



AGENDA

Council Meeting

9:30 AM - Thursday, September 15, 2022
Council Chambers

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	A. CALL TO ORDER	
	B. ADOPTION OF AGENDA	
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4 - 11	1. <u>County Council Meeting Minutes</u> <u>Council Meeting - 01 Sep 2022 - Minutes</u>	
	D. SUBDIVISION APPLICATIONS	
	E. PUBLIC HEARINGS	
	F. DELEGATIONS	
	1. <u>9:30 a.m. - Mike Warkentin - Lethbridge & District Exhibition</u>	
	2. <u>10:00 a.m. - Sgt. Mike Numan - RCMP Quarterly Update</u>	
	G. DEPARTMENT REPORTS	
	G.1. COMMUNITY SERVICES	
12 - 23	G.1.1. <u>Animal Control Bylaw Review</u> <u>Animal Control Bylaw Review</u>	
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347 - 369	G.1.3. <u>Bylaw 22-012 - Re-designate a portion of NE/NW 12-9-19-W4 from Rural Agriculture to Rural Recreation- Third Reading</u>	

[Bylaw 22-012 - Re-designate Portions of the NE/NW 12-9-19-W4 from RA to RR -Third Reading](#)

- 370 - 372 G.1.4. **Alberta Development Officers Week - September 18-24**
[Alberta Development Officers Week September 18-24, 2022](#)

G.2. MUNICIPAL SERVICES

- 373 - 386 G.2.1. **Agricultural Service Board Bylaw 22-017 and Terms of Reference**
[Agricultural Service Board Bylaw 22-017 & Terms of Reference](#)

- 387 - 388 G.2.2. **South Region Agricultural Service Board Conference in Crowsnest Pass & 2023 Agriculture Service Board Conference in Grand Prairie**
[South Region Agricultural Service Board Conference in Crowsnest Pass & 2023 Agricultural Service Board Conference in Grande Prairie](#)

G.3. CORPORATE SERVICES

G.4. ADMINISTRATION

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H. CORRESPONDENCE

- 389 1. **Picture Butte High School**
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I. COUNTY COUNCIL AND COMMITTEE UPDATES

- 390 - 393 1. **Lethbridge County Council Attendance Update - August 2022**
[Lethbridge County Council Attendance Update - August 2022](#)

J. NEW BUSINESS

K. CLOSED SESSION

1. **Water Discussion - (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party & Section 21 - Disclosure Harmful to Intergovernmental Relations)**
2. **Purchase of Water License - (FOIP Section 25 - Disclosure Harmful to Economic and Other Interests of a Public Body)**
3. **Road Discussion - (FOIP Section 27 - Privileged Information)**

L. ADJOURN



MINUTES
Council Meeting
9:30 AM - Thursday, September 1, 2022
Council Chambers

The Council Meeting of Lethbridge County was called to order on Thursday, September 1, 2022, at 9:30 AM, in the Council Chambers, with the following members present:

PRESENT: Reeve Tory Campbell
Deputy Reeve Klaas VanderVeen
Councillor Lorne Hickey
Councillor Mark Sayers
Councillor John Kuerbis
Councillor Eric Van Essen
Councillor Morris Zeinstra
Director of Community Services, Larry Randle
Director of Public Operations, Jeremy Wickson
Infrastructure Manager, Devon Thiele
Manager of Finance & Administration, Jennifer Place
Executive Assistant, Candice Robison
Supervisor of Planning & Development, Hilary Janzen
Senior Planner, Steve Harty

A. CALL TO ORDER

Reeve Tory Campbell called the meeting to order at 9:30 a.m.

Reeve Campbell thanked Exhibition Park for including the County in their Whoop Up Days pancake breakfast and thanked Council and staff who participated.

Reeve Campbell thanked the City of Lethbridge Council and Staff for hosting the Mayor's Community BBQ Event following the Whoop Up Days Parade.

Reeve Campbell acknowledged the Coaldale Food Grains Harvest and the Picture Butte Food Grains BBQ.

B. ADOPTION OF AGENDA

201-2022	Deputy Reeve VanderVeen	MOVED that the September 1, 2022 Lethbridge County Council Meeting Agenda be approved as amended.	CARRIED
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C. ADOPTION OF MINUTES

C.1. County Council Meeting Minutes

202-2022	Councillor Sayers	MOVED that the August 4, 2022 Lethbridge County Council Meeting Minutes be approved as presented.	CARRIED
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D. SUBDIVISION APPLICATIONS

**D.1. Subdivision Application #2022-0-120 – Gilmar Crane Service
- Lot 1, Plan 8211420 within NW1/4 3-9-21-W4M**

203-2022 Councillor MOVED that the Industrial subdivision of Lot 1, Plan 8211420 within
Kuerbis NW1/4 3-9-21-W4M (Certificate of Title No. 091 110 270), to subdivide
a 5.01-acre (2.03 ha) parcel to create titles 2.65 & 2.37 acres (1.07 &
0.96 ha) each respectively in size, for industrial use; BE APPROVED
subject to the following:

CONDITIONS:

1. That, pursuant to Section 654(1)(d) of the Municipal Government Act, all outstanding property taxes shall be paid to Lethbridge County.
2. That, pursuant to Section 655(1)(b) of the Municipal Government Act, the applicant or owner or both enter into and comply with a Development Agreement with Lethbridge County which shall be registered concurrently with the final plan against the title(s) being created. The applicant is responsible for payment of any applicable servicing and off-site levy fees payments, applicable to their acreage share, including City of Lethbridge fees if applicable which may be addressed through the terms of the Development Agreement.
3. The applicant must remove the small shed so there is no encroachment over the new shared property line, to the satisfaction of the Subdivision Authority, prior to final endorsement.
4. That the applicant submits a final plan as prepared by an Alberta Land Surveyor that certifies the exact location and dimensions of the parcels being subdivided, as approved.
5. That any easement(s) as required by utility companies or the municipality shall be established.

CARRIED

F. DEPARTMENT REPORTS

F.1. COMMUNITY SERVICES

F.1.1. Bylaw 22-013 - Re-designate Plan 0011814 Lot 17 in the SW 6 10-21-W4 from Rural Urban Fringe to Grouped Country Residential- First Reading

204-2022 Councillor MOVED that Bylaw 22-013 be read a first time.
Hickey

CARRIED

F.1.2. Bylaw 22-014 - Re-designate a portion of Plan 1012154 Block 5 Lot 1 in the SE 6 10-20-W4 from Rural Agriculture to Grouped Country Residential- First Reading

205-2022 Councillor MOVED that Bylaw 22-014 be read a first time.
Kuerbis

CARRIED

F.1.3. April-June 2022 Community Peace Officer Report

David Entz presented the April - June 2022 Community Peace Officer Report to Council.

Reeve Campbell recessed the meeting at 9:55 a.m.

Reeve Campbell reconvened the meeting at 10:00 a.m.

E. PUBLIC HEARINGS - 10:00 A.M.

E.1. Bylaw 22-012 - Re-designate portion of NE/NW 12-9-19-W4 from Rural Agriculture to Rural Recreation- Public Hearing

Reeve Campbell called a recess to the Council Meeting, for the Public Hearing for Bylaw 22-012 at 10:01 a.m.

206-2022	Deputy Reeve VanderVeen	MOVED that the Public Hearing for Bylaw 22-012 commence at 10:02 a.m.	CARRIED
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Reeve Campbell asked if anyone from the public wished to speak in favour or opposition of Bylaw 22-012.

The Applicants, Nelson and Benson Porter spoke in favour of Bylaw 22-012.

Dave Davies, Mel Vaselenak, Brian Ober, Keith Duncan, Benny Martens, Barry Leith, David Croy, Richard Wilson, Cindy Nirose and Willemina Heyboer spoke in opposition of Bylaw 22-012. Concerns included: condition of the road infrastructure, dust, speed, parking, noise, enforcement issues and safety.

207-2022	Councillor Hickey	MOVED that the Public Hearing for Bylaw 22-012 adjourn at 11:00 a.m.	CARRIED
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208-2022	Councillor Kuerbis	MOVED that Bylaw 22-012 be read a second time.	CARRIED
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209-2022	Councillor Sayers	MOVED to postpone third reading of Bylaw 22-012 to the September 15, 2022 Council Meeting.	CARRIED
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210-2022	Councillor Van Essen	MOVED to direct administration to bring back information to the September 15 Council meeting regarding Twp 9-2 infrastructure to the Stafford Reservoir.	CARRIED
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Reeve Campbell recessed the meeting at 11:22 a.m.

Reeve Campbell reconvened the meeting at 11:33 a.m.

G. DELEGATIONS

G.1. Link Pathway Project - Phase 1 Approval Request

11:00 a.m. Peter Casurella – Link Pathway Society

Peter Casurella and Kim Welby were present from the Link Pathway Society to provide information to Council on Phase 1 of the Link Pathway.

211-2022	Deputy Reeve VanderVeen	MOVED that the September 17, 2020 Council resolution regarding the Link Pathway be amended to read as follows: Whereas, Lethbridge County Council supports in principle, the creation of a regional pathway through the municipality that may eventually link the Town of Coaldale and the City of Lethbridge, but in order to minimize risk to the County, several conditions must first
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be met by the Link Pathway Society before Council will give its final approval for Phase 1 of the project and for Phase 2 at some time in the future; therefore, be it

Resolved, that written agreements with all landowners, including the SMRID, granting permission for the pathway to run through their property along the Phase 1 route and for Phase 2 at some time in the future, must be completed; and be it

Resolved, that written confirmation from the City of Lethbridge that they are committed to constructing the pathway that will connect with the city pathway network, must be provided before approval of Phase 2 can be considered; and be it

Resolved, that all roadway crossings be engineered and constructed to the satisfaction of the County before the pathway is open for public use; and be it

Resolved, that written permission from CP Rail must be given for the pathway to cross the railway before approval of Phase 2 can be considered; and be it

Resolved, that written permission from Alberta Transportation must be given for the pathway to cross their property before approval of Phase 2 can be considered; and be it

Resolved, that the County be thoroughly involved throughout the planning and development phase of the pathway; and be it

Resolved, a Memorandum of Understanding between Lethbridge County, SMRID and LINK Pathway Society be completed for Phase 1 and for Phase 2 at some time in the future, and be it

Resolved, that once these conditions have been fulfilled for Phase 1, Lethbridge County will consider approving construction of Phase 1 of the pathway through the County from the Town of Coaldale to its terminus on the north side of Highway 512, and be it

Resolved, that once the conditions have been fulfilled for Phase 2, Lethbridge County will consider approving construction of Phase 2 of the pathway through the County from its terminus on the north side of Highway 512 to the City of Lethbridge.

CARRIED

212-2022	Deputy Reeve VanderVeen	MOVED that Lethbridge County Council approves the Memorandum of Understanding between the Saint Mary River Irrigation District, the Link Pathway Society, and further, that Lethbridge County hereby authorizes the construction of Phase 1 of the Link Pathway.
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CARRIED

Reeve Campbell recessed the meeting at 12:02 p.m.

Reeve Campbell reconvened the meeting at 12:31 p.m.

F. DEPARTMENT REPORTS

F.1. COMMUNITY SERVICES

F.1.4. Fire Service Response Fees Waiver Request

211-2022 Deputy Reeve VanderVeen MOVED that County Council denies the request to waive the Fire Services Fees in the amount of \$3,508 for invoice #12281. CARRIED

F.1.5. Iron Springs Parade - September 10 - Verbal Report

The Iron Springs Parade being held on September 10 was discussed.

F.2. CORPORATE SERVICES

F.2.1. Quarterly Financial Report - May - July 2022

Jennifer Place, Manager of Finance and Administration presented the Quarterly Financial Report May - July 2022 to Council.

F.2.2. 2022 Business Tax Adjustments

213-2022 Deputy Reeve VanderVeen MOVED that County Council approved the 2022 Business Tax adjustment requests as presented in the total amount of \$1,772.50. CARRIED

F.2.3. Tax Penalty Waiver Request

214-2022 Councillor Kuerbis MOVED that County Council not waive tax penalties in the amount of \$304.53 as requested for tax roll 37620404. CARRIED

F.2.4. 2023 Budget Presentation Schedule

215-2022 Deputy Reeve VanderVeen MOVED that County Council approve the 2023 Budget Presentation Schedule as presented. CARRIED

F.3. MUNICIPAL SERVICES

F.4. ADMINISTRATION

F.5. INFRASTRUCTURE

H. CORRESPONDENCE

Correspondence Items H.1 - H.4 were reviewed.

H.1. Town of Tofield - Victim Services Redesign

H.2. Vulcan County - Transition to Ambulance Service Provider Contract

H.3. National Police Federation - Keep the Alberta RCMP

H.4. Minister of Seniors and Housing

I. **COUNTY COUNCIL AND COMMITTEE UPDATES**

I.1. **Lethbridge County Council Attendance Update - July 2022**

Council reviewed the highlights from the Lethbridge County Council Attendance Update for July 2022.

Division 1

Councillor Lorne Hickey

July 7	Lethbridge County Council Meeting
July 14	Lethbridge County Special Council Meeting
July 14	Council/CAO Economic Development Discussion
July 19	Lethbridge County/City of Lethbridge Intermunicipal Committee

Division 2

Reeve Tory Campbell

July 1	City of Lethbridge Canada Day Event at Henderson Park
July 14	Lethbridge County Special Council Meeting
July 14	Council/CAO Economic Development Discussion
July 15	CAO/Reeve Meeting
July 15	Meeting with MP Rachael Thomas
July 16	Nobleford Parade
July 19	Lethbridge County/City of Lethbridge Intermunicipal Committee
July 21	Team Lethbridge Planning Meeting

Division 3

Councillor Mark Sayers

July 7	Lethbridge County Council Meeting
July 14	Lethbridge County Special Council Meeting
July 14	Council/CAO Economic Development Discussion

Division 4

Councillor John Kuerbis

July 7	Lethbridge County Council Meeting
July 14	Lethbridge County Special Council Meeting

Division 5

Councillor Eric Van Essen

July 7	Lethbridge County Council Meeting
July 14	Lethbridge County Special Council Meeting
July 14	Council/CAO Economic Development Discussion
July 16	Nobleford Parade

Division 6

Deputy Reeve Klaas VanderVeen

July 7	Lethbridge County Council Meeting
July 14	Lethbridge County Special Council Meeting
July 14	Council/CAO Economic Development Discussion
July 22	SAEWA Board Meeting

Division 7
Councillor Morris Zeinstra

July 7 Lethbridge County Council Meeting
July 14 Lethbridge County Special Council Meeting
July 14 Council/CAO Economic Development Discussion
July 16 Nobleford Parade

J. NEW BUSINESS

K. CLOSED SESSION

K.1. Proposed Regional Economic Development Initiative - Follow-up Report (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party and Section 25 - Disclosure Harmful to Economic and Other Interests of a Public Body)

K.2. Waterline Discussion (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party and Section 21 - Disclosure Harmful to Intergovernmental Relations)

216-2022 Councillor MOVED that the Lethbridge County Council Meeting move into
Hickey Closed Session, pursuant to Section 197 of the *Municipal Government Act*, the time being 1:13 p.m. for the discussion on the following:

K.1. Proposed Regional Economic Development Initiative - Follow-up Report (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party and Section 25 - Disclosure Harmful to Economic and Other Interests of a Public Body)

K.2. - Waterline Discussion (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party and Section 21 - Disclosure Harmful to Intergovernmental Relations)

Present during the Closed Session:
Lethbridge County Council
Senior Management
Administrative Staff
CARRIED

217-2022 Councillor MOVED that the Lethbridge County Council Meeting move out of the
Kuerbis closed session at 2:35 p.m.

CARRIED

K.2. Waterline Discussion (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party and Section 21 - Disclosure Harmful to Intergovernmental Relations)

218-2022 Councillor MOVED that the letter reviewed during the September 1st closed
Kuerbis meeting regarding the waterline be sent under the Reeve's signature to Lethbridge City Council.

CARRIED

K.1. 1:30 PM - Proposed Regional Economic Development Initiative (FOIP Section 16 - Disclosure Harmful to Business Interests of a Third Party and Section 25 - Disclosure Harmful to Economic and Other Interests of a Public Body)

219-2022 Deputy MOVED that Lethbridge County commits financial resources and
Reeve pursues entering into a partnership with a third party for a proposed
VanderVeen solar energy project.

CARRIED

E. **ADJOURN**

220-2022	Councillor Sayers	MOVED that the Lethbridge County Council Meeting adjourn at 2:38 p.m.	CARRIED
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Reeve

CAO

AGENDA ITEM REPORT



Title: Animal Control Bylaw Review
Meeting: Council Meeting - 15 Sep 2022
Department: Community Services
Report Author: Larry Randle

APPROVAL(S):

Ann Mitchell, Chief Administrative Officer,

Approved - 01 Sep 2022

STRATEGIC ALIGNMENT:



Governance



Relationships



Region



Prosperity

EXECUTIVE SUMMARY:

At the July 7, 2022 council meeting, administration was given informal direction to report back to council on Animal Control Bylaw No. 17-008 (attached).

RECOMMENDATION:

Option 1. Maintain status quo and do not amend the current animal control bylaw or create a new animal control bylaw applicable to hamlets only.

REASON(S) FOR RECOMMENDATION(S):

The nature of the county is that it is a mostly rural, agricultural municipality. Consequently, when people have a large enough land mass even within the boundaries of a hamlet, some may feel that they should be able to keep a limited number of farm animals.

PREVIOUS COUNCIL DIRECTION / POLICY:

Animal Control Bylaw No. 17-008 was adopted in January, 2018 as a way of establishing regulations for the keeping of fur-bearing animals, fowl and livestock on residential properties and small lots, while prohibiting them altogether in hamlets. The bylaw does not apply to cats and dogs.

BACKGROUND INFORMATION:

The Animal Control Bylaw has been in place since January, 2018. The need for the bylaw was largely driven by an increasing number of residential property owners keeping higher than acceptable numbers of farm animals on their properties, much to the chagrin of their neighbours. Prior to the adoption of the bylaw, county administration was hard-pressed to find the authority to regulate the number of animals that could be kept on residential properties.

The bylaw prohibits the keeping of any fur-bearing animals, fowl or livestock on any property within a hamlet. The bylaw permits, but regulates the keeping of animals on residential properties outside a

hamlet. In 2022 when the county enforced the bylaw on a property owner who had some cows on their property inside of a hamlet, the owner came forward to council as a delegation and asked for a review of the bylaw.

It is important to note that the bylaw does permit horses in hamlets on parcels two acres or larger, in accordance with the permitted animal units per parcel-size regulations. This may be due to the fact that horses are generally kept more as pets rather than food sources.

The largest single parcel in a county hamlet is 21 acres. If the current animal control bylaw regulations were applied to this parcel, it would allow 24 animal units (i.e. 24 cows, 1200 broiler chickens, 63 sheep or goats, etc.) on the property - excessive for a hamlet. The attached animal control comparisons sheet shows how some other municipalities in the region regulate the keeping of animals on municipal properties.

ALTERNATIVES / PROS / CONS:

Option 1. Maintain status quo.

Pros: Preserves the current animal control bylaw which has been administered and applied with relatively few issues since it was approved in 2018.

Cons: Prohibits the keeping of non-domestic animals on any land parcels that are located within hamlet boundaries.

Option 2: Amend the current animal control bylaw so that it would allow for the keeping of animals in hamlets in a manner that mirrors the regulations for the keeping of animals on residential properties not located in a hamlet, with or without a permitting system.

Pros:

- Preserves the current animal control bylaw but expands it to include hamlets.
- Regulates the keeping of animals in hamlets and on all other properties in the county in a consistent manner.

Cons:

- May not be well accepted by hamlet residents who prefer a more residential feel to their neighbourhoods.
- Would allow for a relatively high number of animals on larger parcels located in hamlets which would almost surely create conflicts with nearby smaller-lot, residential property owners.

Option 3. Establish a new bylaw that would allow for the keeping of non-domestic animals in hamlets if certain criteria were met. This could include a permitting system to allow for closer regulation of the keeping of animals in hamlets and to facilitate easier enforcement measures in cases where violations occur.

Pros: Provides some flexibility for county residents who own parcels in hamlets that are larger than typical residential-size lots and who would like to keep a few animals.

Cons: May create problems for hamlet residents who prefer a more residential feel to their neighbourhoods.

FINANCIAL IMPACT:

No direct financial impacts have been identified.

LEVEL OF PUBLIC PARTICIPATION:



Inform



Consult



Involve



Collaborate



Empower

ATTACHMENTS:

[Bylaw 17-008 - Animal Control](#)

[Animal Control Comparisons](#)

LETHBRIDGE COUNTY
IN THE PROVINCE OF ALBERTA

Bylaw No. 17-008

Whereas, the Municipal Government Act, R.S.A. 2000, c. M-26 as amended authorizes Council to pass Bylaws regulating and controlling wild and domestic animals and activities relating to them; and

Whereas the *Municipal Government Act*, R.S.A. 2000, c. M -26 and amendments thereto, allows a municipality to impose fines and penalties for infractions of the Bylaw; and

Whereas it is desirable and in the best interest of the public to pass a Bylaw to regulate and provide the controls for Animals within the municipal boundaries of Lethbridge County by way of an Animal Control Bylaw. This Bylaw does not include Dogs, as they are covered in Bylaw 1405 *Dog Regulation and Control Bylaw*. Cats are not controlled within Lethbridge County.

1. Title

This Bylaw 17-008 may be cited as the "Animal Control Bylaw".

