. — Technical Requirements

NRCB | Natural Resources Conservation Board

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

.CB USE ONLY	Application number	Legal land description
☒ Approval ☐ Registration ☐ Authorization ☐ Amendment	RA21043	NE 15-42-24 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.

Feb 15/22 — Date of signing

Joe Thalen — Signature

Double T Cattle — Corporate name (if applicable)

Joe Thalen — 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)
6 feedlot pens Total Area 52,256 sq. m with	4-32.97x304.8 & 2-32.97x182.88
Total area under roof 15,057 sq. m (scraper alley and feed alley)	4-9.5x304.8 & 2-9.5x182.88
Catch basin 'L' shaped Refer to drawing for exact size.	~~43mx110x & 52mx34m~~ Approx. 56.64 x 122.38 38.61 x 52.21

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

Existing facilities	Dimensions (m) (length, width, and depth)	NRCB USE ONLY
Sow Barn	27mx40m	

Note: only the approximate east half of the sow barn retains the original concrete floor, though the north pit wall was renovated to include drive through overhead doors. This barn is further discussed on the next page and in Decision Summary RA21043.

NRCB USE ONLY

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)

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

Old pig barn is being used for livestock processing building.

Livestock processing facilities are not considered to be manure collection areas or manure storage facilities; they are ancillary structures that do not require a permit under the AOPA.

Construction completion date for proposed facilities December 31, 2025

Additional information

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

Livestock category and type (Available in the Schedule 2 of the Part 2 Matters Regulation)	**Permitted number**	**Proposed increase or decrease in number (if applicable)**	**Total**
Beef, Cow/finisher	0	4500	4500
Sow Farrow to Finish	700	700	0

The status of the CFO's permits and its associated livestock capacity are discussed in Decision Summary RA21043.

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 Parks (AEP) for a confined feeding operation (CFO)

Date and sign one of the following four options

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

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

Signed this ____day of _____, 20____. _____

Signature of Applicant or Agent

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

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

Signed this 18 day of Feb, 2022. _____

Signature of Applicant or Agent

OPTION 3: Additional water licence not required

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

Signed this ____ day of _____, 20____. _____

Signature of Applicant or Agent

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

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

Signed this ____ day of _____, 20____. _____

Signature of Applicant or Agent

NRCB Natural Resources Conservation Board

NRCB USE ONLY

ALL SIGNATURES IN FILE ☒ YES ☐ NO

DATES OF APPROVAL OFFICER SITE VISITS

December 17, 2021, March 24 and 30, 2022	

CORRESPONDENCE WITH MUNICIPALITIES AND REFERRAL AGENCIES

Date deeming letters sent: March 2, 2022

Municipality: _____

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

Alberta Health Services:

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

Alberta Environment and Parks: ☐ N/A

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

Alberta Transportation: ☒ N/A

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

Alberta Regulatory Services: ☒ N/A

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

Other: _____ ☒ N/A

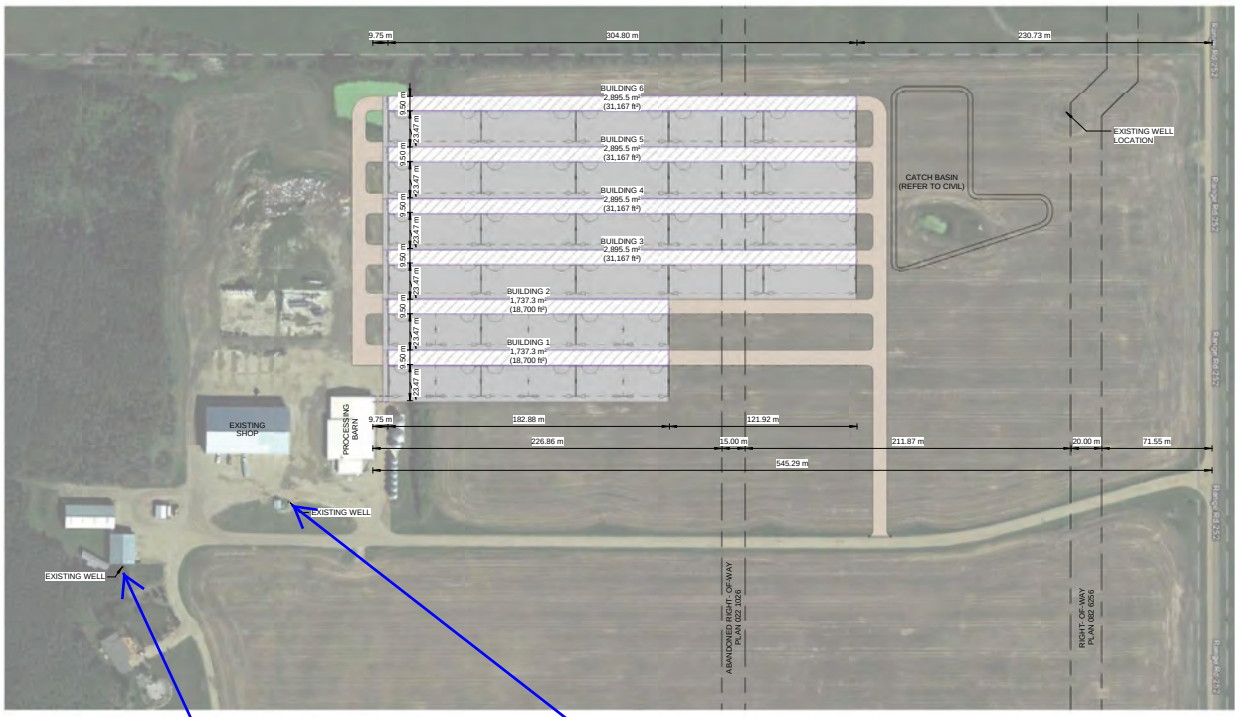
☐ letter sent ☐ response received ☐ written/email ☐ verbal ☐ no comments received

Other: _____ ☒ N/A

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

Note: Copies of the responses to the application, other than those noted above, were shared with AHS, AEP, Alberta Transportation, Alberta Regulatory Services and the county. See Decision Summary RA21043.

https://bit.ly/3wT0BqC



0m 30m 60m 90m 120m 150m
VISUAL SCALE 1:1500

1 Site Plan
A1.1 1 : 1500

AEP water well ID
288714

AEP water well ID
286659

NOTES CONCERNING BUILDING LOCATION

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

SITE PLAN LEGEND

PROPERTY LINE	
SETBACK LINE	
RIGHT OF WAY LINE	
RIGHT OF WAY HATCH	
PROPOSED BUILDING	
FENCE	
MAN DOOR	
OVERHEAD DOOR	
BARRIER FREE ENTRANCE	

SITE SCHEDULE

ON SITE		
GRAVEL	85,197.90 ft²	7,915.1 m²
	85,197.90 ft²	7,915.1 m²
Grand total	85,197.90 ft²	7,915.1 m²

SITE MATERIAL LEGEND

- APRON
- SIDEWALK
- LIGHT DUTY ASPHALT
- HEAVY DUTY ASPHALT
- GRAVEL
- LANDSCAPING
- HARD LANDSCAPING
- MULCH

Application RA21043 Page 34 of 45

NO.	DESCRIPTION	DATE
A	ISSUED FOR PRELIMINARY REVIEW	2021-07-19
B	ISSUED FOR PRELIMINARY REVIEW	2021-07-22
C	ISSUED FOR PRELIMINARY REVIEW	2021-08-20
D	ISSUED FOR PRELIMINARY REVIEW	2021-08-24
E	ISSUED FOR PRELIMINARY REVIEW	2021-08-25
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30
G	ISSUED FOR ENGINEERING REVIEW	2021-09-21
H	ISSUED FOR ENGINEERING REVIEW	2021-09-22
I	REVISED CATCH BASIN	2021-10-12
J	REVISED CATCH BASIN	2022-01-31
K	REVISED CATCH BASIN	2022-02-09

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

EAGLE BUILDERS
THE PRECAST CONCRETE CONNECTION

Stamp:

PRELIMINARY

NOT FOR CONSTRUCTION

aggregate design studio ltd.
(403) 885-5525 P.O. BOX 1690 BLACKFALDS, AB, T0M 0J0

Site Plan

A1.1

Project number:	A20585
Date:	2022-02-09 12:47:13 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated

Water Well Drilling Report

View in Metric | 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 288714
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1997/11/06

Well Identification and Location

Measurement in Imperial

Owner Name	Address	Town	Province	Country	Postal Code
VAN DEPT, WIM	RR3, PONOKA				T4L 1R3

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	NE	15	42	25	4				

Measured from Boundary of
ft from
ft from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.620020 Longitude -113.518071
How Location Obtained
Not Verified

Elevation ft
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Rotary

Proposed Well Use
Stock

Type of Work
New Well

Formation Log

Measurement in Imperial

Depth from ground level (ft)	Water Bearing	Lithology Description
20.00		Brown Shale
115.00		Gray Shale
120.00		Sand & Coal
150.00		Shale
155.00		Gray Sandstone
170.00		Gray Shale
172.00		Hard Shale
217.00		Gray Sandstone
255.00		Gray Shale
260.00		Coal
280.00		Gray Shale
290.00		Coal
300.00		Gray Shale

Yield Test Summary

Measurement in Imperial

Recommended Pump Rate 25.00 igpm

Test Date	Water Removal Rate (igpm)	Static Water Level (ft)
1997/09/14	25.00	162.00

Well Completion

Measurement in Imperial

Total Depth Drilled	Finished Well Depth	Start Date	End Date
300.00 ft		1997/09/10	1997/09/11

Borehole

Diameter (in)	From (ft)	To (ft)
0.00	0.00	300.00

Surface Casing (if applicable)
Plastic
Size OD : 6.00 in
Wall Thickness : 0.039 in
Bottom at : 139.00 ft

Well Casing/Liner
Plastic
Size OD : 4.50 in
Wall Thickness : 0.237 in
Top at : 120.00 ft
Bottom at : 300.00 ft

Perforations

From (ft)	To (ft)	Diameter or Slot Width(in)	Slot Length (in)	Hole or Slot Interval(in)
217.00	240.00	0.125		8.00
280.00	300.00	0.000		0.00

Perforated by Saw

Annular Seal Driven
Placed from 0.00 ft to 139.00 ft
Amount

Other Seals

Type	At (ft)

Screen Type
Size OD : 0.00 in

From (ft)	To (ft)	Slot Size (in)

Attachment
Top Fittings Bottom Fittings

Pack
Type Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Company Name
TALL PINE DRILLING LTD.

Certification No
1

Copy of Well report provided to owner Date approval holder signed

Water Well Drilling Report

View in Metric | 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 288714
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1997/11/06

GOWN ID

Well Identification and Location

Measurement in Imperial

Owner Name	Address	Town	Province	Country	Postal Code
VAN DEPT, WIM	RR3, PONOKA				T4L 1R3

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	NE	15	42	25	4				

Measured from Boundary of
ft from
ft from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.620020 Longitude -113.518071
How Location Obtained
Not Verified

Elevation ft
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Imperial

Distance From Top of Casing to Ground Level in
Is Artesian Flow
Rate igpm
Is Flow Control Installed
Describe

Recommended Pump Rate 25.00 igpm
Recommended Pump Intake Depth (From TOC) 270.00 ft
Pump Installed Yes
Type
Depth ft
Make
H.P. 3
Model (Output Rating)

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

Additional Comments on Well
DRILLER REPORTS DISTANCE FROM TOP OF CASING TO GROUND LEVEL: 1'.

Yield Test

Taken From Ground Level
Depth to water level

Measurement in Imperial

Test Date 1997/09/14
Start Time 12:00 AM
Static Water Level 162.00 ft

Method of Water Removal
Type Pump
Removal Rate 25.00 igpm
Depth Withdrawn From 270.00 ft

If water removal period was < 2 hours, explain why

Pumping (ft)	Elapsed Time Minutes:Sec	Recovery (ft)
	1:00	188.00
	2:00	174.00
	3:00	170.00
	4:00	168.00
	5:00	167.00
	6:00	166.00
	7:00	165.50
	8:00	165.00
	9:00	164.58
	10:00	164.67
	14:00	163.58
	20:00	162.08
	35:00	162.00
	75:00	162.00

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	ig	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Company Name
TALL PINE DRILLING LTD.

Certification No
1

Copy of Well report provided to owner Date approval holder signed

14/31

Water Well Drilling Report

View in Metric | 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 286659
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1997/06/23

Well Identification and Location

Measurement in Imperial

Owner Name	Address	Town	Province	Country	Postal Code
VAN DE PAL, WIM	P.O. BOX 6 SITE 19 RR3, PONOKA				T4L 1R3

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	NE	15	42	25	4				

Measured from Boundary of
ft from
ft from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.620020 Longitude -113.518071
How Location Obtained
Not Verified

Elevation ft
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Rotary

Proposed Well Use
Domestic

Type of Work
New Well

Formation Log

Measurement in Imperial

Depth from ground level (ft)	Water Bearing	Lithology Description
20.00		Clay
40.00		Gray Sand
50.00		Gray Shale
60.00		Hard Sandstone
110.00		Gray Shale
120.00		Green Shale
130.00		Gray Sandstone
170.00		Green Shale
250.00		Gray Sandstone
270.00		Green Shale

Yield Test Summary

Measurement in Imperial

Recommended Pump Rate 15.00 igpm

Test Date	Water Removal Rate (igpm)	Static Water Level (ft)
1997/04/29	15.00	168.80

Well Completion

Measurement in Imperial

Total Depth Drilled	Finished Well Depth	Start Date	End Date
270.00 ft		1997/04/29	1997/04/29

Borehole

Diameter (in)	From (ft)	To (ft)
0.00	0.00	270.00

Surface Casing (if applicable)
Plastic
Size OD : 6.00 in
Wall Thickness : 0.039 in
Bottom at : 79.00 ft

Well Casing/Liner
Plastic
Size OD : 4.50 in
Wall Thickness : 0.237 in
Top at : 70.00 ft
Bottom at : 270.00 ft

Perforations

From (ft)	To (ft)	Diameter or Slot Width(in)	Slot Length (in)	Hole or Slot Interval(in)
210.00	270.00	0.128		8.00

Perforated by Saw

Annular Seal Driven
Placed from 0.00 ft to 79.00 ft
Amount

Other Seals

Type	At (ft)

Screen Type
Size OD : 0.00 in

From (ft)	To (ft)	Slot Size (in)

Attachment
Top Fittings Bottom Fittings

Pack
Type Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
TALL PINE DRILLING LTD.

Copy of Well report provided to owner Date approval holder signed

Water Well Drilling Report

View in Metric | 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 286659
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1997/06/23

GOWN ID

Well Identification and Location

Measurement in Imperial

Owner Name	Address	Town	Province	Country	Postal Code
VAN DE PAL, WIM	P.O. BOX 6 SITE 19 RR3, PONOKA				T4L 1R3

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	NE	15	42	25	4				

Measured from Boundary of
ft from
ft from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.620020 Longitude -113.518071
How Location Obtained
Not Verified

Elevation ft
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Imperial

Distance From Top of Casing to Ground Level in
Is Artesian Flow
Rate igpm
Is Flow Control Installed
Describe

Recommended Pump Rate 15.00 igpm
Recommended Pump Intake Depth (From TOC) 208.00 ft
Pump Installed
Depth ft
Type
Make
H.P.
Model (Output Rating)

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

Additional Comments on Well
DRILLER REPORTS DISTANCE FROM TOP OF CASING TO GROUND LEVEL: 1'6".

Yield Test

Taken From Ground Level
Depth to water level

Measurement in Imperial

Test Date 1997/04/29
Start Time 12:00 AM
Static Water Level 168.80 ft

Method of Water Removal
Type Air
Removal Rate 15.00 igpm
Depth Withdrawn From 208.00 ft

If water removal period was < 2 hours, explain why

Pumping (ft)	Elapsed Time Minutes:Sec	Recovery (ft)
	1:00	189.00
	2:00	177.00
	3:00	174.50
	4:00	173.50
	5:00	173.25
	7:00	172.58
	8:00	172.33
	10:00	171.83
	14:00	171.42
	20:00	170.00
	30:00	169.75
	40:00	169.42
	60:00	169.17
	90:00	168.92
	105:00	168.83
	120:00	168.75

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	ig	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
TALL PINE DRILLING LTD.

Copy of Well report provided to owner

Date approval holder signed

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:** Feedlot pens

Proposed 2: Catch basin **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	not in known flood plain
Surface water information	How many springs are within 100 m of the manure storage facility or manure collection area?	0	0	0		☒ YES ☐ NO ☐ YES with exemption	none observed or reported
	How many water wells are within 100 m of the manure storage facility or manure collection area?	0	0	0		☐ YES ☐ NO ☒ YES with exemption	one within 100 m of pens, see TD page 6
	What is the shortest distance from the manure collection or storage facility to a surface water body? (e.g., lake, creek, slough, seasonal)	2630m	2630m	2630m		☒ YES ☐ NO ☐ YES with exemption	> 500 m to intermittent creeks
Groundwater information	What is the depth to the water table?		2.59m	2.59m		☐ YES ☐ NO ☒ YES with exemption	see Decision Summary RA21043
	What is the depth to the groundwater resource/aquifer you draw water from?	64m	64m	64m		☒ YES ☐ NO ☐ YES with exemption	15.2 m based on AEP water wells 93973 and 286659

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

Last updated February 26, 2021

NRCB Natural Resources Conservation Board

NRCB USE ONLY

ENVIRONMENTAL RISK SCREENING INFORMATION

ERST for **proposed** facilities

Facility	Groundwater score	Surface water score	File number
Pens	Low	Low	RA21043
Catch basin	Low	Low	RA21043

ERST for **existing** facilities

Facility	Groundwater score	Surface water score	File number
As noted on page 2 the remaining swine barn will not be used to collect or store manure, for this reason I did not risk screen this facility.			

ERST related comments:

NRCB USE ONLY

WATER WELL AND SURFACE WATER INFORMATION

Well IDs: 286659 and 288714 _____ _____ _____

_____ _____ _____

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

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

Water wells ☐ N/A

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

Surface water ☒ N/A

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

Water Well Exemption Screening Tool ☐ N/A

Water Well ID	Preliminary Screening Score	Secondary Screening Score	Facility
286659	35 (continue)	7 (exemption more likely)	Pens

Groundwater or surface water related comments:

0m 300m 600m 900m 1200m 1500m

VISUAL SCALE 1:15000

1 Neighbour Plan
A1.0 1 : 15000

NO.	DESCRIPTION	DATE
A	ISSUED FOR PRELIMINARY REVIEW	2021-07-19
B	ISSUED FOR PRELIMINARY REVIEW	2021-07-22
C	ISSUED FOR PRELIMINARY REVIEW	2021-08-20
D	ISSUED FOR PRELIMINARY REVIEW	2021-08-24
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30
G	ISSUED FOR ENGINEERING REVIEW	2021-09-21
H	ISSUED FOR ENGINEERING REVIEW	2021-09-22
I	REVISED CATCH BASIN	2021-10-12
J	REVISED CATCH BASIN	2022-01-31
K	REVISED CATCH BASIN	2022-02-09

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

EAGLE BUILDERS
THE PRECAST CONCRETE CONNECTION

Stamp:

PRELIMINARY

NOT FOR CONSTRUCTION

aggregate design studio ltd.
(403) 885-5525 P.O. BOX 1690 BLACKFALDS, AB, T0M 0J0

Neighbour Plan

A1.0

Project number:	A20585
Date:	2022-02-09 12:47:11 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated

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**
Curtis and Lorraine Tonneson	05-14-42-25 W4	1058	CRH	1	1,045	n/a	yes
Klaus Van Der Molen	04-22-42-25 W4	1047	CRH	1	1,030	n/a	yes
Don and Monica Brennan	12-14-42-25 W4	665	A	1	670	n/a	yes
Brad and Sarah Overreem	02-15-42-25 W4	1160	A	1	1,200	n/a	yes
Sipke and Margriet Dijkstra	15-22-42-25 W4	1370	A	1	1,280	n/a	yes

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)**
Double T	section 15-42-25 w4	242.8	Black	198	
Double T	sw-14-42-25 w4	56.7	Black	50	
Morsan	north 20-42-25 w4	93.1	Black	81	yes
	SE 25-42-25 W4	140ac/57 ha		45	yes
	SE 12-43-25 W4	109 ac/44 ha	Total	41	yes

* 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 February 26, 2021

Ponoka County's Land use bylaw zones and the applicable MDS categories are discussed in Decision Summary RA21043.

NRCB Natural Resources Conservation Board

NRCB USE ONLY

MINIMUM DISTANCE SEPARATION

Methods used to determine distance (if applicable): scaled air photo, 2021 from Google Earth

Margin of error (if applicable): _____

Requirements (m): Category 1: 659 Category 2: 878 Category 3: 1,098 Category 4: 1,756

Technology factor: ☐ YES ☒ NO

Expansion factor: ☐ YES ☒ NO

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

The MDS related concerns are discussed in Decision Summary RA21043.

