
3									
4									
5									
6									

LOGGED BY: CA	COMPLETION DEPTH: 2.70 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **TP005**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Mechanical Excavator	ELEVATION:

SAMPLE TYPE ■ SHELBY TUBE ◪ CORE SAMPLE ☒ SPT SAMPLE ▤ GRAB SAMPLE ▥ NO RECOVERY

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) ■ N-VALUE ■ (20 40 60 80) ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	Elevation (m)
0		Topsoil (150 mm)							
		Clay Till - silty, some sand, trace gravel, stiff, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions							
1									
				B1		●			
2									
		End of test pit at 2.5 m, no sloughing or seepage.							
3									
4									
5									
6									

LOGGED BY: CA	COMPLETION DEPTH: 2.50 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **TP006**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Mechanical Excavator	ELEVATION:

SAMPLE TYPE ■ SHELBY TUBE ◪ CORE SAMPLE ☒ SPT SAMPLE ▤ GRAB SAMPLE ▥ NO RECOVERY

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) ■ N-VALUE ■ (20 40 60 80) ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	Elevation (m)
0		Topsoil (200 mm)							
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets	▤	B1					
1		Clay Till - silty, some sand, trace gravel, stiff, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions							
2			▤	B2					
		End of test pit at 2.3 m, no sloughing or seepage.							
3									
4									
5									
6									

LOGGED BY: CA	COMPLETION DEPTH: 2.30 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Project: Feedlot Expansion		BOREHOLE NO: **TP007**
Client: Diamond Two Feeders Ltd.		PROJECT NO: REL243022
	Mechanical Excavator	ELEVATION:

SAMPLE TYPE ■ SHELBY TUBE ◪ CORE SAMPLE ☒ SPT SAMPLE ▤ GRAB SAMPLE ▥ NO RECOVERY

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) ■ N-VALUE ■ (20 40 60 80) ◆ UNCONF. SHEAR STR. (kPa) ◆ (100 200 300 400) ● 0.5 x POCKETPEN. (kPa) ● (100 200 300 400)	OTHER DATA	Elevation (m)
0		Topsoil (200 mm)							
		Clay - silty, some sand, stiff to very stiff, moist, medium to high plastic, brown, rootlets		B1					
1									
		Clay Till - silty, some sand, trace gravel, stiff, moist, medium plastic, olive brown, platy, coal inclusions and oxide stains, high plastic inclusions		B2					
2									
3		End of test pit at 2.9 m, no sloughing or seepage.							
4									
5									
6									

LOGGED BY: CA	COMPLETION DEPTH: 2.90 m
REVIEWED BY: BR	COMPLETION DATE: 24-5-3

AB TRANS BOREHOLE LOG DIAMOND TWO FEEDERS LTD. - FEEDLOT EXPANSION.GPJ AB_TRANS.GDT 24-6-3

Appendix B – BOREHOLE LOCATION PLAN

Figure 1 – Site Plan
Borehole & Test Pit Locations

Appendix C – LABORATORY TEST RESULTS

ATTERBERG LIMITS TEST

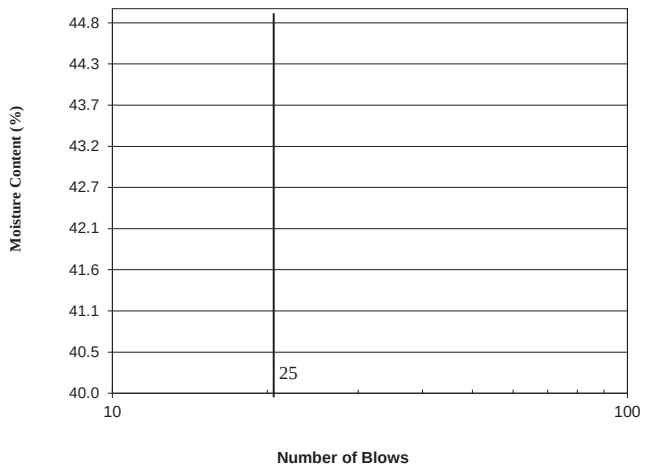
Attention: Mr. Robert Kroening

Project No: REL243022
Date: 14-May-24

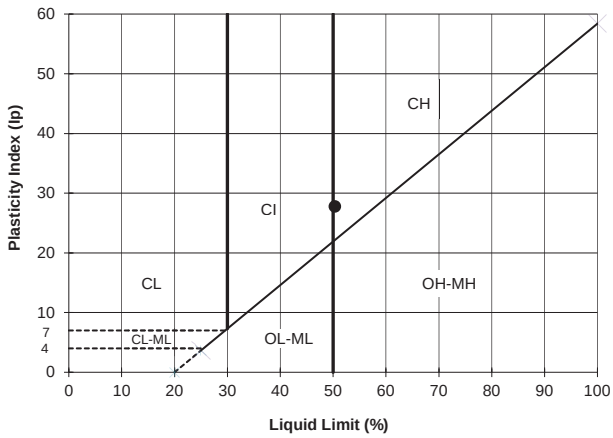
Project: Diamond Two Feeders Ltd. - Feedlot Expansion

Liquid Limit Test				Plastic Limit Test		
# of Blows	30					
Tare #	6			Tare #	A4	
Wet Wt + Tare	24.205			Wet Wt + Tare	12.468	
Dry Wt + Tare	20.704			Dry Wt + Tare	11.497	
Wt of Tare	13.608			Wt of Tare	7.198	
% Moisture	49.3			% Moisture	22.6	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 50.4 **Plastic Limit (%):** 22.6 **Plasticity Index:** 27.8

Classification : CH **Depth:** 3.7 m **Sample ID:** 1B5

Technician: TK

= Input Data

Per: [redacted]