2. Definitions

For the purpose of this Bylaw 17-008 the following terms shall have the corresponding meaning:

- a. "Animal" means any live non-human vertebrate or invertebrate, including bird or reptile, without limiting the generality of the foregoing, includes domestic animals, an animal raised for commercial purposes, an animal kept as a working animal, a pet or for hobby purposes such as breeding, showing, or sporting, fowl, an exotic animal, livestock, pigeons, reptiles and wild animals.
- b. "County" means the municipal corporation of Lethbridge County or the area within the boundaries of Lethbridge County as the context requires.
- c. "Damage to Public or Private Property" shall include any harm done to public or private property
- d. "Domestic Animal" shall mean any domestic male or female dog or cat.
- e. "Enforcement Officer" means any person appointed by Lethbridge County to carry out the provisions of this Bylaw; Animal Control Officer, Bylaw Enforcement Officer or Community Peace Officer.
- f. "Hamlet" means any land designated hamlet within Lethbridge County's jurisdiction (Monarch, Kipp, Diamond City, Shaughnessy, Iron Springs, Turin, Chin, Fairview)
- g. "Nuisance" means any Animal, which by reason of:
 - i. Accumulation of waste;
 - ii. Accumulation of material contaminated by waste;
 - iii. Disposal of waste;
 - iv. Disposal of material contaminated by waste;
 - v. Trespass upon property;
 - vi. Threat to public safety; or
 - vii. Noise,

Which is in the opinion of the Enforcement Officer, and having regard for all circumstances, injurious or obnoxious or likely to unreasonably injure, endanger, or detract from the comfort, repose, health, peace, or safety of persons or property within the boundary of the County.

- h. "Multi Parcel Subdivision" means a subdivision greater than three (3) adjacent or contiguous parcels and the size of each parcel is predominantly 4.05 hectares (10 acres) or less in area and any parcels/grouping of parcels that are designated Grouped Country Residential (GCR) in accordance with the Lethbridge County Land Use Bylaw.
- i. "Owner" means any person, partnership, association or corporation owning, harbouring, possessing or consent, having charge of control over any animals.
- j. "Residential Parcel" for the purpose of this Bylaw shall be defined as a parcel less than 10 hectares (24.7 acres) where the main use is residential in nature.
- k. "Violation Tag" means a Municipal violation notice or tag, allowing for a voluntary payment of a specified penalty to be paid out of court to the County in lieu of appearing in answer to a summons.
- l. "Violation Ticket" means a ticket issued pursuant to Part 2 or Part 3 of the *Provincial Offences Procedure Act*, R.S.A. 2000, c.P-34 and regulations thereunder, as amended or replaced and repealed from time to time.

3. Animal /Bird Regulations

- a.on any subdivision, as defined in this Bylaw between 0.40 hectares (1 acre) and 10.0 hectares (24.7 acres) in size, the following animal units are permitted in Lethbridge County:

Residential Parcel Size in Hectares	Residential Parcel Size in Acres	Allowable Number of Animal Units
0.0 – 0.39 hectares	0.0-.99 acres	0
0.4-0.6 hectares	1.0-1.99 acres	1
0.81-1.21 hectares	2.0-2.99 acres	2
1.22-1.61 hectares	3.0-3.99 acres	3
1.62-2.02 hectares	4.0-4.99acres	5
2.03-2.42 hectares	5.0-5.99 acres	6
2.43-4.04 hectares	6.0-6.99 acres	7
4.05 hectares or greater	7 acres or greater	8*

*Plus the number of animal units permitted for that portion of the parcel in excess of 7 acres. Example 5.26 hectares (12.99 acres) 8+2=10 total animal units.

Parcels larger than 10 hectares (24.7 acres) have no restriction on the number animal units permitted. Registration or permits will be required from the Natural Resources Conservation Board (NRCB) if the number of animal units exceeds the NRCB thresholds.

- b. For the purpose of this section "one animal unit" equals the following:
 - i. One horse, donkey, or mule over a year old
 - ii. Two colts up to one year old
 - iii. One llama/alpaca
 - iv. Two ostrich, emu, or other ratite
 - v. One cow or steer over one year old
 - vi. Two calves up to one year old
 - vii. One elk or bison/buffalo
 - viii. Fifty (50) broiler chickens
 - ix. Fifteen (15) chickens (layers)
 - x. Ten (10) ducks, turkeys, pheasants, geese or other similar fowl or in combination thereof
 - xi. Three sheep or goats over a year old

- xii. Two swine over a year old
- xiii. Twenty (20) rabbits or other similar rodents

- c. Land owners are responsible for ensuring the following standards are complied with:
 - i. feces or manure must be properly managed and contained on the premises, and regularly disposed of in a healthy, safe manner and shall not run-off, contaminate or cause nuisance to other lands or water sources;
 - ii. dead animals must be promptly and properly removed or disposed of within 48 hours to minimize odours, flies, and transmission of disease to other animals or humans.

4. Prohibitions and Exemptions

- a. No fur bearing animals, fowl, or livestock other than domestic animals shall be permitted within the hamlets.
- b. Horses are permitted in hamlets on parcels 2 acres or greater in size provided they adhere to the animal unit restrictions as outlined in Table 3a.
- c. No wild boars shall be permitted.
- d. Facilities or developments involving the keeping of animals (e.g. riding academies, equestrian centre/facilities) that have an approved development permit from Lethbridge County authorizing such use, are exempt from the provisions of this Bylaw provided they are acting in compliance with their permit approval conditions.
- e. Multi-unit subdivisions with development controls or architectural controls (approved by Lethbridge County), which specifically speak to the keeping of livestock shall be exempt from this bylaw and those development controls or architectural controls shall apply.

5. Orders

- a. Every Order written with respect to this Bylaw must:
 - i. Indicate the person to whom it is directed;
 - ii. Identify the person to whom the Order relates by municipal address or legal description;
 - iii. Identify the date it was issued;
 - iv. Identify how the property fails to comply with this or other Bylaws;
 - v. Identify the specific provisions of the Bylaw the person contravenes;
 - vi. Identify the nature of the action required to be taken to be compliant;
 - vii. Identify the time within which the action must be completed;
 - viii. Indicate that if the required action is not completed within the time specified, the County may take whatever action or measures necessary to remedy the contravention; and
 - ix. Indicate expenses and costs of any action or measures taken by the County under this Section are an amount owing to the County by the person to whom the Order is directed.
- b. Every Order written in respect to provisions of another Bylaw must contain the same information as set out in Section 5a, modified as necessary in the context of that Bylaw.

- c. An Order pursuant to this Bylaw will be deemed to have been sufficiently served if:
 - i. Served to the accused directly, or
 - ii. Mailed to the address of the registered Owner or person occupying a property, or
 - iii. Posted in an obvious place on the property referred to on the Order, when the Enforcement Officer has reason to believe:
 - 1. That the Owner or Occupant to whom the Order is addressed is evading service; or
 - 2. No other means of service is available.
- d. If an Order is sent via registered mail as referred to in Section 5c (ii) then is deemed to be received by the Owner or Occupant five (5) days after the Order was mailed.

6. Offences and Penalties

- a. A person who contravenes any Section of this Bylaw is guilty of an offence and liable on summary conviction before a Provincial Court Judge, to fines as listed in Schedule "A" of this Bylaw.
- b. A Provincial Judge, in addition to the penalties provided in the Bylaw, may direct or order the Owner of an animal:
 - i. To prevent such animal from doing mischief, or causing a disturbance, or a nuisance complained of; or
 - ii. To comply with any other relevant sections of this Bylaw, or in any other manner deemed appropriate
- c. An Enforcement Officer may issue a Violation Tag to a person who the Enforcement Officer has reasonable and probable grounds to believe has contravened any provision of this Bylaw:
 - i. Identifying a voluntary payment as described in Schedule "A" of this Bylaw, and
 - ii. The person to who the Violation Tag is issued may, in lieu of being prosecuted for the offence, pay to Lethbridge County the penalty specified in the time period indicated on the Violation Tag.
- d. A Violation Tag shall be deemed to have been sufficiently served if:
 - i. Served to the accused directly, or
 - ii. Mailed to the address of the registered Owner occupying a property, or
 - iii. Secured to the property in respect of which the offence is alleged to have been committed.
- e. Where a Violation Tag has been issued and the penalty specified on the Violation Tag has not been paid within the prescribed time, then an Enforcement Officer may issue a Violation Ticket specifying that a voluntary payment be made as described in Schedule "A" of this Bylaw.
- f. Alternatively, an Enforcement Officer may immediately issue a Violation Ticket to any person who the Officer has reasonable grounds to believe has contravened any provisions of the Bylaw, specifying that:
 - i. A voluntary payment be made as described in Schedule "A" of this Bylaw; or
 - ii. If it is in the public interest to compel the accused to appear before a Judge, issue a summons respecting any offence for which a voluntary payment may be made requiring the accused to appear before a Provincial Court Judge on the initial appearance date without the alternative of making a voluntary payment.

- g. The levying and payment of any fines shall not relieve a person from the necessity of:
 - i. Immediately remedying the situation that created the violation; or
 - ii. Paying any fees, charges, or costs for which he/she is liable under the provisions of this Bylaw.

7. Exercise of Discretion

- a. Lethbridge County has the discretion to enforce this Bylaw and is not liable for any outcomes should an Enforcement Officer decide not to enforce this Bylaw if acting in good faith.

8. Severability Provisions

- a. Should any provision of this Bylaw be invalid, then such provisions shall be severed and the remaining Bylaw shall be maintained.

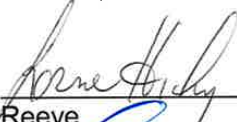
9. Application

- a. The provisions of this Bylaw shall apply to all lands within the municipal boundaries of Lethbridge County.


10. Effective Date

- a. This Bylaw 17-008 shall come into effect on the date of third reading.

GIVEN first reading this 7th day of December, 2017.




 Reeve




 Interim Chief Administrative Officer
 Sheldon Steinke, CLGM

GIVEN second reading this 24th day of January, 2018.




 Reeve




 Interim Chief Administrative Officer
 Sheldon Steinke, CLGM

GIVEN third reading this 24th day of January, 2018,



 Reeve



 Interim Chief Administrative Officer
 Sheldon Steinke, CLGM

**Schedule “A”
Offences and Penalties**

Bylaw Section	Offence	Penalties	2 nd Offence (within 12 months)	3 rd or any subsequent Offence (within 12 months)
3a	Failure to comply with allowable Animal Units per parcel size	\$250.00	\$500.00	\$1,000.00
4a	Harbour or keep fur bearing animals, fowl or livestock within a hamlet	\$250.00	\$500.00	\$1,000.00
5	Failure to comply with an Order	\$250.00	\$500.00	\$1,000.00

Animal Control Comparisons

Mountainview County has an animal control bylaw that appears to allow for regulated keeping of animals but not on parcels smaller than one acre, except as per the excerpt below. The bylaw also regulates animals on parcels larger than 10 acres. It also does not appear to differentiate hamlets from any other type of district or lands.

- 3.11 On parcels of land less than 0.40 ha (1 acre) Low Density Livestock may be allowed with a permit as specified in Schedule "B". Concentrated Livestock density will not be permitted.

Cardston County has a bylaw and free permitting system that will allow for the keeping of one livestock on parcels larger than one acre. It does not appear to allow more than one large animal on a larger parcel (eg. 3 acres).

The County of Warner allows animals in certain parts of hamlets, while prohibiting them in other parts of hamlets (i.e. southwest of Front Street, north of Eighth Avenue, etc.) via a permitting system.

The Municipal District of Pincher Creek has an animal control bylaw that includes specific regulations for hamlets. Permits are required.

County of Newell allows livestock in hamlets in accordance with an "animal units per land size" formula similar to Lethbridge County. They do not issue permits for these but can enforce violations under their bylaw. Land must be a minimum of one acre and must include a fenced or contained roaming pen of at least one acre.

Vulcan County regulates livestock in hamlets in accordance with an "animal units per land size" formula similar to Lethbridge County. They do not issue permits for these but can enforce violations under their bylaw.

- 6.2. Persons residing on a parcel or property districted as one of the following:

- a. R1 – Country Residential;
- b. R3 – Hamlet Unserved;
- c. R4 – Hamlet Served;
- d. HR – Hamlet Reserve;
- e. POS – Public Open Space;
- f. REC – Recreational;
- g. INS – Institutional; or
- h. DC – Direct Control

and having a titled area less than 0.28 ha (0.7 acres), or parcels or property districted R2 – Country Residential Estate are not permitted to have Livestock, Poultry or Fowl, except for Urban Hens.

The Town of Coalhurst allows up to 10 properties in town to have up to 5 chickens each through a \$30 annual licence and permit.

The Town of Picture Butte has a bylaw for the keeping of chickens which almost mirrors that of the Town of Coalhurst.

The Village of Stirling allows a maximum of two livestock per acre or 25 poultry. Properties smaller than one acre may have up to 8 poultry but no livestock. They charge \$25 or \$50 for a permit.

The Town of Nobleford allows urban hens via a permitting system.

AGENDA ITEM REPORT



Title: Bylaw 22-009 MacLaine Acres Area Structure Plan and Bylaw 22-010 Land Use Bylaw Amendment Lethbridge Urban Fringe to Grouped Country Residential - First Reading

Meeting: Council Meeting - 15 Sep 2022

Department: Community Services

Report Author: Hilary Janzen

APPROVAL(S):

Larry Randle, Director of Community Services,
Ann Mitchell, Chief Administrative Officer,

Approved - 01 Sep 2022
Approved - 04 Sep 2022

STRATEGIC ALIGNMENT:



Governance



Relationships



Region



Prosperity

EXECUTIVE SUMMARY:

An application was received for the MacLaine Acres Area Structure Plan (Bylaw 22-009) and to re-designate Plan 927LK, Block 1 Lots 1 and 3, Plan 8010198 Block 2 Lot 1 and a portion of NW 28-9-21-W4 from Lethbridge Urban Fringe to Grouped Country Residential (Bylaw 22-010). This would allow for the phased subdivision of the parcels for Country Residential use.

RECOMMENDATION:

That Bylaw 22-009 be read a first time.

That Bylaw 22-010 be read a first time.

REASON(S) FOR RECOMMENDATION(S):

First reading of Bylaw 22-009 and Bylaw 22-010 will allow County Administration to set the date for the Public Hearing and send out the required notices for the proposed bylaws.

PREVIOUS COUNCIL DIRECTION / POLICY:

- The Lethbridge County and City of Lethbridge Intermunicipal Development Plan allow for the subdivision of parcels in the area north of the City if the applicant submits an updated Area Structure Plan and re-designates the property to the Grouped Country Residential Land Use District.
- The Lethbridge County Municipal Development Plan requires that where there will be more than 4 adjacent titles that the applicant submit an Area Structure Plan for County Council consideration and that the parcels be re-designated to the Grouped Country Residential Land Use District.

- The Grouped Country Residential Land Use Strategy encourages subdivision in areas close to urban areas and where the lands are fragmented and considered poor quality agricultural lands.

BACKGROUND INFORMATION:

An application was received for the MacLaine Acres Area Structure Plan (Bylaw 22-009) and to re-designate Plan 927LK, Block 1 Lots 1 and 3, Plan 8010198 Block 2 Lot 1 and portion of NW 28-9-21-W4 from Lethbridge Urban Fringe to Grouped Country Residential (Bylaw 22-010). This would allow for the phased subdivision of the parcels for Country Residential use. The area in question had a previous Area Structure Plan that showed the future subdivision of these parcels (Plowman Area Structure Plan - Bylaw 1231).

The MacLaine Acres Area Structure Plan provides a plan for the future subdivision of the subject lands in a manner that attempts to meet the County's current policies and requirements. This area is within the Intermunicipal Development Plan area with the City of Lethbridge and some of the lands are subject to the County's Industrial/Commercial Land Use Strategy.

The application has been circulated to all County Departments, the City of Lethbridge, and external agencies for review. Any comments or concerns will be presented at the Public Hearing along with the planning considerations. It is anticipated that the public hearing will be held in November 2022.

ALTERNATIVES / PROS / CONS:

County Council may refuse first reading of the Bylaws. Refusing the bylaws would be contrary to legal advice which has been that first reading of the bylaws shall be given as the applicant and the public have the right to attend and speak at a public hearing which is set upon first reading of the bylaws. The public hearing process allows County Council the opportunity to hear all positions (in favour and opposed) on the bylaws and make an informed decision. If first reading of the bylaws is not given, the applicant could appeal that decision to the Alberta Court of Appeal.

FINANCIAL IMPACT:

If the bylaws were approved, future development would be taxed at the County's residential tax rate. There would additional costs to the County (i.e. maintenance of infrastructure) that would arise if the bylaws are approved.

LEVEL OF PUBLIC PARTICIPATION:

☐ Inform ☐ Consult ☒ Involve ☐ Collaborate ☐ Empower

ATTACHMENTS:

[Bylaw 22-009- MacLaine Acres - ASP](#)
[MacLaine Acres ASP Compiled PDF -August 30-2022 - reduced size](#)
[Appendix 2.3,6 - Seperate Cover - Aug30-2022 reduced file size](#)
[Bylaw 22-010 - MacLaine Acres - Amendment to LUB](#)

**LETHBRIDGE COUNTY
IN THE PROVINCE OF ALBERTA**

BYLAW NO. 22-009

**A BYLAW OF LETHBRIDGE COUNTY BEING A BYLAW PURSUANT TO
SECTION 633(1) OF THE MUNICIPAL GOVERNMENT ACT, REVISED
STATUTES OF ALBERTA 2000, CHAPTER M.26**

WHEREAS the landowners wish to develop lands within Plan 927LK, Block 1, Lots 1 and 2, and Plan 8010198, Block 2, Lot 1, and portion of NW 28-9-21-W4;

AND WHEREAS the County's Municipal Development Plan and the Lethbridge County and City of Lethbridge Intermunicipal Development Plan requires that developers prepare an Area Structure Plan to ensure sound development occurs within Lethbridge County;

AND WHEREAS the total area considered by the Area Structure Plan is approximately 80 acres (32.3 hectares);

AND WHEREAS the landowner/developer have prepared the "MacLaine Acres Area Structure Plan" which contains engineering, survey, and geotechnical information to support the above conditions.

NOW THEREFORE BE IT RESOLVED, under the Authority and subject to the provisions of the Municipal Government Act, Revised Statutes of Alberta, 2000, Chapter M-26, as amended, the Council of Lethbridge County in the Province of Alberta duly assembled does hereby enact the following:

- 1. The "MacLaine Acres Area Structure Plan" Bylaw No. 22-009, attached as "Appendix A".

GIVEN first reading this 15th day of September, 2022.

Reeve

CAO

GIVEN second reading this _____ day of _____, 20____.

Reeve

CAO

GIVEN third reading this _____ day of _____, 20____.

Reeve

CAO

1 st Reading	September 15, 2022
2 nd Reading	
Public Hearing	
3 rd Reading	

MacLaine Acres

AREA STRUCTURE PLAN

Sec. 28 - 9-21-W4M



MARTIN
GEOMATIC CONSULTANTS

208645CE

MacLaine Acres

AREA STRUCTURE PLAN

Sec. 28 - 9-21-W4M



FOR REVIEW	Jan 27, 2022
FOR APPROVAL	Aug 30, 2022

Prepared for: Rick & Carol Aldoff
Kenneth Smith
Ryan & Karen Petersman
1946291 Alberta Ltd.

Prepared by: Martin Geomatic Consultants Ltd.
255 - 31st Street North
Lethbridge, AB
T1H 3Z4

MARTIN
GEOMATIC CONSULTANTS
Consulting Engineers, Planners, and Land Surveyors
255-31st Street North Lethbridge, Alberta T1H 3Z4
Ph: (403) 329-0050 E-mail: geomart@mgd.ca Fax: (403) 329-6594
File No. 208645CE

MACLAINE ACRES AREA STRUCTURE PLAN

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MACLAINE ACRES AREA STRUCTURE PLAN

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1.0. INTRODUCTION

1.1. PURPOSE OF THE PLAN

The purpose of the MacLaine Acres Area Structure Plan (ASP) is to provide a comprehensive planning framework for development of the land within Sec. 28-9-21-W4. The Plan Area is located in Lethbridge County and is shown on **Figure 1- General Location Plan**. Prior to consideration of subdividing or re-subdividing a property, Lethbridge County requires preparation of an Area Structure Plan to address all planning issues related thereto. The purpose of this area structure plan is thus to provide all pertinent information to the County and its advisors that will enable development of the subject property.

1.2. ASP LAND OWNERSHIP

The properties represented by the MacLaine Acres ASP encompass four separate parcels with the following ownerships. Refer to **Figure 2 – Land Use Concept, Appendix 1 – Property Ownership Titles**.

C of T 161 045 741, 1946291 Alberta Ltd.

C of T 161 154 313, Kenneth Dale Smith

C of T 091 049 136, Ryan Garret Van Eeden Petersman, Karen Virginia Van Eeden Petersman

C of T 911 153 848, Richard Michael Aldoff and Carol Ann Aldoff

1.3. BACKGROUND TO THE AREA STRUCTURE PLAN

The conceptual design for the subject property is part of the Area Structure plan for Sunny View Estates. (Lethbridge County Bylaw No.1231)

The designs presented in the MacLaine Acres ASP generally follow the intent of the Sunny View conceptual design. (See **Appendix 8 – Sunny View ASP Concept Design**). Changes have been made to reflect the current owner's vision as well it reflects current conditions and standards (particularly the proposed CANAMEX Highway).

The subject property containing approximately 79.36 acres (32.12 ha) more or less is proposed for re-zoning from Lethbridge Urban Fringe (LUF) to Grouped Country Residential (GCR). This will allow the development to proceed with subdivision of the area into smaller parcels with a minimum lot size of 2 acres (0.8 ha).

1.4. INTERPRETATION

This document shall be referred to as "*The MacLaine Acres Area Structure Plan*".

All terms referred to in this Bylaw shall have the same meaning as in the Municipal Government Act, the Municipal Development Plan or the Land Use Bylaw unless otherwise indicated.

1.5. THE APPROVAL PROCESS

Lethbridge County requires submission of planning documents that are of sufficient detail and clarity to permit comprehensive review by the various agencies, government departments, and utility companies which provide community planning advice to the County.