LAND BASE FOR MANURE AND COMPOST APPLICATION

Land base required: 351 ha (black)

Land base listed: 493.6 ha

Area not suitable: 78.6 ha

Available area 415 ha Requirement met: ☒ YES ☐ NO

Land spreading agreements required: ☒ YES ☐ NO

Manure management plan: ☐ YES ☒ NO If yes, plan is attached: ☐

PLANS

Submitted and attached construction plans: ☒ YES ☐ NO

Submitted aerial photos: ☒ YES ☐ NO

Submitted photos: ☐ YES ☒ NO

GRANDFATHERING

Already completed: ☒ YES ☐ NO ☐ N/A

If already completed, see Decision Summary RA02053

Manure Spreading Agreement

This agreement is between _____Double T Cattle_____, manure producer, and

_____Morsan Farms_____ Manure receiver.

Length of agreement: This agreement is valid for a time period of _____3 years_____ (minimum of three years)

Legal land location	Soil type[1]	Acres suitable for manure spreading[2]
N 20-42-25-W4	Black	230 acres 81 ha available
SE-25-42-25-W4	Black	140 acres 45 ha available
SE-12-43-25-W4	Black	109 acres 41 ha available

[1] Soil type choices: Dark brown and brown, Grey wooded, Black, Irrigated.

[2] Land within required setbacks from water bodies, water wells, residences, etc. is not to be included.

Other comments:

Manure producer (confined Feeding Operation) Legal Land Location_____

Date of signing	Signature	Print name	Corporate name(if appl)
May 12 2022		Jesse Thaler.	

Manure Receiver – Landowner(s)[3]

Date of signing	Signature	Print name	Corporate name(if appl)
May 12 2022		Morris Thaler.	

[3] All registered owners of land, or authorized signing authorities must sign.

Catch Basin Dimension Calculator

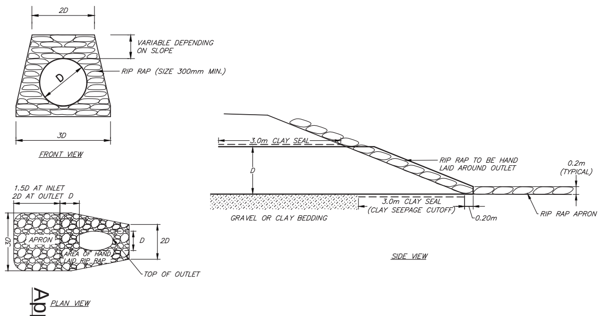
For more information on runoff control catch basin design consideration including liner options; catch basin protection, etc... check out the catch basin factsheet.

Name Double T Cattle Feed Lot
Land Location Ponoka County

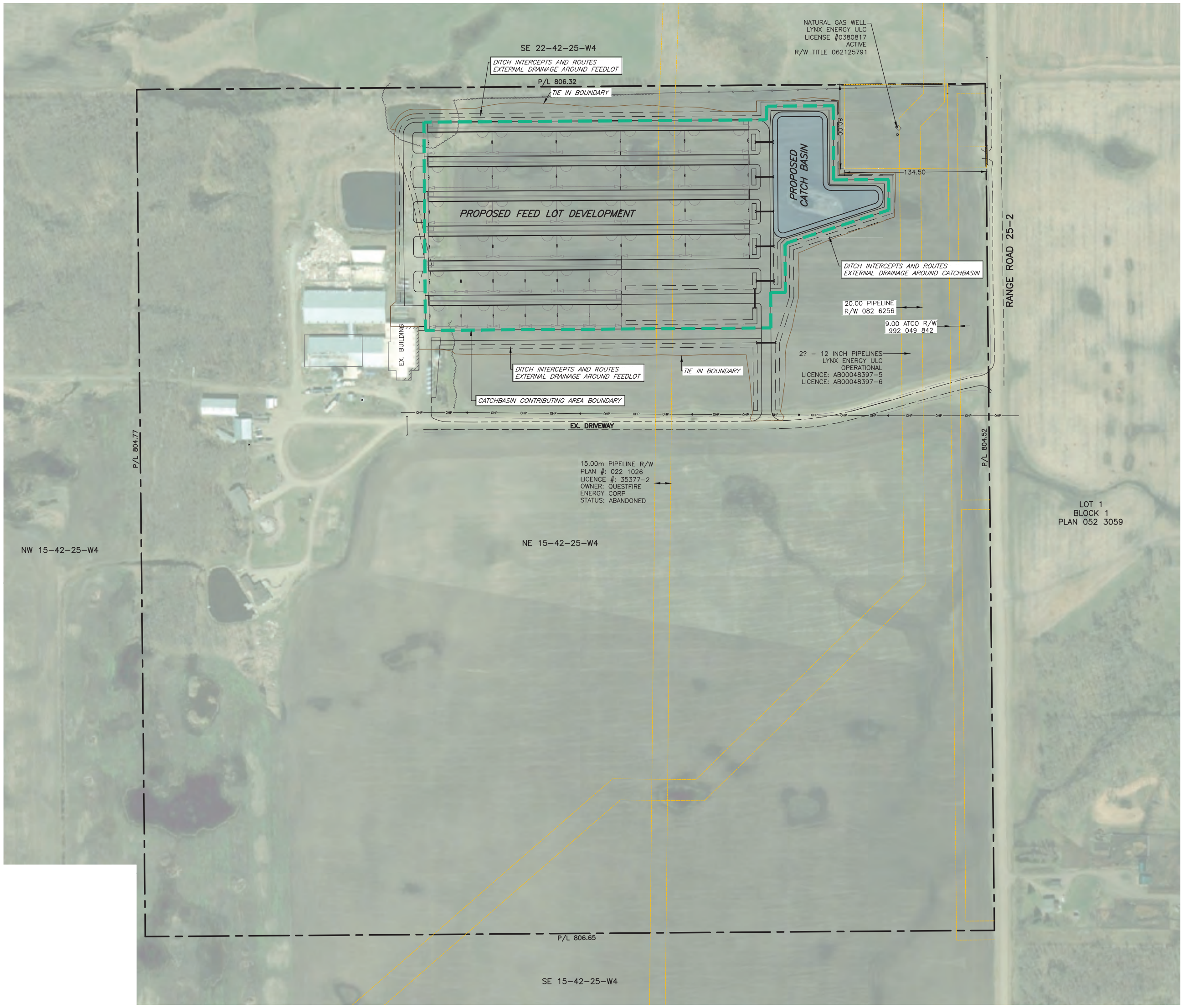
Estimating Runoff Potential

Area	Length (m)	Width (m)	Paved?	Area (m^2)
1	329	198	YES	65142.00
2	48	53	YES	2544.00
3	49	167	YES	8183.00
4			NO	0
	Total Area			75869.00

Estimation of water runoff to be collected in the catch basin:
6069.52 m^3
214343 ft^3
1335107 Imp. Gal



A — RIP-RAP CULVERT END PROTECTION
SCALE: N.T.S.



STANDARD LEGEND

PROPOSED / EXISTING

GRADING
- CONTOURS (890.00)
- ELEVATIONS (×100.000)
- SLOPES (0.80%)
- SWALE/DITCH SLOPES

DEEP UTILITIES
- SANITARY SEWER
- STORM SEWER
- CATCHBAIN/CATCHBASIN MANHOLE
- CULVERT
- HYDRANT
- REDUCER
- TEE
- VALVE
- PLUG OR CAP

SHALLOW UTILITIES
- GAS LINE
- BURIED POWER LINE
- SHAW LINE
- TELUS LINE
- OVERHEAD POWER
- FIBER OPTIC LINE
- TRANSFORMER
- TELUS PEDESTAL
- SHAW PEDESTAL
- TELUS/SHAW PEDESTAL
- 3 PARTY PEDESTAL
- POWER POLE
- LIGHT POLE

STANDARD LEGEND CONTINUED

PROPOSED / EXISTING

ROADWAYS
- CENTERLINE
- CONCRETE CURB (LOG BOC)
- EDGE OF ASPHALT
- EDGE OF GRAVEL
- DITCH BOTTOM
- SIGNS

LEGAL
- PROPERTY LINE
- EASEMENT

MISCELLANEOUS
- FENCE
- TIE IN BOUNDARY
- CATCH BASIN
- CATCH BASIN CATCHMENT BOUNDARY

NOT FOR CONSTRUCTION UNTIL APPROVED BY APPROVING AUTHORITY

CIVIL DRAWINGS PREPARED AS PER SITE PLAN DATED 2021-09-22

#	YEAR-MO-DA	SUBMISSION DESCRIPTION	BY
1	2021-10-05	ISSUED FOR REVIEW	EJV
2	2021-11-04	ISSUED FOR REVIEW – REVISED CULVERTS	JRR
3	2022-01-20	ISSUED FOR REVIEW – REVISED CATCHBASIN	JRR
4	2022-02-02	ISSUED FOR REVIEW – REVISED CATCHBASIN 2	JRR
5	2022-02-23	ISSUED FOR REVIEW	FQ

AL-TERRA ENGINEERING (RED DEER) LTD.
QUALITY • COMMITMENT • INTEGRITY • • • SUCCESS
#202, 4708 50th AVENUE, RED DEER, ALBERTA PH: 403-340-3022

NOT FOR CONSTRUCTION

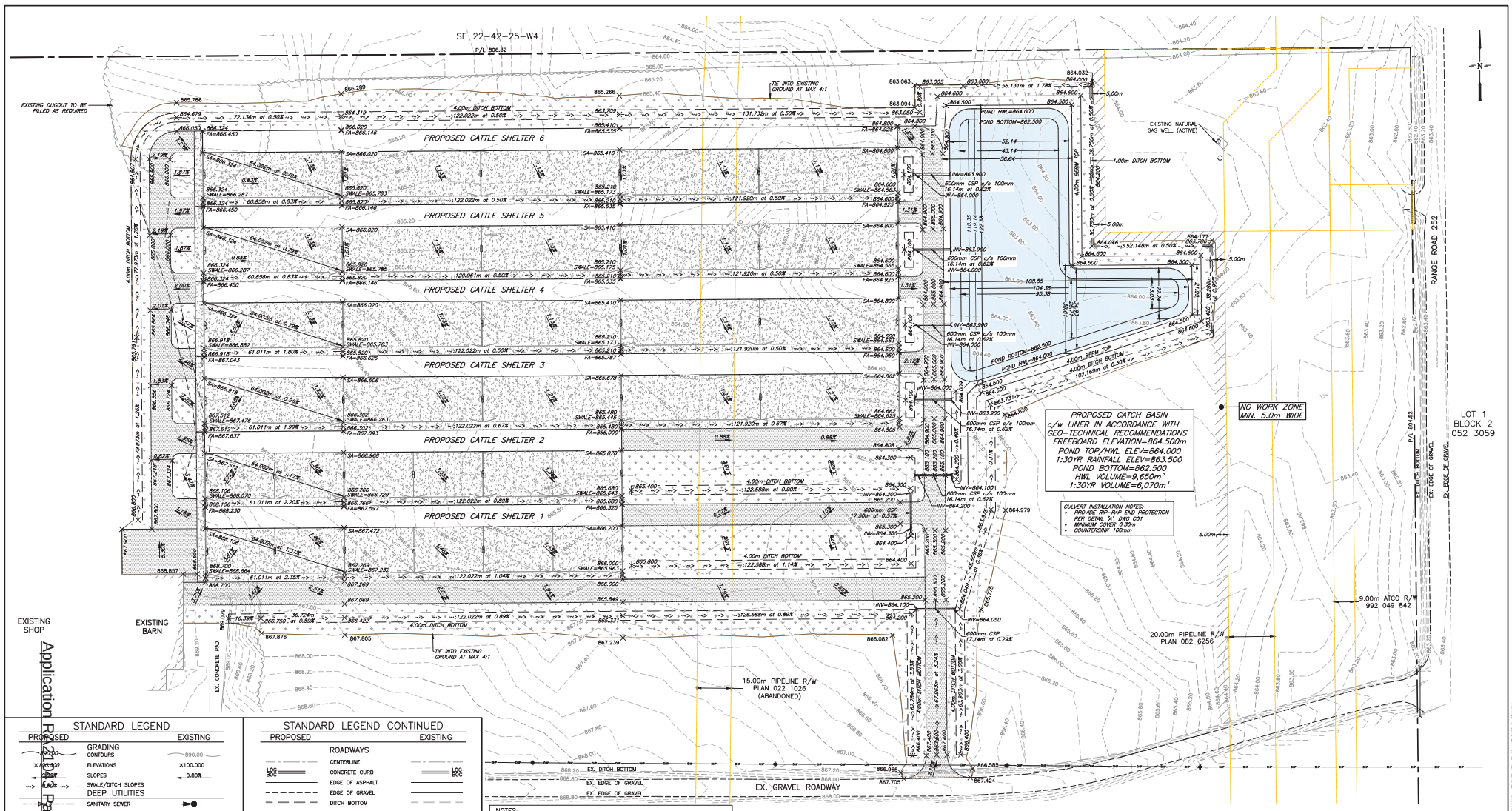
CLIENT: **EAGLE BUILDERS**
PROJECT: **DOUBLE T CATTLE FEEDLOT**
DRAWING TITLE: **SITE LOCATION & RUNOFF CONTROL CATCH BASIN PLAN**

PROJECT NO.: 5457
NE 15-42-25-W4
PONOKA COUNTY, AB

SCALE H1:2000 — 25 50 100
NOT TO SCALE UNLESS PLOTTED ON ARCH D PAPER

DRAWN: TMW
DESIGNED: JRR
REVIEWED: FQ
PLOTTED: 2022-02-23
SHEET No.: 1/2
C01

Z:\PROJECTS\5457-MORSAN FARM FEEDLOT\30 - DESIGN\04 PRODUCTIONS SHEETS\C01 - SITE LOCATION PLAN.DWG, LAST SAVED 2022-02-23, LAST SAVED BY FQUAMRUL



STANDARD LEGEND

PROPOSED		EXISTING
	GRADING	
	CONTOURS	
×100.000	ELEVATIONS	×100.000
4.0%	SLOPES	0.80%
	SWALE/DITCH SLOPES	
	DEEP UTILITIES	
	SANITARY SEWER	
	STORM SEWER	
	CATCHBAIN/CATCHBASIN MANHOLE	
	CULVERT	
	HYDRANT	
	REDUCER	
	TEE	
	VALVE	
	PLUG OR CAP	
	SHALLOW UTILITIES	
GAS	GAS LINE	GAS
BPE	BURIED POWER LINE	BPE
SHW	SHAW LINE	SHW
TEL	TELUS LINE	TEL
OHP	OVERHEAD POWER	OHP
F/O	FIBER OPTIC LINE	F/O
	TRANSFORMER	
	TELUS PEDESTAL	
	SHAW PEDESTAL	
	TELUS/SHAW PEDESTAL	
	3 PARTY PEDESTAL	
	POWER POLE	
	LIGHT POLE	

STANDARD LEGEND CONTINUED

PROPOSED		EXISTING
	ROADWAYS	
	CENTERLINE	
LOC BOC	CONCRETE CURB	LOC BOC
	EDGE OF ASPHALT	
	EDGE OF GRAVEL	
	DITCH BOTTOM	
	SIGNS	
	LEGAL	
	PROPERTY LINE	
	EASEMENT	
	MISCELLANEOUS	
	FENCE	
	TIE IN BOUNDARY	
	CONCRETE	
	LANDSCAPING	
	GRAVEL	
	CATCH BASIN	
	OVERLAND DRAINAGE ROUTE	

NOTES:
1) ELEVATIONS ARE TO TOP OF ASPHALT OR FINISHED GROUND UNLESS OTHERWISE NOTED.
2) EXISTING GRADES.....0.80%
DESIGN GRADES.....0.80%
EXISTING GROUND ELEVATION.....00.00
DESIGN GROUND ELEVATION.....00.00
DESIGN SWALE BOTTOM ELEVATION.....SWALE=00.00
DESIGN SCRAPER ALLEY ELEVATION.....SA=00.00
DESIGN FEED ALLEY ELEVATION.....FA=00.00
3) CONSTRUCTION TO BE COMPLETED IN ACCORDANCE WITH PONOKA COUNTY ENGINEERING STANDARDS.
4) TOPOGRAPHIC SURVEY COMPLETED BY AL-TERRA ENGINEERING (RED DEER) ON JULY 22, 2021. SITE PLAN SUPPLIED BY OTHERS
5) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES PRIOR TO CONSTRUCTION.

NOTES FOR BUILDINGS:
1. REFER TO STRUCTURAL & ARCHITECTURAL DRAWINGS FOR ANY GRADING WITHIN THE BUILDING FOOTPRINT.
2. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF ALL SITE FEATURES AND AMENITIES.
3. FOUNDATION WALL FOR CATTLE SHELTERS TO BE EXPOSED ON THE NORTH SIDE OF FEED ALLEY PER BUILDING CROSS SECTIONS. HEIGHT OF EXPOSURE = FEED ALLEY ELEVATION – ADJACENT SWALE EDGE ELEVATION, REFER TO ARCHITECTURAL DRAWINGS FOR DETAILS.

#	YEAR-MO-DA	SUBMISSION DESCRIPTION	BY
1	2021-10-05	ISSUED FOR REVIEW	TMW
2	2021-11-04	ISSUED FOR REVIEW – REVISED CULVERTS	JRR
3	2022-01-20	ISSUED FOR REVIEW – REVISED CATCHBASIN	JRR
4	2022-02-02	ISSUED FOR REVIEW – REVISED CATCHBASIN 2	JRR
5	2022-02-23	ISSUED FOR REVIEW	FQ

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#202, 4708 50th AVENUE, RED DEER, ALBERTA PH: 403-340-3022

NOT FOR CONSTRUCTION

NOT FOR CONSTRUCTION UNTIL APPROVED BY APPROVING AUTHORITY

CIVIL DRAWINGS PREPARED AS PER SITE PLAN DATED 2021-09-22

CLIENT: EAGLE BUILDERS
PROJECT: DOUBLE T CATTLE FEEDLOT
DRAWING TITLE: SITE GRADING PLAN

PROJECT NO.: 5457
NE 15-42-25-W4
PONOKA COUNTY, AB

SCALE 1:750 (10 20 40)
NOT TO SCALE UNLESS PLOTTED ON ARCH D PAPER

DRAWN: TMW
DESIGNED: JRR
REVIEWED: FQ
PLOTTED: 2018-12-13
SHEET No.: 2/2

C02

Layfield's HDPE geomembranes are manufactured to meet GRI-GM13 Standard Specification and have been extensively used in a variety of containment applications. HDPE geomembranes have low permeability, good ultra violet resistance, and excellent chemical resistance. HDPE 60 geomembrane is a field assembled lining material that must be installed by trained installers. HDPE is used in a multitude of applications such as a landfill liner, a pond liner, and in water containment projects.

Geomembrane Properties			
Property	**Test Method**	**Values**	**Testing Frequency**
Thickness (min. avg) Thickness, lowest individual for 8 out of 10 values	ASTM D5994	1.50 mm 1.53 mm	Every Roll
Sheet Density (min.)	ASTM D792	0.940 g/cc	Every 90,000 kg
Tensile Properties (min. avg.) Break Strength Break Elongation (calculated at gage length of 2 in.) Yield Strength Yield Elongation (calculated at gage length of 1.3 in.)	ASTM D6693 Type IV	 40 kN/m 700% 22 kN/m 12%	Every 9,000 kg
Tear Resistance (min. avg)	ASTM D1004	187 N	Every 20,000 kg
Puncture Resistance (min. avg)	ASTM D4833	480 N	Every 20,000 kg
Stress Crack Resistance (min.)	ASTM D5397 (Appendix X1)	500 hrs	Once every two resin railcars
High Pressure Oxidative Induction Time (min.)	ASTM D5885	400 minutes	Every 90,000 kg
Carbon Black Content	ASTM D4218	2.0 - 3.0%	Every 9,000 kg
Carbon Black Dispersion	ASTM D5596	9 out of 10 in CAT 1 or 2; 1 in CAT 3	Every 20,000 kg
Oven Ageing at 85° C % retained HPOIT after 90 days (min.)	ASTM D5721 ASTM D5885	 80%	Once per formulation
UV Resistance % retained HPOIT after 1600 hrs (min.)	ASTM D7238 ASTM D5885	 50%	Once per formulation

Resin Properties			
Resin Density (minimum)	ASTM D792	0.932 g/cc	Once per railcar
Resin Melt Index at 2.16 Kg/190°C (max.)	ASTM D1238	1.0 g/10 min	Once per railcar

Thermally Bonded Seam Strength (as per GRI-GM19)			
Hot Wedge Seams - Shear Strength (min.)	ASTM D6392	525 N/25mm	Not Applicable
Hot Wedge Seams - Peel Strength (min.)	ASTM D6392	398 N/25mm	Not Applicable
Extrusion Fillet Seams – Shear Strength (min.)	ASTM D6392	525 N/25mm	Not Applicable
Extrusion Fillet Seams – Peel Strength	ASTM D6392	340 N/25mm	Not Applicable

Typical Roll Dimensions (Rolls dimensions may vary ± 1%)	
Roll Width	6.86 meters
Roll Length	158.5 meters

Latest product specifications are available on Layfield Group website www.layfieldgroup.com

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

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

LIQUID MANURE STORAGE: Synthetic liner

*(complete a copy of this section for **EACH** proposed liquid manure storage facility with a synthetic liner)*

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

1. Feedlot Catch Basin
2. _____

Manure storage capacity *(use one row in the table for **EACH** cell of the synthetic lined storage, attach additional pages if you require more rows)*

	Length (m)	Width (m)	Total depth (m)	Depth below ground level (m)	Slope run:rise			NRCB USE ONLY	
					Inside end walls	Inside side walls	Outside walls	Calculated storage capacity (excl. 0.5 m freeboard) (m^3)	Filled in lower ¼? Y/N
1.	~~95~~	~~110~~	2	~~1~~ 1.5*	3:1	3:1	4:1	9,650	no
2.	See Drawings attached for Shape and Volumes. 56.64 x 122.38 38.61 x 52.21								
							TOTAL CAPACITY		

Surface water control systems

Describe the run-on and runoff control system

Berms elevated above surrounding landscape with 0.5m free-board.