ATTERBERG LIMITS TEST

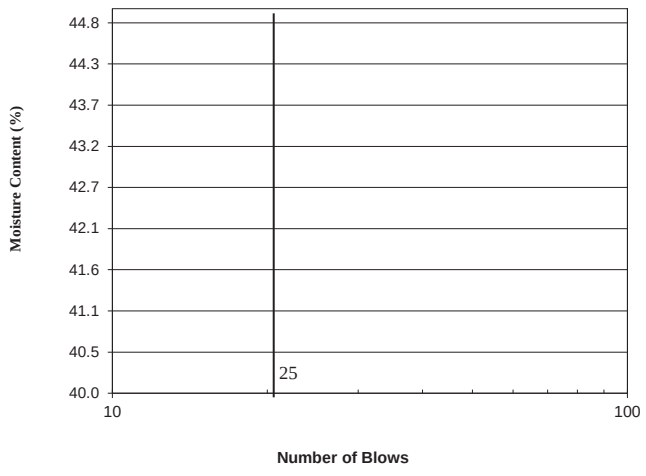
Attention: Mr. Robert Kroening

Project No: REL243022
Date: 14-May-24

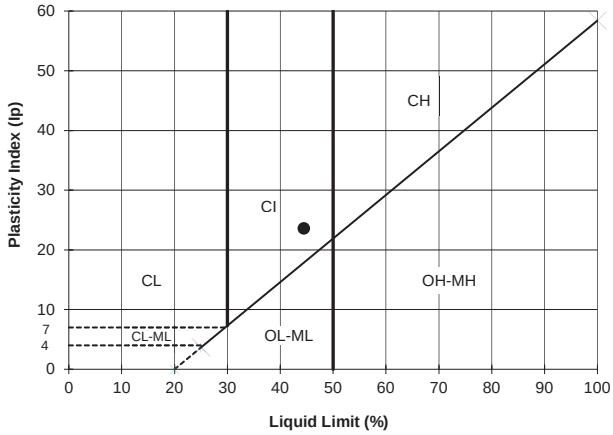
Project: Diamond Two Feeders Ltd. - Feedlot Expansion

Liquid Limit Test				Plastic Limit Test		
# of Blows	22					
Tare #	5			Tare #	C	
Wet Wt + Tare	23.839			Wet Wt + Tare	11.336	
Dry Wt + Tare	20.620			Dry Wt + Tare	10.628	
Wt of Tare	13.485			Wt of Tare	7.242	
% Moisture	45.1			% Moisture	20.9	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 44.5 **Plastic Limit (%):** 20.9 **Plasticity Index:** 23.6

Classification : CI **Depth:** 0.6 m **Sample ID:** 3B1

Technician: TK

= Input Data

Per: [redacted]

ATTERBERG LIMITS TEST

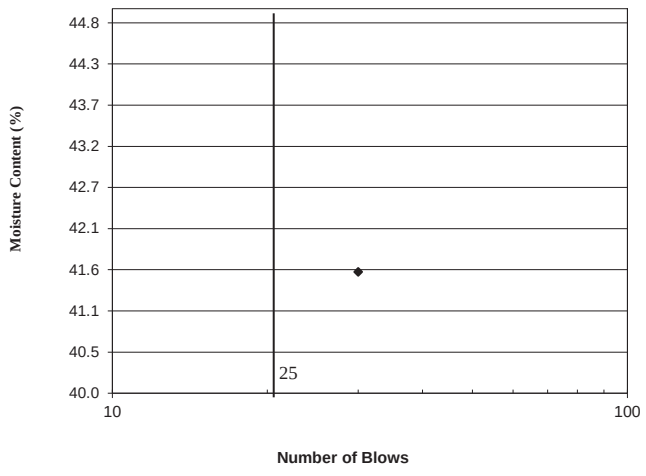
Attention: Mr. Robert Kroening

Project No: REL243022
Date: 14-May-24

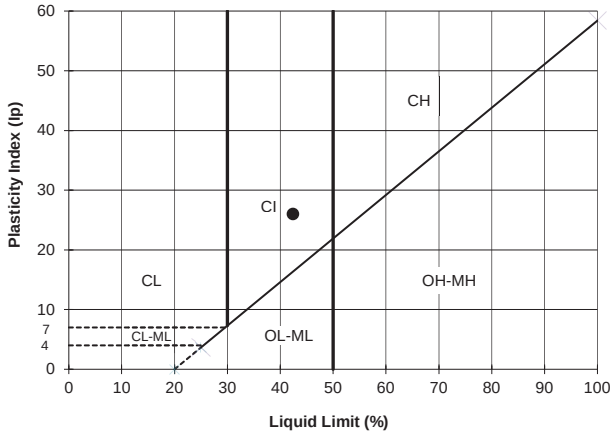
Project: Diamond Two Feeders Ltd. - Feedlot Expansion

Liquid Limit Test				Plastic Limit Test		
# of Blows	30					
Tare #	9			Tare #	10	
Wet Wt + Tare	24.671			Wet Wt + Tare	11.013	
Dry Wt + Tare	21.413			Dry Wt + Tare	10.479	
Wt of Tare	13.577			Wt of Tare	7.238	
% Moisture	41.6			% Moisture	16.5	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 42.4 **Plastic Limit (%):** 16.5 **Plasticity Index:** 26.0

Classification : CI **Depth:** 3.7 m **Sample ID:** 3B5

Technician: TK

= Input Data

Per: [redacted]

Reporting of these results constitutes a testing service only. Engineering interpretation or evaluation of these test results is provided only on written request. The data presented is for the sole use of the client stipulated above.

ATTERBERG LIMITS TEST

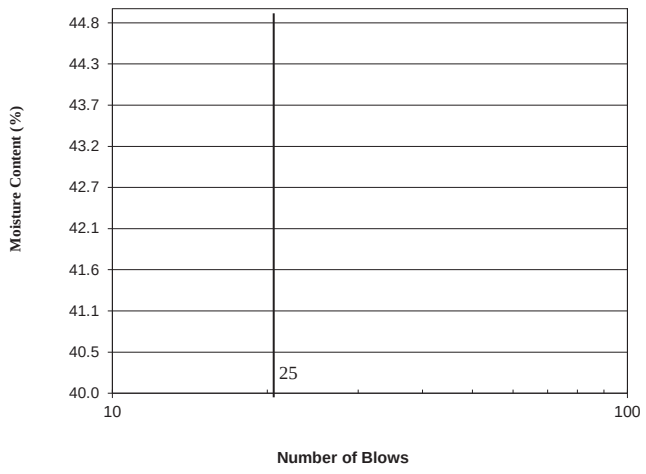
Attention: Mr. Robert Kroening

Project No: REL243022
Date: 14-May-24

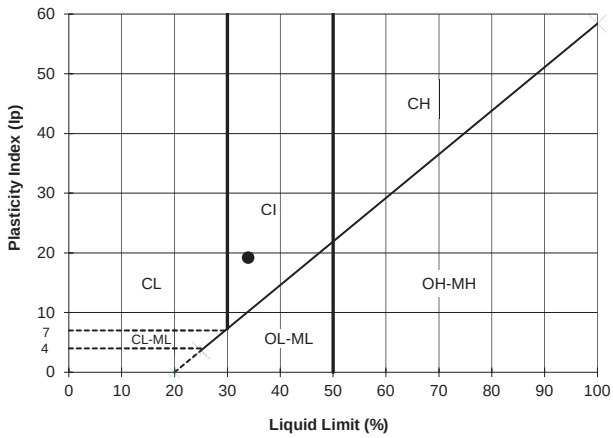
Project: Diamond Two Feeders Ltd. - Feedlot Expansion