MACLAINE ACRES AREA STRUCTURE PLAN

The plan is submitted for approval according to provincial statutory requirements. This plan will also be used to support a land use reclassification pursuant to Lethbridge County Land Use Bylaw #1404.

The plan should be submitted to the City of Lethbridge for comments and verification that the plan adheres to the relevant Intermunicipal Development plans.

1.6. PLAN PREPARATION

During the preparation of the area structure plan document, Martin Geomatic Consultants Ltd. (MGCL) corresponded with:

- the landowners and some of the neighbors of the proposed plan area,
- Lethbridge County staff,
- County of Lethbridge Rural Water Association,
- Alberta Transportation staff,
- Saint Mary River Irrigation District,
- Fortis Alberta,
- ATCO Gas,
- Shaw Cable,
- Telus Communications.

2.0. LEGISLATIVE FRAMEWORK

2.1. THE MUNICIPAL GOVERNMENT ACT

The MacLaine Acres Area Structure Plan has been produced in accordance with Section 633 of the Municipal Government Act. It is the intention of this plan to create a framework for the development of a portion of 28-9-21-W4 into Grouped Country Residential classified area.

2.2. THE SOUTH SASKATCHEWAN REGIONAL PLAN

The MacLaine Acres ASP aims to follow the Alberta Government South Saskatchewan Regional Plan (SSRP) 2014 – 2024, Amended May 2018.

Strategic Outcomes of the SSRP aligned with the MacLaine Acres ASP include: sustainable development wherein economic development takes into account environmental sustainability and social outcomes, promoting efficient use of land, and strengthening communities.

2.3. LETHBRIDGE COUNTY MUNICIPAL DEVELOPMENT PLAN

The MacLaine Acres ASP aims to follow the Lethbridge County Municipal Development Plan (MDP) Bylaw No. 22-001

The MDP outlines specific requirements with respect to land use and developments. The MacLaine Acres ASP has adhered to the intent of Part 4, Plan Policies. More specifically, this ASP has endeavored to meet the requirements as detailed in Part 4, Section 8 Grouped Country Residential. The ASP meets the specific requirements of Policies 8.0, 8.1, 8.3 and 8.5 of the MDP. With respect to Policy 8.5 Potable Water, the source of potable water has not yet been finalized. The ASP presents three alternatives for the potable water supply and the Developer is endeavoring to obtain water through the water co-op. The water source must be finalized and approved by Lethbridge County prior to subdivision.

The Grouped Country Residential Land Use District (GCR) is intended to provide for a high quality clustered residential development in areas where no conflict to agriculture can be anticipated pursuant to the municipal development plan.

The minimum lot size is 2 acres (0.8 ha) to facilitate on-site sewage disposal systems.

Additional requirements of the Land Use Bylaw will be noted in subsequent sections of the plan where necessary.

2.4. COUNTY LAND USE BYLAW

The Grouped Country Residential Land Use District (GCR) is intended to provide for a high quality clustered residential development in areas where no conflict to agriculture can be anticipated pursuant to the municipal development plan.

The minimum lot size is 2 acres (0.8 ha) to facilitate on-site sewage disposal systems.

Additional requirements of the Land Use Bylaw will be noted in subsequent sections of the plan where necessary

2.5. INTERMUNICIPAL DEVELOPMENT PLAN (CITY & COUNTY)

The plan area is located in Policy Area 3 – North, as shown in the City of Lethbridge & Lethbridge County Intermunicipal Development Plan.

The following Land Use policies may affect the MacLaine Acres ASP, while measures to address each constraint are provided:

2.5.1. POLICIES 3.4.3.14 AND 3.4.3.15

This policy indicates that new grouped country residential should not generally be considered unless it is to complete an existing grouped country residential development and an ASP is prepared. MacLaine Acres falls into this category as what is presented in this ASP is a completion of the existing Sunnyview Estates grouped country residential development. The ASP for Sunny View Estates shows the intent to develop the surrounding land as grouped country residential. This is clearly shown in the concept plan that is part of the Sunny View ASP (see **Appendix 8- Sunny View Concept Plan**).

2.5.2. POLICY 3.4.3.16

This policy requires that the City of Lethbridge provides comments and input to the County for Policy Area 3 – North. As such this ASP should be sent to the City for their review.

2.5.3. POLICY 3.4.3.17

This policy requires that residential development not occur within the provincial setback from landfills. MacLaine Acres is not within the setback distance and therefore adheres to this policy.

2.5.4. POLICY 3.4.3.18 AND 3.4.3.19

These policies suggest that the City, the County and Alberta Transportation work collaboratively on a Functional Design Study and a subsequent Special Study and that future land uses take into consideration these studies.

2.5.5. POLICY 3.4.3.20

This policy states that the ASP's should not be considered within limits of the CANAMEX Development Node until the above noted Special studies is completed. The north easterly portion of the MacLaine ASP falls on the fringe of the CANAMEX Development Node. Although the Special Study has not yet been commenced, Alberta Transportation has addressed the planning needs for the interchange through various consultations during the preparation of the ASP. Their comments have been integrated into the design and planning of this ASP. Their comments include:

- Provide sufficient land in the planning to allow for the future widening of Highway 843 and for the future CANAMEX interchange tapering. This is reflected in the ASP.
- Provide allowance for a future service road within the plan area that runs parallel with and adjacent to the future highway tapering. Also, when the service road is built, there should be only a single connection point to Highway 843. The service road will be constructed when the CANAMEX interchange is built. This ASP makes provisions for the service road and reflects a future single connection point to Highway 843.

2.5.6. POLICY 3.5.1 AND 3.5.2

These policies identify the need to provide and maintain enhanced development and landscaping at highway entrances and along the highways that are identified in the policy area. The easterly portion of MacLaine Acres falls within an identified highway corridor. The Architectural Controls for MacLaine Acres will address these policies with respect to landscaping that is consistent with the intent of these policies and the Highway Enhance Design Guidelines. The land developer will also address landscaping at the visible points along the highway and at the entrances.

2.6. LETHBRIDGE COUNTY GROUPED COUNTRY RESIDENTIAL LAND USE STRATEGY

2.6.1. SITING

This development meets the following criteria for these preferred locations of GCR developments from the County Municipal Development Plan and the Land Use Strategy.

Poor quality agricultural land with three parcels of less than 20 acres each resulting in difficulty to farm.

- The site consists of cut-off and fragmented parcels.
- The site is made up of existing titles/ parcels.
- The site is the completion of a grouped country residential site that is located adjacent to 2 existing and a building GCR development.
- This development generally correlates with the concept plan prepared in conjunctive with the adjacent Sunnyview Grouped Country Residential Development

2.6.2. LAND USE CONFLICTS

This ASP site has no land use conflicts as outlined in GCR land use strategy.

2.6.3. SERVICING

This site meets the following criteria from the GCR land strategy

- Supply of potable water
- Supply of irrigation water from SMRID
- Suitable soils for multiple private septic field use for treatment of waste water. (refer to **Appendix 6, Septic Field Feasibility**)
- A Storm Management Plan has been completed and is attached as **Appendix 7- Stormwater Management Plan**.
- The various shallow utility companies have been contacted and they have verified that gas, electrical and telephone services are available to the site.

2.6.4. ROADS

- Legal and physical access is available to all lots by way of a dedicated municipal road.
- The municipal access roads known as Twp – Rd. 94A and 94B are not paved but have been identified as gravel roads under the provisions of their approval for the developments at the time when these roads were created.
- Highway 843 which is the access road for both Twp-Rd 94A and 95B is not paved. The maintenance and improvements to this road are the responsibility of Alberta Transportation.

2.6.5. FIRE SUPPRESSIONS

- Lots are a minimum of 2 acres in size which will enable the houses to be setback a considerable distance from each other thereby help minimize fire spreading
- The responding fire department is in Coaldale which is about 20 minutes from the site. The Lethbridge fire department in north Lethbridge is 10 minutes away and can provide assistance when deemed necessary.

3.0. THE PLAN AREA AND SITE ANALYSIS

3.1. LOCATION AND DEFINITION OF PLAN AREA

The plan area is located in Lethbridge County within Sec. 28-9-21-W4. The plan area is situated along Highway 843 and approximately 0.9 km north of the City of Lethbridge boundary which is 62 Ave. North. It is bordered on the north by farmland; on the east, by Range Road 213, on the south by a grouped country residential community, and on the west by irrigation canal and farmland (refer to **Figure 2 - Land Use Concept**). The plan area includes four land parcels: (Refer to **Appendix 1 Property Ownership Titles**)

- Lot 1 Block 2 Plan 8010198, 34.843 acres (14.1 ha), owner(s): Richard Michael Aldoff, Carol Ann Aldoff;
- Lot 2 Block 1 Plan 927LK, 20.02 acres (8.1 ha), owner(s): Kenneth Dale Smith;
- Lot 1 Block 1 Plan 927LK, 24.65 acres (9.98 ha), owner(s): 1946291 Alberta Ltd.;
- Title number 091 049 136, owner(s): Ryan Garret Van Eeden Petersman, Karen Virginia Van Eeden Petersman.

3.2. SITE CHARACTERISTICS

The existing site features and contours are shown on **Figure 3.0 Existing Site**.

- Access to the plan area is from Lethbridge County Township Road 94A, Township Road 94B, and Highway 843.
- There are existing potable waterlines owned by the County of Lethbridge Rural Water Association (C.O.L.R.W.A.), which run adjacent to the site along Township Roads 94-A and 94-B, and along the north boundary of the plan area.
- There is an existing Saint Mary River Irrigation District (S.M.R.I.D.) canal along the west boundary of the plan area,
- There is an existing S.M.R.I.D. buried pipeline running along the south and center portions of the plan area. The south portion of this buried pipeline is planned to be re-aligned to accommodate the extension of Township Road 94-A,
- There are two existing dugouts located in the north and east areas of the site, with irrigation water supplied by (S.M.R.I.D.),
- There is an active high pressure gas line owned by ATCO, running north to south along the eastern site boundary,
- There are existing 60 mm and 42 mm gas distribution lines owned by ATCO, which run across the site to service the existing dwellings,
- There is an abandoned gas well located in the northwest part of the site which has been reclaimed. The well was abandoned in 1999 and the reclamation was completed in 2002. The licensee is Husky Oil Operations Limited.
- Overhead power follows the County Roads along Range Road 213, Township Road 94-A, and Township Road 94-B.
- Five existing residential dwellings are located in the plan area which currently use septic field disposal of wastewater.

MACLAINE ACRES AREA STRUCTURE PLAN

3.3. SOILS

According to the Alberta Soils Information System, the site soils are characterized as a “Lethbridge (LET) Series” soil - “...Orthic Dark Brown Chernozem on medium textured ([loam], [silt-loam]) sediments deposited by wind and water.”

The “Geotechnical Evaluation, MacLaine Acres Area Structure Plan, Section 28 Twp 9 Rge 21 W4M, Lethbridge County, Alberta” report prepared by Tetra Tech Canada Inc., October 2021, (refer to the attached **Appendix 2- Geotechnical Evaluation**) indicates that the soil stratigraphy was found to have topsoil underlain by clay and clay till deposits.

This report provides more information on the soil and ground water candidates with recommendations on the excavations, site grading, dewatering, buried services and trench backfill, concrete, pavement, stormwater management, residential construction, sewage disposal, and testing and inspections.

The report cautions that challenges may be encountered due to soil and ground water conditions. The report further provides recommendations with respect to the groundwater.

3.4. TOPOGRAPHY

The site is relatively flat with ground slopes at 0.5 % to 2 %. A slight ridge splits the site into two general drainage areas as shown in **Figure 3 - Existing Site**:

3.4.1. EAST CATCHMENT AREA

East catchment: drains from west to east across the site and released to the west ditch of Highway 843. The high point of this catchment area is located along the west catchment boundary, at an approximate elevation of 907.2 m. The low point is located at the east end of the site at an approximate elevation of 900.0 m.

3.4.2. WEST CATCHMENT AREA

West catchment: runoff is trapped in a topographical depression located in the western area of the site. The highpoint of this catchment area is along the west boundary at an approximate elevation of 908.6 m. The low point is located near the center of this catchment area at an approximate elevation 905.2 m.

3.5. WATER AND HYDROLOGY

- The above noted Geotechnical Evaluation found that the depth to ground water varied from 0.7 meters to 5.2 meters.
- There are no natural bodies of water within the plan area.
- Two man-made dugouts exist within the plan area and are filled by a pipeline owned by SMRID.

3.6. HABITAT AND VEGETATION

The plan area consists mainly of cultivated mixed grasses that produce a hay crop.

3.7. ENVIRONMENTAL, HISTORICAL AND ARCHAEOLOGICAL SIGNIFICANCE

The “Phase 1 Environmental Site Assessment, MacLaine Acres, Portions of Section 28 Twp 9 Rge 21 W4M, Lethbridge County, Alberta” report prepared by Tetra Tech Canada Inc., September 2021 (refer to the attached **Appendix 3 – Environmental Site Assessment**) indicates:

- The site and surrounding area has historically been used for agriculture,
- A SMRID canal formerly transected the property.
- A large dugout was formerly situated in the property.
- One (1) potential source of on-site contamination has been identified which is a group of old barrels. If soil staining is encountered when the barrels are removed, then it is recommended that further assessment is completed.
- No offsite sources of environmental impairment are apparent.
- A hazardous building material assessment is recommended prior to building demolition.
- No further environmental investigation is required at this time.
- MGCL consulted the Alberta Culture and Tourism’s Listing of Historic Resources to determine that the lands within the plan area have not been identified as having a Historic Resource Value. (Refer to the attached **Appendix 4 – Historical Resource Assessment**).

3.8. EXISTING LAND USE

- The plan area is mainly used for agriculture with cultivated crops and horse grazing. The land cover has a mix of natural grasslands and irrigated cropland (*refer to Figures 3-Existing Site & 4-Aerial Photograph*);
- There are five houses within the plan area, four of which are inhabited. These four inhabited houses are intended to remain in place and are incorporated in the development layout (*refer to Figure 5A&B - Lot Layout - Phases 1&2*);
- Township Roads 94-A and 94-B and Highway 843 provide access to the plan area.
- The land use for the site is currently Lethbridge Urban Fringe (LUF).

4.0. SITE FEATURES

4.1. LOCATION

- The site is within the rural agricultural area of Lethbridge County thereby giving residents the rural atmosphere that many people desire.
- The site is within close proximity to the City of Lethbridge where a wide variety of educational, medical, commercial, recreational and community services exist.

4.2. HIGHWAY ACCESS

Provincial Highway 843 provides access to the development area from the city of Lethbridge.

4.3. EASE OF DEVELOPMENT

Basic utilities such as potable and non potable water, storm water drainage channel, gas and electrical are located at or near the site boundary and therefore the servicing and development of the site will be generally simple, efficient and economical.

4.4. SURROUNDING USES OF LAND

The land within and surrounding the ASP area is fragmented with a mix of agriculture and grouped country residential uses. The plan area is comprised of four small land parcels which makes agriculture difficult. The development of the MacLaine Acres Land would complete Sunny View Estates which is an existing clustering of grouped country residential homes. This development would also enhance and complement the existing Sunny View Estates and Myndio Chollak subdivisions. Several other country residences with larger parcel sizes are also in the area surrounding the MacLaine Acres area. There are two existing group country residential developments approximately 2 km west of the plan area which are consistent with the proposed development style. The Edgewood and Deerview Estates communities have approximately 30 or more existing grouped country residential lots.

4.5. LIFESTYLE

The proposed development provides for a type of residential land use that would allow families to build and live in a community offering rural lifestyle and still enjoy urban type utility services.

5.0. PLAN GOALS AND OBJECTIVES

5.1. PLAN GOALS

5.1.1.

The MacLaine Acres Area Structure Plan will respond to the needs, issues and requirements identified by the owners, Lethbridge County as well as those agencies and organizations having an interest in the planning of this area.

5.1.2.

The goals of this Area Structure Plan follow the planning policies outlined through the legislative framework.

5.1.3.

When adopted by Lethbridge County Council, this Area Structure Plan will create the framework for subdividing and developing the subject property.

5.1.4.

This document will function as the required plan and as such will outline:

- proposed land use,
- proposed lot layout,
- the road access and circulation,
- the location of public utilities,
- supply of potable water,
- sanitary sewage disposal,
- drainage and stormwater management,
- supply of community irrigation water,
- other related matters.

5.2. PLAN OBJECTIVES

5.2.1.

The MacLaine Acres Area Structure Plan will adhere to the following objectives:

- create lots with a minimum size of 2 acres (0.8 ha),
- institute a storm water management system for the planned development,
- if available, utilize potable water from the County of Lethbridge Rural Water Association,
- consider road access and circulation for the development,
- investigate the suitability of on-site septic systems for wastewater treatment and disposal,
- allow for a community irrigation system,
- identify electrical, gas, and communications servicing.

6.0. DESIGN AND LAND USE

6.1. PROPOSED LAND USE

A total of approximately 27 residential lots with a minimum size of 2 acres (0.8 ha) and 3 PUL lots for storm water management purposes will be created on the proposed development. It is proposed to have the Land Use changes to Grouped Country Residential, as shown on **Figure 2 - Land Use Concept**. Additionally, 3 lots are proposed along Highway 843 to allow for future highway widening and a service road. At the time of subdivision, if required by the county, caveats will be placed on these 3 lots that would prevent construction on the lots.

6.2. DENSITY AND POPULATION

The housing density within the proposed development comprises 27 residential lots plus 3 PUL lots or 0.34 units per acre (0.84 units per ha.) of net area (*refer to **Figure 5 - Lot Layout - Phase 1** and **Figure 6 - Lot Layout - Phase 2***),

Based on an average occupancy of 3 persons per household, the population within the plan area is estimated to be approximately 81 persons.

The number of lots may vary by plus or minus a few lots during the final design. Additionally there may be minor layout changed resulting from the final design process. Any changes would need to be approved by Lethbridge County, during the subdivision approval process.

6.3. RESERVE REQUIREMENTS

If the County does not want land dedicated as municipal reserve, cash-in-lieu would be provided to achieve the 10% municipal reserve requirement.

MACLAINE ACRES AREA STRUCTURE PLAN

7.0. ROADS

7.1. SITE ACCESS AND CIRCULATION

Access into the proposed development area will be via Highway 843. A local road is proposed to extend west from Twp-Rd. 94-A, and extend north and loop back to Hwy 843, to provide access to the proposed community. A cul-de-sac will come off of the loop road to the west *refer to **Figure 5 - Lot Layout - Phase 1** and **Figure 6 - Lot Layout - Phase 2***. The type of road surface will be determined at the time of subdivision depending on the status of Highway 843. Future site access will be via a service road from Twp-Rd. 94-A which will be built at the time of the future Hwy 3 / Hwy 843 interchange.

Lands required for Canamex, which includes right of ways for highways or roads and services roads will be taken in the future.

Alberta Transportation has indicated that a TIA is not required prior to ASP approval. Alberta Transportation shall be consulted prior to any subdivision to determine if and when a TIA might be required.

7.2. PHASES OF ROADWAY CONSTRUCTION

There are three phases of construction anticipated for the site:

7.2.1. PHASE 1A

Phase 1A would include seven residential lots located at the center of the site. Access to Phase 1A would be along TWP-94B with no additional land dedicated to road right of way.

7.2.2. PHASE 1B

Phase 1B would include thirteen residential lots located at the west portion of the site. Access to Phase 1B would be through a westerly extension of Township Road 94A which would then be extended northerly with two cul-de-sacs. A temporary emergency access would be provided along the north boundary of the site, extending to Hwy 843.

7.2.3. PHASE 2

Phase 2 would include seven residential lots located at the north portion of the site. A County road would be developed, with a connection from Hwy 843, which would extend through Phase 2 and connect to Phase 1B, the cul-de-sac at the end of the Phase 1B road. This would then provide a looped road through the subdivision. The Phase 1B emergency access would be removed upon completion of the looped road.

MACLAINE ACRES AREA STRUCTURE PLAN

8.0. SERVICING

8.1. POTABLE WATER SUPPLY AND DISTRIBUTION

It is envisioned that the domestic potable water requirements for the subdivision will be met by one of the following alternatives or by a combination of these alternatives.

8.1.1. POTABLE WATER SUPPLY, ALTERNATIVE 1

The first alternative is to have the water supplied by the County of Lethbridge Rural Water Association via extensions from an existing potable water pipe running through the site. Each lot will be supplied with a trickle system to fill individual cisterns. The Water Co-op is in the process of finalizing their water supply plans for this area.

8.1.2. POTABLE WATER SUPPLY, ALTERNATIVE 2

The second alternative is the provision of ground water well(s) which will supply each lot via a trickle system to fill individual cisterns. Pre-chlorination and/or other treatment may be required prior to distribution to each lot. The feasibility of this alternative will be determined if it is required by Lethbridge County.

8.1.3. POTABLE WATER SUPPLY, ALTERNATIVE 3

The third alternative is use SMRID supplied irrigation water that will be treated as required by each individual lot owner. The feasibility of this alternative will be determined as required by Lethbridge County.

8.1.4. DETERMINATION OF FINAL POTABLE WATER SOURCES

The final method of water supply will be dependent on the Water Co-op's final plans and the costs associated with each of the alternatives. The ultimate method of supply could be by a combination of these alternatives which would be subject to Lethbridge County administrative approval.

The County may consider allowing four lots in Phase 1A to haul potable water pending the final determination of a potable water supply for the balance of the lots.

8.1.5. GOVERNMENT REQUIREMENTS

The water supply and cisterns will be installed in accordance with requirements of the Chinook Health Region, the Safety Codes Council of Alberta and Lethbridge County.

8.1.6. HOME OWNER ASSOCIATION

The potable water and irrigation systems will not be taken over by Lethbridge County. A separate entity will be created to manage these facilities. The entity and management requirements shall be approved by Lethbridge County.