* the southwest corner will be approximately 2.1 m below ground, the water table was observed to be as shallow as 2.47 m below ground surface in fall 2021. A condition will be added to the permit, see discussion in Decision Summary RA21043.

Sealing

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

Pipe boot welded to liner and clamped to pipe.

NRCB USE ONLY
Requirements met: ☒ YES ☐ NO

Liner protection

Describe how the inside walls, bottom and outside walls are protected from erosion

Concrete pad will be poured under pipe fill area. Vegetation on exterior berm slope.

Describe how the physical integrity of the liner will be maintained from other damage

Care and caution will be used to prevent damage to liner.

NRCB USE ONLY
Requirements met: ☒ YES ☐ NO

LIQUID MANURE STORAGE: Synthetic liner (cont.)

Synthetic liner details

Provide synthetic liner material details

60mil HD liner. Spec sheet attached.

Additional information *(attach copies of design/engineering reports)*

NRCB USE ONLY

Requirements met: ☒ YES ☐ NO

Condition required: ☒ YES ☐ NO

Report attached: ☐ YES ☒ NO

NRCB USE ONLY

Catch basin

~~Liquid manure~~ storage volume calculator attached: ☒ YES ☐ NO

Depth to water table: 2.47 m — Requirements met: ☐ YES ☒ NO

Depth to uppermost groundwater resource: 15.2 m — Requirements met: ☒ YES ☐ NO

As noted previously, a condition will be added to the permit to address water table separation.

ERST completed: ☒ see ERST page for details

Surface water control systems

Requirements met: ☒ YES ☐ NO

Details/comments:

Synthetic liner requirements

Leakage detection system required: ☐ YES ☒ NO

If yes, please explain why.

Construction plans approved by professional engineer: ☐ YES ☒ NO

Will liner be installed by manufacturer approved contractor and qualified third party?: ☒ YES ☐ NO

Preparation of liner bed (comments):

A condition will be added requiring the liner to be installed by a qualified third party and that a completion report be submitted.

Condition required: ☒ YES ☐ NO

NRCB Natural Resources Conservation Board

NRCB USE ONLY **RUNOFF CONTROL CATCH BASIN CAPACITY SUMMARY (if applicable)**	
Facility 1 feedlot	
Name / description catch basin	Capacity 9,650 m^{3*}
Facility 2	
Name / description	Capacity
Facility 3	
Name / description	Capacity
Facility 4	
Name / description	Capacity
TOTAL CAPACITY	9,650 m^3
RUNOFF VOLUME FROM CONTRIBUTING AREAS	5,901 m^3
MEETS AOPA RUNOFF CONTROL VOLUME REQUIREMENTS	☒ YES ☐ NO

* the stated catch basin capacity is reasonable, see page 76 below.

The approximate catchment area for the catch basin is 81,600 m^2. Of this, approximately 62,000m^2 will be either paved by concrete, covered by roofs, or have a synthetic liner.

The 1:30 year rainfall event in the the Standards and Administration regulation for Ponoka is 80 mm.

62,000m^2 x 0.080 m x 1.0 (runoff coefficient for "paved" area) = 4,960 m^3
19,600 m^2 x 0.080 m x 0.6 (runoff coefficient for unpaved area with 80 mm rainfall) = 941 m^3

Based on the above, I would expect there to be approximately 5,901 m^3 of runoff directed to the catch basin in a 1:30 year rainfall event.

Part 2 — Technical Requirements

NRCB Natural Resources Conservation Board

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

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

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

Facility description / name *(as indicated on site plan)* **1.** Feedlot pens

2. _____

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.	4 x 304.8	32.97	0	
2.	2 x 182.88	32.97	0	
			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

Catch basin used

Liner protection

Describe how the physical integrity of the liner will be maintained

Cleaned and inspected periodically

NRCB USE ONLY

Requirements met: ☒ YES ☐ NO

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

Concrete liner details

Concrete thickness 0.152m (6")	Method of sulphate protection: type 10 HS cement
Concrete strength 30 mpa	Concrete reinforcement size and spacing 10M bar at 0.305m on center each way

Concrete requirements can be found in Technical Guideline Agdex 096-93
Guideline minimums:
Solid manure: 25MPa (D)
Solid manure (wet): 30MPa (C)
Method of sulphate protection:
Type 50 or Type 10 with fly ash or equivalent

NRCB USE ONLY

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

Additional information *(attach as required)*

NRCB USE ONLY

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

Depth to water table: 2.47 m Requirements met: ☒ YES ☐ NO

Depth to Uppermost groundwater resource: 15.2 m Requirements met: ☒ YES ☐ NO

ERST completed: ☒ see ERST page for details

Surface water control systems

Requirements met: ☒ YES ☐ NO Details/comments:

Concrete liner details

The proposed concrete and rebar meet the requirements of Agdex 096-93. Despite this, the large concrete pads can be prone to cracking. Accordingly, conditions will be added to the permit requiring 1. the pad be constructed with an equivalent concrete liner with rebar as proposed and 2. the pad/pens to have adequate sealed expansion joints or crack control.

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

Double T Cattle

Ponoka County, Alberta Feedlot

SYMBOL LEGEND

CONSTRUCTION REFERENCE — 2	CONSTRUCTION TAG
FINISH REFERENCE — 1	EXTERIOR FINISH TAG
GRID NUMBER — 0	GRID BUBBLE
DOOR REFERENCE — 101A	DOOR TAG
ROOM NUMBER — ROOM NAME 101	ROOM TAG
DESCRIPTION — T/O FLOOR; ELEVATION — 100'-0"	ELEVATION DATUM
DRAWING NUMBER — 1; SHEET NUMBER — A4.1	WALL SECTION CALLOUT
DRAWING NUMBER — 1; SHEET NUMBER — A4.1	BUILDING SECTION CALLOUT
DRAWING NUMBER — 1; SHEET NUMBER — A3.1	ELEVATION CALLOUT
WINDOW REFERENCE — 11	WINDOW TAG
ELEVATION — 6' 6"	ELEVATION TAG
DRAWING TITLE; DRAWING NUMBER — 1; SHEET NUMBER — A2.0; SCALE — 1/8" = 1'-0" (Floor Plan)	DRAWING TITLE

DRAWING INDEX

Sheet Number	Sheet Name	Current Revision
A0.0	Index	K
A1.0	Neighbour Plan	K
A1.1	Site Plan	K
A2.0	Floor Plan Overall	H
A2.1	Floor Plan Enlarged	H
A2.2	Roof Plan Overall	G
A4.1	Building Sections	F
A4.2	Building Sections	H
A4.3	Wall Sections	F
A5.0	Architectural Details	F
A5.1	Architectural Details	F

NO.	DESCRIPTION	DATE
A	ISSUED FOR PRELIMINARY REVIEW	2021-07-19
B	ISSUED FOR PRELIMINARY REVIEW	2021-07-22
C	ISSUED FOR PRELIMINARY REVIEW	2021-08-20
D	ISSUED FOR PRELIMINARY REVIEW	2021-08-24
E	ISSUED FOR PRELIMINARY REVIEW	2021-08-25
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30
G	ISSUED FOR ENGINEERING REVIEW	2021-09-21
H	ISSUED FOR ENGINEERING REVIEW	2021-09-22
I	REVISED CATCH BASIN	2021-10-12
J	REVISED CATCH BASIN	2022-01-31
K	REVISED CATCH BASIN	2022-02-09

Double T Cattle
Feedlot

Ponoka County, Alberta

15-15-42-25 W4

EAGLE BUILDERS
THE PRECAST CONCRETE CONNECTION

Stamp:

PRELIMINARY

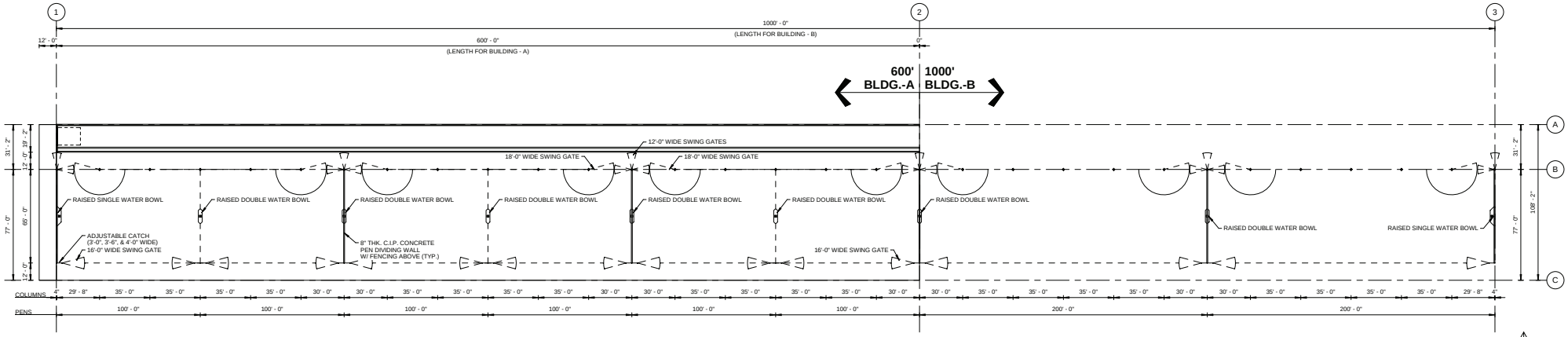
NOT FOR CONSTRUCTION

aggregate design studio ltd.
(403) 885-5525 P.O. BOX 1690 BLACKFALDS, AB, T0M 0J0

Index

A0.0

Project number:	A20585
Date:	2022-02-09 12:47:09 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated



1 A2.0 Overall Floor Plan
1/32" = 1'-0"

Application RA21043 Page 35 of 45

NO.	DESCRIPTION	DATE
A	ISSUED FOR PRELIMINARY REVIEW	2021-07-19
B	ISSUED FOR PRELIMINARY REVIEW	2021-07-22
C	ISSUED FOR PRELIMINARY REVIEW	2021-08-20
D	ISSUED FOR PRELIMINARY REVIEW	2021-08-24
E	ISSUED FOR PRELIMINARY REVIEW	2021-08-25
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30
G	ISSUED FOR ENGINEERING REVIEW	2021-09-21
H	ISSUED FOR ENGINEERING REVIEW	2021-09-22

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

EAGLE BUILDERS
THE PRECAST CONCRETE CONNECTION

Stamp:

PRELIMINARY

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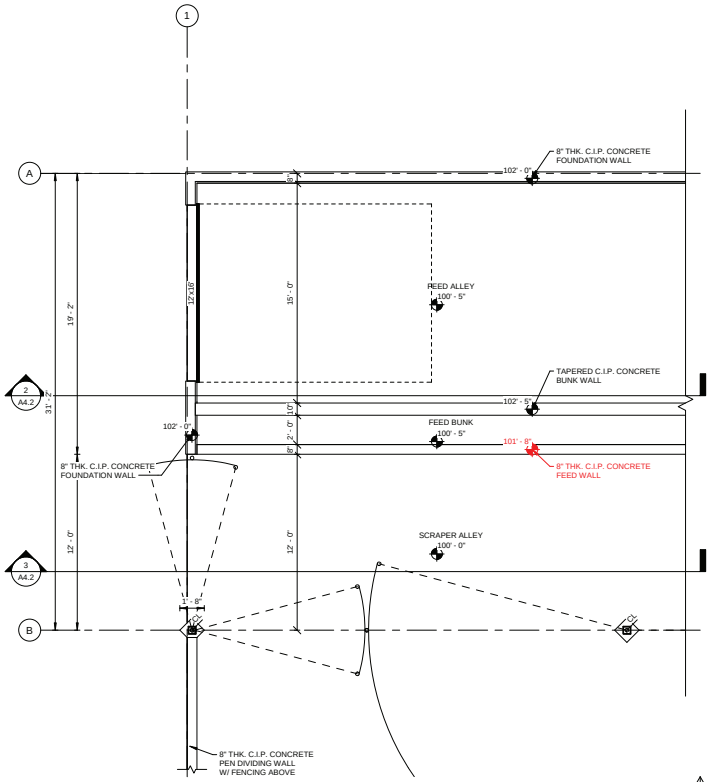
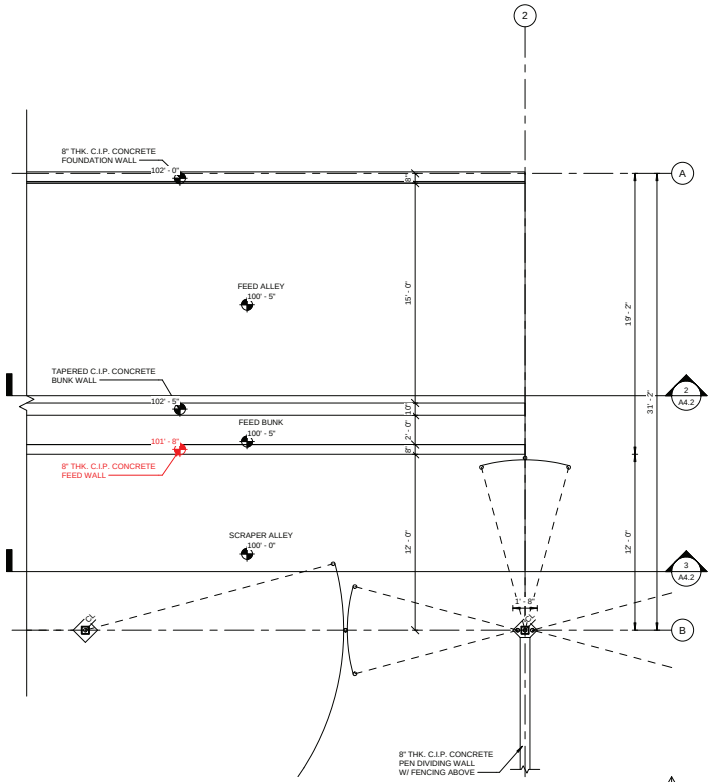
Floor Plan Overall

A2.0

Project number:	A20585
Date:	2022-02-09 12:48:04 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated



3 A2.1 Enlarged Floor Plan - West
1/4" = 1'-0"



2 A2.1 Enlarged Floor Plan - East
1/4" = 1'-0"

NO.	DESCRIPTION	DATE
A	ISSUED FOR PRELIMINARY REVIEW	2021-07-19
B	ISSUED FOR PRELIMINARY REVIEW	2021-07-22
C	ISSUED FOR PRELIMINARY REVIEW	2021-08-20
D	ISSUED FOR PRELIMINARY REVIEW	2021-08-24
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30
H	ISSUED FOR ENGINEERING REVIEW	2021-09-22

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

EAGLE BUILDERS
THE PRECAST CONCRETE CONNECTION

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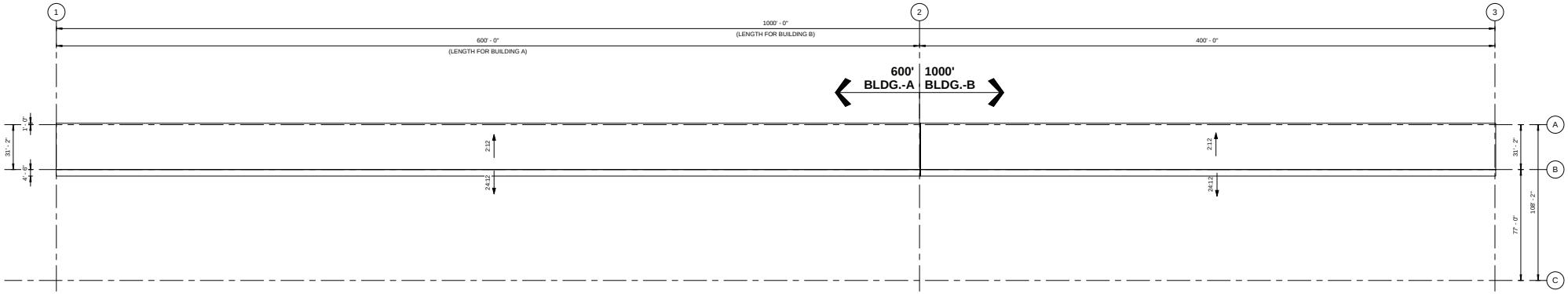
Floor Plan Enlarged

A2.1

Project number:	A20585
Date:	2022-02-09 12:48:04 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated



4 A2.2 Overall Roof Plan
1/32" = 1'-0"

NO.	DESCRIPTION	DATE
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30
G	ISSUED FOR ENGINEERING REVIEW	2021-09-21

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

EAGLE BUILDERS
THE PRECAST CONCRETE CONNECTION

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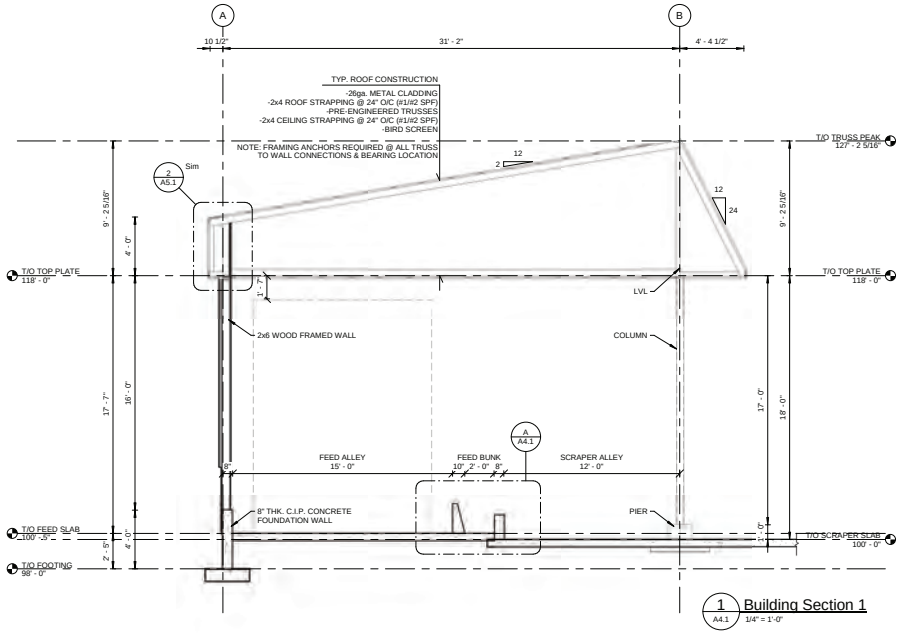
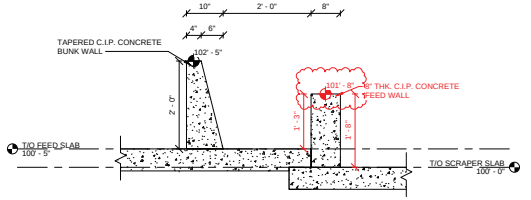
Roof Plan Overall

A2.2

Project number:	A20585
Date:	2022-02-09 12:48:04 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated



1 A4.1 Building Section 1
1/4" = 1'-0"



A A4.1 Feed Bunk Section
3/4" = 1'-0"

Application RA21043 Page 38 of 45

NO.	DESCRIPTION	DATE
A	ISSUED FOR PRELIMINARY REVIEW	2021-07-19
B	ISSUED FOR PRELIMINARY REVIEW	2021-07-22
C	ISSUED FOR PRELIMINARY REVIEW	2021-08-20
D	ISSUED FOR PRELIMINARY REVIEW	2021-08-24
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