Liquid Limit Test				Plastic Limit Test		
# of Blows	20					
Tare #	14			Tare #	A6	
Wet Wt + Tare	24.027			Wet Wt + Tare	12.485	
Dry Wt + Tare	21.302			Dry Wt + Tare	11.813	
Wt of Tare	13.473			Wt of Tare	7.262	
% Moisture	34.8			% Moisture	14.8	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 33.9 **Plastic Limit (%):** 14.8 **Plasticity Index:** 19.2

Classification : CI **Depth:** 4.5 m **Sample ID:** 4B6

Technician: TK

= Input Data

Per: [redacted]

ATTERBERG LIMITS TEST

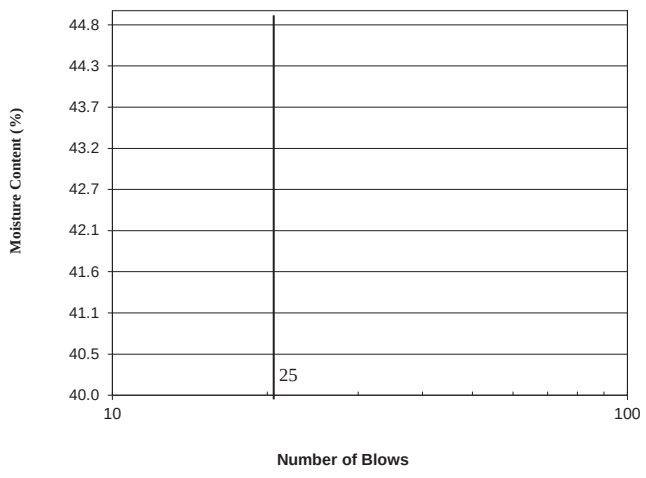
Attention: Mr. Robert Kroening

Project No: REL243022
Date: 14-May-24

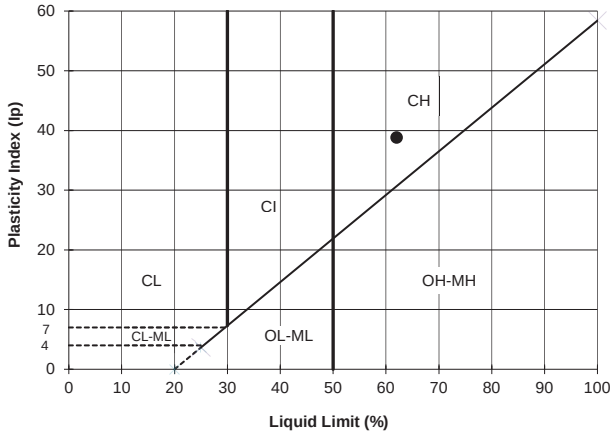
Project: Diamond Two Feeders Ltd. - Feedlot Expansion

Liquid Limit Test				Plastic Limit Test		
# of Blows	21					
Tare #	1			Tare #	A8	
Wet Wt + Tare	23.109			Wet Wt + Tare	10.806	
Dry Wt + Tare	19.438			Dry Wt + Tare	10.127	
Wt of Tare	13.633			Wt of Tare	7.201	
% Moisture	63.2			% Moisture	23.2	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 62.0 **Plastic Limit (%):** 23.2 **Plasticity Index:** 38.8

Classification : CH **Depth:** 0.6 m **Sample ID:** 5B1

Technician: TK

= Input Data

Per: [redacted]

ATTERBERG LIMITS TEST

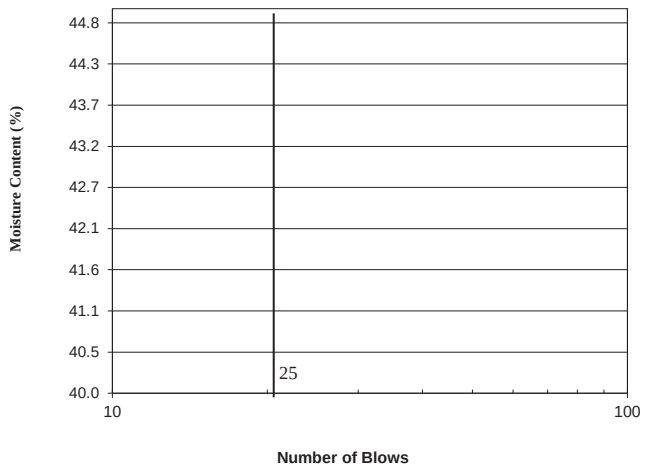
Attention: Mr. Robert Kroening

Project No: REL243022
Date: 14-May-24

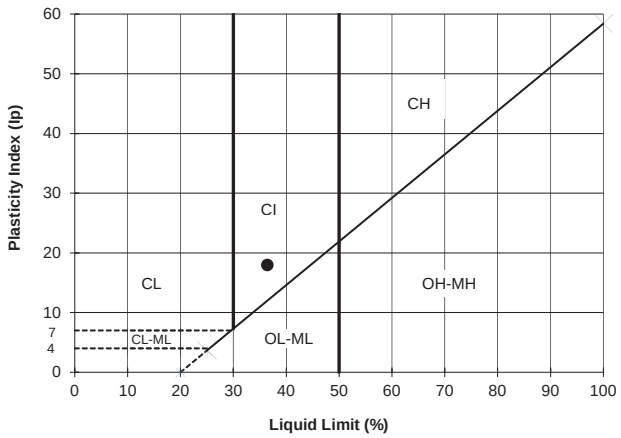
Project: Diamond Two Feeders Ltd. - Feedlot Expansion