8.2. SEWAGE DISPOSAL

Each lot will have its own on site waste water treatment and dispersal system.

8.2.1. LICENSED DESIGN

The detailed design of each septic system shall be completed by a licensed designer at the time of the house construction.

MACLAINE ACRES AREA STRUCTURE PLAN

8.2.2. ALBERTA REGULATIONS

Alberta Regulations AR229/97 and AR196/2015, the *Alberta Private Sewage Systems Standard of Practice 2015* (the "SOP") describes the requirements for the design of on-site wastewater treatment and disposal systems.

8.2.3. SEPTIC FEASIBILITY ASSESSMENT

The "Preliminary Septic Disposal Field Feasibility Assessment, Proposed MacLaine Acres Subdivision, Section 28 Range 9 Township 21 West of the 4th Meridian, Lethbridge County, Alberta" report prepared by Tetra Tech Canada Inc., October 08, 2021 (refer to the attached **Appendix 6- Septic Feasibility Assessment**) indicates:

- Twelve (12) test pits were excavated to a depth of 3 m to observe soil profiles and collect samples which found silty clay loam, silty loam, clay loam, loam, silty loam.
- The soil textures are feasible for soil base treatment, or soil based treatment with treatment mound.
- The majority of soil textures are suitable for septic effluent quality 2 or better with pressure distribution lateral pipe.
- Restrictive soil layers encountered may require further assessment, depending on site grading, location of septic field and efficient loading.

8.2.4. LOCATION OF SEPTIC FIELD

No on-site wastewater management system components shall be installed in areas designated for conveyance or detention of runoff or behind the development setback lines.

8.3. STORM WATER MANAGEMENT

- Stormwater within the development will be managed such that runoff will be stored on-site to attenuate peak discharge and directed to an existing discharge location on a road right-of-way, which is the ditch on the west side of Hwy-843 (refer to **Figure 7 - Stormwater Management**).
- Post-development runoff will be stored and released at controlled rate that is the lower of, the pre-development rate at the discharge point and 2.0 liters per second from developed land. This is better than the Alberta Environment and Parks requirements and the Lethbridge County Engineering Guidelines and Minimum Service Standards. A summary of the existing and proposed drainage systems follows, and a more detailed description of the site drainage is included in the Stormwater Management Plan, which is appended to this document in **Appendix 7- Stormwater Management Plan**.

8.3.1. EXISTING CONDITIONS

- The land is generally flat with ground slopes of 0.5% to 2.0% with majority of the site runoff draining the east into the Highway 843 ditch system. Analysis of the terrain shows the site has six overland catchment areas.
- East sub-catchment - drains from west to east across the site and released to the west ditch of Highway 843. The high point of this catchment area is located on the south end of the west catchment boundary, at an approximate elevation of 907.2 m, and the low point is located at the northeast end of the site at an approximate elevation of 900.0 m.
- Dugout sub-catchment – this is the area of the existing water dugout for farm use, that drains to itself. It does not have a discharge location.
- West-NW sub-catchment drains from south to north and discharges to the property to the north.
- West-SE sub-catchment drains from the NW to the SE and discharges to the Township road 94A ditch.

MACLAINE ACRES AREA STRUCTURE PLAN

- West SW sub-catchment drains from south to north and discharges to the property to the south.
- West Central sub-catchment – drains to a topographical depression located in the center of the sub-catchment. The highpoint of this catchment area is along the west boundary at an approximate elevation of 908.6 m. The low point is located near the center of this catchment area at an approximate elevation 905.0 m. Calculations show that this catchment will not spill overland during a major storm event and empties through infiltration and evaporation. This area, if it spills, is to the east the topographical depression.

8.3.2. DRAINAGE CONCEPT

- The stormwater management concept is detailed in the attached Stormwater Management Plan. Refer to **Appendix 7- Stormwater Management Plan**.
- Storm water runoff from the site will be directed into storage pond(s), which will be designed to store runoff up to a 24 hour duration, 1 in 100 year frequency event. Although three ponds are shown in the concept drawings the County wants only one pond. During the design phase only one pond will be considered unless circumstance at the time indicates additional ponds may be necessary. Any changes from one pond will be at the County's discretion. The stormwater ponds will not be used as a source for irrigation purposes.
- The ponds will be drained either by gravity or pumped at the Counties discretion into the west Highway 843 ditch. This ditch currently directs all runoff northerly to ultimately end up in the Oldman River. Flow from this site will be restricted as outlined above and stored. The 2.0 litres per second per ha release rate from developed areas is approximately 43% of the predevelopment release rate to Highway 843 ditch. The maximum release will match existing conditions.
- Lethbridge County has undertaken a master drainage study for the entire area around MacLaine Acres. The Storm Water Management plan for this site can be adjusted in order to be compliant with the County's study.
- All of the designated drainage conveyance routes and storage facilities will either be on public rights-of-way, Public Utility Lots, or be protected by Utility right-of-way in favor of Lethbridge County, or easement or caveat.

8.3.3. SITE GRADING

- The subdivision will be graded to be consistent with the overall Stormwater Management Plan as shown on **Figure 7 - Stormwater Management**. Individual lots will generally be graded such that surface runoff will be directed to perimeter swales designed to carry the stormwater runoff into the ditches and then into the stormwater detention facilities.

8.4. UTILITIES

8.4.1. ELECTRICITY

Epcor is the electricity provider for Lethbridge County and the distributor is Fortis Alberta. It is planned that electrical service to individual lots will be distributed underground. Internal roadways will be serviced with street lights. All necessary applications for the detailed design and installation of electric utilities will be submitted to Fortis for their approval.

8.4.2. NATURAL GAS

Natural gas is available through ATCO Gas, who have has advised that there are no known capacity issues with servicing the proposed development.

MACLAINE ACRES AREA STRUCTURE PLAN

8.4.3. TELECOMMUNICATIONS/CABLE SERVICE

Telus Communications provides telephone and cable service for the area. Cellular phone service is also available.

Shaw Cable does not offer services in this area and does not plan to be servicing the proposed development at this time.

8.4.4. SOLID WASTE MANAGEMENT

Individual solid waste will be disposed of at a local transfer station.

8.5. IRRIGATION SYSTEM

8.5.1. COMMUNITY IRRIGATION

A community irrigation system will provide SMRID supplied non-potable water to each lot for watering lawns and gardens. This irrigation water will be supplied by SMRID to the irrigation water storage pond. This pond is separate from the storm water management pond. The water will be pumped from the pond through a communal pipeline system with lateral connections supplying each lot. The current plan is to have a central irrigation water storage pond. During the final design, the necessity for a central pond may be eliminated and water will be supplied to ponds on each lot directly from the SMRID turnout.

8.5.2. FIRE PROTECTION WATER

Water for fire protection will be available through this central irrigation water storage pond or individual ponds, which will have their level maintained with irrigation water supplied by SMRID.

8.5.3. SMRID APPROVAL

This irrigation water supply system will require approval for SMRID.

8.5.4. OPERATION OF SYSTEM

A separate entity will be created to own and operate the irrigation system within the development. The irrigation piping will be installed in an easement through the lots in favor this entity. '

MACLAINE ACRES AREA STRUCTURE PLAN

9.0. PROTECTIVE SERVICES

9.1.1. FIRE PROTECTION

- The Lethbridge Fire Department is the responding station with the north Lethbridge station being about 10 minutes from the ASP site.
- Lots are a minimum of 2 acres in size which will enable the houses to be setback a considerable distance from each other thereby helping to minimize fire spreading/
- Several water sources exist within and surrounding the plan area which may be available for fire protection water use.
-

9.1.2. POLICE PROTECTION

Policing in Lethbridge County is provided by the Royal Canadian Mounted Police (R.C.M.P.) which has a detachment located in the Town of Coaldale, approximately 21 km from the plan area.

MACLAINE ACRES AREA STRUCTURE PLAN

10.0. DEVELOPMENT AGREEMENT

The Developer will enter into a Development Agreement with Lethbridge County regarding the following matters:

- Runoff conveyance and detention as per the Stormwater Management Plan,
- Roadway construction,
- Potable water installation,
- Irrigation system,
- Shallow utilities,
- Other services or matters considered necessary by Lethbridge County.

The ownership and management of the potable water system and the irrigation water system will be by a separate entity; and will not be provided by Lethbridge County.

The roadways and stormwater management system will be owned and managed by Lethbridge County.

The ownerships of the shallow utilities will be by the respective provider of each utility (i.e. electric, gas, telephone and telecommunication systems).

Lethbridge County may determine that pre-grading of some lots is required. If a lot is designated for pre-grading by the County the individual lot owner will be required to a clause to the grades as set. Adhere with respect to this requirement will be included in the Architectural Control.

11.0. ARCHITECTURAL CONTROLS

11.1. PURPOSE OF CONTROLS

The developer of MacLaine Acres will establish a set of Architectural Controls in order to achieve standards, an appropriate level of house design compatibility, and development limitations within the plan area.

11.2. TYPICAL CONTROLS THAT WILL BE IN EFFECT WITHIN MACLAINE ACRES INCLUDE THE FOLLOWING:

1. Minimum dwelling unit area and site coverage (building footprint),
2. Diversity in home design,
3. Incorporation of energy efficiency features,
4. Roof pitch & materials,
5. Exterior finishing materials,
6. Fencing materials,
7. Minimum landscaping requirements in which xeriscaping will be considered,
8. Hobby farm animals such as horses,
9. Accessory building and vehicle storage.
10. Building and lot drainage and grading requirements

11.3. DEVELOPER FENCING AND LANDSCAPING

The developer may undertake construction of certain stretches of fencing or installation of certain aspects of landscaping to establish the character of the development.

MACLAINE ACRES AREA STRUCTURE PLAN

12.0. IMPLEMENTATION AND DEVELOPMENT CONTROL

- This Area Structure Plan will become a Bylaw of Lethbridge County.
- All subsequent subdivision applications must adhere to provisions of this A.S.P. Bylaw and the Land Use Bylaw.
- Development applications, within the boundaries of the plan area, must comply with the requirements of the respective land use districts for which they are proposed.
- Building permits must be reviewed through a safety codes process approved by Lethbridge County.
- Lethbridge County may utilize other bylaws and policies that will regulate aspects of activity within the boundaries of the Area Structure Plan.
- The Land Use Bylaw must be amended to Grouped Country Residential to reflect this ASP.
- The lot owner or his builder must follow the Architectural Controls.
- There are several references within this ASP that refer to the formation of a Landowners Association. An alternative management and operating entity may be designated instead of the Homeowners Association. Any changes must be approved by the Lethbridge County administration. Formal amendments to the ASP would not be required if this change was to be implemented.

MACLAINE ACRES AREA STRUCTURE PLAN

13.0. PHASING

There are three phases of construction anticipated for the site:

- Phase 1A located in the S.E. portion of the ASP would include seven residential lots and a PUL lot.
- Phase 1B located in the west portion of the site, would include thirteen residential lots and a PUL lot.
- Phase 2 located in the N.E. portion of the ASP would include seven residential lots and a PUL lot.
- Smaller sub-phases may be proposed at the detailed design and subdivision stage of the project. This will be determined based on future consumer demand for lots.

14.0. ADJACENT LANDOWNER CONSULTATION AND OTHER CORRESPONDENCE

14.1. NOTICE SENT TO ADJACENT LAND OWNERS

A letter and drawings were hand delivered to the residences in the immediate vicinity of the ASP. (See **Appendix 5- Adjacent Landowner and Consultation and Other Correspondence**)

14.2. NEIGHBOURHOOD COMMENTS

Two written comment was received and one telephone comment was received.

- The telephone comment expressed the concern that when they built their house they were advised that there would be no future development to impair their views. Additionally, they were concerned about the increased traffic and resulting dust. In particular their concern was regarding the condition of poor maintenance of Highway 843.
- One written comment expressed concern with higher density resulting from the development. They were told when they purchased their lot that no one would build across from their lot. This higher density would also lead to increased traffic, and increased number of dogs. Concern with the effect on the water table was also expressed. (Refer to **Appendix 5 - Adjacent Landowner Consultation and Other Correspondence**)
- The other written comment expressed concern about the lack of water available from the water co-op. They also wanted Hwy 843 to be paved as soon as possible due to the poor maintenance currently being experienced. He also would like to have Twp. Road 94A and 94B paved at the same time construction occurs on this development. . (Refer to **Appendix 5 - Adjacent Landowner Consultation and Other Correspondence**)
-

14.3. OTHER RELATED CORRESPONDENCE

- Map & Letter Sent to neighbors
- Neighborhood Comments
- Map from SMRID
- Map from Fortis
- Map from Alberta Energy Regulator
- Map from ATCO Gas
- Map from County of Lethbridge Rural Water Association
- Lethbridge County Map "Development Consideration"

15.0. MARKET DEMAND

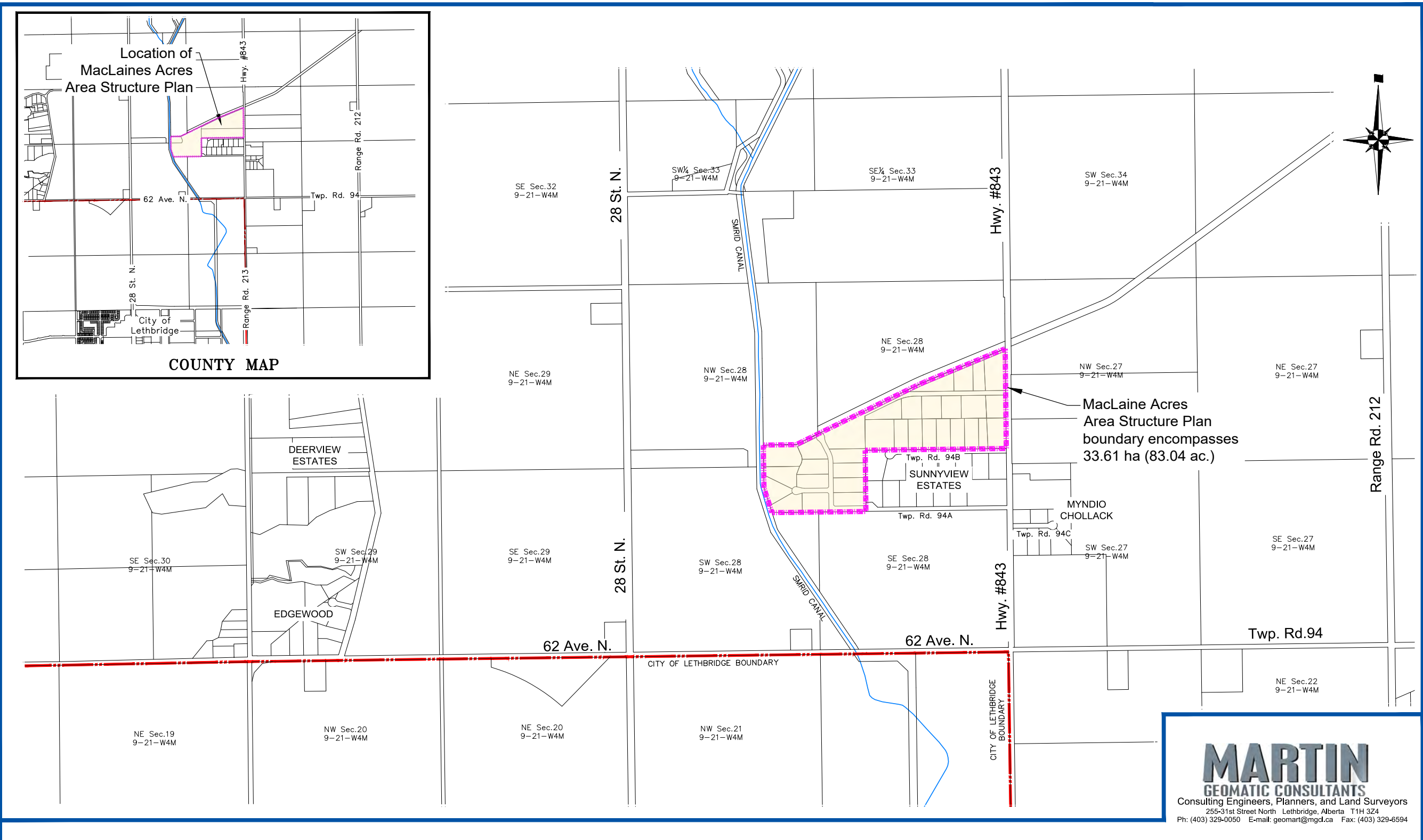
The County's Group Residential strategy requires that a market demand study be included with the ASP. After discussing this with some land appraisers and realtors it was determined that such a study is very difficult to undertake, it's also very inaccurate and requires a "crystal ball" approach.

It is possible that the lots in this ASP could take anywhere up to 10 or 15 years to be all sold. Estimating the market conditions over that period of time would be impossible. The best measure of market demand is the number of lots that are serviced at one time. Even though the ASP may contain 30 lots, the developers of MacLaine Acres will only service lots that they can foresee will be sold in relatively a short time period.

The ASP provides the framework for how the development is to proceed. Just because the ASP is approved it does not mean servicing all the lots at one time. With respect to this development, the owner of Phase 1A has about 5 buyers that are interested in purchasing now. As such his plan is to service all 7 lots right away. The owner of Phase 1B has indicated he would not be servicing any lots for about 3 years. Even then he will not start servicing until he has purchaser interest in approximately 5 lots. The balance would be serviced based on market demand at that time. The owner of Phase 2 has no plans for servicing the lots. It could be 5 to 10 years before he gets started. The developers will regulate putting lots on the market only when there is purchaser interest and even then the servicing will be done in small phases.

FIGURES

1. GENERAL LOCATION PLAN
2. LAND USE CONCEPT
3. EXISTING SITE
4. AERIAL PHOTOGRAPH
5. LOT LAYOUT - PHASE 1
6. LOT LAYOUT – PHASE 2
7. STORMWATER MANAGEMENT