EAGLE BUILDERS
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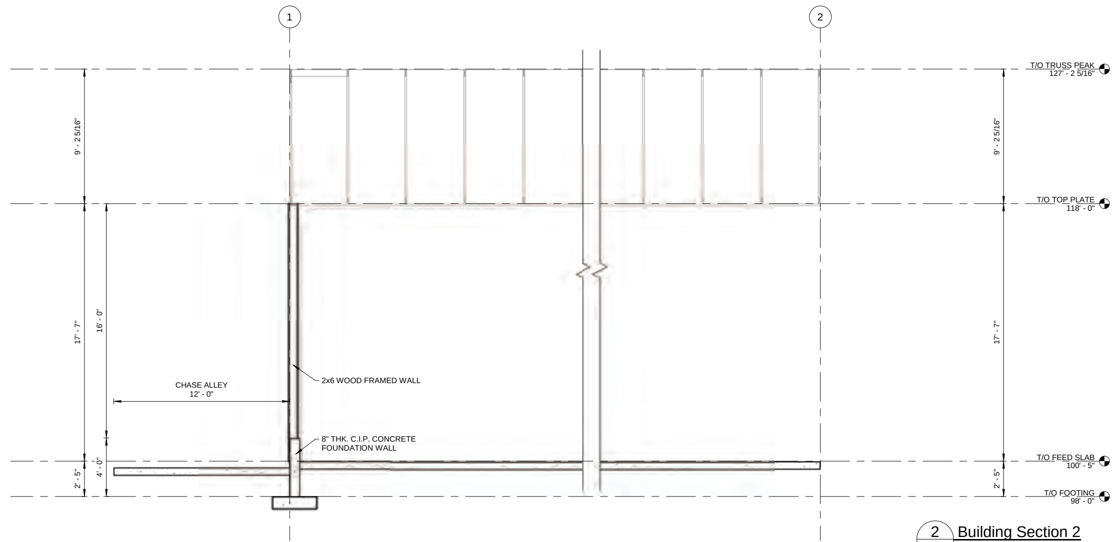
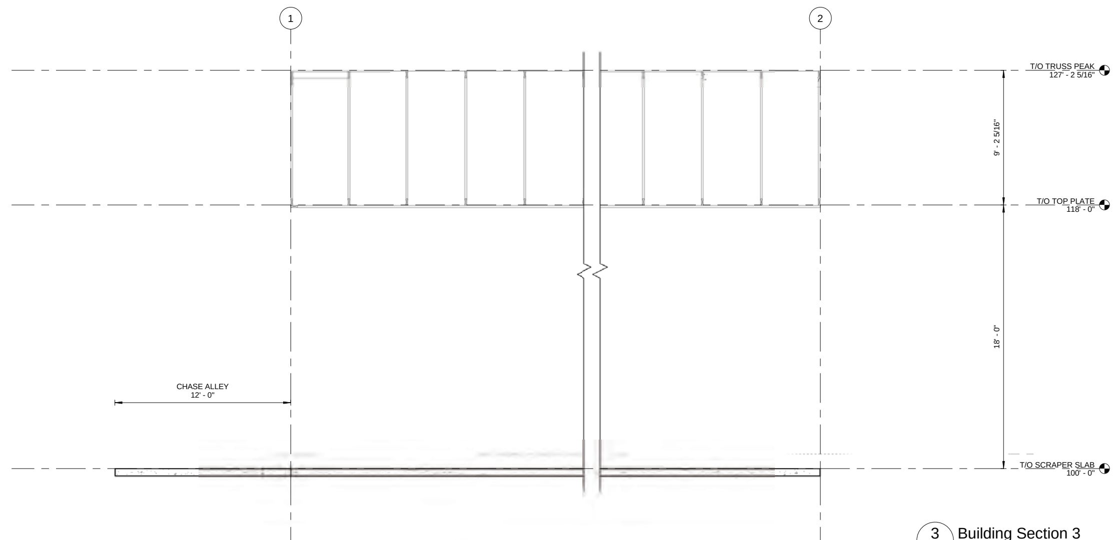
Building Sections

A4.1

Project number:	A20585
Date:	2022-02-09 12:48:05 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated



2 Building Section 2
A4.2 1/4" = 1'-0"



3 Building Section 3
A4.2 1/4" = 1'-0"

D:\Double T Cattle\2021 Feedlot (A20585)\Model\Double T Cattle Feedlot - Building.rvt

NO.	DESCRIPTION	DATE
A	ISSUED FOR PRELIMINARY REVIEW	2021-07-19
B	ISSUED FOR PRELIMINARY REVIEW	2021-07-22
C	ISSUED FOR PRELIMINARY REVIEW	2021-08-20
D	ISSUED FOR PRELIMINARY REVIEW	2021-08-24
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30
H	ISSUED FOR ENGINEERING REVIEW	2021-09-22

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

EAGLE BUILDERS
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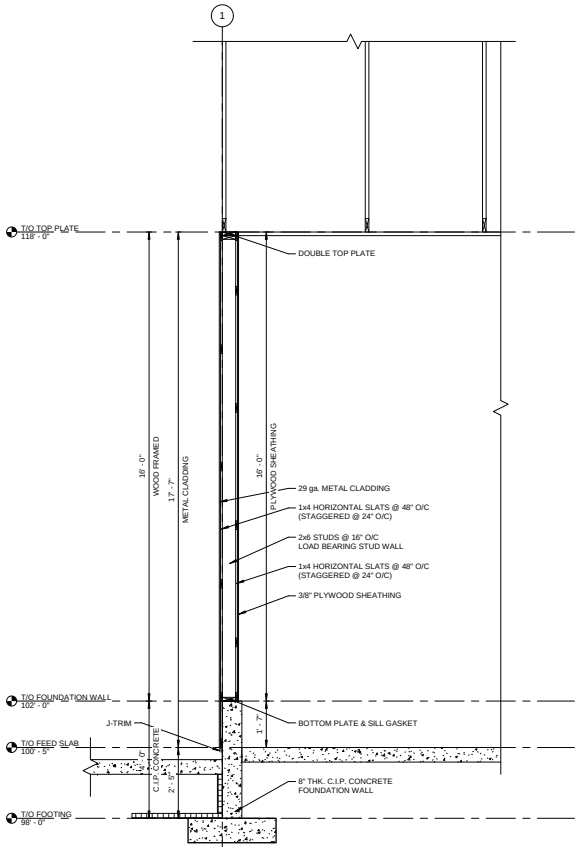
ALL WORK MUST COMPLY WITH THE MOST RECENT EDITION OF THE APPLICABLE BUILDING CODE AND ANY OTHER GOVERNING AUTHORITIES.

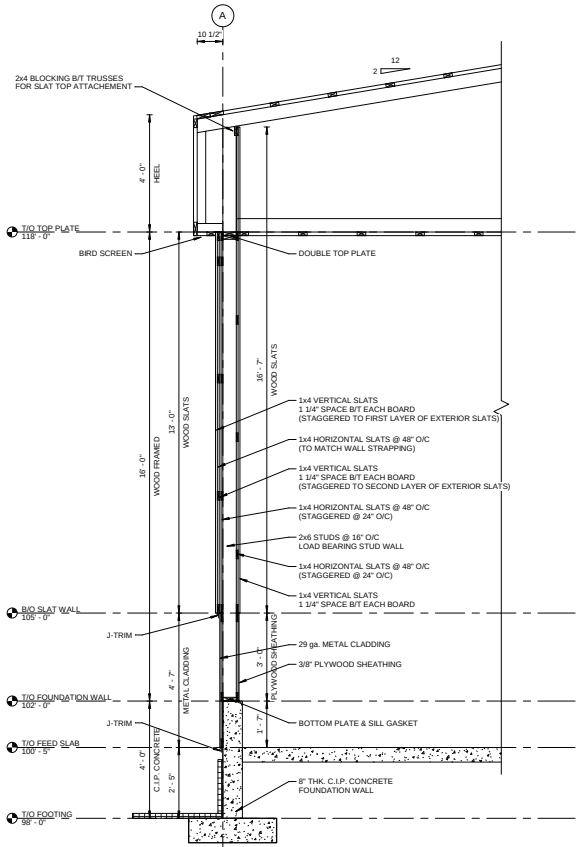
Building Sections

A4.2

Project number:	A20585
Date:	2022-02-09 12:48:07 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated



5 End Wall Section
A4.3 1/2" = 1'-0"



4 Side Wall Section
A4.3 1/2" = 1'-0"

Application RA21043 Page 40 of 45

NO.	DESCRIPTION	DATE
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

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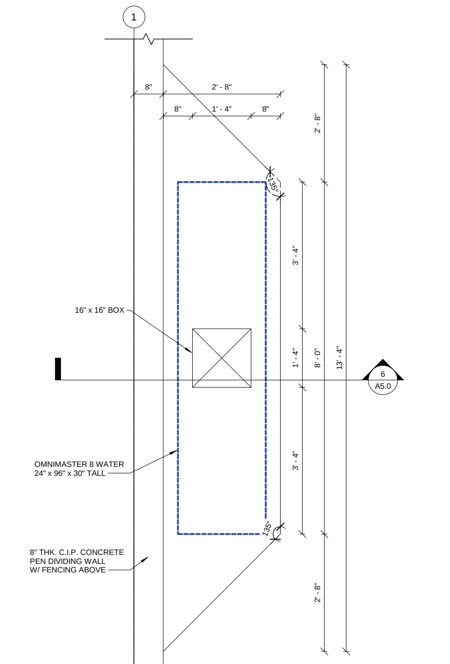
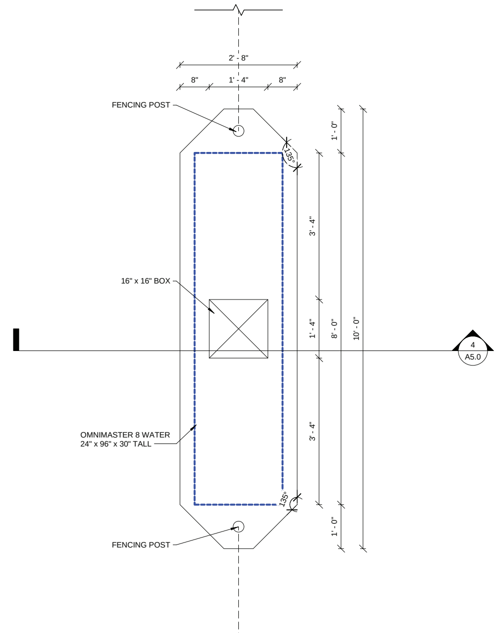
Wall Sections

A4.3

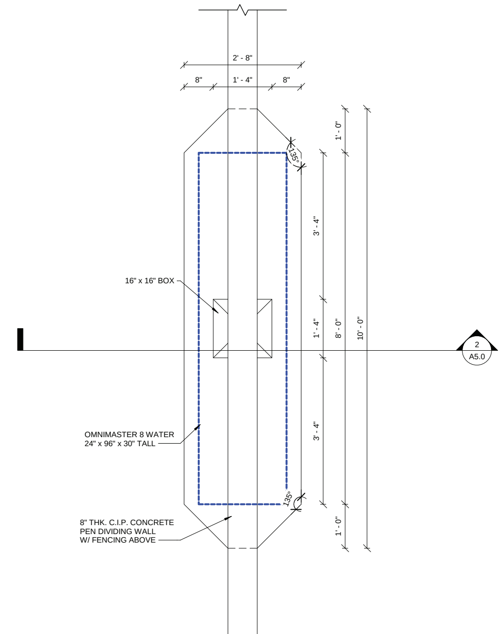
Project number:	A20585
Date:	2022-02-09 12:48:07 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated



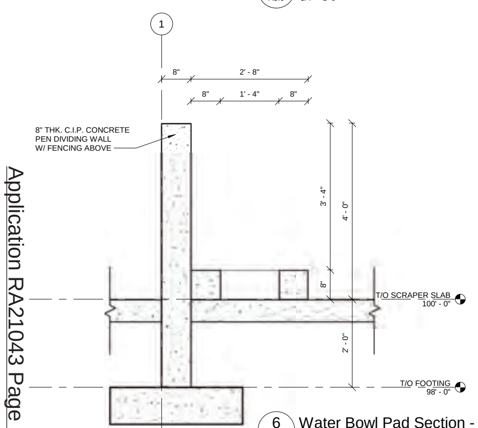
5 A5.0 Water Bowl Pad Plan - Single
3/4" = 1'-0"



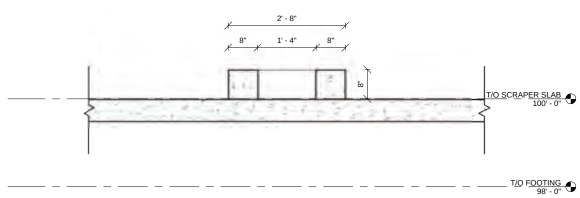
3 A5.0 Water Bowl Pad Plan - Double @ Fence
3/4" = 1'-0"



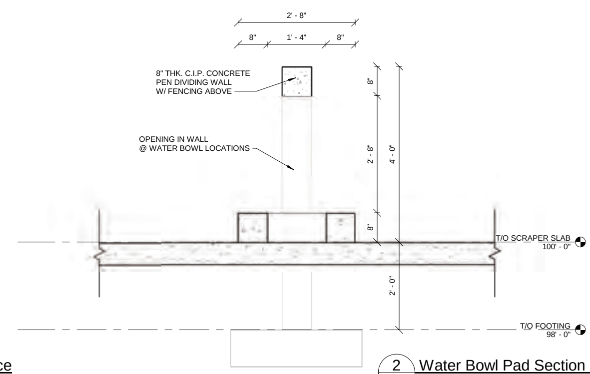
1 A5.0 Water Bowl Pad Plan - Double @ Wall
3/4" = 1'-0"



6 A5.0 Water Bowl Pad Section - Single
3/4" = 1'-0"



4 A5.0 Water Bowl Pad Section - Double @ Fence
3/4" = 1'-0"



2 A5.0 Water Bowl Pad Section - Double @ Wall
3/4" = 1'-0"

NO.	DESCRIPTION	DATE
D	ISSUED FOR PRELIMINARY REVIEW	2021-08-24
E	ISSUED FOR PRELIMINARY REVIEW	2021-08-25
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

EAGLE BUILDERS
THE PRECAST CONCRETE CONNECTION

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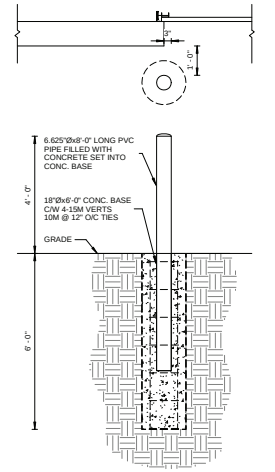
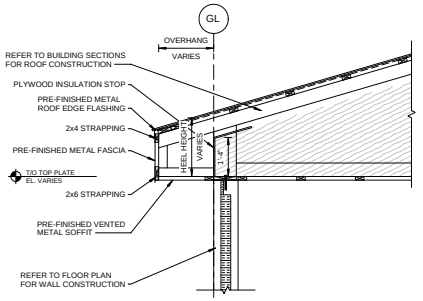
Architectural Details

A5.0

Project number:	A20585
Date:	2022-02-09 12:48:09 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated



1 A5.1 Bollard Detail 1/2" = 1'-0"



2 A5.1 Soffit Detail 1/2" = 1'-0"

NO.	DESCRIPTION	DATE
F	ISSUED FOR ENGINEERING REVIEW	2021-08-30

Double T Cattle Feedlot

Ponoka County, Alberta

15-15-42-25 W4

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Architectural Details

A5.1

Project number:	A20585
Date:	2022-02-09 12:48:09 PM
Drawn by:	JC
Checked by:	JC
Scale:	As indicated

Union Street Geotechnical

7th October, 2021
File No. USG1276

Eagle Builders LP
27312 - 17 Twp. Rd. 394
Aspelund Industrial Park
Blackfalds, Alberta
T0M 0J0

ATTENTION: Mr. Allan Prediger, Project Manager

Dear Mr. Prediger,

SUBJECT: Double T Cattle Co.
Proposed Confined Feedlot
N.W. ¼ of 15-42-25 W4M
Ponoka County, Alberta

1 INTRODUCTION

Union Street Geotechnical Ltd. (Union Street) was retained by Eagle Builders LP (Eagle Builders) to perform a field investigation, and subsequent laboratory testing on the subgrade, to aid in the design and construction of a proposed confined feedlot for Double T Cattle Co. located within the N.W. ¼ of 15-42-25 W4 in Ponoka County, Alberta, as shown on Drawing No. A1. Nine boreholes were advanced in the proposed pen and catch basin development footprint for liner design purposes. Based on the boreholes advanced, it was determined that the upper subgrade is predominantly composed of till overlying mudstone.

2 DESCRIPTION OF THE PROJECT AND SITE

2.1 SITE DESCRIPTION

The site is located approximately 1.5 km north-northwest of the intersection of Range Road 252 and Township Road 422, within the N.W. ¼ of 15-42-25 W4 in

4726 - 78A Street Close
Red Deer, Alberta
T4P 2J2

Bus: 403-350-9688
www.unionstreetgeo.ca

Ponoka County, Alberta, as shown on Drawing No. A1. The proposed feedlot development site within the N.W. ¼ was relatively flat with the geological drainage of the area sloping east.

The proposed feedlot is currently utilized as agricultural land and bordered by agricultural land to the north, east, south, with the existing agricultural development to the west-southwest of the proposed feedlot. Photographs depicting the site are attached to this report.

2.2 Proposed Development

The proposed development consists of feedlot pens, catch basin, and associated development. Specific development details are unknown at the time of this report writing but are assumed to be typical to those in the area and for developments of this nature.

Recommendations contained in this report have been given for the above described development and those typical of a development of this nature. If there are any changes to the proposed development, or their locations, these changes should be reviewed by Union Street personnel to confirm the applicability of this report to the revised development plans.

3 Field Investigation and Laboratory Analysis

The field investigation program included drilling nine boreholes at the locations shown on Drawing No. A2. The borehole locations were established by Union Street personnel based on a discussion with the owner, proposed development footprint, utility clearance, and access. No formal surveying of the borehole locations or site were completed and therefore, all drawings, locations, measurements, and legal descriptions are approximate and conceptual in nature.

On 14th September, 2021, nine boreholes (designated as BH101 to BH109) were advanced using a truck-mounted auger drill utilizing 150 mm diameter, continuous flight augers, operated by Venom Environmental Drilling Ltd. The boreholes were advanced to a depth of 4.57 m to 9.14 m below ground surface.

3.1 GENERAL STRATIGRAPHY

The subsurface conditions were relatively uniform in all nine borehole locations for liner design purposes. In general, and to the depths drilled, the soil conditions encountered at the borehole locations generally consisted of, in descending order; topsoil overlying till and mudstone. Topsoil, with an approximate average thickness of 320 mm, was encountered at surface in all nine boreholes. Till, with varying clay, silt, and sand content was encountered underlying the topsoil in all nine boreholes which extended to an average depth of 3.13 m below grade. It was yellowish brown (10YR 5/8) to dark grey (10YR 4/1), oxidized to non-oxidized, moist, soft to hard, massive, contained gravel, silt pocket, and coal chip inclusions, and was calcareous. A thin sand seam was encountered within the till in Borehole BH106. Mudstone was encountered underlying the till in all nine boreholes which extended to the maximum exploration depth. The mudstone generally consisted of clayey silt with trace to some sand. Observations made during the field investigation, visual descriptions of the soils, and the results of laboratory analysis are presented in the attached Borehole Logs and Laboratory Test Results.

Undisturbed samples were collected within the till encountered in Borehole BH102 to aid in the proposed catch basin liner design and within the till encountered in Borehole BH109 to aid in the proposed pen liner design. Sample MW16, obtained from Borehole BH102 at 4.57 m below grade, was submitted for hydraulic conductivity testing which indicated a permeability value of 7.87×10^{-9} cm/s. Sample MW48, obtained from Borehole BH109 at 3.05 m below grade, was submitted for hydraulic conductivity testing which indicated a permeability value of 6.61×10^{-7} cm/s.

Three MUSC tests were performed on till samples obtained from Boreholes BH101, BH105, and BH107. The MUSC results are summarized in Table 3.1.

TABLE 3.1: SUMMARY OF TILL MODIFIED UNIFIED SOILS CLASSIFICATION TEST RESULTS

Sample No. and Depth	Borehole No.	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Moisture Content (%)	MUSC – Soil Type
MW3 - 2.29 m	BH101	51.9	11.8	40.1	16.5	CH
MW29 - 0.76 m	BH105	52.4	11.3	41.1	11.4	CH
MW35 - 0.76 m	BH107	40.1	13.0	27.1	12.2	CI
Average:		48.1	12.0	36.1	13.4	CI-CH

Based on the results in Table 3.1 the till has an average MUSC of "CI-CH" - Silts or Clays of medium to high plasticity.

Four Mechanical Wash Sieves (MWSs) were performed on till samples obtained from Borehole BH101, BH105, BH107, and BH109. The MWS sieve results are summarized in Table 3.2.

TABLE 3.2: SUMMARY OF TILL MUSC AND PSA TEST RESULTS

Sample No. and Depth	Borehole No.	Gravel Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)
MW3 - 2.29 m	BH101	0.4	33.2	66.4	
MW29 - 0.76 m	BH105	1.9	31.5	66.6	
MW35 - 0.76 m	BH107	0.6	33.5	65.8	
MW45 - 0.76 m	BH109	0.1	67.5	32.4	
Average:		**0.8**	**41.4**	**57.8**	

Cobbles and boulders were not encountered during drilling, but as till is a heterogeneous mixture of all grain sizes, cobbles and boulders may be encountered during construction.

A Particle Size Analysis (PSA) and MWS were performed on mudstone samples obtained from Borehole BH101. The PSA and MWS results are summarized in Table 3.3.

TABLE 3.3: SUMMARY OF MUDSTONE SIEVE AND HYDROMETER TEST RESULTS

Sample No. and Depth	Borehole No.	Gravel Content (%)	Sand Content (%)	Silt Content (%)	Clay Content (%)
MW5 - 3.81 m	BH101	0.0	17.7	82.3	
MW7 - 5.33 m	BH101	0.0	0.9	67.9	31.2
Average:		**0.0**	**9.3**	**54.5**	**36.2**

Notes:
1 - The fines results of MW5 were split 50/50 in the average.