Liquid Limit Test				Plastic Limit Test		
# of Blows	24					
Tare #	A			Tare #	A2	
Wet Wt + Tare	22.860			Wet Wt + Tare	11.461	
Dry Wt + Tare	20.368			Dry Wt + Tare	10.801	
Wt of Tare	13.562			Wt of Tare	7.238	
% Moisture	36.6			% Moisture	18.5	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 36.4 **Plastic Limit (%):** 18.5 **Plasticity Index:** 17.9

Classification : CI **Depth:** 3.1 m **Sample ID:** 1TP3

Technician: TK

= Input Data

Per: [redacted]

ATTERBERG LIMITS TEST

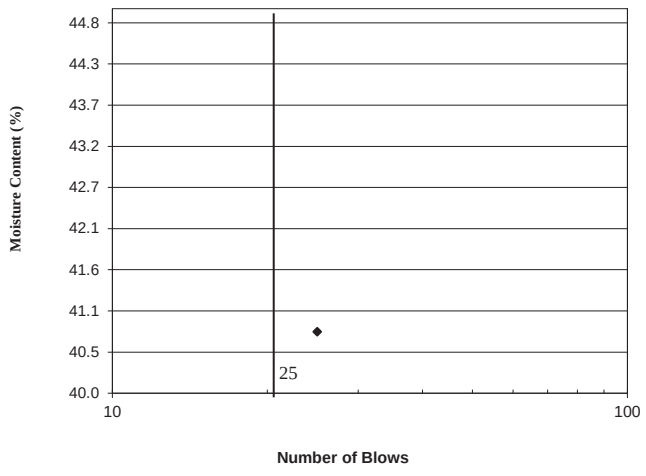
Attention: Mr. Robert Kroening

Project No: REL243022
Date: 14-May-24

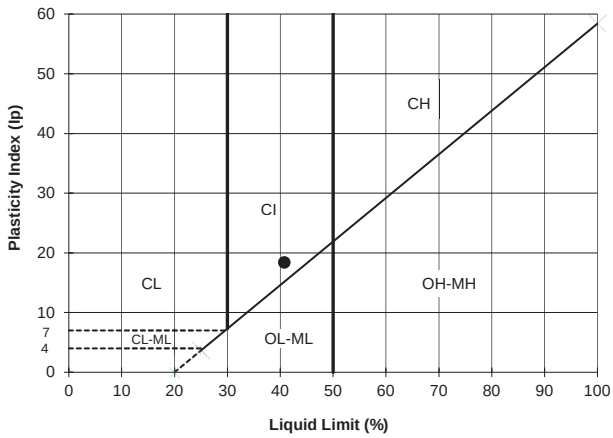
Project: Diamond Two Feeders Ltd. - Feedlot Expansion

Liquid Limit Test				Plastic Limit Test		
# of Blows	25					
Tare #	2			Tare #	AB	
Wet Wt + Tare	25.573			Wet Wt + Tare	11.708	
Dry Wt + Tare	22.100			Dry Wt + Tare	10.895	
Wt of Tare	13.588			Wt of Tare	7.271	
% Moisture	40.8			% Moisture	22.4	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 40.8 **Plastic Limit (%):** 22.4 **Plasticity Index:** 18.4

Classification : CI **Depth:** 0.9 m **Sample ID:** 2TP1

Technician: TK

= Input Data

Per: [redacted]

ATTERBERG LIMITS TEST

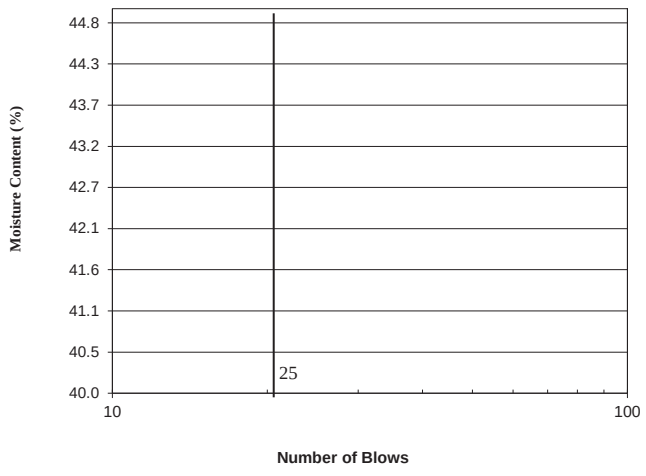
Attention: Mr. Robert Kroening

Project No: REL243022
Date: 14-May-24

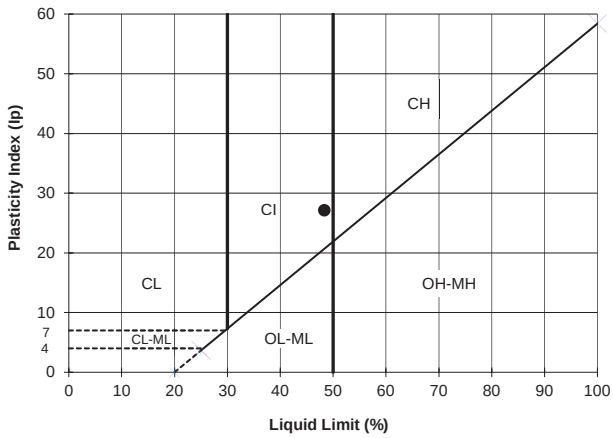
Project: Diamond Two Feeders Ltd. - Feedlot Expansion

Liquid Limit Test				Plastic Limit Test		
# of Blows	20					
Tare #	11			Tare #	B	
Wet Wt + Tare	24.085			Wet Wt + Tare	10.863	
Dry Wt + Tare	20.582			Dry Wt + Tare	10.222	
Wt of Tare	13.516			Wt of Tare	7.203	
% Moisture	49.6			% Moisture	21.2	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 48.4 **Plastic Limit (%):** 21.2 **Plasticity Index:** 27.1

Classification : CI **Depth:** 1.8 m **Sample ID:** 2TP2

Technician: TK

= Input Data

Per: [redacted]