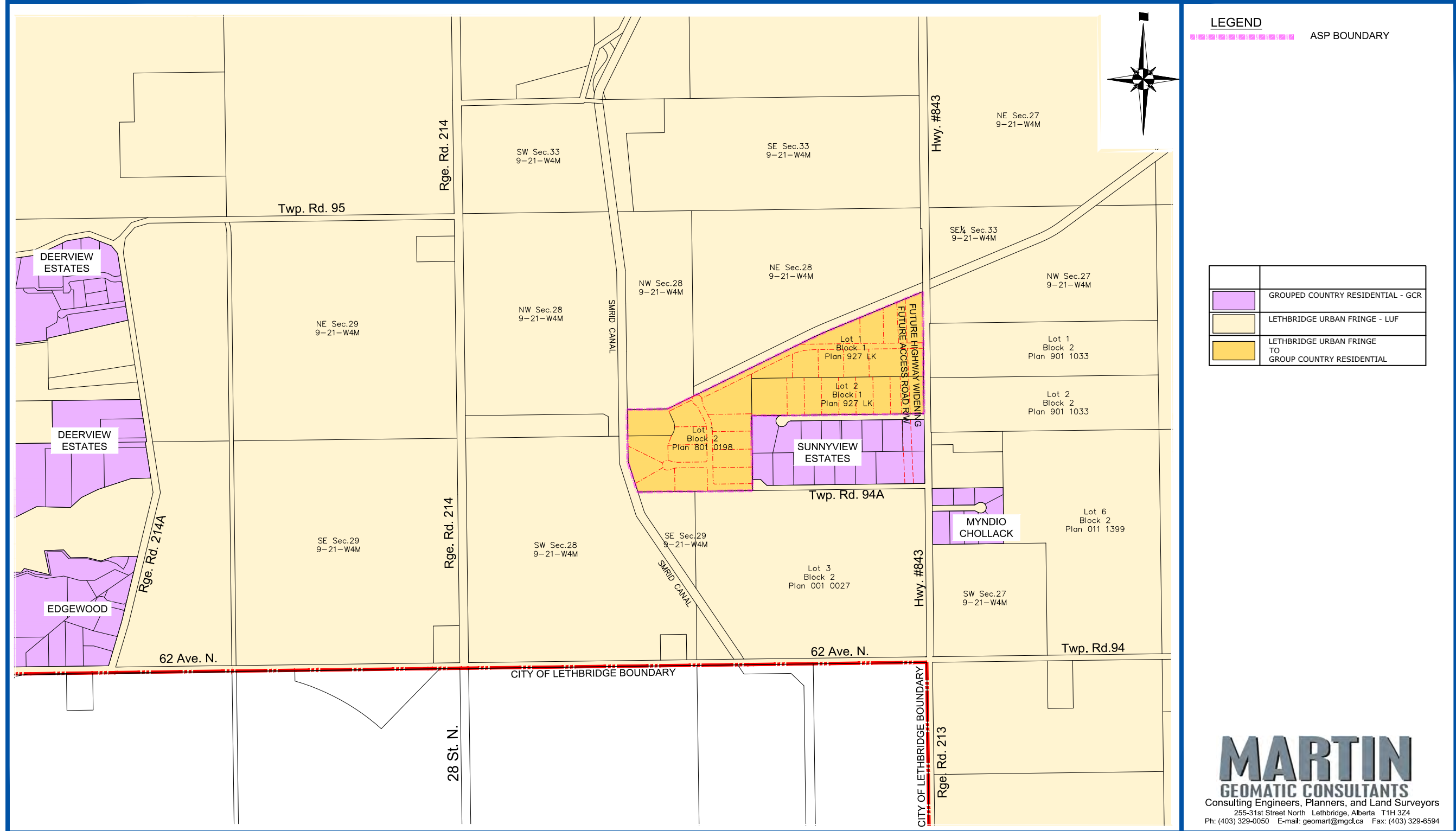
MacLaine Acres

AREA STRUCTURE PLAN

GENERAL LOCATION PLAN FIGURE 1.0

May 11, 2022

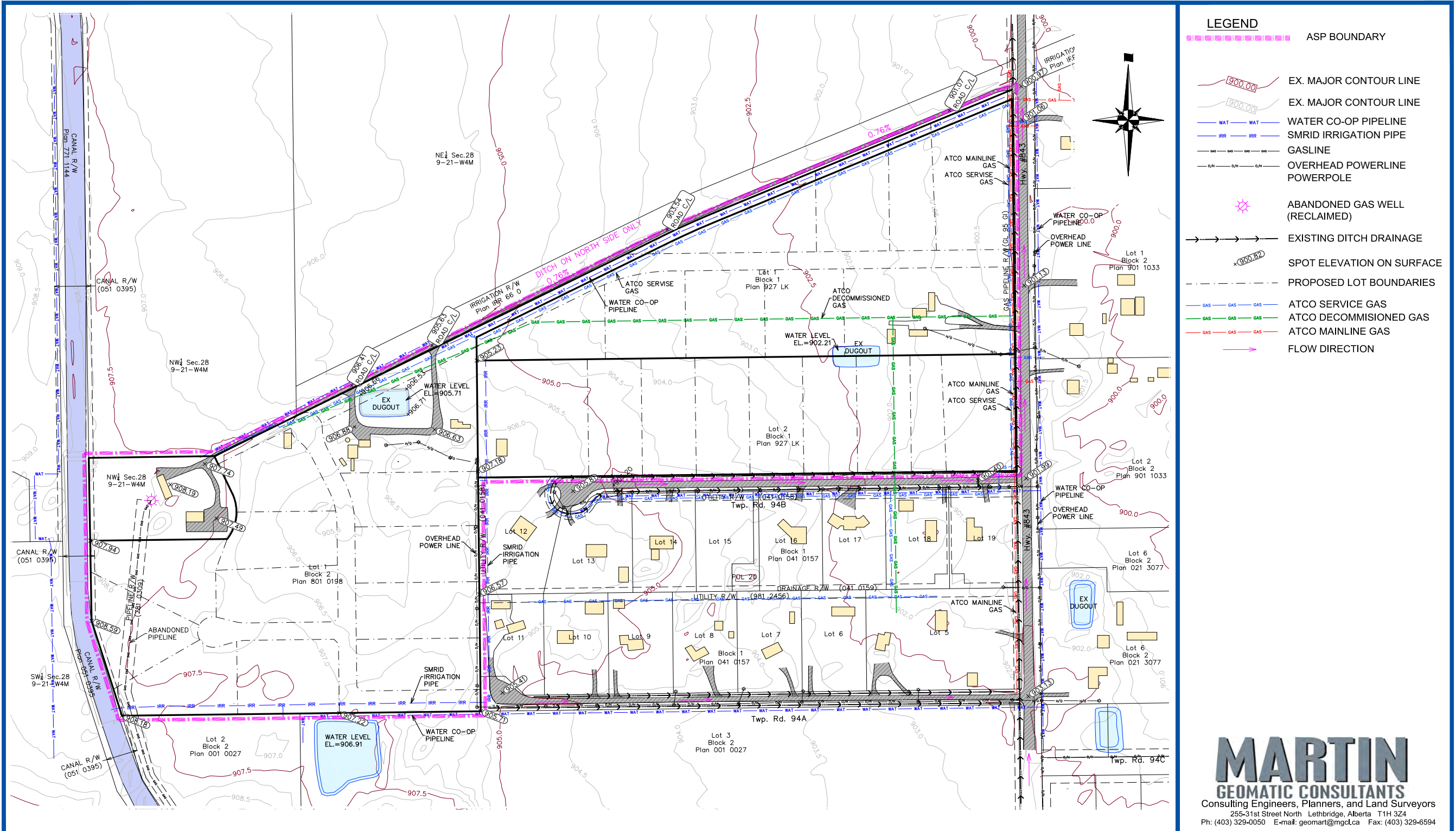
208645CE



MacLaine Acres

AREA STRUCTURE PLAN

LAND USE CONCEPT
FIGURE 2.0



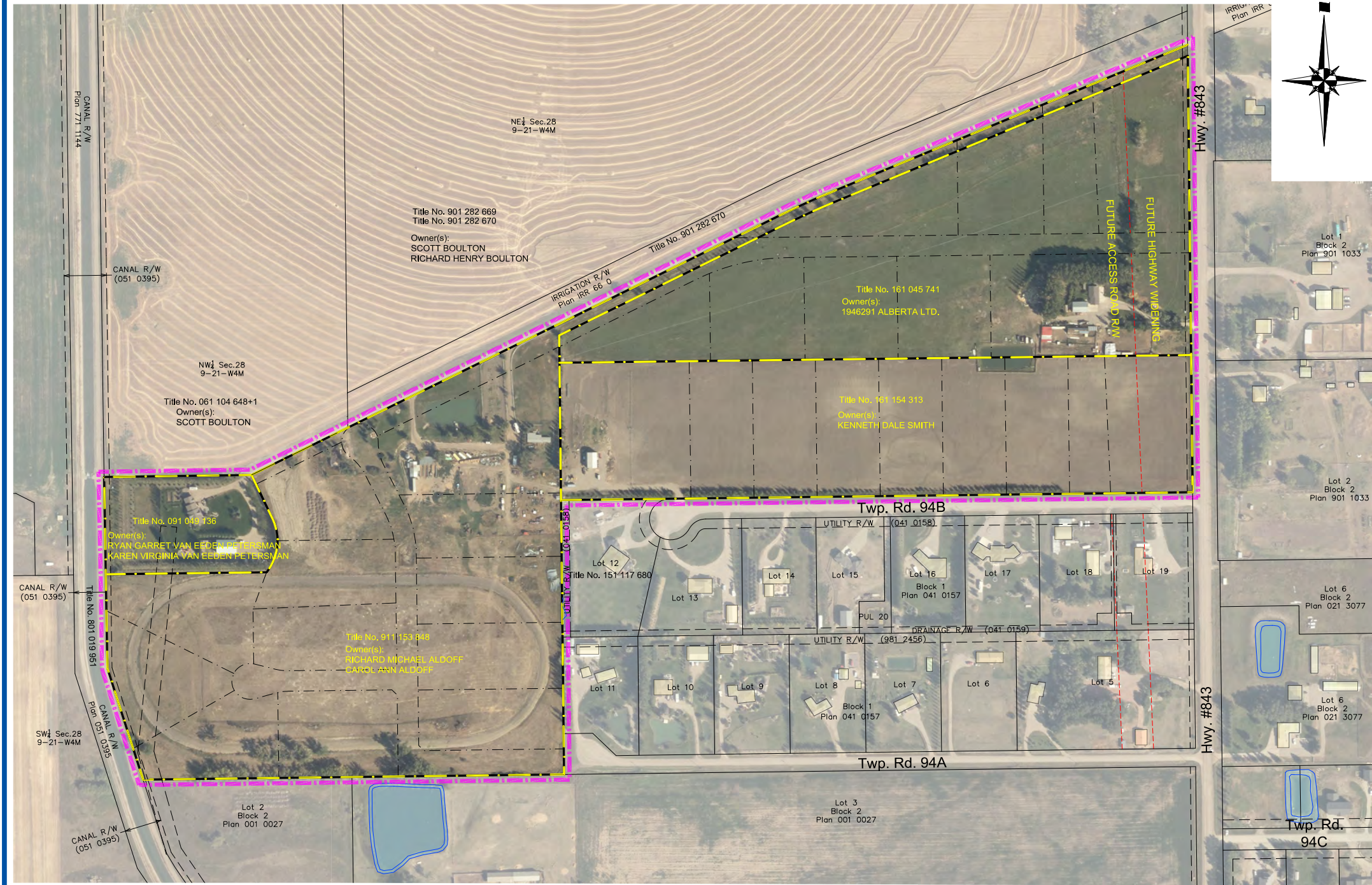
MacLaine Acres

AREA STRUCTURE PLAN

EXISTING SITE
FIGURE 3.0

May 11, 2022

208645CE



LEGEND

ASP BOUNDARY

TITLE BOUNDARY

MARTIN
GEOMATIC CONSULTANTS
Consulting Engineers, Planners, and Land Surveyors
255-31st Street North Lethbridge, Alberta T1H 3Z4
Ph: (403) 329-0050 E-mail: geomart@mgcl.ca Fax: (403) 329-6594

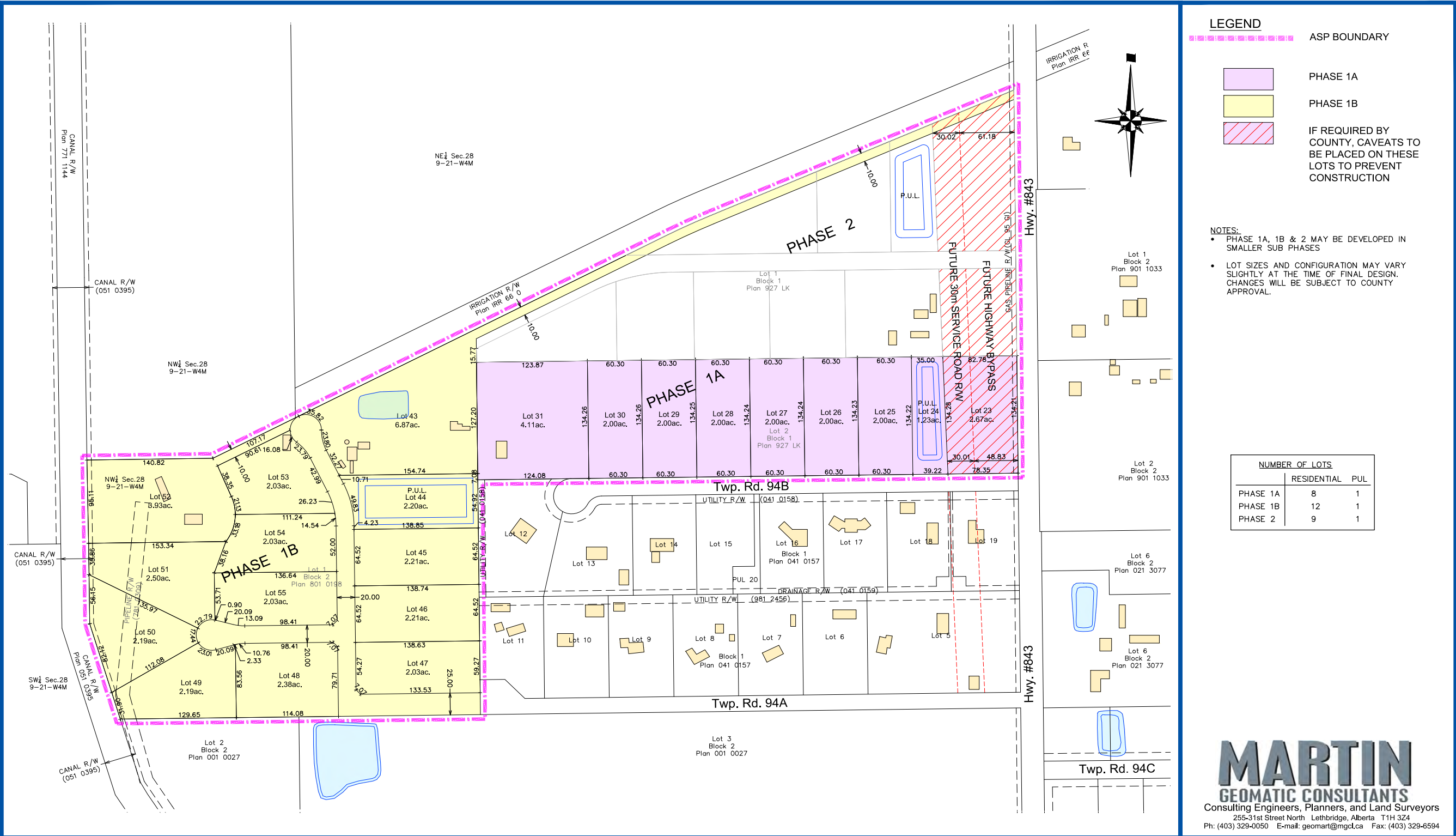
MacLaine Acres

AREA STRUCTURE PLAN

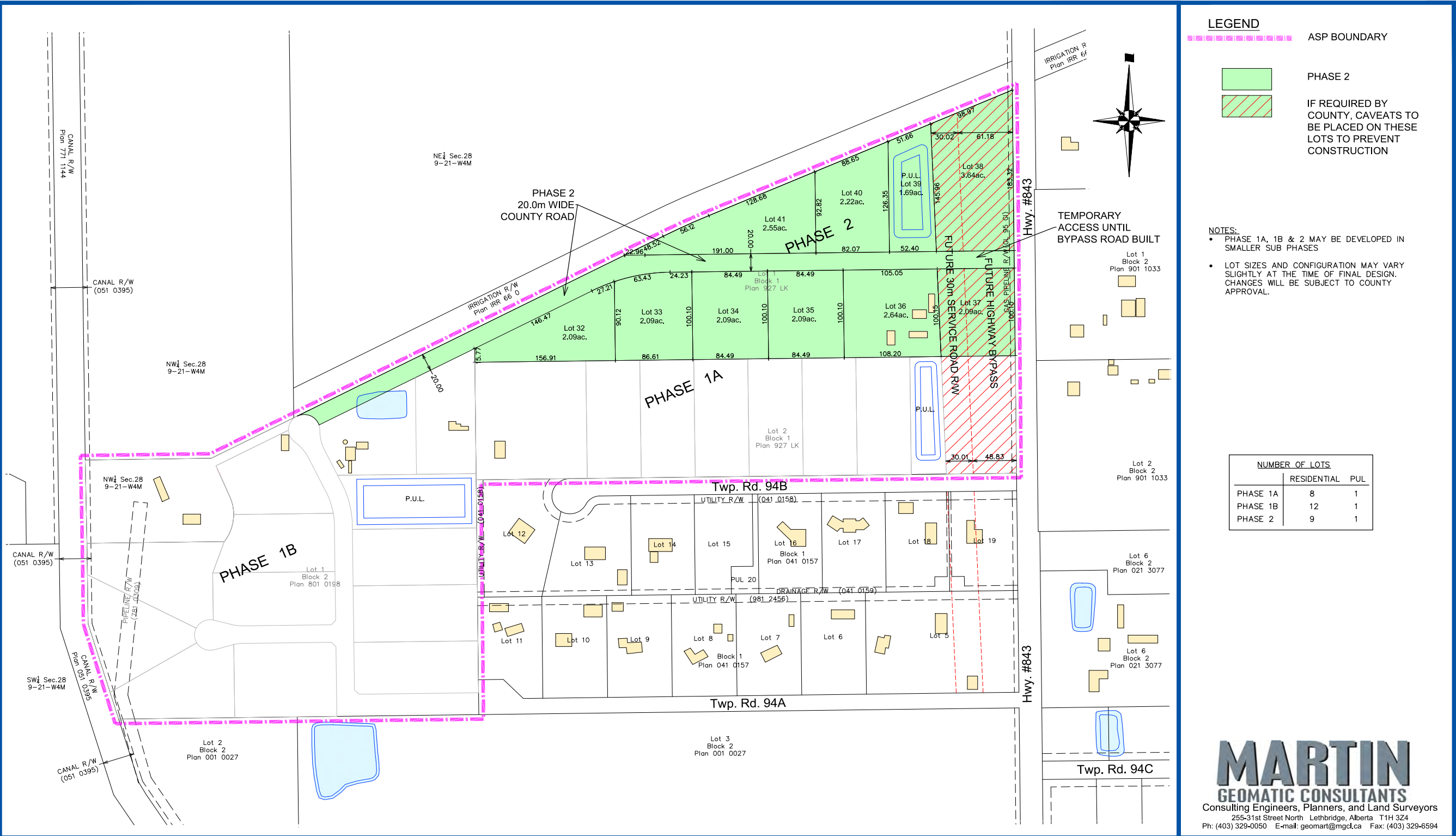
AERIAL PHOTO
FIGURE 4.0

May 11, 2022

208645CE



MacLaine Acres AREA STRUCTURE PLAN LOT LAYOUT - PHASE 1 FIGURE 5.0 May 11, 2022 208645CE



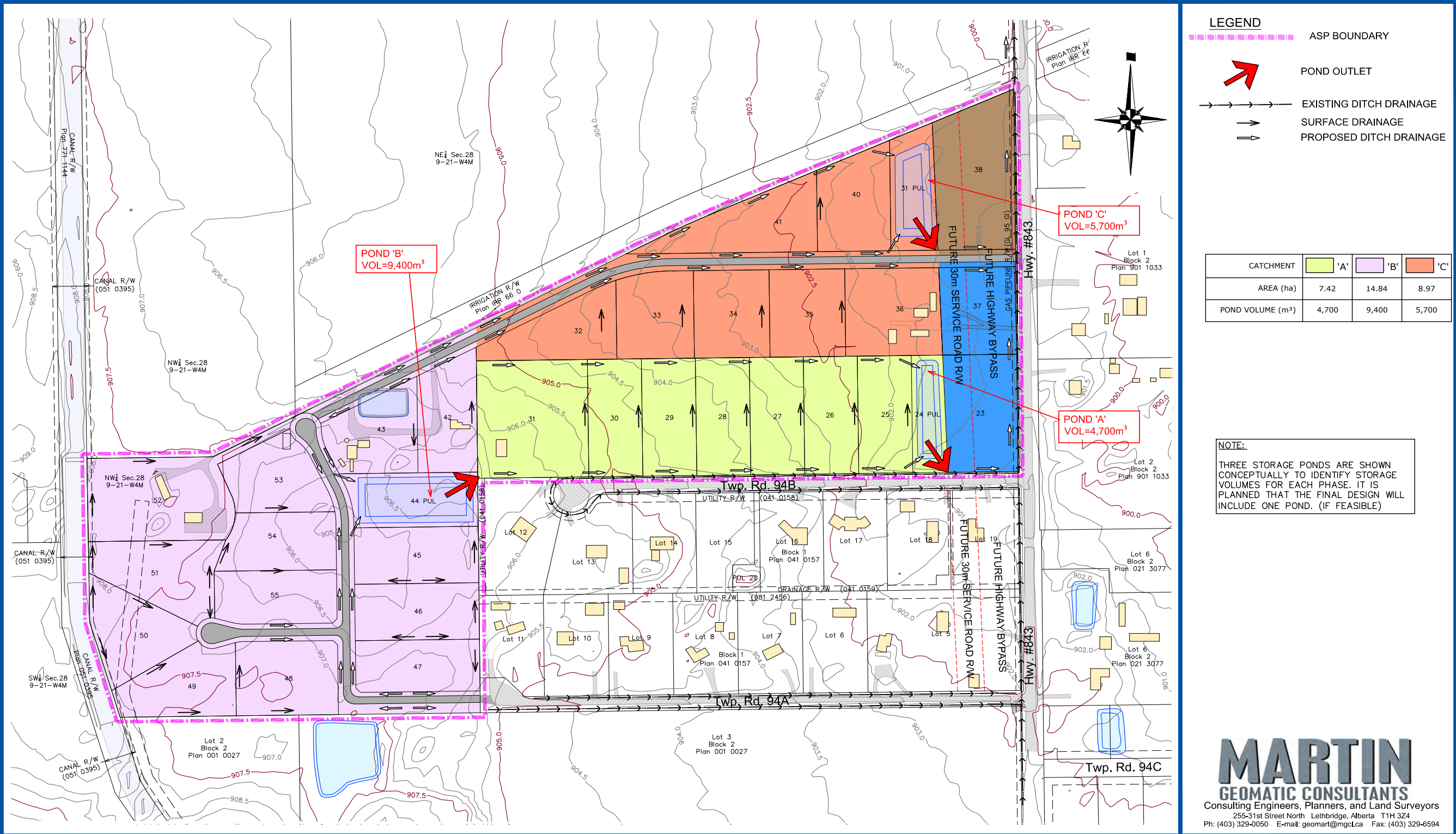
MacLaine Acres

AREA STRUCTURE PLAN

LOT LAYOUT - PHASE 2 FIGURE 6.0

May 11, 2022

208645CE



MacLaine Acres

AREA STRUCTURE PLAN

STORMWATER MANAGEMENT FIGURE 7.0

May 11, 2022

208645CE

APPENDIX

1. **PROPERTY OWNERSHIP TITLES**
2. **GEOTECHNICAL EVALUATION** (PROVIDED UNDER SEPARATE COVER)
3. **ENVIRONMENTAL SITE ASSESSMENT** (PROVIDED UNDER SEPARATE COVER)
4. **HISTORICAL RESOURCE ASSESSMENT**
5. **ADJACENT LANDOWNER CONSULTATION & OTHER CORRESPONDENCE**
 - MAP & LETTER SENT TO NEIGHBORS
 - NEIGHBORHOOD COMMENTS
 - MAP FROM SMRID
 - MAP FROM FORTIS
 - MAP FROM ALBERTA ENERGY REGULATOR
 - MAP FROM ATCO GAS
 - MAP FROM COUNTY OF LETHBRIDGE RURAL WATER ASSOCIATION
 - LETHBRIDGE COUNTY MAP "DEVELOPMENT CONSIDERATION"
6. **SEPTIC FEASIBILITY ASSESSMENT** (PROVIDED UNDER SEPARATE COVER)
7. **STORMWATER MANAGEMENT PLAN**
8. **SUNNY VIEW ASP CONCEPT DESIGN**
9. **ALBERTA TRANSPORTATION-PORION OF FIGURE 5.2.3 (LETHBRIDGE AND AREA NHS
& NSTC FUNCTIONAL PLANNING STUDY, MARCH 12, 2004 – STANTEC)**

APPENDIX 1

Property Ownership Titles



LAND TITLE CERTIFICATE

S
LINC SHORT LEGAL TITLE NUMBER
0031 401 425 4;21;9;28;NW 091 049 136

LEGAL DESCRIPTION

MERIDIAN 4 RANGE 21 TOWNSHIP 9
SECTION 28

THAT PORTION OF THE SOUTHERLY 313 FEET IN PERPENDICULAR WIDTH THROUGHOUT OF
THE NORTH WEST QUARTER WHICH LIES BETWEEN THE EAST LIMIT OF CANAL RIGHT OF WAY
ON PLAN 0510395 AND THE EAST LIMIT OF CANAL RIGHT OF WAY ON PLAN IRR55
EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME

ESTATE: FEE SIMPLE

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 061 010 978

REGISTERED OWNER(S)				
REGISTRATION	DATE (DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
091 049 136	23/02/2009	TRANSFER OF LAND	\$345,000	\$345,000

OWNERS

RYAN GARRET VAN EEDEN PETERSMAN

AND

KAREN VIRGINIA VAN EEDEN PETERSMAN

BOTH OF:

R.R. 8, SITE 41, COMP 15

LETHBRIDGE

ALBERTA T1J 4P4

AS JOINT TENANTS

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION	DATE (D/M/Y)	PARTICULARS
NUMBER		

7586LJ	03/11/1972	CAVEAT
--------	------------	--------

ENCUMBRANCES, LIENS & INTERESTS

PAGE 2

091 049 136

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY
LIMITED.