3.2 GROUNDWATER

Seepage was observed in Boreholes BH101 to BH103 at an average depth of 6.71 m below grade and three piezometers were installed following drilling. The groundwater elevation was recorded on the 28th September, 2021, 14 days following drilling, and the results are summarized in Table 3.4.

TABLE 3.4: SUMMARY OF GROUNDWATER MEASUREMENTS

Borehole No.	Borehole Depth (m)	Groundwater Level[1] (m), 28th September, 2021
BH101	7.93	2.47
BH108	9.14	2.68
BH109	4.57	2.63
Average:		**2.59**

Notes:
1 - Below existing grade.

Based on seepage encountered during drilling and the groundwater elevations recorded in the piezometers, the average groundwater table is likely (approx.) 2.0 m to 3.0 m below ground surface. Groundwater levels are subject to meteorological events, seasonal variations, site gradient, and other salient factors resulting in the water table varying with time.

4 REFERENCES

The following was referenced while composing this letter:

- Province of Alberta, "*Agricultural Operation Practices Act and Regulations*", Revised Statutes of Alberta 2000, Chapter A-7, Alberta Queen's Printer, 2010;
- Province of Alberta, "*Agricultural Operation Practices Act and Regulations*", Standards and Administration Regulation, Part 2, Alberta Queen's Printer, 2017;
- Alberta Government, "*Catch Basin Design and Management*", Technical Guideline Agdex 096-101, August 2012;
- Natural Resources Conservation Board, "*Determining Equivalent Protective Layers and Constructed Liners*", Technical Guideline Agdex 096-61, May 2013; and,
- AL-Terra Engineering (Red Deer) Ltd., "*Site Location & Runoff Control Catch Basin Plan*", Project No. 5457, dated 6th October, 2021.

5 FEEDLOT PENS

5.1 STRIPPING

All organic soil, vegetation, sand, etc. should be stripped from the feedlot footprint prior to the start of feedlot grading construction activities.

5.2 NATURALLY OCCURRING LINER

The Natural Resources Conservation Board (NRCB) requires naturally occurring protective layers for solid manure collection and storage facilities, such as feedlots, to have a minimum thickness of 2.0 m and a maximum hydraulic conductivity of 1.0×10^{-6} cm/s. Based on the average thickness of the till stratum encountered in the six boreholes advanced in/near the proposed feedlot footprint, 2.79 m, and the

factored hydraulic conductivity test result of the till in Borehole BH109, 6.61×10^{-6} cm/s, the encountered native till in the vicinity of Borehole BH109 does not meet the naturally occurring protective layer requirement.

5.3 COMPACTED SOIL LINER

The NRCB requires compacted soil liners for solid manure collection and storage facilities, such as feedlot pens, to have a minimum thickness of 0.5 m and a maximum hydraulic conductivity of 5.0×10^{-7} cm/s. A hydraulic conductivity analysis was performed on a native till sample obtained from Borehole BH102 at 4.57 m below grade and which had a factored result of 7.87×10^{-8} cm/s. Native till utilized as fill obtained from the vicinity of Borehole BH102 (eastern portion of the site) compacted to a minimum 1,902 kg/m^3 dry density at 15.1% moisture will be suitable as a clay liner across the feedlot and meets NRCBs soil liner requirement.

If a compacted soil liner is utilized, the NRCB requires the bottom of the soil liner to be equal aor greater than 1.0 m from the groundwater table at the time of construction.

5.4 CONCRETE LINER

The client has indicated that the pens will likely utilize a concrete liner. If concrete is utilized, it must offer the equivalent protection of a 0.50 m thick soil liner with a permeability of not more than 5.0×10^{-7} cm/s. The type of concrete proposed for the liner is unknown at this time, but is expected to well exceed this requirement.

5.5 GRADING

The base of the pens must be positively graded, to ensure liquids don't pond on the subgrade, to a catch basin or other runoff control system. It is assumed that till, from cut/fill grading activities, will be utilized during construction if fill is required. Due to its plasticity, the till isn't recommended for areas requiring structural fill.

Fill, composed of native till, should be placed in lifts not exceeding 200 mm and compacted to a minimum 98% of its Standard Proctor Dry Density (SPDD) at moisture contents +2% of optimum. The local soils may require moisture

conditioning to achieve the required degrees of compaction. The degree to which moisture conditioning of the fill would be required may vary with the local soils and construction season. There may also be some localized areas where the native soils may require drying, or blending with drier soils, in order to achieve the required degrees of compaction.

6 CATCH BASIN

6.1 CAPACITY

For preliminary design purposes, the design volume of the catch basin must have a storage capacity that can accommodate a 1 in 30 year rainfall. For the Ponoka region a 1 in 30 year event equates to approximately 80 mm of rainfall. The drainage area of the feedlot, including the proposed catch basin, is approximately 79,703 m^2. The following was utilized to determine the catch basins miniumu required capacity.

$$V_{30} = D_A \times R_{30} \times C_R$$

Where:

V_{30} = One Day Rainfall Volume (m^3);
D_A = Drainage Area (m^2);
R_{30} = One Day Rainfall (m); and,
C_R = Runoff Coefficient (1.0 for a paved area).

Based on the referenced formula, it has been determined that the expected one day rainfall volume for the site is approximately 6,376.2 m^3. However, to ensure the liners integrity due to drying out and cracking, and to increase the timeframe between emptying, the design capacity of the catch basin should be greater than the 1 in 30 year rainfall volume. Union Street recommends increasing the total volume capacity by approximately 60% of the 1 in 30 year rainfall minimum volume to approximately 10,137 m^3.

The size and capacity of the catch basin may change depending on the liner option selected as, for example, a synthetic liner will allow a deeper catch basin, allowing a reduced footprint, reducing the required capacity. Therefore, although the general

footprint will remain similar, the size and location of the catch basin shown on the attached drawing may slightly differ from that actually constructed.

The catch basin must have a marker that is clearly visible at all times indicating the minimum volume required to accommodate a 1 in 30 year one day rainfall event.

6.2 Stripping

All organic soil and vegetation should be stripped from the catch basin footprint prior to the start of catch basin construction activities.

6.3 Catch Basin Excavation

All till material from the catch basin excavation that is determined to be suitable for reuse should be stockpiled.

The banks of the catch basin should be cut at no steeper than 3H:1V. The capacity of the catch basin should designed ensuring a minimum 0.5 m freeboard. It is the responsibility of the contractor to remove water from trenches and excavations, regardless of origin. If while constructing the slopes of the catch basin subsurface, groundwater begins eroding the slopes and entering the catch basin, construction will need to be halted immediately and dewatering techniques will need to be implemented before construction continues. It is anticipated that potential groundwater problems can be resolved with well graded ditching and the installation of subgrade sumps around the perimeter of the site. If extreme groundwater seepage becomes present, more advanced dewatering techniques can be implemented. Although possible, it is not expected that seepage and sloughing will be encountered during construction unless excavations exceeds 2.6 m in depth.

Pumps and other materials necessary to keep the excavation free of water while work is in progress should be provided. Provisions should be made in case of accidental stoppage of dewatering equipment to prevent damage to the work area. The excavations must be protected against flooding and damage from surface run-off. Water removed from the site is to be disposed of in a manner that will not damage the work area or other property or persons.

Materials will be excavated and removed to the depths necessary for the construction of the structure and drainage system. Care must be taken to minimize the disturbance to the supporting soil. After the excavation has been shaped, any over-excavated areas will be backfilled and compacted to a density equal to or greater than the undisturbed soil. All slopes in the subgrade are to be uniform and in a condition suitable for a catch basin.

6.4 EMBANKMENTS AND FILL

An embankment/berm is recommended to be constructed around the perimeter of the feedlot to divert and minimize surface runoff from outside the operation from flowing into the catch basin. Additionally, a berm is recommended along the perimeter of the catch basin to prevent accidental effluent release outside of the operation and ensure a minimum 0.5 m freeboard. The exterior slope of a catch basin wall should be no steeper than 4H:1V. Any fills required can be constructed from the till subgrade encountered on-site. If an insufficient quantity of suitable on-site subgrade fill is not available, it will have to be analyses, imported, and compacted.

Areas requiring fills will be uniformly graded, scarified and re-compacted to the necessary density prior to being filled. Common excavated materials will be placed in the embankments, and in over-excavations if approved by the Geotechnical Engineer. Fills should be placed in lifts not exceeding 200 mm and compacted to minimum 98% of the SPDD at +2% Moisture. Fill material may require moisture conditioning prior to compaction.

6.5 LINER

6.5.1 Naturally Occurring Soil Liner

Following a review of the referenced NRCB documentation, it is understood that a naturally occurring protective layer for a catch basin must have a minimum thickness of 5.0 m and a maximum hydraulic conductivity of 1.0×10^{-6} cm/s. Additionally, the groundwater table must be approximately 1.0 m below the bottom of the naturally occurring liner. Laboratory testing was conducted on an undisturbed till sample in Borehole BH101 with a hydraulic conductivity of 7.87×10^{-9} cm/s. However, NRCB

requires laboratory permeability results to be reduced by an order of magnitude. When reduced by this magnitude, the design hydraulic conductivity of the till in the catch basin location is assumed to be $7.87x10^{-8}$ cm/s. Based on the average thickness of the till stratum encountered in Boreholes BH101 to BH103 and BH108 (boreholes advanced in/near the proposed catch basin footprint) and the factored hydraulic conductivity of the till, 2.80 m and $7.87x10^{-8}$ cm/s respectively. As such, a naturally occurring till layer 0.39 m thick with a permeability of $7.87x10^{-8}$ cm/s offers the equivalent protection of a 5.0 m thick layer with a permeability of $1.0x10^{-6}$ cm/s. A minimum liner thickness of 0.5 m is recommended however to ensure its structural integrity.

If a naturally occurring soil liner is utilized, the NRCB requires the bottom of the soil liner to be equal or greater than 1.0 m from the groundwater table at the time of construction.

6.5.2 Compacted Soil Liner

A compacted soil liner could be utilized at this site, but as the till's naturally occurring permeability meets the referenced requirements, it is unlikely that a compacted soil liner would be utilized at this site.

6.5.3 Geomembrane

If a catch basis with a great depth is required, to reduce the overall footprint, a synthetic liner can be used. If utilized, all geomembrane products should be handled, stored, and placed in accordance with the manufacturer's recommendations. Materials should be stored so that they do not come into contact with substances that may affect their physical or chemical properties such as fuel, exhausts, or petroleum products.

The installation contractor should be a contractor approved by the civil engineer who is trained to install the manufacturer's geomembrane. Installation should be performed by personnel experienced in seaming the materials under the constant supervision of the manufacturer. It is recommended that the installation contractor provide a written report on the completed installation certifying that the liner was

installed in accordance with the requirements of the manufacturer's specifications, the liner is ready for operation, and the warranty is in effect.

Geotextiles should be sufficiently anchored and deployed in a manner that will reduce folds and wrinkles. In the presence of wind, geotextiles should be weighted with sandbags or equivalent ballast. Geotextiles are to be cut using an approved cutter. Care should be taken in the installation process not to entrap excessive dust or stones that could damage the geomembrane.

The contactor should submit a panel layout proposal for the geomembrane to the engineer prior to the geomembrane placement. Care should be taken in the method used to unroll the panels so that damage to the liner or the supporting soil and/or geomembrane. Sand bags or equivalent ballast that will not damage the liner should be placed on the liner to prevent uplift. No equipment or tools that could damage the liner or underlying surfaces by handling or other means should be used. No personnel working on the liner will wear damaging shoes or engage in activities that could harm the liner, including smoking. All defects and damage will be documented and marked for repair. Repairs will be conducted in a manner suitable to the geomembrane manufacturer.

No NRCB technical specifications regarding synthetic liner were found. If utilized, it is recommended to discuss the liner requirements with the manufacturer and once a product has been selected, to discuss the technical specifications with the NRCB.

Pumping may be required during liner placement if the excavation starts to fill with groundwater. It is recommended that the means be available to prevent "bubbling" of the liner if groundwater starts to form below the liner in the catch basin footprint.

Seepage and sloughing may be encountered in the till subgrade depending upon the base elevation of the catch basin.

If a synthetic liner is utilized, the NRCB requires the bottom of the liner to be equal or greater than 1.0 m from the groundwater table at the time of construction.

6.6 Quality Control / Quality Assurance

As part of the quality control program, it is recommended that a geotechnical engineer or representative be on-site to inspect the excavation and compaction required. The geotechnical engineer will be able to provide immediate on-site recommendations to potential difficulties that may arise during construction.

6.7 Inlet Pipe

It is understood multiple inlet pipes will be utilized for the construction of the catch basin. The inlet pipes must be sealed to ensure liquid manure doesn't seep back along the pipe extrusion, creating a potential source of contamination. Bentonite chips or concrete are typically utilized around the inlet pipe to create the required seal.

6.8 Erosion

Due to the catch basin's size or liner type, these measures may not be necessary, but unchecked erosion can lead to slope and berm failure and erosion preventative measures may be required. Placing riprap is normally the most cost effective erosion protection material, placed on the waterward side, due to its effectiveness, durability and availability.

Additionally, exposed soil should be graded to the required slope, overlain with topsoil, and seeded or hydroseeded with grass. Trees and shrubs planting is not recommended as tree roots detrimentally affect berms by root penetration and shrubs cause obstructions in viewing piping, seepage, and burrowing animals. The vegetation will serve to protect the upper portions of the slope from erosion by surface runoff water and will also increase the stability of the slope. The grass should be trimmed regularly as to not obstruct the inspectors view.

6.9 Fence

It is recommended that continuous fencing around the perimeter of the catch basin is constructed. A fence will help prevent unauthorized entry to the catch basin and will also help reduce the detrimental effects of burrowing animals such as beavers, muskrats, gophers, etc.

6.10 INSPECTIONS

It is the responsibility of the owner to conduct routine and periodic inspections and to maintain and repair the catch basin to acceptable standards. It is recommended that the catch basin is inspected on a regular basis or as per the Natural Resources Conservation Board. The inspector shall note, but not be limited to noting, the presence or absence of settlement, seepage, burrowing animals, erosion, freeboard level, erosion protection performance and condition, fence condition, vegetation growth that my lead to a decreased performance of the liner, and general berm and catch basin condition.

7 CLOSURE

Union Street Geotechnical Ltd. prepared this report for the exclusive use of Eagle Builders LP, and their agents, to aid in the design and construction of the proposed Double T Cattle Co. feedlot located within the N.W. ¼ of 15-42-25 W4 in Ponoka County, Alberta. The content reflect Union Street's best judgement available to it at the time of preperation. Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibility of such third party and Union Street accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Our recommendations and conclusions are based upon the information obtained from the subsurface exploration. The borings and associated laboratory testing indicate subsurface conditions only at the time and to the depth, of the specific boring location investigated and only for the soil properties tested. The subsurface conditions may vary between the boreholes and over time. The interpretation of subsurface conditions provided is a professional opinion of encountered conditions and is not a certification or guarantee of site conditions. If variations, or other latent conditions become evident, Union Street should be notified immediately so that our conclusions and recommendations can be re-evaluated. Although subsurface conditions have been explored, we have not conducted investigations, sampling, field or laboratory testing, evaluations, or modelling of the site or subsurface conditions with respect to the presence of contaminated soil or groundwater or slope stability conditions.

This report contains the results of our geotechnical investigation as well as certain recommendations arising from our investigation. The general recommendations herein do not constitute a design, in whole or in part, of any of the structural elements of the proposed work. Incorporation of any or all of our general recommendations into the design of any such element does not constitute us as designers or co-designers of such elements, nor does it mean that such design is appropriate in geotechnical terms. The designers of such elements must consider the appropriateness of our general recommendations in light of all design criteria known to them, many of which are not known by us. Our mandate has been to perform a geotechnical investigation and provide general site suitability recommendations, which we have completed by means of this report. We have had no mandate to design, or review the design of any elements of the proposed work and accept no responsibility for such design or design review.

This report has been prepared in accordance with generally accepted geotechnical engineering practice common to the local area. No other warranty, expressed or implied, is made.

Yours truly,

Union Street Geotechnical Ltd.

Prepared By:

Neil Tomaszewski, E.I.T.
Project Engineer

Reviewed By:

PROFESSIONAL ENGINEER ALBERTA
JOSHUA M. WILSON
ID 80317

7th Oct, 2021

Joshua Wilson, P.Eng.
Geotechnical Manager

Union Street Geotechnical Ltd.
APEGA Permit No. P12644

7th October, 2021
APEGA ID# 80317

Union Street Geotechnical

ATTACHMENTS

DRAWINGS

Drawing No. A1 - Site Location Plan

Drawing No. A2 - Borehole Location Plan

PHOTOGRAPHS

Photographs No. 1 & 2

BOREHOLE LOGS

Boreholes No. BH101 to BH109, inclusive

LABORATORY TEST RESULTS

Flexible Wall Permeameter - Sample No. MW16

Flexible Wall Permeameter - Sample No. MW48

Laboratory Hydrometer - Sample No. MW7

Union Street Geotechnical

Drawings

LEGEND

- SITE BOUNDARY
- ROAD RIGHT OF WAY
- PROPERTY LINE (WHITE)

GENERAL NOTES

1 DRAWINGS COMPLIED FROM

MULTIPLE VECTOR AND RASTER GIS FIELDS AS PUBLISHED BY THE GOVERNMENT OF CANADA, THE GOVERMENT OF ALBERTA, NATURAL RESOURCES CANADA, EARTH SCIENCES SECTOR, CANADA CENTRE FOR MAPPING AND EARTH OBSERVATION, HAMLET OF NISKU.

AREIAL PHOTOGRAPH (C) 2020 MAXAR TECHNOLOGIES (C) GOOGLE EARTH PRO.

UNION STREET GEOTECHNICAL INVESTIGATION.

& PDF SKETCH PROVIDED BY THE CLIENT

2 LEGAL DESCRIPTION
A PORTION OF N E 1/4 15-42-25-W4M

0 100 200 300 400 m
0 100 200 300 400 yds
SCALE 1:20,000

NOTE SCALE IS FOR REFERENCE PURPOSES ONLY AND IS APPROXIMATE IN NATURE.

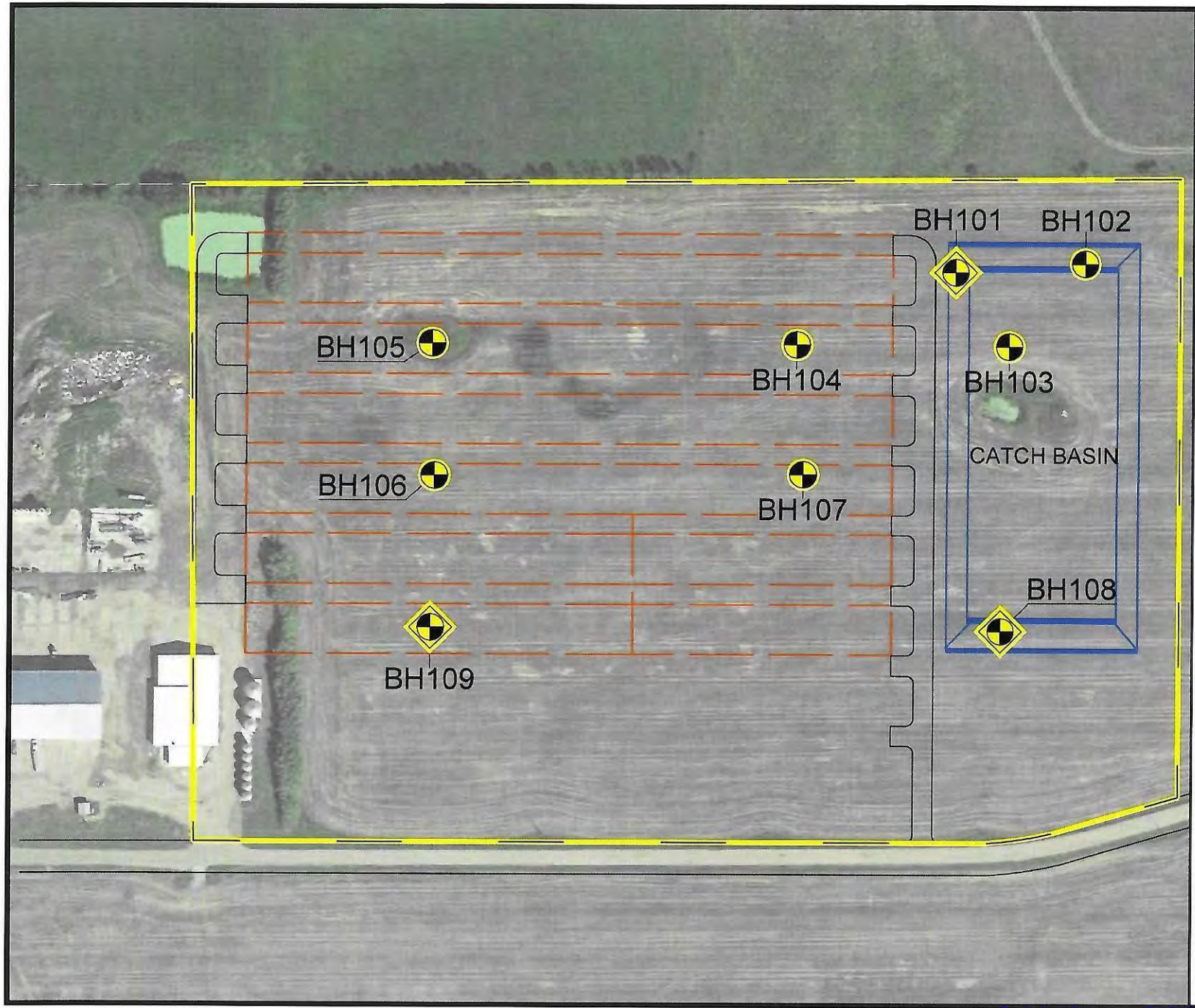
No	REVISION/ISSUE	DATE

UNION STREET GEOTECHNICAL LTD.
Union Street Geotechnical

PROJECT NAME AND ADDRESS
GEOTECHNICAL INVESTIGATION
DOUBLE T CATTLE CO.
N.E. 1/4 OF 15-42-25-W4M
PONOKA COUNTY,
ALBERTA

PROJECT: GEOTECHNICAL INVESTIGATION	SHEET: A1
PROJECT NUMBER: USG1276	
DATE: 24.09.2021	
DRAWING NAME: SITE LOCATION PLAN	

USG1276 - Drawing.dwg
30.09.2020



LEGEND:

- ROADWAY
- PROPERTY LINE (WHITE)
- SITE BOUNDARY
- PROPOSED BUILDINGS
- PROPOSED CATCH BASIN
- BOREHOLE LOCATION
- PIEZOMETER LOCATION

GENERAL NOTES

1 DRAWINGS COMPLIED FROM

MULTIPLE VECTOR AND RASTER GIS FILE DS AS PUBLISHED BY THE GOVERNMENT OF CANADA, THE GOVERMENT OF ALBERTA, NATURAL RESOURCES CANADA, EARTH SCIENCES SECTOR, CANADA CENTRE FOR MAPPING AND EARTH OBSERVATION, CITY OF GRANDE PRAIRIE.