ATTERBERG LIMITS TEST

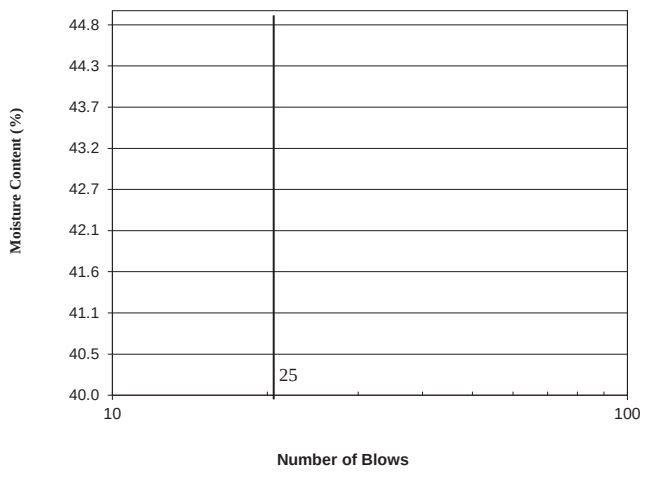
Attention: Mr. Robert Kroening

Project No: REL243022
Date: 14-May-24

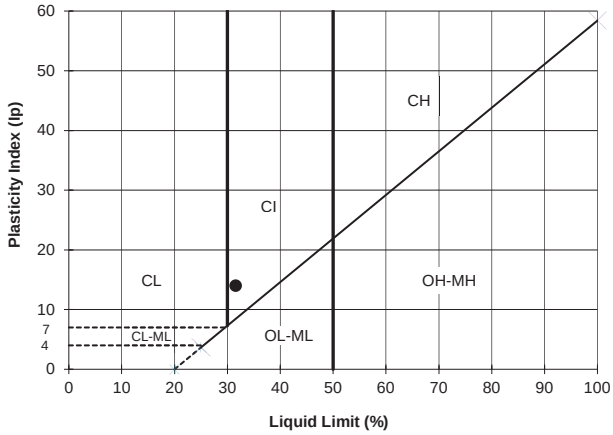
Project: Diamond Two Feeders Ltd. - Feedlot Expansion

Liquid Limit Test				Plastic Limit Test		
# of Blows	27					
Tare #	8			Tare #	A5	
Wet Wt + Tare	27.543			Wet Wt + Tare	11.908	
Dry Wt + Tare	24.202			Dry Wt + Tare	11.205	
Wt of Tare	13.533			Wt of Tare	7.211	
% Moisture	31.3			% Moisture	17.6	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 31.6 **Plastic Limit (%):** 17.6 **Plasticity Index:** 14.0

Classification : CI **Depth:** 0.6 m **Sample ID:** 6TP1

Technician: TK

= Input Data

Per: [redacted]

MOISTURE CONTENT

JOB #	JOB DESCRIPTION	PROJECT
REL243022	Diamond Two Feeders Expansion	Evaluation

Test Pit ID	Sample ID	Depth (m)	Tare Mass (g)	Wet + Tare (g)	Dry + Tare (g)	Moisture %
BH001	B1	0.7	8.6	211.3	174.4	22.3
	B2	1.5	8.3	218.7	174.9	26.3
	B3	2.2	8.6	204.5	158.1	31.0
	B4	3.0	8.4	210.6	166.1	28.2
	B5	3.7	8.4	217.9	167.6	31.6
	B6	4.5	8.2	209.7	166.8	27.0
	B7	5.2	8.4	214.3	167.6	29.3
	B8	6.0	8.4	205.3	183.8	12.3
BH002	B1	0.7	8.3	207.7	181.6	15.1
	B2	1.5	8.3	215.8	191.2	13.4
	B3	2.2	8.4	214.5	176.4	22.7
	B4	3.0	8.3	208.4	167.7	25.5
	B5	3.7	8.2	210.7	166.7	27.8
	B6	4.5	8.3	208.8	178.3	17.9
	B7	5.2	8.2	222.9	193.5	15.9
	B8	6.0	8.2	215.8	186.1	16.7
BH003	B1	0.7	8.1	209.1	189.3	10.9
	B2	1.5	8.2	211.6	172.1	24.1
	B3	2.2	8.3	212.3	172.9	23.9
	B4	3.0	8.4	204.0	159.8	29.2
	B5	3.7	8.3	202.9	172.1	18.8
	B6	4.5	8.5	206.5	181.1	14.7
	B7	5.2	8.2	208.9	177.3	18.7
	B8	6.0	8.3	207.2	174.7	19.5
BH004	B1	0.7	8.4	213.0	180.8	18.7
	B2	1.5	8.3	206.6	181.0	14.8
	B3	2.2	8.3	203.7	182.5	12.2
	B4	3.0	8.2	209.4	185.9	13.2
	B5	3.7	8.4	207.3	179.4	16.3
	B6	4.5	8.2	215.3	191.3	13.1
	B7	5.2	8.3	208.5	181.5	15.6
	B8	6.0	8.4	210.8	187.4	13.1

MOISTURE CONTENT

JOB #	JOB DESCRIPTION	PROJECT
REL243022	Diamond Two Feeders Expansion	Evaluation

Test Pit ID	Sample ID	Depth (m)	Tare Mass (g)	Wet + Tare (g)	Dry + Tare (g)	Moisture %
BH005	B1	0.7	8.4	207.0	166.9	25.3
	B2	1.5	8.4	205.4	165.8	25.2
	B3	2.2	8.3	214.4	169.8	27.6
	B4	3.0	8.3	206.1	177.3	17.0
	B5	3.7	8.4	206.5	180.8	14.9
	B6	4.5	8.4	207.8	180.5	15.9
	B7	5.2	8.2	209.8	184.9	14.1
	B8	6.0	8.3	209.9	184.2	14.6
BH006	B1	0.7	8.2	202.7	166.0	23.3
	B2	1.5	8.3	209.4	176.6	19.5
	B3	2.2	8.4	215.1	172.4	26.0
	B4	3.0	8.3	205.5	157.8	31.9
	B5	3.7	8.4	212.2	185.2	15.3
	B6	4.5	8.4	208.4	180.5	16.2
	B7	5.2	8.2	205.0	177.7	16.1
	B8	6.0	8.3	208.2	175.5	19.6
TP001	B1	0.6	8.4	217.8	177.9	23.5
	B2	1.1	8.1	208.7	173.6	21.2
	B3	3	8.3	206.7	172.5	20.8
TP002	B1	1	8.3	210.9	177.3	19.9
	B2	1.8	8.3	206.1	162.6	28.2
	B3	3.4	8.5	204.9	158.6	30.8
TP003	B1	1	8.2	205.3	163.9	26.6
	B2	2.4	8.4	205.7	156.1	33.6
TP004	B1	0.6	8.3	205.6	176.1	17.6
	B2	2.1	8.2	203.3	179.7	13.8
TP005	B1	1.5	8.4	217.3	177.8	23.3
TP006	B1	0.6	8.2	213.3	189.5	13.1
	B2	2.1	8.5	209.2	170.5	23.9
TP007	B1	0.6	8.6	204.2	168.1	22.6
	B2	1.8	8.2	210.8	160.2	33.3