731 064 400 22/10/1973 UTILITY RIGHT OF WAY
GRANTEE - FORTISALBERTA INC.
320 - 17 AVENUE S.W.
CALGARY
ALBERTA T2S2Y1
"PORTION DESCRIBED"
(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 001299373)
(DATA UPDATED BY: CHANGE OF NAME 051006146)

761 094 355 26/07/1976 IRRIGATION ORDER/NOTICE
THIS PROPERTY IS INCLUDED IN THE ST. MARY RIVER
IRRIGATION DISTRICT

911 208 327 17/09/1991 CAVEAT
RE : EASEMENT
CAVEATOR - THE BOARD OF DIRECTORS OF THE ST. MARY
RIVER IRRIGATION DISTRICT
BOX 278
LETHBRIDGE
ALBERTA J1J3Y7

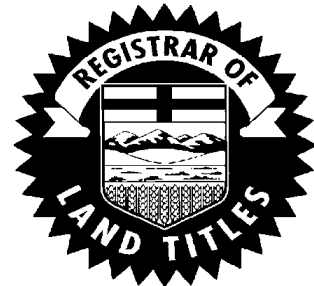
001 070 445 15/03/2000 EASEMENT
OVER AND FOR BENEFIT OF: (SEE INSTRUMENT)

TOTAL INSTRUMENTS: 005

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN
ACCURATE REPRODUCTION OF THE CERTIFICATE OF
TITLE REPRESENTED HEREIN THIS 22 DAY OF JULY,
2020 AT 04:31 P.M.

ORDER NUMBER: 39774534

CUSTOMER FILE NUMBER: 208645



END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED
FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER,
SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM
INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION,
APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS
PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING
OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S) .



LAND TITLE CERTIFICATE

S
LINC SHORT LEGAL TITLE NUMBER
0015 110 463 927LK;1;1 161 045 741

LEGAL DESCRIPTION
PLAN 927LK
BLOCK 1
LOT 1
EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME
AREA: 9.98 HECTARES (24.65 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE
ATS REFERENCE: 4;21;9;28;E

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 121 127 186

REGISTERED OWNER(S)				
REGISTRATION	DATE (DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
161 045 741	18/02/2016	TRANSFER OF LAND	\$600,000	\$600,000

OWNERS

1946291 ALBERTA LTD.
OF 94054 HWY 843
LETHBRIDGE
ALBERTA T1J 5R2
(DATA UPDATED BY: CHANGE OF ADDRESS 171243340)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION		
NUMBER	DATE (D/M/Y)	PARTICULARS
8048GH	02/01/1952	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. AS TO PORTION OR PLAN:GL95 "16.5 FT. STRIP"

1648LO . 07/07/1972 CAVEAT

ENCUMBRANCES, LIENS & INTERESTS

PAGE 2

161 045 741

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

RE : EASEMENT
CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY
LIMITED.

851 074 023 08/05/1985 CAVEAT
RE : EASEMENT
CAVEATOR - THE BOARD OF DIRECTORS OF ST. MARY RIVER
IRRIGATION DISTRICT.
P.O. BOX 278, LETHBRIDGE
ALBERTA T1J3Y7
AGENT - F J BREWIN

111 123 556 19/05/2011 UTILITY RIGHT OF WAY
GRANTEE - ATCO GAS AND PIPELINES LTD.

161 045 742 18/02/2016 MORTGAGE
MORTGAGEE - SERVUS CREDIT UNION LTD.
151 KARL CLARK RD NW
EDMONTON
ALBERTA T6N1H5
ORIGINAL PRINCIPAL AMOUNT: \$450,000

161 045 743 18/02/2016 CAVEAT
RE : ASSIGNMENT OF RENTS AND LEASES
CAVEATOR - SERVUS CREDIT UNION LTD.
151 KARL CLARK RD NW
EDMONTON
ALBERTA T6N1H5
AGENT - SARAH A BAINBRIDGE

171 029 546 01/02/2017 WRIT
CREDITOR - FRIEDA SANFORD
1601-25 AVE NORTH
LETHBRIDGE
ALBERTA T1H4N8
DEBTOR - PATRICK WAGNER
RR 8, SITE 41, COMP 18
LETHBRIDGE
ALBERTA T1J4P4
AMOUNT: \$1,976 AND COSTS IF ANY
ACTION NUMBER: 1606 00837

TOTAL INSTRUMENTS: 007

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN
ACCURATE REPRODUCTION OF THE CERTIFICATE OF
TITLE REPRESENTED HEREIN THIS 1 DAY OF
SEPTEMBER, 2020 AT 03:05 P.M.

ORDER NUMBER: 40022907

CUSTOMER FILE NUMBER: 208645LS



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APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS
PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING
OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).



LAND TITLE CERTIFICATE

S
LINC SHORT LEGAL TITLE NUMBER
0019 482 926 927LK;1;2 161 154 313

LEGAL DESCRIPTION
PLAN 927LK
BLOCK 1
LOT 2
EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME
AREA: 8.1 HECTARES (20.02 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE
ATS REFERENCE: 4;21;9;28;E

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 121 127 186 +1

REGISTERED OWNER(S)				
REGISTRATION	DATE (DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
161 154 313	05/07/2016	TRANSFER OF LAND	\$405,000	\$405,000

OWNERS

KENNETH DALE SMITH
OF 5710-57 ST
TABER
ALBERTA T1G 1L1

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION		
NUMBER	DATE (D/M/Y)	PARTICULARS
8048GH	02/01/1952	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. AS TO PORTION OR PLAN:GL95 "16.5 FT STRIP"
1648LO	07/07/1972	CAVEAT

ENCUMBRANCES, LIENS & INTERESTS

PAGE 2

161 154 313

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

RE : EASEMENT

CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY
LIMITED.

851 073 950 08/05/1985 CAVEAT

RE : EASEMENT

CAVEATOR - THE BOARD OF DIRECTORS OF ST. MARY RIVER
IRRIGATION DISTRICT.

P.O. BOX 278, LETHBRIDGE

ALBERTA T1J3Y7

AGENT - F J BREWIN

111 123 556 19/05/2011 UTILITY RIGHT OF WAY

GRANTEE - ATCO GAS AND PIPELINES LTD.

TOTAL INSTRUMENTS: 004

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN
ACCURATE REPRODUCTION OF THE CERTIFICATE OF
TITLE REPRESENTED HEREIN THIS 1 DAY OF
SEPTEMBER, 2020 AT 03:31 P.M.

ORDER NUMBER: 40023326

CUSTOMER FILE NUMBER: 208645LS



END OF CERTIFICATE

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APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS
PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING
OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).



LAND TITLE CERTIFICATE

S
LINC SHORT LEGAL TITLE NUMBER
0016 608 770 8010198;2;1 911 153 848

LEGAL DESCRIPTION
PLAN 8010198
BLOCK 2
LOT 1
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 14.1 HECTARES (34.84 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE
ATS REFERENCE: 4;21;9;28

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 861 107 528

REGISTERED OWNER(S)				
REGISTRATION	DATE (DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
911 153 848	16/07/1991	TRANSFER OF LAND	\$45,000	SEE INSTRUMENT

OWNERS

RICHARD MICHAEL ALDOFF

AND

CAROL ANN ALDOFF

BOTH OF:

S S 1-2-49

LETHBRIDGE

ALBERTA T1J 4B3

AS JOINT TENANTS

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION		
NUMBER	DATE (D/M/Y)	PARTICULARS
741 021 660	08/03/1974	UTILITY RIGHT OF WAY GRANTEE - FORTISALBERTA INC. 320 - 17 AVENUE S.W.

ENCUMBRANCES, LIENS & INTERESTS

PAGE 2

911 153 848

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

CALGARY
ALBERTA T2S2Y1
"30 FT STRIP"
(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 001298059)
(DATA UPDATED BY: CHANGE OF NAME 051006321)

761 133 668 29/10/1976 CAVEAT
CAVEATOR - CONOCOPHILLIPS CANADA OPERATIONS LTD.
P.O. BOX 4365, POSTAL STATION C
CALGARY
ALBERTA T2T5N2
AGENT - KATHY M TROFIN
(DATA UPDATED BY: CHANGE OF ADDRESS 031242905)
(DATA UPDATED BY: TRANSFER OF CAVEAT
091085519)
(DATA UPDATED BY: TRANSFER OF CAVEAT
091210804)

791 020 979 09/02/1979 UTILITY RIGHT OF WAY
GRANTEE - CONOCOPHILLIPS CANADA OPERATIONS LTD.
"SW 1/4"
(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 091205485)

791 020 980 09/02/1979 UTILITY RIGHT OF WAY
GRANTEE - CONOCOPHILLIPS CANADA OPERATIONS LTD.
"SW 1/4 OF SEC 28-9-21-4"
(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 091205451)

791 020 981 09/02/1979 UTILITY RIGHT OF WAY
GRANTEE - CONOCOPHILLIPS CANADA OPERATIONS LTD.
"SW 1/4 SEC 28-9-21-4"
(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 091205485)

971 093 143 05/04/1997 CAVEAT
RE : EASEMENT
CAVEATOR - THE BOARD OF DIRECTORS OF ST. MARY RIVER
IRRIGATION DISTRICT.
P.O. BOX 278, LETHBRIDGE
ALBERTA T1J3Y7

991 292 262 07/10/1999 MORTGAGE
MORTGAGEE - ALBERTA TREASURY BRANCHES.
601 MAYOR MAGRATH DR.S
LETHBRIDGE
ALBERTA

ENCUMBRANCES, LIENS & INTERESTS

PAGE 3

911 153 848

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

ORIGINAL PRINCIPAL AMOUNT: \$55,000

001 225 359 12/08/2000 AMENDING AGREEMENT

AMOUNT: \$77,300

AFFECTS INSTRUMENT: 991292262

021 035 034 29/01/2002 UTILITY RIGHT OF WAY

GRANTEE - COUNTY OF LETHBRIDGE RURAL WATER
ASSOCIATION LIMITED.

021 365 728 18/10/2002 CAVEAT

RE : OPTION TO PURCHASE

CAVEATOR - ST MARY RIVER IRRIGATION DISTRICT.

P.O. BOX 278

LETHBRIDGE

ALBERTA T1J3Y7

111 222 936 31/08/2011 UTILITY RIGHT OF WAY

GRANTEE - ATCO GAS AND PIPELINES LTD.

TOTAL INSTRUMENTS: 011

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN
ACCURATE REPRODUCTION OF THE CERTIFICATE OF
TITLE REPRESENTED HEREIN THIS 22 DAY OF JULY,
2020 AT 04:31 P.M.

ORDER NUMBER: 39774534

CUSTOMER FILE NUMBER: 208645



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PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING
OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).

APPENDIX 2

Geotechnical Evaluation

PROVIDED UNDER SEPARATE COVER

APPENDIX 3

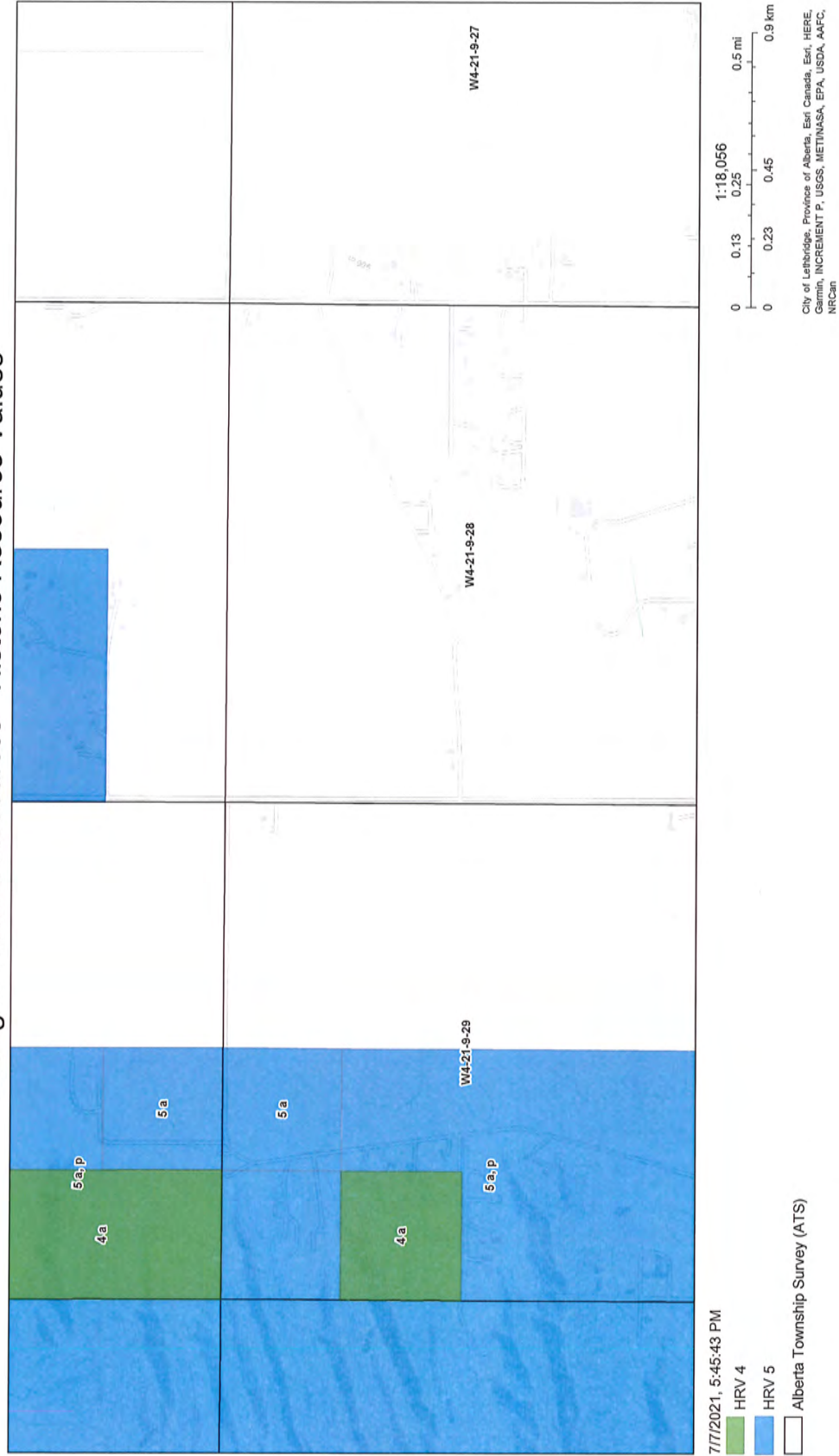
Environmental Site Assessment

PROVIDED UNDER SEPARATE COVER

APPENDIX 4

Historical Resource Assessment

Listing of Historic Resources - Historic Resource Values



Subdivision *Historical Resources Act* Compliance

PURPOSE: To identify the circumstances under which proposed subdivisions require *Historical Resources Act* approval and to provide guidelines for the submission of applications to obtain approval.

SCOPE: Subdivision applicants, developers, municipalities, and other planning authorities in Alberta.

BACKGROUND: In accordance with Section 5(5) of the [Subdivision and Development Regulation](#), applications for subdivision of areas containing or likely to contain historic resources must be referred to Alberta Culture and Tourism. This applies equally to private and public lands.

PROCEDURES - ROUTINE:

Subdivision

The subdivision authority and/or the owner/developer must consult Alberta Culture and Tourism's *Listing of Historic Resources*¹ to determine if the lands that are subject to subdivision have been flagged as having a **Historic Resource Value (HRV)**.

1. **If the subject lands do not overlap areas identified in the *Listing of Historic Resources*, *Historical Resources Act* approval is not required, although the provisions of Section 31 of the *Historical Resources Act* still apply.²**

¹ Alberta Culture and Tourism's *Listing of Historic Resources* is a publically available list of lands that contain, or are likely to contain, significant historic resources. Updated twice yearly, the *Listing* is an information resource for residential, commercial, and industrial developers and can guide the regulatory approval process. The *Listing* and Instructions for Use are available at: <https://www.alberta.ca/listing-historic-resources.aspx>.

² It is important to note that, even if *Historical Resources Act* approval is not required prior to the initiation of land surface disturbance activities, or if *Historical Resources Act* approval has been granted, Section 31 of the *Act* requires that anyone who discovers a historic resource, such as an archaeological, palaeontological, historic structures or Aboriginal Traditional Use site, during the course of development activities must cease work and notify Alberta Culture and Tourism immediately for further direction on the most appropriate action. Details about who to contact can be found in [Standard Requirements under the *Historical Resources Act*. Reporting the Discovery of Historic Resources](#).

2. **If the subject lands wholly or partially overlap areas identified as having an HRV of 1, 2, 3, or 4 in the *Listing of Historic Resources*, *Historical Resources Act* approval is required.** A Historic Resources (HR) Application must be submitted to Alberta Culture and Tourism via the Online Permitting and Clearance ([OPaC](#)) system.³ Development activities, including any land disturbance, may not proceed until *Historical Resources Act* approval has been obtained in writing.⁴
3. **If the subject lands wholly or partially overlap areas identified as having an HRV of 5 (and no other value) in the *Listing of Historic Resources*, *Historical Resources Act* approval must be obtained through the submission of an HR Application, with the following exceptions:**
 - First parcel out
 - 80-acre split
 - Lot line/boundary adjustment
 - Parcel consolidation

Subdivisions for these four purposes do not require *Historical Resources Act* approval if situated in lands assigned an HRV of 5 only. Subdivision of HRV 5 lands for all other purposes do require *Historical Resources Act* approval, and development, including any land disturbance, may not proceed until this approval has been obtained in writing.

Lands that contain, or are likely to contain, significant historic resources may require the conduct of a [Historic Resources Impact Assessment](#) (HRIA) prior to development. If required, this direction will be communicated in Alberta Culture and Tourism's response to the HR application. An HRIA must be conducted by a qualified heritage consultant on behalf of the developer, at the developer's expense. Results of the HRIA must be reported to Alberta Culture and Tourism and subsequent *Historical Resources Act* approval must be granted before development proceeds.

Where a proposed subdivision includes lands that overlap areas with HRVs on the Listing, a Subdivision Authority may choose to submit the details for review in an HR Application prior to subdivision approval or condition *Historical Resource Act* approval as part of their subdivision approval. In these instances, no development activities are to commence until *Historical Resources Act* approval has been granted.

³ Information regarding Historic Resources Applications and the OPaC system can be found at: <https://www.alberta.ca/online-permitting-clearance.aspx>.

⁴ Where *Historical Resources Act* approval is required, the Historic Resources Application must include all lands in the subdivision area, not just those identified as having an HRV.

Area Structure and Redevelopment Plans

Alberta Culture and Tourism recommends that municipalities and/or developers submit for review through the OPaC system, all Area Structure Plans, Area Redevelopment Plans, and other long-term planning documents. The outcome of this review will provide the applicant with information about historic resource concerns in the planning areas and may offer guidance for developing strategies to address these concerns.

PROCEDURES – NON-ROUTINE:

Notwithstanding the instruction provided above, if Alberta Culture and Tourism is made aware of historic resource concerns associated with lands not included in the *Listing of Historic Resources*, direction may be given to submit an HR application. This direction is made under Section 37(2) of the [Historical Resources Act](#) and can be applied to any type of project.

For further information please contact:

[Head, Regulatory Approvals & Information Management](#)
Historic Resources Management Branch
Alberta Culture and Tourism

Approved by: Darryl Bereziuk, Director, Archaeological Survey

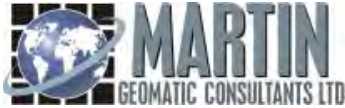
Date: January 22, 2019

APPENDIX 5

Adjacent Landowner Consultation and other Correspondence

- Map & Letter Sent To Neighbors
- Neighborhood Comments
- Map from SMRID
- Map from Fortis
- Map from Alberta Energy Regulator
- Map from ATCO Gas
- Map from County of Lethbridge Rural Water Association
- Lethbridge County Map “Development Consideration”

Map & Letter Sent To Neighbors



CONSULTING ENGINEERS, PLANNERS & LAND SURVEYORS
255 – 31st Street North, Lethbridge, Alberta, T1H 3Z4
PH: (403) 329-0050 FAX: (403) 329-6594
Email: geomart@mgcl.ca

May 2nd, 2022

File: 208645CE

Dear Neighbor:

Re: Proposed Subdivision – Area Structure Plan
Lethbridge County, Alberta
Sec. 28-9-21-W4

We are writing to provide notification and to seek feedback regarding a new country residential development being planned in your community. We are preparing an Area Structure Plan report in support of a twenty-seven lot subdivision located at the properties of Rick Aldoff, Ken Smith, and Pat Wagner along Highway 843, Township roads 94-A and 94-B. The development would follow the Lethbridge County Land Use Bylaw for Group Country Residential zoning. The concept drawings are attached for your reference.