AREIAL PHOTOGRAPH (C) 2020 MAXAR TECHNOLOGIES (C) GOOGLE EARTH PRO.

UNION STREET GEOTECHNICAL INVESTIGATION,

& PDF SKETCH PROVIDED BY THE CLIENT

2 LEGAL DESCRIPTION
A PORTION OF N.E. 1/4 15-42-25-W4M

0 10 20 30 40 50 m
0 50 100 150 ft

SCALE 1:2,500

NOTE: SCALE IS FOR REFERENCE PURPOSES ONLY AND IS APPROXIMATE IN NATURE.

No	REVISION/ ISSUE	DATE

UNION STREET GEOTECHNICAL LTD.

Union Street Geotechnical

PROJECT NAME AND ADDRESS
GEOTECHNICAL INVESTIGATION
DOUBLE T CATTLE CO.
N.E. 1/4 OF 15-42-25-W4M
PONOKA COUNTY,
ALBERTA

PROJECT: GEOTECHNICAL INVESTIGATION	SHEET: A2
PROJECT NUMBER: USG1276	
DATE: 24.09.2021	
DRAWING NAME: BOREHOLE LOCATION PLAN	

USG1276 - Drawing.dwg

30.09.2020

Union Street Geotechnical

Photographs

Photographs - Geotechnical Investigation
N.W. ¼ of 15-42-25 W4
Ponoka County, Alberta

Photograph No. 1: Photograph taken from near the western edge of the proposed feedlot, facing east, showing the proposed feedlot footprint, site grading, agricultural land, and general site conditions observed at the time of drilling. Photograph taken on the 14th September, 2021.

Photograph No. 2: Photograph taken from near the eastern edge of the proposed feedlot, facing west, showing the proposed feedlot footprint, site grading, agricultural development to the west-southwest, and general site conditions observed at the time of drilling. Photograph taken on the 14th September, 2021.

Borehole Logs

FIELD BOREHOLE LOG

BOREHOLE NUMBER: BH101

PROJECT NUMBER: **USG1276**
PROJECT NAME: **Geotechnical Investigation**
LOCATION: **N.W. 1/4 of 15-42-25 W4, Ponoka County, Alberta**
CLIENT: **Eagle Builders LP**
DRILLING METHOD: **150 mm Solid Stem Auger**
LOGGED BY: **M.W.**
DATE BEGUN: **14 September, 2021**
DATE COMPLETED: **14 September, 2021**

CASING STICKUP: **1.00 m**
TOTAL DEPTH: **7.93 m**
GROUND SURFACE ELEVATION: **N/A**

Union Street Geotechnical

DEPTH (m)	LITHOLOGY	DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT "N"	POCKET PEN (kPa)	MOISTURE CONT. (%)	SULPHATE (%)	USC	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	WELL INSTALLATION
0.0		TOPSOIL: 356 mm thick.										Cap.
1.0		TILL: Clay, silty, sandy. Very dark brown (10YR 2/2). Oxidized. Moist. Stiff to very stiff. Massive. Coal chip, gravel, and silt pocket inclusions. Calcareous.		MW1		192	11.8					
2.0				MW2	12	132	16.0					
3.0				MW3		96	16.5		CH	51.9	11.8	Solid 25 mm PVC casing.
4.0		MUDSTONE: Silty, clayey, some sand. Dark grey (10YR 4/1). Non-oxidized. Dry to moist. Very stiff to hard. Massive. Calcareous.		MW4	19	96	19.7					
5.0				MW5		144	16.0		CH	55.0	19.5	Auger cuttings.
6.0		@ 5.33 m, trace sand.		MW6	Ref.	215	15.4					
7.0		@ 7.62 m, seepage.		MW7		-	15.1					
8.0		NOTES: End of borehole at 7.93 m below surface. Seepage, but no sloughing encountered during drilling. Piezometer installed, annulus backfilled to surface with auger cuttings. Water level at 2.47 m below grade on 28 September, 2021.		MW8	Ref.	144	15.1					Hand slotted 25 mm PVC.
9.0				MW9		-	20.9					
				MW10	Ref.	96	17.6					
				MW11		48	23.3					

FIELD BOREHOLE LOG

BOREHOLE NUMBER: BH102

PROJECT NUMBER: **USG1276**
PROJECT NAME: **Geotechnical Investigation**
LOCATION: **N.W. 1/4 of 15-42-25 W4, Ponoka County, Alberta**
CLIENT: **Eagle Builders LP**
DRILLING METHOD: **150 mm Solid Stem Auger**
LOGGED BY: **M.W.**
DATE BEGUN: **14 September, 2021**
DATE COMPLETED: **14 September, 2021**

CASING STICKUP: **N/A**
TOTAL DEPTH: **9.14 m**
GROUND SURFACE ELEVATION: **N/A**

Union Street Geotechnical

DEPTH (m)	LITHOLOGY	DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT "N"	POCKET PEN (kPa)	MOISTURE CONT. (%)	SULPHATE (%)	USC	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	WELL INSTALLATION
0.0		TOPSOIL: 356 mm thick.										
1.0		TILL: Clay, silty, some sand. Dark yellowish brown (10YR 4/4) to dark brown (10YR 3/3). Oxidized. Moist. Very stiff. Massive. Coal chip, gravel, and silt pocket inclusions. Calcareous.		MW12		192	10.2					
2.0				MW14		144	15.7					
3.0												
4.0		@ 4.88 m, seepage.		MW15		-	15.7					
5.0		MUDSTONE: Silt, clayey, some to trace sand. Dark grey (10YR 4/1). Non-oxidized. Dry to moist. Very stiff to hard. Massive. Calcareous.		MW16		-	16.1					Auger cuttings.
				MW17		-	26.1					
6.0												
7.0				MW18		-	27.9					
8.0												
9.0		NOTES: End of borehole at 9.14 m below surface. Seepage and sloughing encountered during drilling. Borehole backfilled to surface with auger cuttings.		MW19		-	29.2					
10.0												

FIELD BOREHOLE LOG

BOREHOLE NUMBER: BH103

PROJECT NUMBER: **USG1276**
PROJECT NAME: **Geotechnical Investigation**
LOCATION: **N.W. 1/4 of 15-42-25 W4, Ponoka County, Alberta**
CLIENT: **Eagle Builders LP**
DRILLING METHOD: **150 mm Solid Stem Auger**
LOGGED BY: **M.W.**
DATE BEGUN: **14 September, 2021**
DATE COMPLETED: **14 September, 2021**

CASING STICKUP: **N/A**
TOTAL DEPTH: **9.14 m**
GROUND SURFACE ELEVATION: **N/A**

Union Street Geotechnical

DEPTH (m)	LITHOLOGY	DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT "N"	POCKET PEN (kPa)	MOISTURE CONT. (%)	SULPHATE (%)	USC	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	WELL INSTALLATION
0.0		TOPSOIL: 305 mm thick.										
1.0		TILL: Clay, silty, some sand. Yellowish brown (10YR 5/8) to dark grey (10YR 4/1). Oxidized. Moist. Hard. Massive. Coal chip, gravel, and silt pocket inclusions. Calcareous.		MW20		215	12.0					
2.0				MW21		215	17.8					
3.0		MUDSTONE: Silt, clayey, some to trace sand. Grey (10R 5/1) to dark grey (10YR 4/1). Non-oxidized. Dry to moist. Very stiff to hard. Massive. Calcareous.										
4.0				MW22		-	14.8					Auger cuttings.
5.0												
6.0				MW23		-	15.7					
7.0				MW24		-	28.8					
8.0		@ 7.62 m, seepage.										
9.0		NOTES: End of borehole at 9.14 m below surface. Seepage and sloughing encountered during drilling. Borehole backfilled to surface with auger cuttings.		MW25		-	29.9					
10.0												

FIELD BOREHOLE LOG

BOREHOLE NUMBER: BH104

PROJECT NUMBER: **USG1276**
PROJECT NAME: **Geotechnical Investigation**
LOCATION: **N.W. 1/4 of 15-42-25 W4, Ponoka County, Alberta**
CLIENT: **Eagle Builders LP**
DRILLING METHOD: **150 mm Solid Stem Auger**
LOGGED BY: **M.W.**
DATE BEGUN: **14 September, 2021**
DATE COMPLETED: **14 September, 2021**

CASING STICKUP: **N/A**
TOTAL DEPTH: **4.57 m**
GROUND SURFACE ELEVATION: **N/A**

Union Street Geotechnical

DEPTH (m)	LITHOLOGY	DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT "N"	POCKET PEN (kPa)	MOISTURE CONT. (%)	SULPHATE (%)	USC	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	WELL INSTALLATION
0.0		TOPSOIL: 356 mm thick.										
1.0		TILL: Clay, silty, some sand. Yellowish brown (10YR 5/6) to dark greyish brown (10YR 4/2). Oxidized. Moist. Very stiff. Massive. Coal chip, gravel, and silt pocket inclusions. Calcareous.		MW26		144	9.4					
2.0				MW27		144	15.5					Auger cuttings.
3.0												
4.0		MUDSTONE: Silt, clayey, some to trace sand. Pale Brown (10YR 6/3). Non-oxidized. Dry to moist. Very stiff to hard. Massive. Calcareous.		MW28		168	20.2					
5.0		NOTES: End of borehole at 4.57 m below surface. No seepage or sloughing encountered during drilling. Borehole backfilled to surface with auger cuttings.										
6.0												
7.0												
8.0												
9.0												
10.0												

FIELD BOREHOLE LOG

BOREHOLE NUMBER: BH105

PROJECT NUMBER: **USG1276**
PROJECT NAME: **Geotechnical Investigation**
LOCATION: **N.W. 1/4 of 15-42-25 W4, Ponoka County, Alberta**
CLIENT: **Eagle Builders LP**
DRILLING METHOD: **150 mm Solid Stem Auger**
LOGGED BY: **M.W.**
DATE BEGUN: **14 September, 2021**
DATE COMPLETED: **14 September, 2021**

CASING STICKUP: **N/A**
TOTAL DEPTH: **4.57 m**
GROUND SURFACE ELEVATION: **N/A**

Union Street Geotechnical

DEPTH (m)	LITHOLOGY	DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT "N"	POCKET PEN (kPa)	MOISTURE CONT. (%)	SULPHATE (%)	USC	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	WELL INSTALLATION
0.0		TOPSOIL: 305 mm thick.										
1.0		TILL: Clay, silty, sandy. Brown (10YR 4/3). Oxidized. Moist. Hard. Massive. Coal chip, gravel, and silt pocket inclusions. Calcareous.		MW29		215	11.4		CH	52.4	11.3	
2.0												Auger cuttings.
3.0		MUDSTONE: Silt, clayey, some to trace sand. Dark grey (10YR 4/1). Non-oxidized. Dry to moist. Stiff to hard. Massive. Calcareous.		MW30		96	24.1					
4.0				MW31		-	17.6					
5.0		NOTES: End of borehole at 4.57 m below surface. No seepage or sloughing encountered during drilling. Borehole backfilled to surface with auger cuttings.										
6.0												
7.0												
8.0												
9.0												
10.0												

FIELD BOREHOLE LOG

BOREHOLE NUMBER: BH106

PROJECT NUMBER: **USG1276**
PROJECT NAME: **Geotechnical Investigation**
LOCATION: **N.W. 1/4 of 15-42-25 W4, Ponoka County, Alberta**
CLIENT: **Eagle Builders LP**
DRILLING METHOD: **150 mm Solid Stem Auger**
LOGGED BY: **M.W.**
DATE BEGUN: **14 September, 2021**
DATE COMPLETED: **14 September, 2021**

CASING STICKUP: **N/A**
TOTAL DEPTH: **4.57 m**
GROUND SURFACE ELEVATION: **N/A**

Union Street Geotechnical

DEPTH (m)	LITHOLOGY	DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT "N"	POCKET PEN (kPa)	MOISTURE CONT. (%)	SULPHATE (%)	USC	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	WELL INSTALLATION
0.0		TOPSOIL: 305 mm thick.										
1.0		TILL: Clay, silty, sandy. Yellowish brown (10YR 5/6). Oxidized. Moist. Stiff to very stiff. Massive. Coal chip, gravel, and silt pocket inclusions. Calcareous.		MW32		96	12.6					
2.0		@ 0.76 m, sand seam, 0.30 m thick.		MW33		144	18.0					Auger cuttings.
3.0		MUDSTONE: Silt, clayey, some to trace sand. Very pale brown (10YR 7/4). Non-oxidized. Dry to moist. Hard. Massive. Calcareous.										
4.0				MW34		-	16.5					
5.0		NOTES: End of borehole at 4.57 m below surface. No seepage or sloughing encountered during drilling. Borehole backfilled to surface with auger cuttings.										
6.0												
7.0												
8.0												
9.0												
10.0												

FIELD BOREHOLE LOG

BOREHOLE NUMBER: BH107

PROJECT NUMBER: **USG1276**
PROJECT NAME: **Geotechnical Investigation**
LOCATION: **N.W. 1/4 of 15-42-25 W4, Ponoka County, Alberta**
CLIENT: **Eagle Builders LP**
DRILLING METHOD: **150 mm Solid Stem Auger**
LOGGED BY: **M.W.**
DATE BEGUN: **14 September, 2021**
DATE COMPLETED: **14 September, 2021**

CASING STICKUP: **N/A**
TOTAL DEPTH: **4.57 m**
GROUND SURFACE ELEVATION: **N/A**

Union Street Geotechnical

DEPTH (m)	LITHOLOGY	DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT "N"	POCKET PEN (kPa)	MOISTURE CONT. (%)	SULPHATE (%)	USC	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	WELL INSTALLATION
0.0		TOPSOIL: 305 mm thick.										
1.0		TILL: Clay, silty, sandy. Dark greyish brown (10YR 4/2). Oxidized. Moist. Hard. Massive. Coal chip, gravel, and silt pocket inclusions. Calcareous.		MW35		215	12.2		CI	40.1	13.0	
2.0		@ 1.52 m, sand, some clay, some silt.		MW36		48	19.2					Auger cuttings.
3.0		MUDSTONE: Silt, clayey, some to trace sand. Dark grey (10YR 4/1). Non-oxidized. Moist. Stiff to hard. Massive. Calcareous.										
4.0				MW37		96	16.6					
5.0		NOTES: End of borehole at 4.57 m below surface. No seepage or sloughing encountered during drilling. Borehole backfilled to surface with auger cuttings.										
6.0												
7.0												
8.0												
9.0												
10.0												

FIELD BOREHOLE LOG

BOREHOLE NUMBER: BH108

PROJECT NUMBER: **USG1276**
PROJECT NAME: **Geotechnical Investigation**
LOCATION: **N.W. 1/4 of 15-42-25 W4, Ponoka County, Alberta**
CLIENT: **Eagle Builders LP**
DRILLING METHOD: **150 mm Solid Stem Auger**
LOGGED BY: **M.W.**
DATE BEGUN: **14 September, 2021**
DATE COMPLETED: **14 September, 2021**

CASING STICKUP: **0.88 m**
TOTAL DEPTH: **9.14 m**
GROUND SURFACE ELEVATION: **N/A**

Union Street Geotechnical

DEPTH (m)	LITHOLOGY	DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT "N"	POCKET PEN (kPa)	MOISTURE CONT. (%)	SULPHATE (%)	USC	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	WELL INSTALLATION
0.0		TOPSOIL: 305 mm thick.										Cap.
1.0		TILL: Sand, some clay, some silt. Brownish yellow (10YR 6/8). Oxidized. Moist. Loose. Massive. Calcareous.		MW38		-	10.4					
2.0		MUDSTONE: Silt, clayey, some to trace sand. Light yellowish brown (10YR 6/4) to grey (10YR 5/1). Non-oxidized. Moist. Hard. Massive. Calcareous.		MW39		-	4.8					Solid 25 mm PVC casing.
4.0				MW40		-	12.9					
5.0				MW41		-	14.0					Auger cuttings.
6.0				MW42		-	16.2					
7.0				MW43		-	14.6					
8.0		NOTES: End of borehole at 9.14 m below surface. No seepage or sloughing encountered during drilling. Piezometer installed, annulus backfilled to surface with auger cuttings. Water level at 2.68 m below grade on 28 September, 2021.		MW44		-	12.0					Hand slotted 25 mm PVC.
9.0												
10.0												

FIELD BOREHOLE LOG

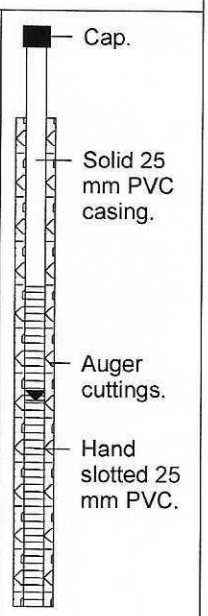
BOREHOLE NUMBER: BH109

PROJECT NUMBER: USG1276
PROJECT NAME: Geotechnical Investigation
LOCATION: N.W. 1/4 of 15-42-25 W4, Ponoka County, Alberta
CLIENT: Eagle Builders LP
DRILLING METHOD: 150 mm Solid Stem Auger
LOGGED BY: M.W.
DATE BEGUN: 14 September, 2021
DATE COMPLETED: 14 September, 2021

CASING STICKUP: 0.85 m
TOTAL DEPTH: 4.57 m
GROUND SURFACE ELEVATION: N/A

Union Street Geotechnical

DEPTH (m)	LITHOLOGY	DESCRIPTION	SAMPLE TYPE	SAMPLE No.	SPT "N"	POCKET PEN (kPa)	MOISTURE CONT. (%)	SULPHATE (%)	USC	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	WELL INSTALLATION
0.0		TOPSOIL: 305 mm thick.										
1.0		TILL: Sand, some clay, some silt. Yellowish brown (10YR 5/8). Oxidized. Moist. Compact. Massive. Calcareous.		MW45		-	15.1					
2.0				MW46		-	-					
				MW47		-	15.3					
3.0				MW48		-	24.5					
4.0		MUDSTONE: Clay, silty, trace sand. Dark grey (10YR 4/1). Non-oxidized. Moist. Hard. Massive. Calcareous.		MW49		-	13.4					
5.0		NOTES: End of borehole at 4.57 m below surface. No seepage or sloughing encountered during drilling. Piezometer installed, annulus backfilled to surface with auger cuttings. Water level at 2.63 m below grade on 28 September, 2021.										
6.0												
7.0												
8.0												
9.0												



Laboratory Test Results

Project Name:		Depth:	4.57 m
Project Number:	USG1276	Testing Company:	Union Street Geo.
Client:		Field Technician:	M.W.
Testhole:	BH102	Sample Date:	
Location:		Lab Technician:	B.B.
Sample Number:	MW6	Date Tested:	September 18, 2021

Flexible Wall Permeameter (ASTM D5084-10)

Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

Material and Test Description

Material Description:

Clay Till - silty, some sand, trace gravel, oxide inclusion, coal, alkalines, dark grey

Test Type:	Constant Head
Mould Size:	Flexible Wall
Sample Source:	Shelby Tube
Fluid Used:	Deaired Water
Fluid Reservoir:	Burrettes

Remoulding Details	
Max Dry Density (kg/m^3):	-
Proctor ID:	-
Percent Max (%):	-
Target Dry Density (kg/m^3):	-

Initial Sample Characteristics

Water Content	
Wet + Tare (g):	434.2
Dry + Tare (g):	379.1
Tare (g):	14.1
Water Content (%):	15.1%

Sample Size					
Trial	1	2	3	4	Average
Diameter (mm):	73.1	72.6	72.6	73.1	72.9
Length (mm):	79.4	79.3	79.2	79.4	79.3
Weight (g)	723.7				

Area (cm^2):	41.7
Volume (cm^3):	330.6
Wet Density (kg/m^3):	2189
Dry Density (kg/m^3):	1902

Specific Gravity (Note 2):	2.72
Void Ratio:	42.9%
Saturation:	95.6%
Porosity:	30.0%

Final Sample Characteristics

Water Content	
Wet + Tare (g):	748.5
Dry + Tare (g):	644.1
Tare (g):	13.1
Water Content (%):	16.5%

Sample Size					
Trial	1	2	3	4	Average
Diameter (mm):	73	73.2	73.1	73.7	73.3
Length (mm):	79.9	79.8	79.9	79.9	79.9
Weight (g)	735.6				

Area (cm^2):	42.1
Volume (cm^3):	336.6
Wet Density (kg/m^3):	2185
Dry Density (kg/m^3):	1875

Specific Gravity (Note 1):	2.72
Void Ratio:	44.9%
Saturation:	100.0%
Porosity:	31.0%

Note 1: Specific gravity for final sample characteristics calculation adjusted to result in 100.0% saturation.
Note 2: Specific gravity for initial sample characteristics calculation set equal to that of the final.