Moisture - Density Relationship Report

3614 18th Avenue North
Lethbridge AB T1H 5S7
Tel: 1-403-942-6170

TO: **Diamond Two Feeders Ltd.**
224070 Township Road 205
Vulcan County, AB

ATTENTION: Robert & Dayna Kroening

ROSEKE PROJECT #: REL243-022

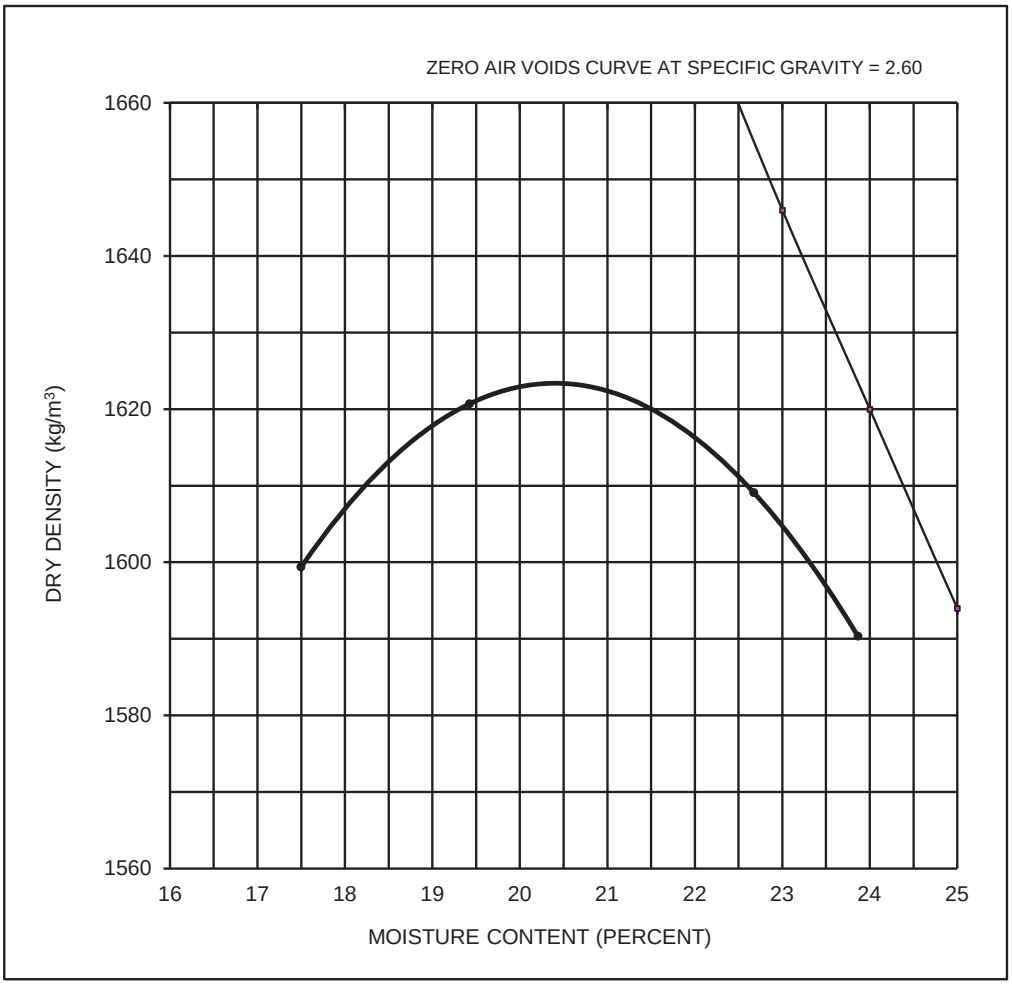
PROJECT: Feedlot Expansion

COMPACTION STANDARD [X] ASTM D698 [ ] ASTM D1557 [ ] ASTM D558 **METHOD:** A

DRY DENSITY kg/m^3	1599	1621	1609	1590			
MOISTURE CONTENT (%)	17.5	19.4	22.7	23.9			

MAXIMUM DRY DENSITY: 1624 kg/m^3
OPTIMUM MOISTURE CONTENT: 20.4 %

SOURCE: TP002



DATE SAMPLED: 6-May-24
SAMPLED BY: REL / CA
DATE RECEIVED: 6-May-24
SAMPLE NO.: 1

RAMMER TYPE
[ ] AUTO
[X] MANUAL

PREPARATION
[X] MOIST
[ ] DRY

PERCENT RETAINED
[E - 5] 4.75 mm SCREEN
[ ] 9.50 mm SCREEN
[ ] 19.0 mm SCREEN

SOIL DESCRIPTION:
Clay / silt

Roseke Engineering Ltd.