A brief description of the planned development follows:

The 27 lot country residential subdivision is located along Highway 843, approximately 1 kilometer north of 62 Avenue North which is the City of Lethbridge boundary. Existing rural residential properties border the development area to the south, the Saint Mary River Irrigation District (SMRID) canal borders the property to the west, and an SMRID pipeline right-of-way borders the north of the property. Each of the 27 lots would be a minimum of 2 acres in area. There would be a graveled public roadway constructed as an extension to Township Road 94A, which would loop through the development and ultimately connect with Highway 843. In order to manage runoff, three storm water ponds would be built within the development. Surrounding the ponds would be landscaped areas to function as public green spaces. Potable water servicing is anticipated to be provided by the County of Lethbridge Rural Water Association or an approved alternate system. Private septic systems will be used to provide on-site wastewater treatment and disposal for each individual lot. Utility servicing would be provided to each lot, including electricity, natural gas, and telecommunications. A community irrigation system is planned to supply untreated irrigation water to each lot for lawn and garden use. Architectural controls are intended to help ensure a high quality development. A phased development plan is anticipated with about 3 phases of construction. The demands of the housing market would influence the timing of each phase.

If you have any comments or concerns about the proposed development, please feel free to contact one of the owners or Martin Geomatic Consultants Ltd. (MGCL) at the contact information listed below. (Please note that if your comment or concerns are technical in nature please contact Matt Redgrave or Ray Martin at MGCL for further assistance)



Owners:

Rick and Carol Aldoff
3601 Redwood Road South,
Lethbridge County, Alberta, T1J 5R2
(403)382-1136
silverspurex@hotmail.com

Ken Smith
3494046 Highway 843
Lethbridge County, Alberta, T1J 5R3
(587)220-4290
Medieval.ken@outlook.com

Pat Wagner
94054 Highway 843,
Lethbridge County, Alberta, T1J 5R2
(403)359-0858
carbonfiberresin@gmail.com

Consultant:

Martin Geomatic Consultants Ltd. (MGCL):

Attention: Ray Martin, P.Eng.,
255 – 31st Street North, Lethbridge, Alberta, T1H 3Z4
(403) 329-0050
raym@mgcl.ca

It would be appreciated if we could receive your comments by May 10th, 2022. We will respond to and address any comments received.

If you do not have any concerns with the proposed development, please read and sign the box below, and provide a copy to one of the contacts above.

Thank you,



Ray Martin, P.Eng
Civil Engineer

I, _____ (print names),

of _____ (address),

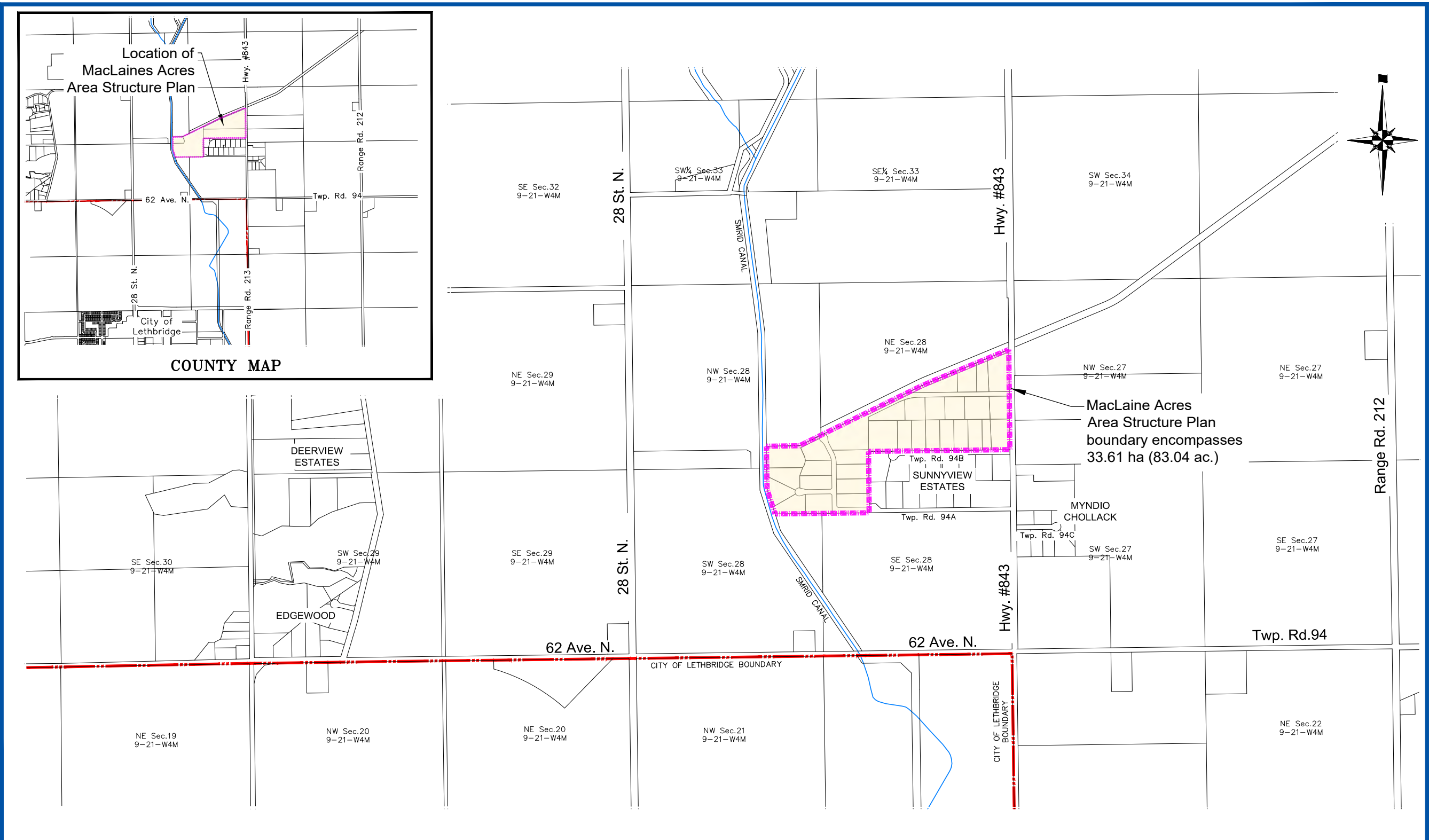
have received the letter and concept drawings from MGCL, dated May 2nd, 2022 outlining the planned 27 lot rural residential development (Aldoff, Smith, Wagner) in Sec-28-9-21 W4M, Lethbridge County.

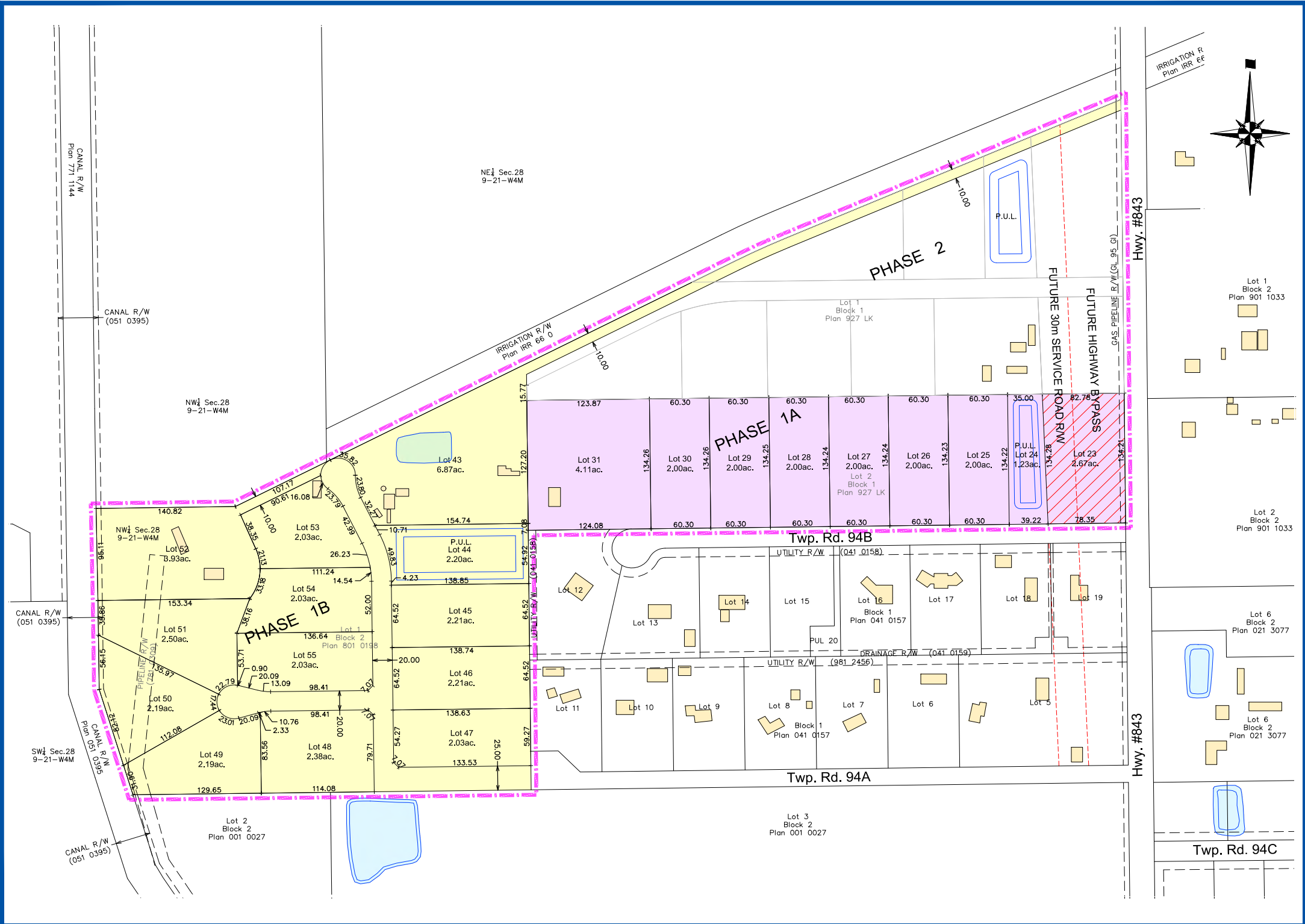
I have reviewed the letter and concept plans and have no concerns with the proposed development at this time, based on the information received.

Regards,

(sign names)

(date)



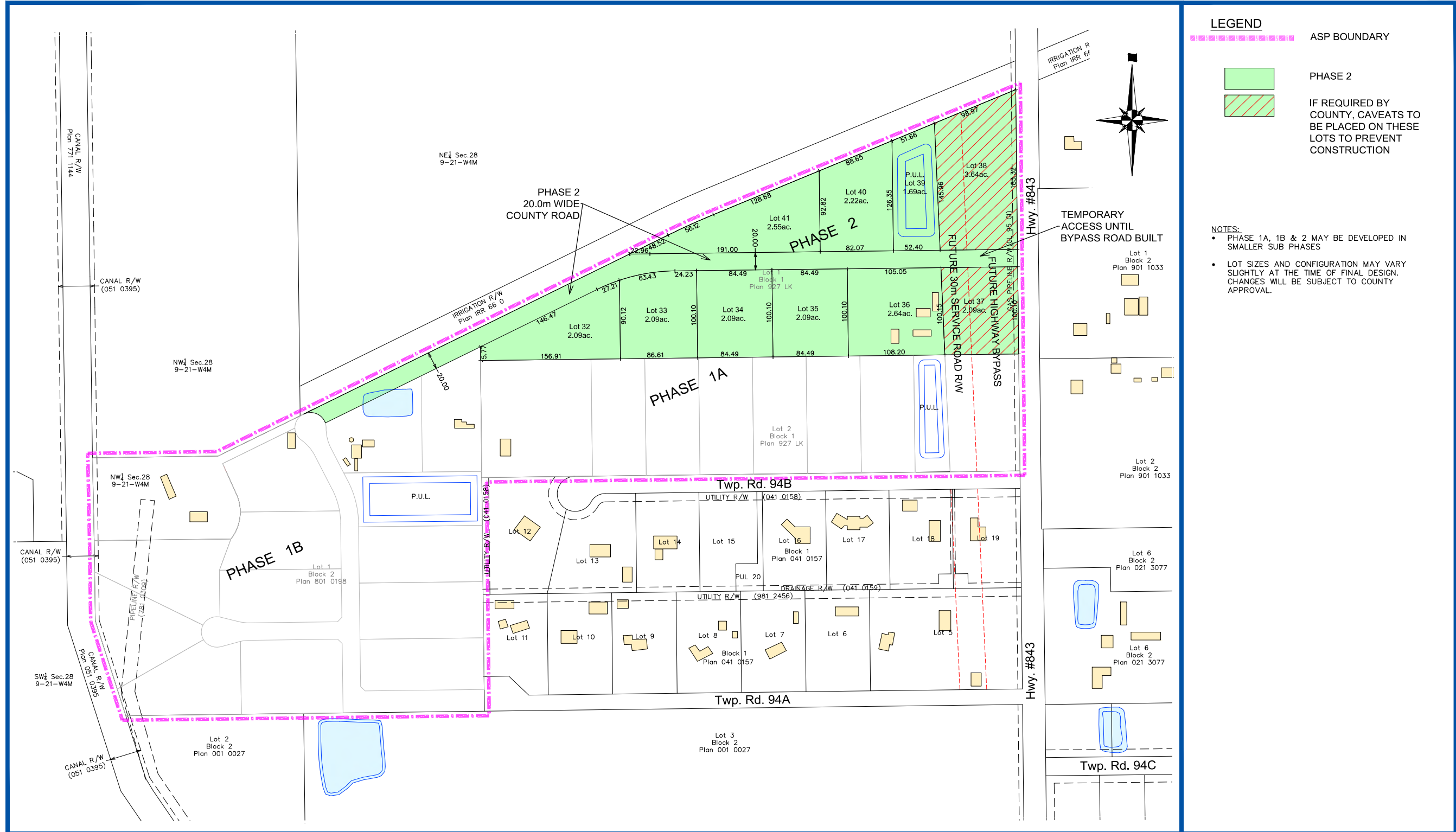


LEGEND

- ASP BOUNDARY
- PHASE 1A
- PHASE 1B
- IF REQUIRED BY COUNTY, CAVEATS TO BE PLACED ON THESE LOTS TO PREVENT CONSTRUCTION

NOTES:

- PHASE 1A, 1B & 2 MAY BE DEVELOPED IN SMALLER SUB PHASES
- LOT SIZES AND CONFIGURATION MAY VARY SLIGHTLY AT THE TIME OF FINAL DESIGN. CHANGES WILL BE SUBJECT TO COUNTY APPROVAL.



Neighborhood Comments

raym@mgcl.ca

From: bhuizing@xplornet.com
Sent: Thursday, December 30, 2021 6:48 PM
To: mattr@mgcl.ca
Cc: raym@mgcl.ca
Subject: Proposed Subdivision

Follow Up Flag: Follow up
Flag Status: Flagged

1. We are very concerned about the proposed subdivision! We first bought an acreage to get away from the city. Now this will become a high density living area. Not what we had anticipated in our future.
2. The water table in our area is high enough now with the way things are. Our sump pump runs too much now, especially when our neighbor to the north (proposed developer) waters his field endlessly for no apparent reason.
3. The previous owner of the farm assured us that no one will build across from us. As stated previously, we came to the country to get away from people. We do not want more here to add to traffic, dogs and other animals. When we first purchased our acreages, we had to sign off that there were not to be any farm animals allowed. We know there are dogs in the area that wander in packs, and create damage. We don't need to have more dogs running around and defecating in our yards!

Sincerely,

Bernie & Holly Huizing

285 - 31st. North

I, Neal Dekens (print names),
of #28-94032 Hwy 843 (address),
have received the letter and concept drawings from MGCL, dated May 2nd, 2022 outlining the planned 27 lot rural residential development (Aldoff, Smith, Wagner) in Sec-28-9-21 W4M, Lethbridge County.
I have reviewed the letter and concept plans and have ~~no~~ concerns with the proposed development at this time, based on the information received.
Regards,
Neal Dekens (sign names)
May 31/2022 (date)
403-635-5323

① you cannot put in any new access until Hwy 843 is Paved, at the present time it can not be maintained as is.

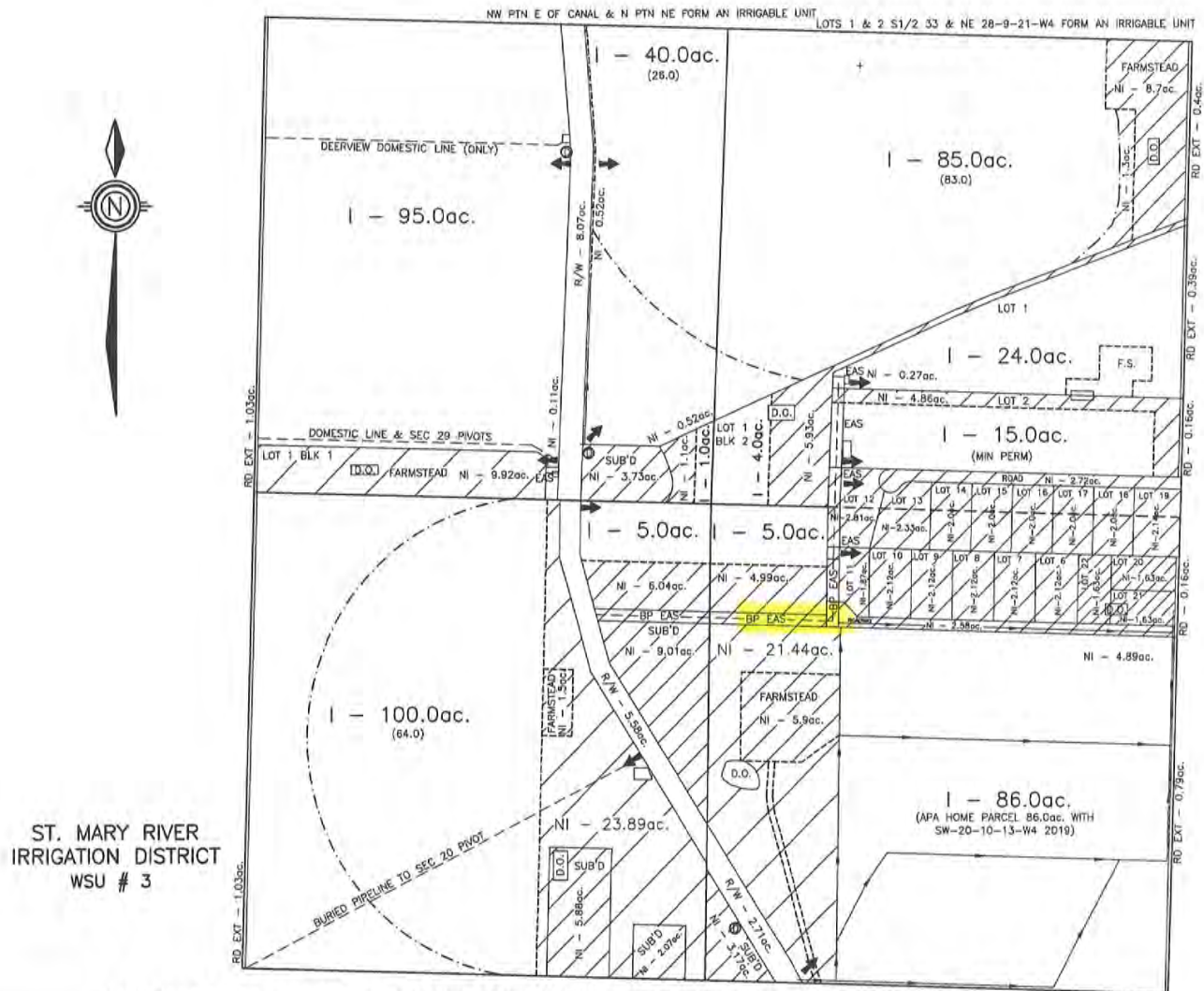
② also there isn't enough water coop permits

③ if + when development happens has to be paved. it shows 16 should be paved. 94A Twp Rd 94032

④ in your Report, Sunnyview Estates ~~and~~ 8 parcels, Myndio's is also - 8 parcels not ~~Myndio's~~ - chollack parcels is across Hwy 843

\\SYNOLOGY-NAS\mgcl-data\DATA\Active Projects\208645 ASP Aldoff\CEIL001 REM_ ASP Notice to neighbors_20220502.doc