Project Name:		Depth:	4.57 m
Project Number:	USG1276	Testing Company:	Union Street Geo.
Client:		Field Technician:	M.W.
Testhole:	BH102	Sample Date:	
Location:		Lab Technician:	B.B.
Sample Number:	MW16	Date Tested:	September 18, 2021

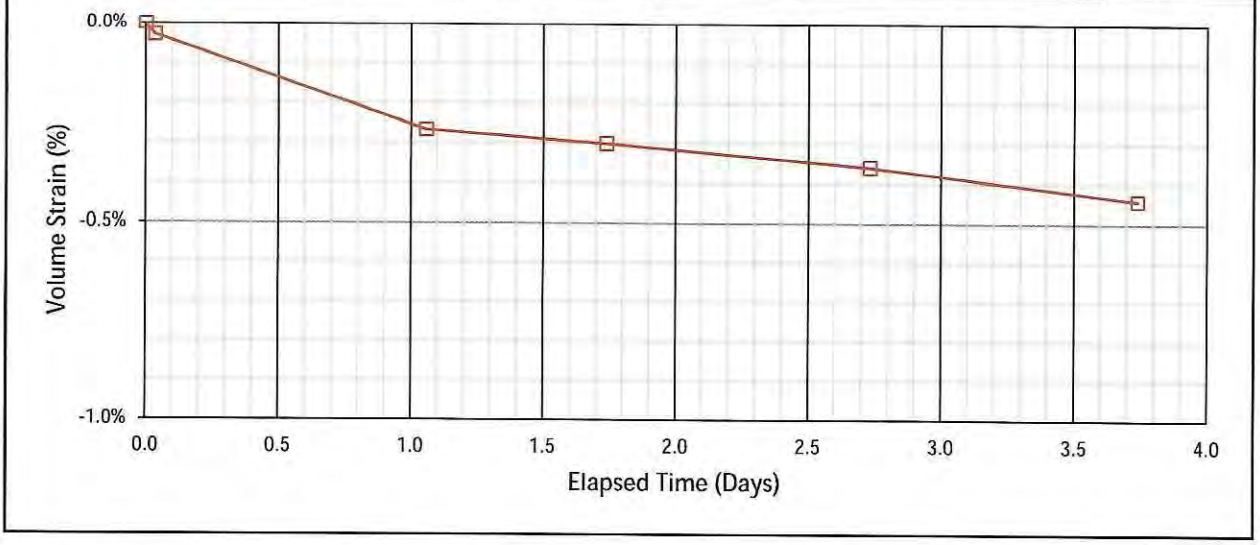
Flexible Wall Permeameter (ASTM D5084-10)

Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

Saturation Data

Cell Pressure (kPa):	160.0	Top Pressure (kPa):	130.0
Bottom Pressure (kPa):	130.0	Pressure Difference (kPa):	-

Date & Time	Elapsed Time (Days)	Room Temp (°C)	Top Burret (mL)	Bottom Burret (mL)	Cell (mL)	Total Vol. Change (mL)	Volume Strain (%)
9/18/21 14:09	0.00	21.0	3.1	3.2	11.9	0	0.00%
9/18/21 14:59	0.03	21.0	3.2	3.2	11.9	-0.10	-0.03%
9/19/21 15:34	1.06	21.0	3.8	4.1	11.2	-0.89	-0.27%
9/20/21 7:54	1.74	21.0	4.0	4.3	10.9	-1.00	-0.30%
9/21/21 7:47	2.73	21.0	4.1	4.5	10.8	-1.19	-0.36%
9/22/21 7:55	3.74	21.0	4.1	4.6	10.9	-1.46	-0.44%
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-



Project Name:		Depth:	4.57 m
Project Number:	USG1276	Testing Company:	Union Street Geo.
Client:		Field Technician:	M.W.
Testhole:	BH102	Sample Date:	
Location:		Lab Technician:	B.B.
Sample Number:	MW16	Date Tested:	September 18, 2021

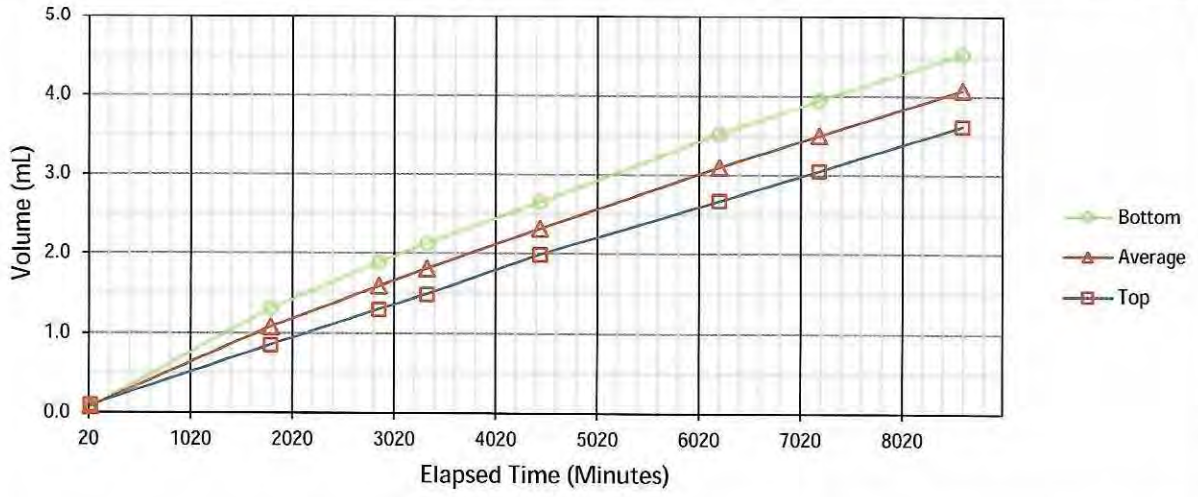
Flexible Wall Permeameter (ASTM D5084-10)

Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

Permeation Data

Cell Pressure (kPa):	160.0	Top Pressure (kPa):	120.0
Bottom Pressure (kPa):	140.0	Pressure Difference (kPa):	20.0

Date & Time	Elapsed Time (Minutes)	Room Temp (°C)	Top Burret (mL)	Bottom Burret (mL)	Top Vol. Change (mL)	Bottom Vol. Change (mL)	Average Vol. Change (mL)
9/22/21 8:02	0	21.0	9.78	0.11	0.00	0.00	0.00
9/22/21 8:39	37	21.0	9.68	0.18	0.10	0.07	0.08
9/23/21 14:07	1805	21.0	8.93	1.42	0.85	1.31	1.08
9/24/21 7:54	2872	21.0	8.48	1.99	1.30	1.88	1.59
9/24/21 15:44	3342	21.0	8.29	2.24	1.49	2.13	1.81
9/25/21 10:20	4458	21.0	7.79	2.76	1.99	2.65	2.32
9/26/21 15:44	6222	21.0	7.11	3.63	2.67	3.52	3.10
9/27/21 8:05	7203	21.0	6.73	4.06	3.05	3.95	3.50
9/28/21 7:28	8606	21.0	6.16	4.64	3.62	4.53	4.08
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-



Project Name:		Depth:	4.57 m
Project Number:	USG1276	Testing Company:	Union Street Geo.
Client:		Field Technician:	M.W.
Testhole:	BH102	Sample Date:	
Location:		Lab Technician:	B.B.
Sample Number:	MW16	Date Tested:	September 18, 2021

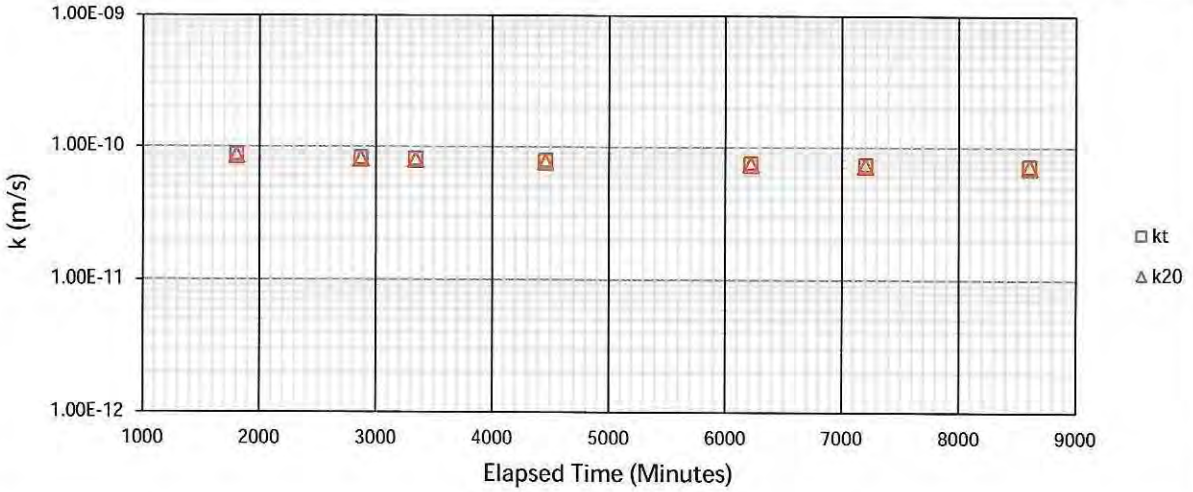
Flexible Wall Permeameter (ASTM D5084-10)

Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

Permeation Data

Head Difference (m):	2.0	Area of Sample (m^2)	4.191E-03
Length of Sample (m):	7.960E-02	Gradient, i	2.562E+01

Elapsed Time (Minutes)	Average Volume Change (mL)	Average Temperature (°C)	k_t (m/s)	R_T	k_{20} (m/s)
1805	1.08	21.0	8.734E-11	0.976	8.525E-11
2872	1.59	21.0	8.239E-11	0.976	8.041E-11
3342	1.81	21.0	8.100E-11	0.976	7.906E-11
4458	2.32	21.0	7.846E-11	0.976	7.658E-11
6222	3.10	21.0	7.553E-11	0.976	7.372E-11
7203	3.50	21.0	7.396E-11	0.976	7.218E-11
8606	4.08	21.0	7.226E-11	0.976	7.053E-11
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	AVERAGE	7.871E-11		7.682E-11



Project Name:		Depth:	3.05 m
Project Number:	USG1276	Testing Company:	Union Street Geo.
Client:		Field Technician:	M.W.
Testhole:	BH109	Sample Date:	
Location:		Lab Technician:	B.B.
Sample Number:	MW48	Date Tested:	September 18, 2021

Flexible Wall Permeameter (ASTM D5084-10)

Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

Material and Test Description

Material Description:
Sandy Clay

Test Type:	Constant Head
Mould Size:	Flexible Wall
Sample Source:	Shelby Tube
Fluid Used:	Deaired Water
Fluid Reservoir:	Burrettes

Remoulding Details	
Max Dry Density (kg/m^3):	-
Proctor ID:	-
Percent Max (%):	-
Target Dry Density (kg/m^3):	-

Initial Sample Characteristics

Water Content	
Wet + Tare (g):	607.6
Dry + Tare (g):	490.7
Tare (g):	14.0
Water Content (%):	24.5%

Sample Size					
Trial	1	2	3	4	Average
Diameter (mm):	73.4	73	72.9	72.8	73.0
Length (mm):	80.3	80.2	80.4	80	80.2
Weight (g)	651.3				

Area (cm^2):	41.9	Specific Gravity (Note 2):	2.68
Volume (cm^3):	336.0	Void Ratio:	72.4%
Wet Density (kg/m^3):	1938	Saturation:	90.9%
Dry Density (kg/m^3):	1557	Porosity:	42.0%

Final Sample Characteristics

Water Content	
Wet + Tare (g):	864.4
Dry + Tare (g):	732.4
Tare (g):	199.6
Water Content (%):	24.8%

Sample Size					
Trial	1	2	3	4	Average
Diameter (mm):	73.1	71.9	72.4	73.0	72.6
Length (mm):	80.2	80.1	80	80.2	80.1
Weight (g)	667.1				

Area (cm^2):	41.4	Specific Gravity (Note 1):	2.68
Volume (cm^3):	331.7	Void Ratio:	66.5%
Wet Density (kg/m^3):	2011	Saturation:	100.0%
Dry Density (kg/m^3):	1612	Porosity:	39.9%

Note 1: Specific gravity for final sample characteristics calculation adjusted to result in 100.0% saturation.
Note 2: Specific gravity for initial sample characteristics calculation set equal to that of the final.

Project Name:		Depth:	3.05 m
Project Number:	USG1276	Testing Company:	Union Street Geo.
Client:		Field Technician:	M.W.
Testhole:	BH109	Sample Date:	
Location:		Lab Technician:	B.B.
Sample Number:	MW48	Date Tested:	September 18, 2021

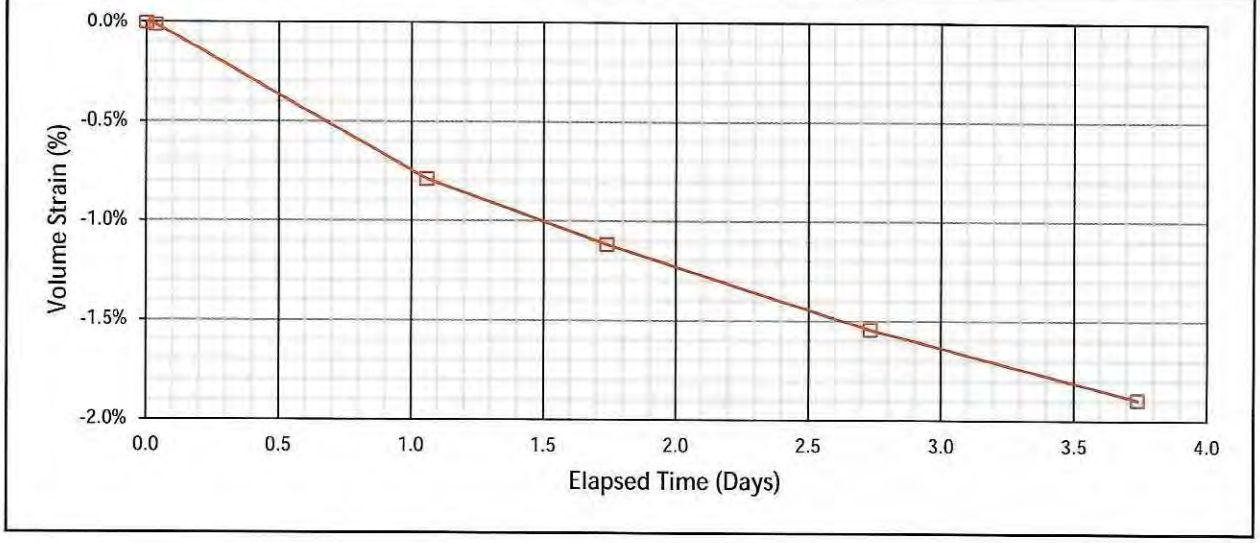
Flexible Wall Permeameter (ASTM D5084-10)

Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

Saturation Data

Cell Pressure (kPa):	160.0	Top Pressure (kPa):	130.0
Bottom Pressure (kPa):	130.0	Pressure Difference (kPa):	-

Date & Time	Elapsed Time (Days)	Room Temp (°C)	Top Burret (mL)	Bottom Burret (mL)	Cell (mL)	Total Vol. Change (mL)	Volume Strain (%)
9/18/21 14:08	0.00	21.0	3.4	3.4	11.9	0	0.00%
9/18/21 14:58	0.03	21.0	3.4	3.3	12.0	-0.04	-0.01%
9/19/21 15:33	1.06	21.0	3.3	3.3	14.8	-2.65	-0.79%
9/20/21 7:53	1.74	21.0	3.4	3.4	15.7	-3.76	-1.12%
9/21/21 7:46	2.73	21.0	3.5	3.6	16.8	-5.19	-1.54%
9/22/21 7:54	3.74	21.0	3.7	3.7	17.7	-6.36	-1.89%
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-



Project Name:		Depth:	3.05 m
Project Number:	USG1276	Testing Company:	Union Street Geo.
Client:		Field Technician:	M.W.
Testhole:	BH109	Sample Date:	
Location:		Lab Technician:	B.B.
Sample Number:	MW48	Date Tested:	September 18, 2021

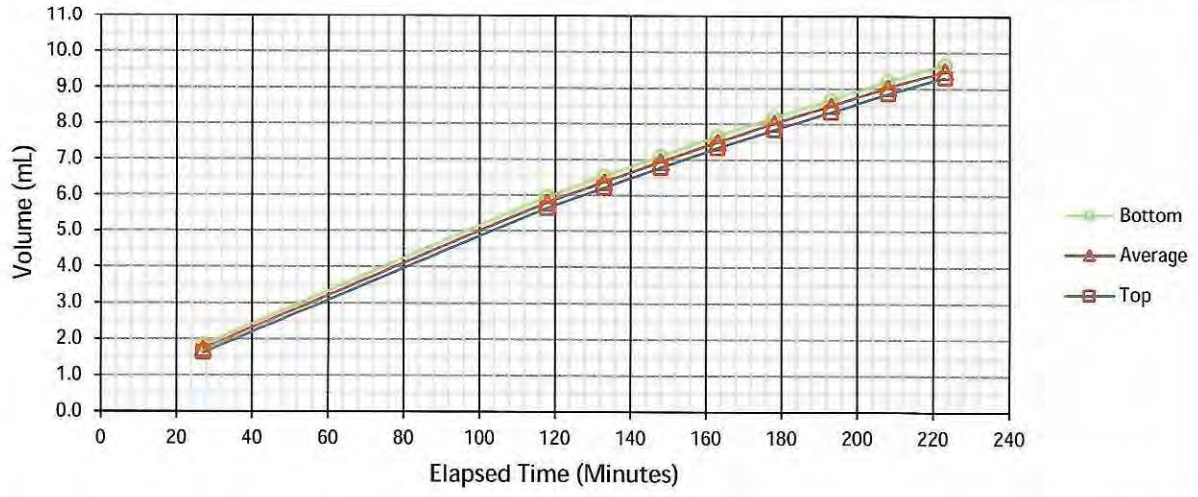
Flexible Wall Permeameter (ASTM D5084-10)

Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

Permeation Data

Cell Pressure (kPa):	160.0	Top Pressure (kPa):	120.0
Bottom Pressure (kPa):	140.0	Pressure Difference (kPa):	20.0

Date & Time	Elapsed Time (Minutes)	Room Temp (°C)	Top Burret (mL)	Bottom Burret (mL)	Top Vol. Change (mL)	Bottom Vol. Change (mL)	Average Vol. Change (mL)
9/22/21 7:59	0	21.0	9.77	0.10	0.00	0.00	0.00
9/22/21 8:26	27	21.0	8.14	1.94	1.63	1.84	1.74
9/22/21 9:57	118	21.0	4.13	6.06	5.64	5.96	5.80
9/22/21 10:12	133	21.0	3.55	6.64	6.22	6.54	6.38
9/22/21 10:27	148	21.0	2.99	7.20	6.78	7.10	6.94
9/22/21 10:42	163	21.0	2.45	7.75	7.32	7.65	7.49
9/22/21 10:57	178	21.0	1.94	8.28	7.83	8.18	8.01
9/22/21 11:12	193	21.0	1.44	8.78	8.33	8.68	8.51
9/22/21 11:27	208	21.0	0.92	9.31	8.85	9.21	9.03
9/22/21 11:42	223	21.0	0.47	9.77	9.30	9.67	9.49
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-



Project Name:		Depth:	3.05 m
Project Number:	USG1276	Testing Company:	Union Street Geo.
Client:		Field Technician:	M.W.
Testhole:	BH109	Sample Date:	
Location:		Lab Technician:	B.B.
Sample Number:	MW48	Date Tested:	September 18, 2021