Per: [redacted]
Devon Rowley

Moisture - Density Relationship Report

3614 18th Avenue North
Lethbridge AB T1H 5S7
Tel: 1-403-942-6170

TO: **Diamond Two Feeders Ltd.**
224070 Township Road 205
Vulcan County, AB

ATTENTION: Robert & Dayna Kroening

ROSEKE PROJECT #: REL243-022

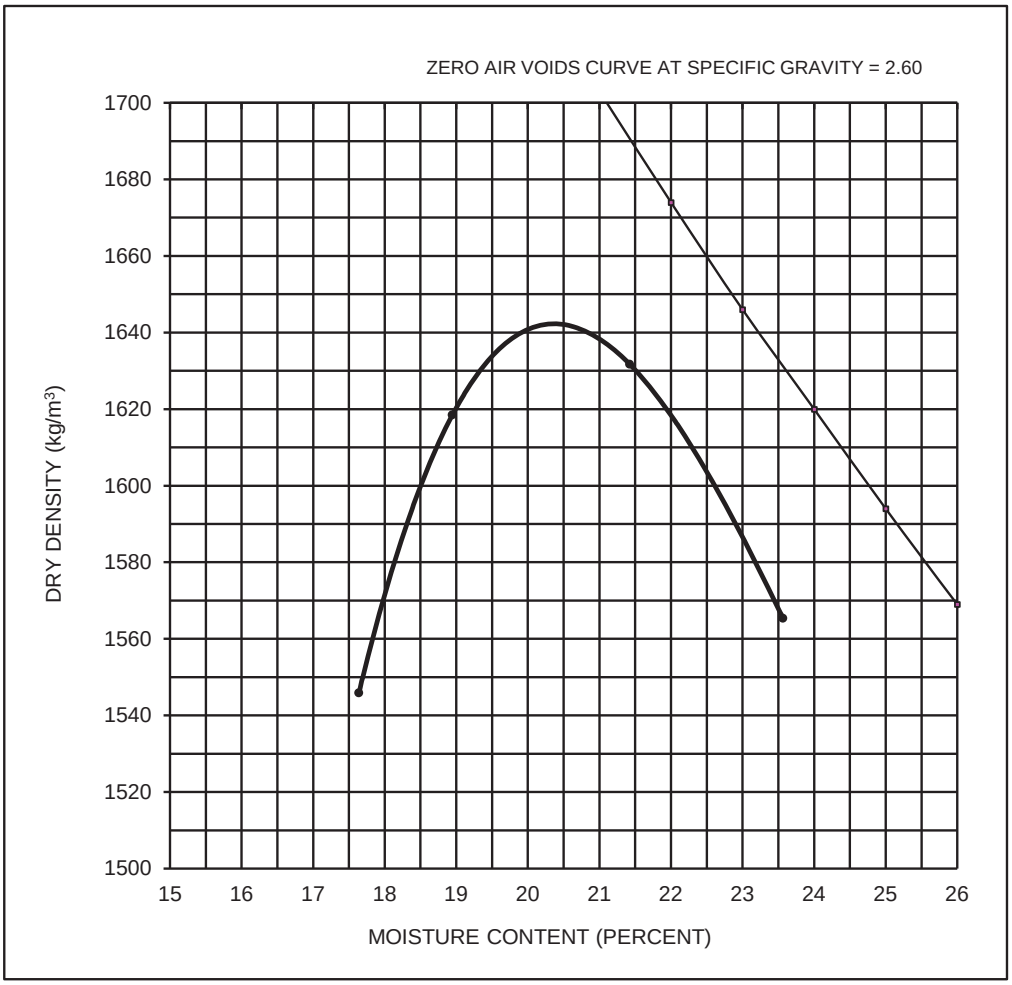
PROJECT: Feedlot Expansion

COMPACTION STANDARD [X] ASTM D698 [ ] ASTM D1557 [ ] ASTM D558 **METHOD:** A

DRY DENSITY kg/m^3	1618	1632	1565	1546			
MOISTURE CONTENT (%)	18.9	21.4	23.6	17.6			

MAXIMUM DRY DENSITY: 1642 kg/m^3
OPTIMUM MOISTURE CONTENT: 20.4 %

SOURCE: TP006



DATE SAMPLED: 6-May-24
SAMPLED BY: REL / CA
DATE RECEIVED: 6-May-24
SAMPLE NO.: 2

RAMMER TYPE
[ ] AUTO
[X] MANUAL

PREPARATION
[X] MOIST
[ ] DRY

PERCENT RETAINED
[E - 5] 4.75 mm SCREEN
[ ] 9.50 mm SCREEN
[ ] 19.0 mm SCREEN

SOIL DESCRIPTION:
Clay / silt

Roseke Engineering Ltd.

Per: [redacted]
Devon Rowley

Borehole / Test Pit ID	Soil Description	Depth (m)	Topsoil Thickness (mm)	Field Dry Density (kg/m^3)	Field Moisture (%)	Average Standard Proctor Maximum Dry Density (kg/m^3)	Average Optimum Moisture Content (%)	Estimated Shrinkage (%)
TP001	Clay - silty	0.6	200	1237	20.5	1633	20.4	24.2
20 m S of BH002	Clay - silty	0.5	150	1226	24.8	1633	20.4	24.9
BH003	Clay - silty	0.9	100	1236	31.6	1633	20.4	24.3
BH004	Clay - silty	0.6	150	1348	28.8	1633	20.4	17.5
Average			150	1262	26.4			22.7

Appendix D – GENERAL CONSTRUCTION GUIDELINES

Backfill Materials and Compaction

1.0 Definitions

"Landscape fill" is typically used in areas such as berms and grassed areas where settlement of the fill and noticeable surface subsidence can be tolerated. "Landscape fill" may comprise soils without regard to engineering quality.

"General engineered fill" is typically used in areas where a moderate potential for subgrade movement is tolerable, such as asphalt (i.e., flexible) pavement areas. "General engineered fill" should comprise clean, granular or clay soils.

"Select engineered fill" is typically used below slabs-on-grade or where high volumetric stability is desired, such as within the footprint of a building. "Select engineered fill" should comprise clean, well-graded granular soils or inorganic low to medium plastic clay soils.

"Structural engineered fill" is used for supporting structural loads in conjunction with shallow foundations. "Structural engineered fill" should comprise clean, well-graded granular soils.

"Lean-mix concrete" is typically used to protect a subgrade from weather effects including excessive drying or wetting. "Lean-mix concrete" can also be used to provide a stable working platform over weak subgrades. "Lean-mix concrete" should be low strength concrete having a minimum 28-day compressive strength of 3.5 MPa. Standard Proctor Density (SPD) as used herein means Standard Proctor Maximum Dry Density (ASTM Test Method D698). Optimum moisture content is defined in ASTM Test Method D698.

2.0 General Backfill and Compaction Recommendations

Exterior backfill adjacent to abutment walls, basement walls, grade beams, pile caps and above footings, and below highway, street, or parking lot pavement sections should comprise "general engineered fill" materials as defined above. Exterior backfill adjacent to footings, foundation walls, grade beams and pile caps and within 600 mm of final grade should comprise inorganic, cohesive "general engineered fill". Such backfill should provide a relatively impervious surficial zone to reduce seepage into the subsoil against the structure.

Backfill should not be placed against a foundation structure until the structure has sufficient strength to withstand the earth pressures resulting from placement and compaction. During compaction, careful observation of the foundation wall for deflection should be carried out continuously. Where deflections are apparent, the compactive effort should be reduced accordingly.

In order to reduce potential compaction induced stresses, only hand-held compaction equipment should be used in the compaction of fill within 1 m of retaining walls or basement walls. If compacted fill is to be placed on both sides of the wall, they should be filled together so that the level on either side is within 0.5 m of each other.

All lumps of materials should be broken down during placement. Backfill materials should not be placed in a frozen state, or placed on a frozen subgrade.

Where the maximum-sized particles in any backfill, material exceed 50 percent of the minimum dimension of the cross-section to be backfilled (e.g., lift thickness), such particles should be removed and placed at other more suitable locations on site or screened off prior to delivery to site.

Bonding should be provided between backfill lifts. For fine-grained materials, the previous lift should be scarified to the base of the desiccated layer, moisture-conditioned, and recompacted and bonded thoroughly to the succeeding lift. For granular materials, the surface of the previous lift should be scarified to about a 75 mm depth followed by proper moisture-conditioning and re-compaction.

3.0 COMPACTION AND MOISTURE CONDITIONING

"Landscape fill" material should be placed in compacted lifts not exceeding 300 mm and compacted to a density of not less than 90 percent of SPD unless a higher percentage is specified by the jurisdiction.

"General engineered fill" and "select engineered fill" materials should be placed in layers of 150 mm compacted thickness and should be compacted to not less than 98 percent of SPD. Note that the contract may specify higher compaction levels within 300 mm of the design elevation. Cohesive materials placed as "general engineered fill" or "select engineered fill" should be compacted at 0 to 2 percent above the optimum moisture content. Note that there are some silty soils which can become quite unstable when compacted above optimum moisture content.

Granular materials placed as "general engineered fill" or "select engineered fill" should be compacted at slightly below (0 to 2%) the optimum moisture content. "Structural engineered fill" material should be placed in compacted lifts not exceeding 150 mm in thickness and compacted to not less than 100 percent of SPD at slightly below (0 to 2%) the optimum moisture content.

4.0 "GENERAL ENGINEERED FILL"

Low to medium plastic clay is considered acceptable for use as "general engineered fill," assuming this material is inorganic and free of deleterious materials. Materials meeting the specifications for "select engineered fill" or "structural engineered fill" as described below would also be acceptable for use as "general engineered fill."

5.0 "SELECT ENGINEERED FILL"

Low to medium plastic clay with the following range of plasticity properties is generally considered suitable for use as "select engineered fill":

Liquid Limit	=	20 to 40%
Plastic Limit	=	10 to 20%
Plasticity Index	=	10 to 30%

Test results should be considered on a case-by-case basis.

Construction Excavations

Construction should be in accordance with good practice and comply with the requirements of the responsible regulatory agencies.

All excavations greater than 1.5m deep should be sloped or shored for worker protection.

Shallow excavations up to about 3m depth may use temporary sideslopes of 1H:1V. A flatter slope of 2H:1V should be used if groundwater is encountered. Localized sloughing can be expected from these slopes.

Deep excavations or trenches may require temporary support if space limitations or economic considerations preclude the use of sloped excavations.

For excavations greater than 3m depth, temporary support should be designed by a qualified geotechnical engineer. The design and proposed installation and construction procedures should be submitted to Roseke for review.

The construction of a temporary support system should be monitored. Detailed records should be taken of installation methods, materials, in situ conditions and the movement of the system. If anchors are used, they should be load tested. Roseke can provide further information on monitoring and testing procedures if required.

Attention should be paid to structures or buried service lines close to the excavation. For structures, a general guideline is that if a line projected down, at 45 degrees from the horizontal from the base of foundations of adjacent structures intersects the extent of the proposed excavation, these structures may require underpinning or special shoring techniques to avoid damaging earth movements. The need for any underpinning or special shoring techniques and the scope of monitoring required can be determined when details of the service ducts and vaults, foundation configuration of existing buildings and final design excavation levels are known.

No surface surcharges should be placed closer to the edge of the excavation than a distance equal to the depth of the excavation, unless the excavation support system has been designed to accommodate such surcharge.

Proof Rolling

Proof-rolling is a method of detecting soft areas in an ‘as-excavated’ subgrade for fill, pavement, floor or foundations or detecting non-uniformity of compacted embankment. The intent is to detect soft areas or areas of low shear strength not otherwise revealed by means of test holes, density testing, or visual examination of the site surface and to check that any fill placed or subgrade meets the necessary design strength requirements.

Proof-rolling should be observed by qualified geotechnical personnel.

Proof-rolling is generally accomplished by the use of a heavy (15 to 60 tonne) rubber-tired roller having 4 wheels abreast on independent axles with high contact wheel pressures (inflation pressures ranging from 550 kPa (80psi) up to 1030 kPa (150 psi).

A heavily loaded tandem axle gravel truck may be used in lieu of the equipment described in the paragraph above. The truck should be loaded to approximately 10 tonnes per axle and a minimum tire pressure of 550 kPa (80 psi). Ground speed - maximum 8 km/hr recommended 4 km/hr.

The recommended procedure is two complete coverages with the proof-rolling equipment in one direction and a second series of two coverages made at right angles to the first series; one 'coverage' means that every point of the proof-rolled surface has been subjected to the tire pressure of a loaded wheel. Less rigorous procedures may be acceptable under certain conditions subject to the approval of an engineer.

Any areas of soft, rutted or displaced materials detected should be either recompacted with additional fill or the existing material removed and replaced with general engineered fill, or properly moisture conditioned as necessary.

The surface of the grade under the action of the proof-roller should be observe, noting; visible deflection and rebound of the surface, formation of a crack pattern in the compacted surface or shear failure in the surface or granular soils as ridging between wheel tracks.

If any part of an area indicates significantly more distress than other parts, the cause should be investigated, by, for example, shallow auger holes.

In the case of granular subgrades, distress will generally consist of either compression due to insufficient compaction or shearing under the tires. In the first case, rolling should be continued until no further compression occurs. In the second case, the tire pressure should be reduced to a point where the subgrade can carry the load without significant deflection and subsequently gradually increased to it specified pressure as the subgrade increases in shear strength under this compaction.