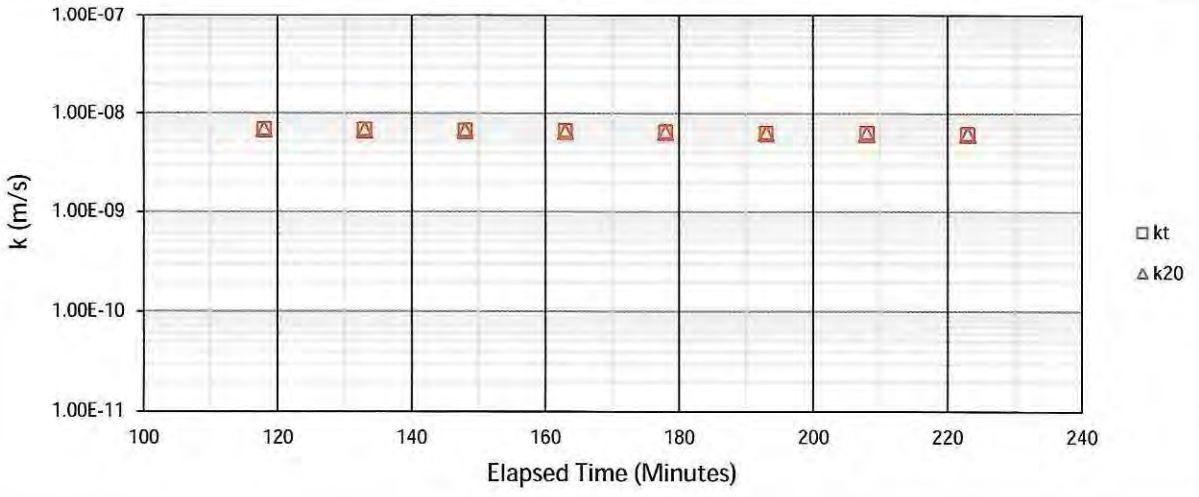
Flexible Wall Permeameter (ASTM D5084-10)

Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

Permeation Data

Head Difference (m):	2.0	Area of Sample (m^2)	4.164E-03
Length of Sample (m):	8.018E-02	Gradient, i	2.544E+01

Elapsed Time (Minutes)	Average Volume Change (mL)	Average Temperature (°C)	k_t (m/s)	R_T	k_{20} (m/s)
118	5.80	21.0	7.028E-09	0.976	6.860E-09
133	6.38	21.0	6.895E-09	0.976	6.729E-09
148	6.94	21.0	6.768E-09	0.976	6.606E-09
163	7.49	21.0	6.652E-09	0.976	6.493E-09
178	8.01	21.0	6.533E-09	0.976	6.376E-09
193	8.51	21.0	6.417E-09	0.976	6.263E-09
208	9.03	21.0	6.341E-09	0.976	6.189E-09
223	9.49	21.0	6.221E-09	0.976	6.072E-09
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	AVERAGE	6.607E-09		6.448E-09



Laboratory Hydrometer — Sample No.: MW07

Sample Information

Date: 14 Sept., 2021 **By:** M.W. **of:** USG **Type:** Pail / Bag

Location: BH101, 17.5' **Specification:** ASTM D 422

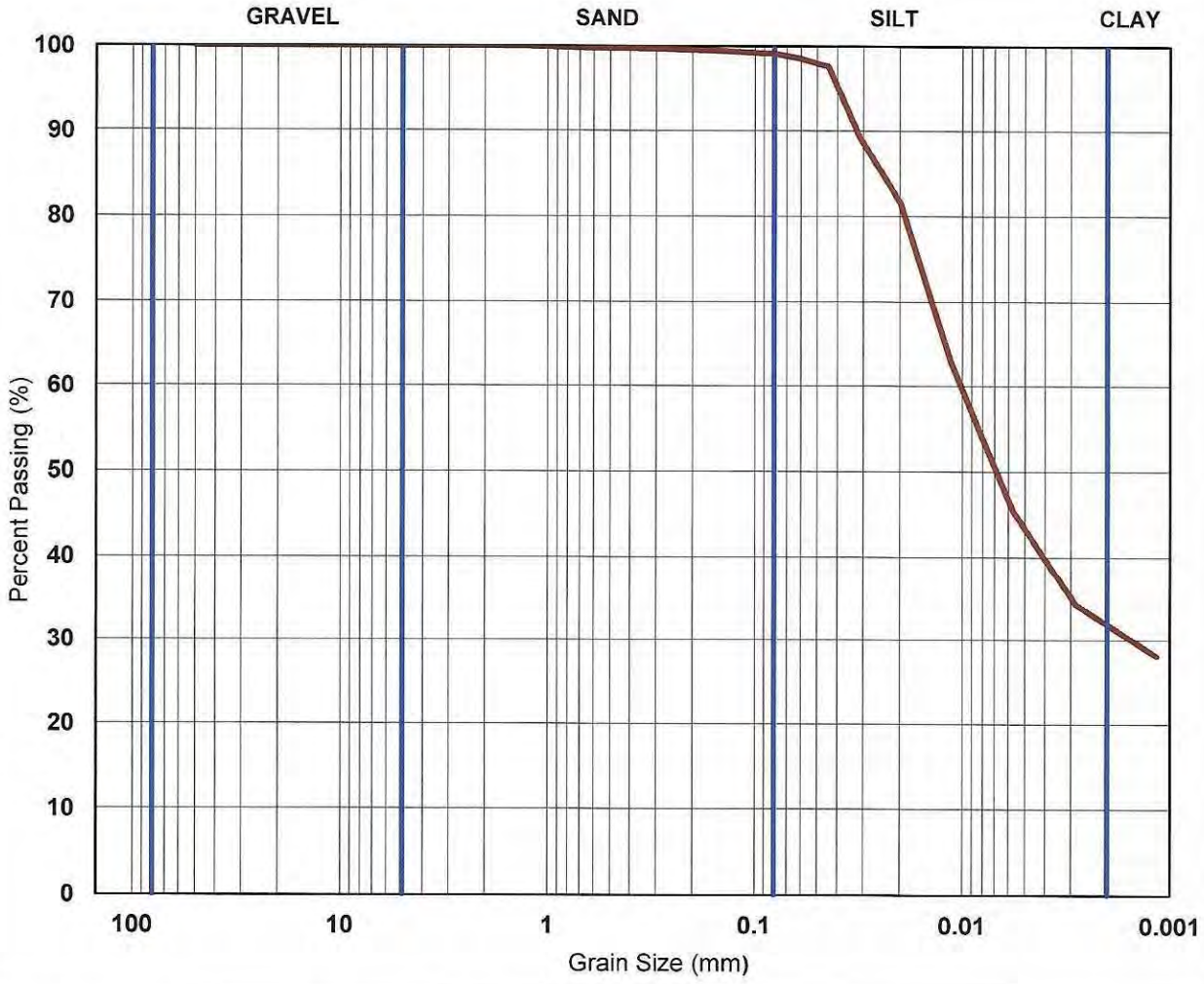
Description: Silt, clayey, sand inclusions.

Specifications: Laboratory Specifications as per ASTM D 422.

Comments:

Sieve Results:

By Type (%): Gravel = **0.0** Sand = **0.9** Silt = **67.9** Clay = **31.2**



Union Street Geotechnical

CLIENT: Eagle Builders LP **FILE No.:** USG1276

PROJECT: 2021 Geotech Investigation **DATE:** 17-Sep-21

LOCATION: Red Deer, Alberta **TECH:** E.G.

March 7, 2022

Jeff Froese
NRCB Approval Officer
Red Deer, AB
jeff.froese@nrcb.ca

RE: Eagle Builders – Double T Cattle Feedlot – Application RA21043 – NE 15-42-25 W4

Thank you for your email request on this file regarding the storage volume of the proposed irregular shape catch basin.

As shown in Figure 1, the Al-Terra engineering report lists a HWL volume of 9650m^3 at a liquid elevation of 864.0m.

Methodology

The chosen methodology to determine the storage volume is to "split" the irregular shape into two rectangular shapes, and calculate the volume for each shape (Figure 1):

1. Large, west rectangle. Dimensions would be:
    a. Length of 128.38m (at 864.5m)
    b. Width of 56.64m (at 864.5m)

2. Small, east rectangle. Dimensions would be:
    a. Length of 52.21m (108.85 – 56.64), (at 864.5m)
    b. Width of 21.99m (at 864.5m)

3. For both rectangles, common dimensions are:
    a. Top of berm 864.5m
    b. Liquid top 864.0m
    c. Pond bottom is 862.5m
    d. Freeboard depth is 0.5m
    e. Total volume (including freeboard) is calculated using a depth of 2.0m
    f. Usable volume (excluding freeboard) is calculated using a liquid depth of 1.5m
    g. Interior side slopes are 3:1 (horizontal to vertical)

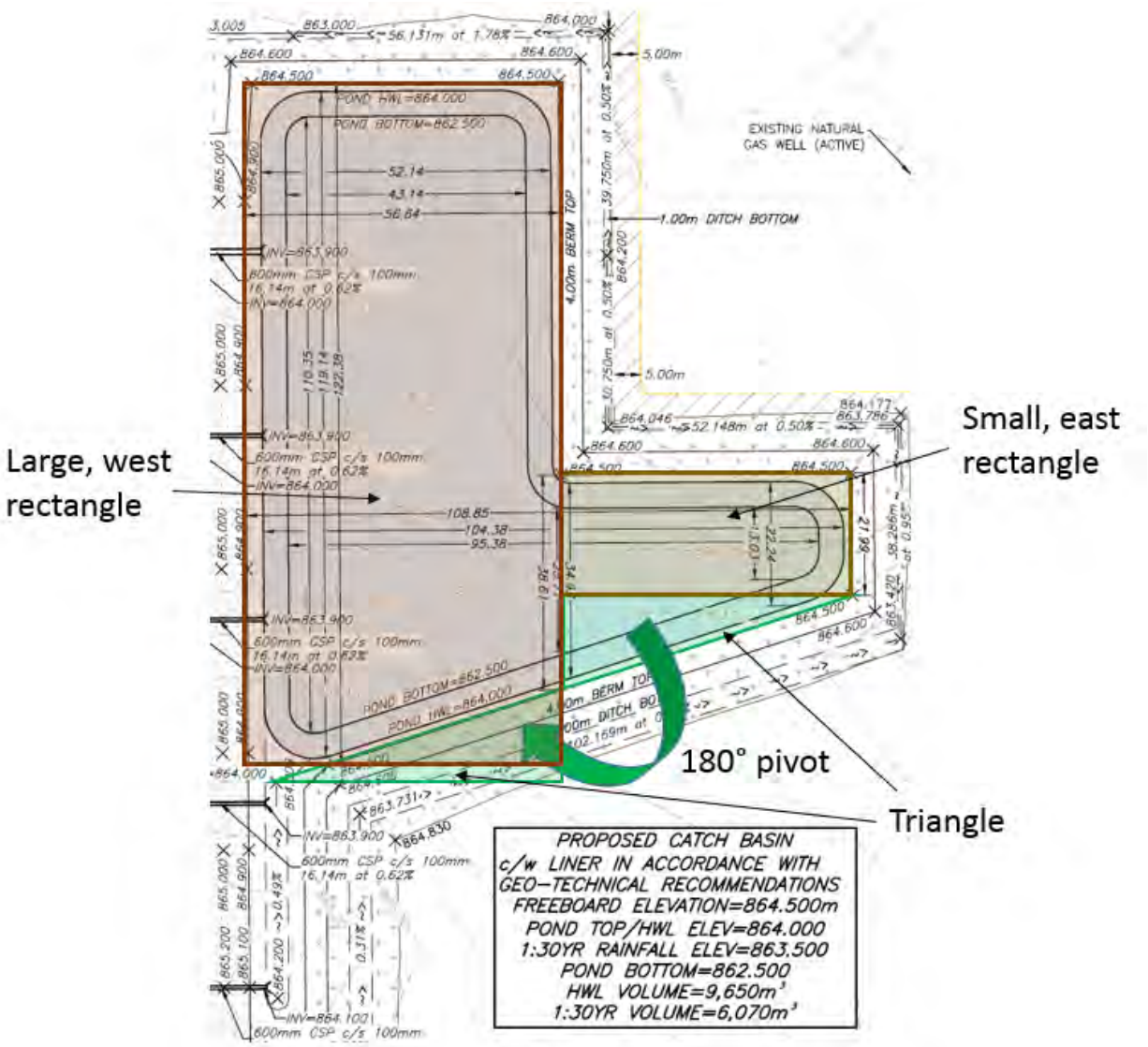


Figure 1. Irregular shape catch basin. Al-Terra Engineering (Red Deer) Ltd., Site Grading Plan Sheet C02. #5, 2022-02-23. Color shading and labels added.

<u>Assumptions</u>

Assumptions and their anticipated effects on the calculations:

- Rounded corners shown are calculated as “square”.
    - This would result in a catch basin volume calculation being slightly larger than the actual catch basin volume.
- Angled catch basin slope on the southeast is split in approximately half, at the intersection of a line that would extend south from the interior berm east top of the large, west rectangle. The triangle on the east side of this slope (and south of the small, east rectangle) would pivot 180 degrees, and be added to the south east corner of the large, west rectangle. “Moving” this portion of the irregular shape catch basin would result in the dimensions of the two rectangles listed.

    - As a portion of the triangle is shown beyond the dimensions of the large, west rectangle (Figure 1), this would result in a catch basin volume calculation being slightly smaller than the actual catch basin volume.
- Catch basin dimensions at west edge of entire catch basin are measured to gravel road (at 864.9m), rather than the catch basin top (at 864.5m) on the other sides.
    - This would result in a catch basin volume calculation slightly larger than the actual catch basin volume.
- Calculating the volume of two catch basins suggests that a "berm" (with 3:1 H to V side slopes) would be between them, when in fact the "berm" volume would be usable catch basin volume.
    - This would result in a catch basin volume calculation slightly smaller than the actual catch basin volume.

Calculations

Volume calculations of the rectangles were made using a calculator published by Alberta Agriculture, Food and Rural Economic Development (https://www.agric.gov.ab.ca/app19/loadcatchbasin)[1]. Results for 1.5m of liquid storage (liquid elevation of 864.0m) for the large, west rectangle and small, east rectangle are shown in Appendix A, and are:

1. Large, west rectangle volume = 8885 m^3 usable volume (excluding freeboard)
2. Small, east rectangle volume = 976 m^3 usable volume (excluding freeboard)
3. Total = 9861 m^3 usable volume (excluding freeboard)

Conclusion

Al-Terra provided a volume of 9650m^3 at a liquid elevation of 864.0m. The total usable volume (excluding freeboard) using the two rectangles method was calculated to be 9861 m^3. The slightly larger volume calculation associated with the two rectangles method is likely to be the net result of the four assumptions.

It is reasonable to use the Al-Terra volume of 9650m^3 as the usable volume (excluding freeboard) of the irregular shape catch basin.

If you have any questions, please contact me.

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[1] Runoff potential was calculated separately because too many assumptions would have been necessary to determine the portion of the feedlot draining to the large, west and small, east rectangles. Therefore, runoff potential calculations were not included in Appendix A.

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 Large, west rectangle

Land Location NE 15-42-25 W4

Estimating Runoff Potential

Area	Length (m)	Width (m)	Paved?	Area (m^2)
1			NO	
	Total Area			

Calculating Catch Basin Volume:

	Construction Dimensions	Storage Dimensions
Length (m):	128.	125.0
Width (m):	56.6	53.6
Depth (m):	2.0	1.5

Evacuation Capacity:

12370 m^3

436842 ft^3

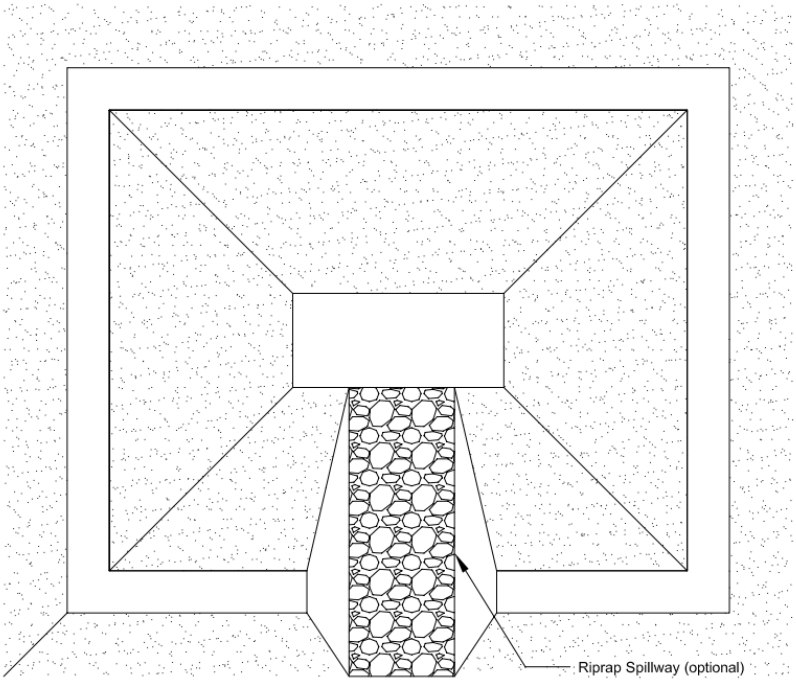
2721015 Imp. Gal

Catch basin volume (minus freeboard):

8885 m^3

313771 ft^3

1954427 Imp. Gal



Comparing Catch Basin Volume versus Runoff Potential:

Runoff potential: m^3

Catch basin volume: 8885 m^3

The catch basin dimensions meet the design requirements in AOPA

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 Small, east rectangle
Land Location NE 15-42-25 W4

Estimating Runoff Potential

Area	Length (m)	Width (m)	Paved?	Area (m^2)
1			NO	
	Total Area			

Calculating Catch Basin Volume:

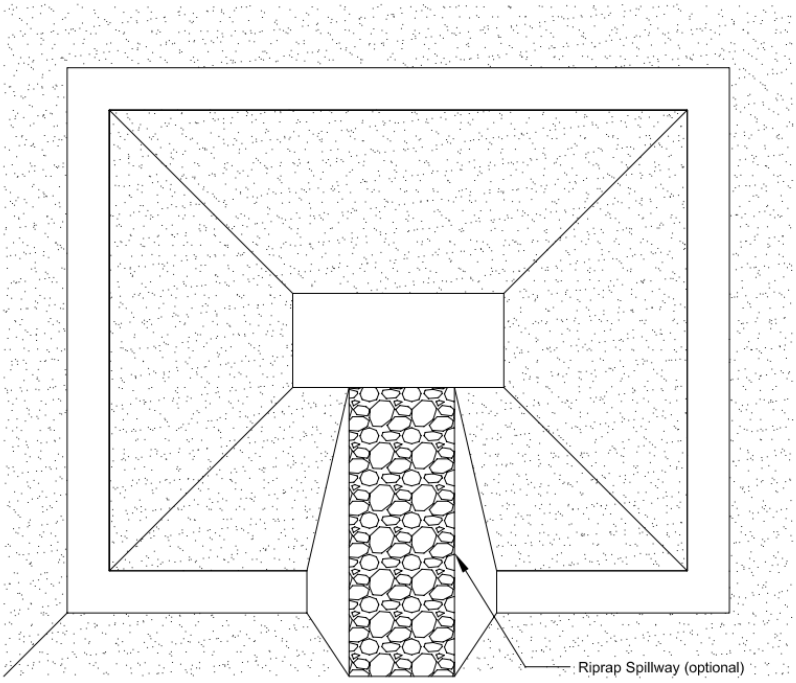
	Construction Dimensions	Storage Dimensions
Length (m):	52.2	49.2
Width (m):	21.9	18.9
Depth (m):	2.0	1.5

Evacuation Capacity:

1493 m^3
52725 ft^3
328415 Imp. Gal

Catch basin volume (minus freeboard):

976 m^3
34467 ft^3
214689 Imp. Gal



Comparing Catch Basin Volume versus Runoff Potential:

Runoff potential: m^3
Catch basin volume: 976 m^3

The catch basin dimensions meet the design requirements in AOPA

Manure Spreading Agreement

This agreement is between _____Morris Thalen_____, manure producer, and

_____Morsan Farms_____ Manure receiver.

Length of agreement: This agreement is valid for a time period of _____3 years_____ (minimum of three years)

Legal land location	Soil type[1]	Acres suitable for manure spreading[2]
N 20-42-25-W4	Black	230 acres

[1] Soil type choices: Dark brown and brown, Grey wooded, Black, Irrigated.

[2] Land within required setbacks from water bodies, water wells, residences, etc. is not to be included.

Other comments:

Manure producer (confined Feeding Operation) Legal Land Location 15-15-42-25-W4

Date of signing	Signature	Print name	Corporate name(if appl)
December 17 2021		Jon Thalen	DOUBLE T

Manure Receiver – Landowner(s)[3]

Date of signing	Signature	Print name	Corporate name(if appl)
December 17 2021		Morris Thalen	MORSAN FARMS

[3] All registered owners of land, or authorized signing authorities must sign.