Map from SMRID



IRRIGATED ACRES MAP OF SEC. 28 TP. 9 RG. 21 W.4

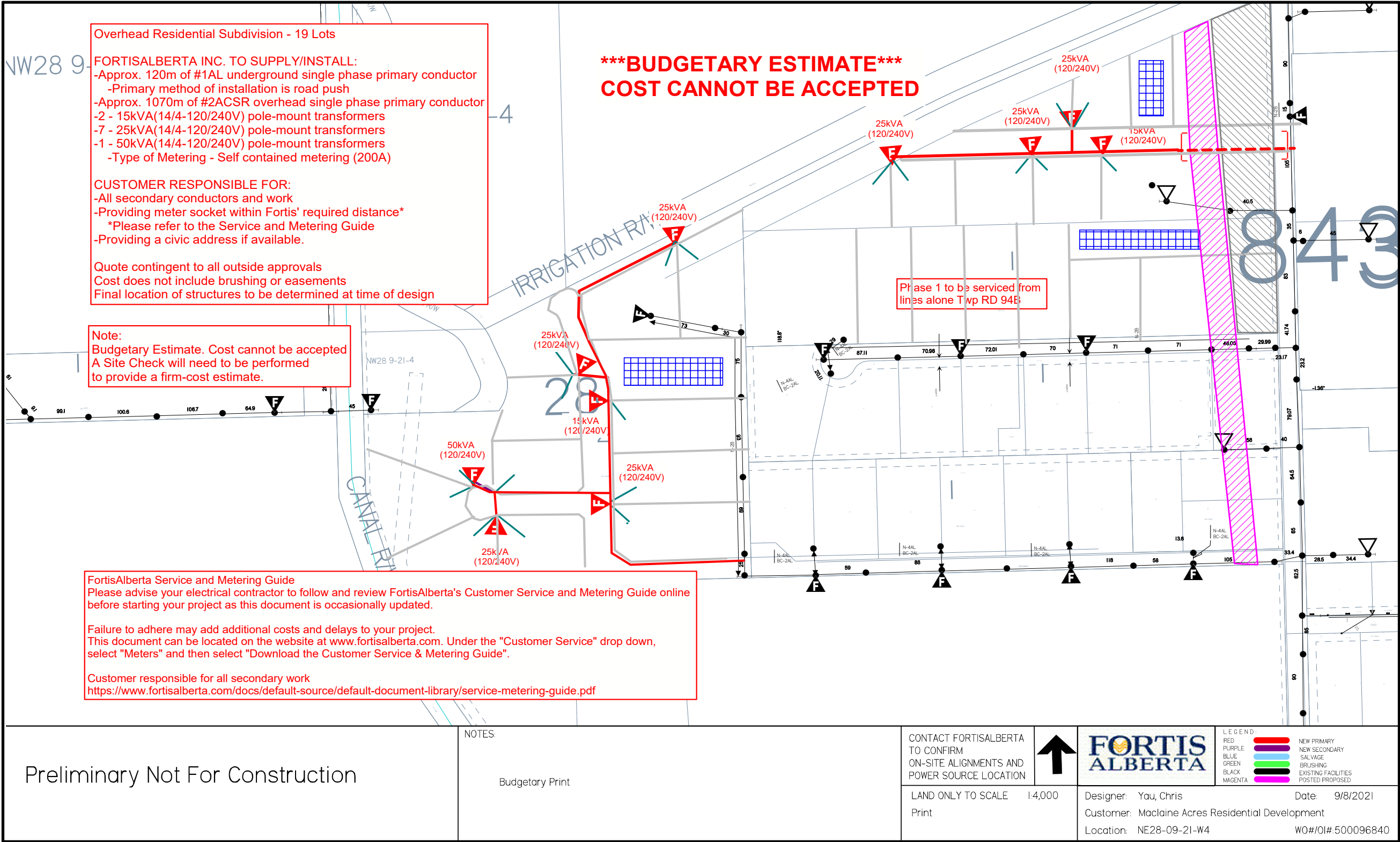
LEGEND			
0.0ac.	IRRIG. AREAS (CLEAR)		DOMESTIC TURNOUT
NI - 0.0ac.	NOT IRRIGATED		PUMP SITE
	ALTERNATE PARCEL AGREEMENT		FARMSTEAD
	POINT OF DELIVERY		DUGOUT
	DRAINAGE CHANNEL		FIELD BOUNDARY
	BURIED PIPE		BURIED PIPELINE EAS
	BOUNDARY OF SPRINKLED AREA		

	S.E.	S.W.	N.W.	N.E.
IRR.	91.0	105.0	136.0	128.0
N.I.	65.34	48.39	15.9	31.05
R/W	2.71	5.58	8.07	
RD EXT	0.95	1.03	1.03	0.95
TOTAL	160.0	160.0	161.0	160.0

REPLACING IRRIGATED ACRES MAP DATED DEC. 2018.

JULY 1, 2019.
DATE

Map from Fortis



Map from Alberta Energy Regulator



Asset: Well Licences

Description

Well Licence Number: 0056743
Current Licensee Name: Husky Oil Operations Limited

Hyperlinks

[Asset Report](#)

Details

Well Licence Number
0056743

Well Name
HUSKY ETAL LETH. 11-28-9-21

Well Type
N/A

Well Symbol
Abandoned Gas

Is Well Sour
N

Current Licence Status
RecCertified

Current Licence Status Date



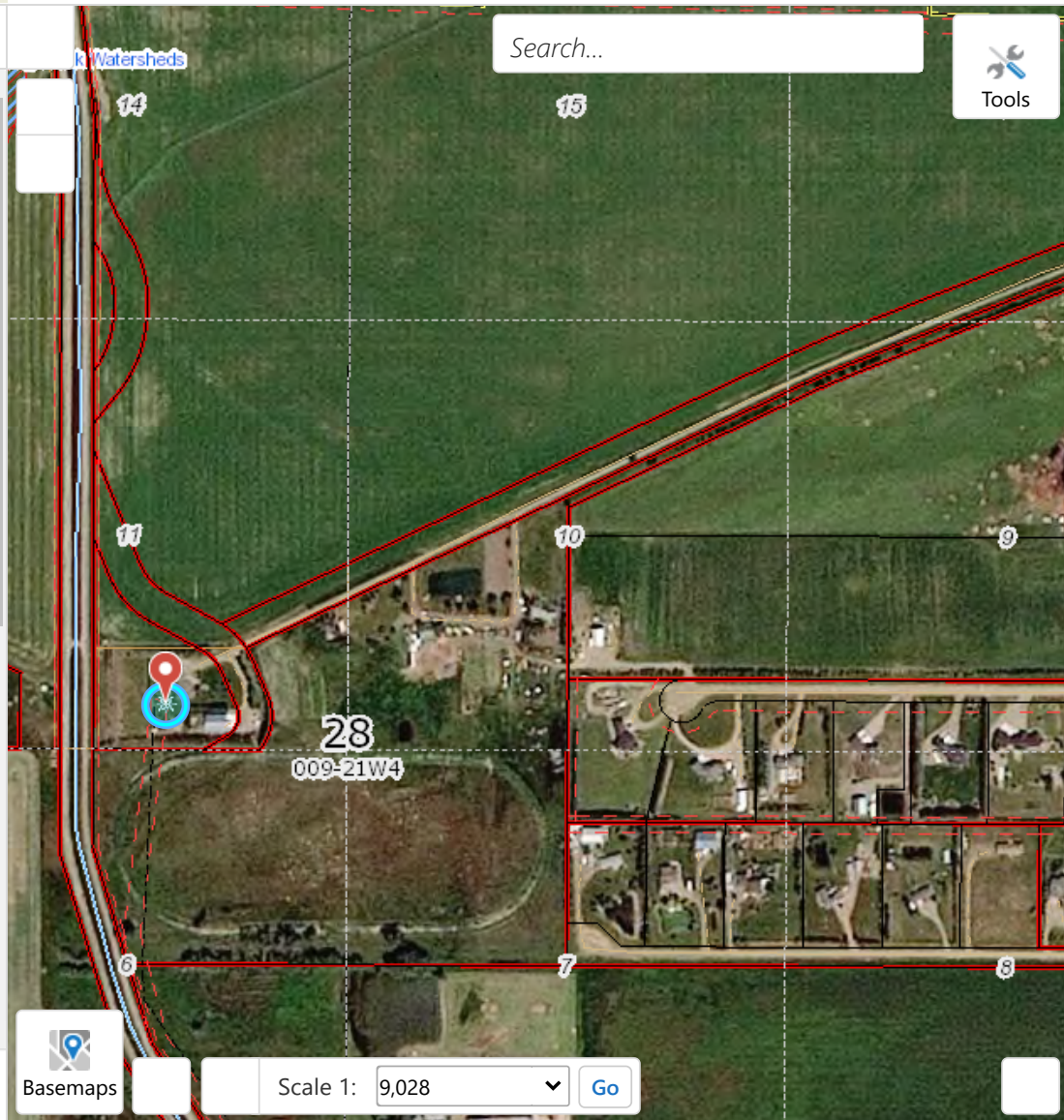
Layers



Quick Search



Asset: Well ...



Basemaps

Scale 1: 9,028

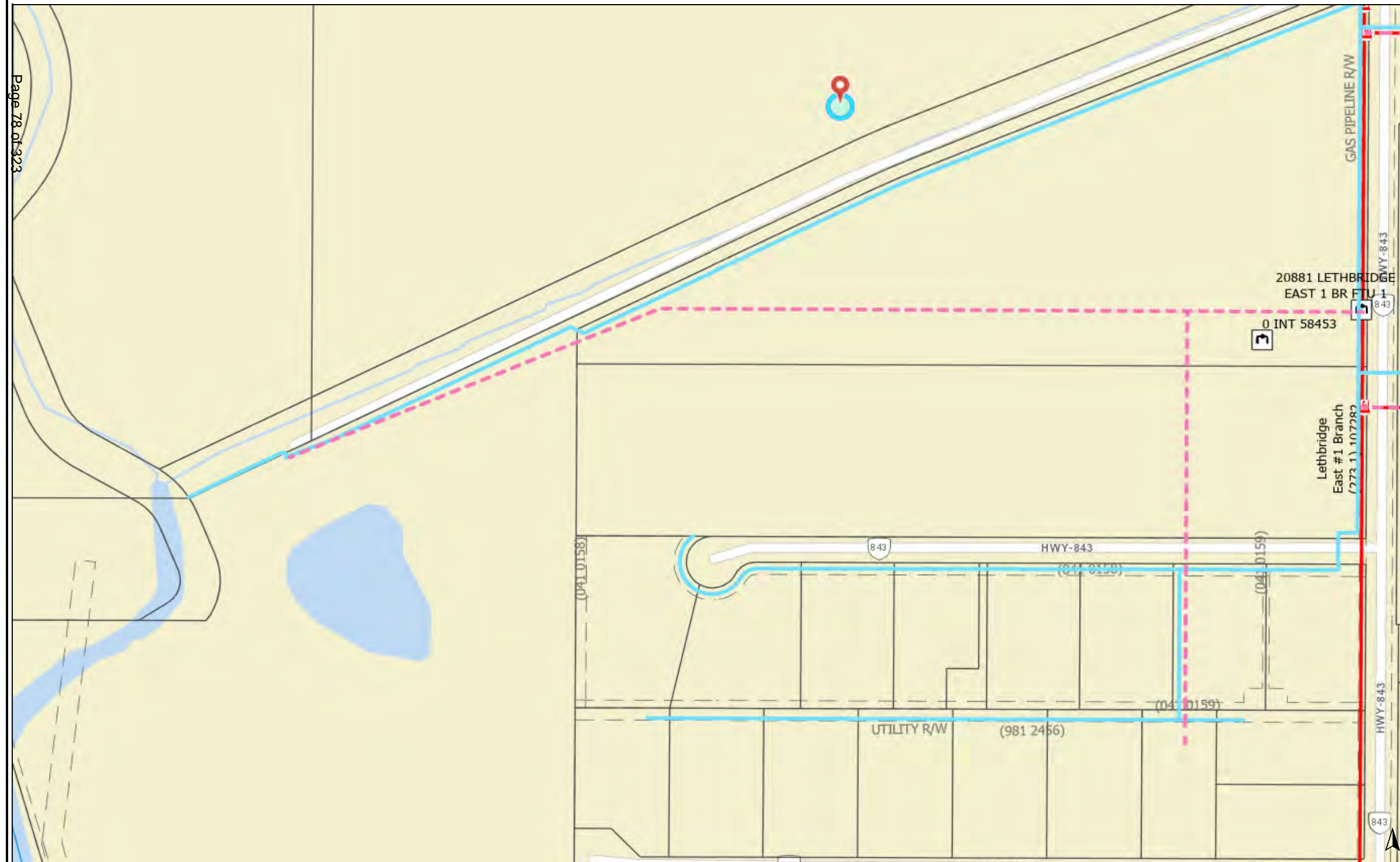


Go



Tools

Map from ATCO Gas



Legend

Distribution

- AB
- LP
- MP
- M1
- M2
- IP
- IP1
- IP2
- IP3
- IP4
- IP5
- IP6
- HP

- Regulator Station
- Rural Tap
- Controllable Valve
- Distribution Capital Project

Transmission

- Abandoned
- Decommissioned
- Operating
- Transmission Station
- Transmission Capital Project

Notes

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Map from County of Lethbridge Rural Water Association

Plan 2 - Hydraulic Analysis of Possible Additional Demand Units

On Jan 15, 2021 COLRWA requested that we complete a hydraulic analysis to check if there is capacity in the existing distribution system to add an 30units to the MacLaine Acres in Sec 28-9-21.

On Jan 26, 2021 we modeled and added the following demands (units) into the existing base model (See Plan 1):

- Total of 30units (15 Imp gpm) in NE28-9-21, 15 units to existing J-189 and 15units to existing J-347, Area immediately north of Lethbridge.

This Hydraulic Scenario:

- Existing water system at Max Demand (refer to Plan 1) plus the proposed additional unit demand noted above.

Results:

- Adding the above 30 unit (15 lpgm) results in approx 3psi pressure drop in the water distribution system north and NE of the City. This results in J-2932 falling below the recommended minimum pressure of 20psi, from 21.7 psi to 19.6psi.

Options to maintain a minimum 20psi in the distribution system:

Option 1 - Reduce the amount of units from 30 to 25 available to the MacLaine Acres Development.

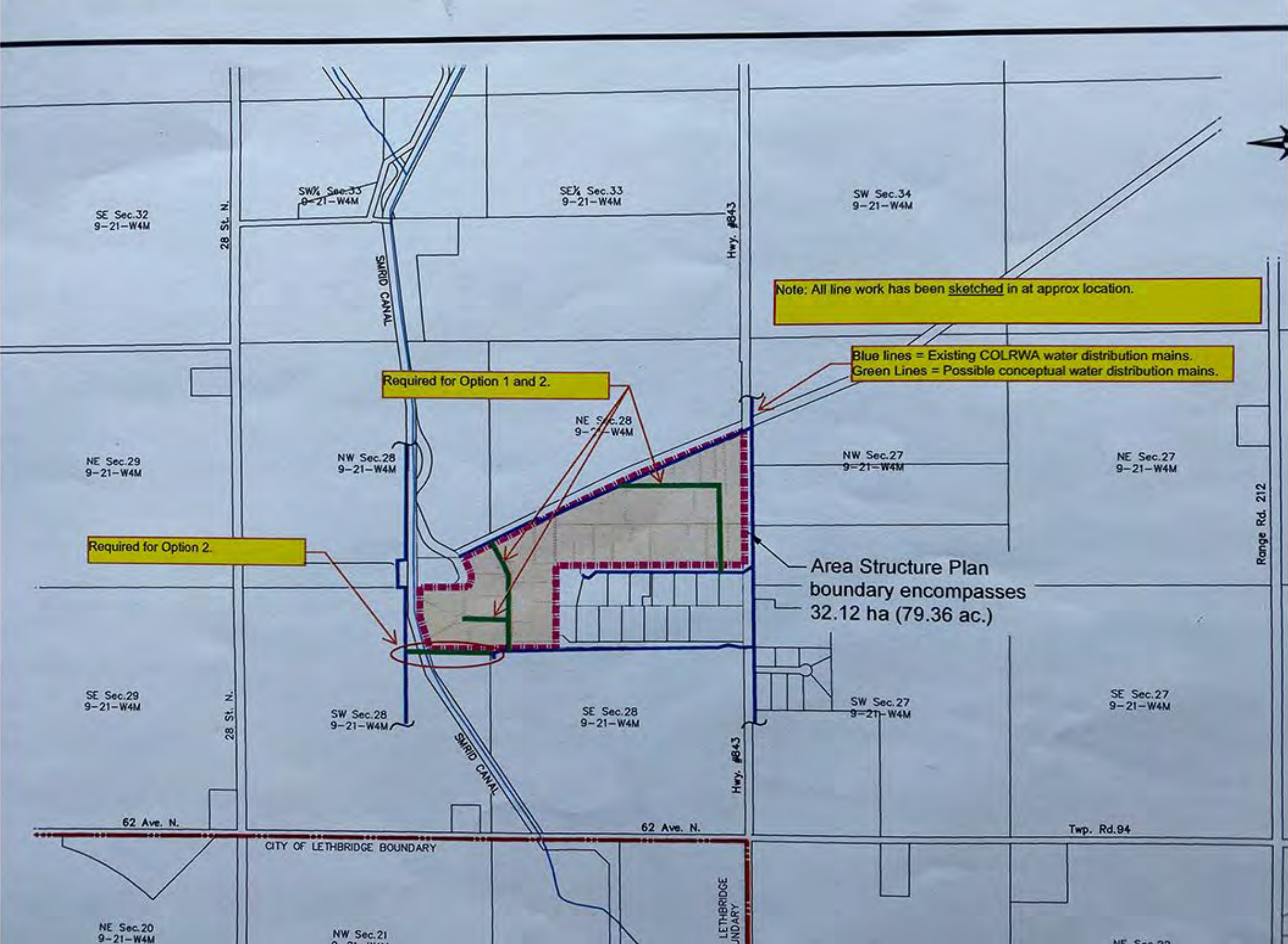
Option 2 - Install piping from 4" distribution main on the west side of canal, under canal, and tie to MacLaine Acres Development water looped main.

Barry Way
Jan 26, 2021

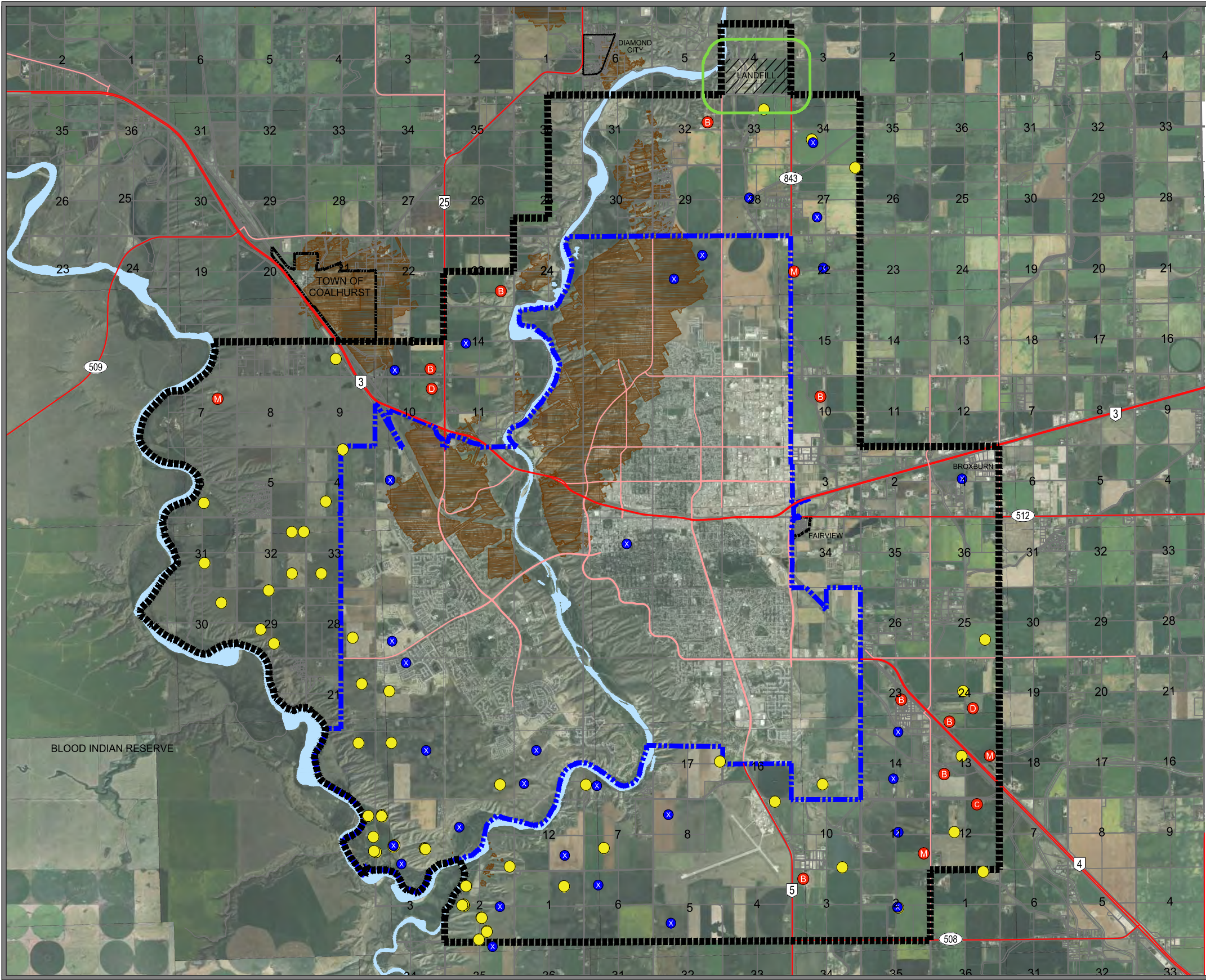
Scenario: CLRWA-Phase 2, Max Demand, Chin c/w Booster Pump



MacLaine Acres



Lethbridge County Map “Development Consideration”



DEVELOPMENT CONSIDERATIONS

LEGEND

- CITY OF LETHBRIDGE
- IDP PLAN AREA
- PROVINCIAL HIGHWAY
- MAJOR ROAD
- LANDFILL
- 450m BUFFER FROM LANDFILL

ALBERTA ENERGY REGULATOR
(AER) DATA - APRIL 2016

- UNDERGROUND COAL MINE
- GAS WELL
- GAS WELL - ABANDONED

CONFINED FEEDING OPERATION

- BEEF
- CHICKEN
- DAIRY
- MIXED

MAP 17
LETHBRIDGE COUNTY
(BYLAW NO. 1478)
& CITY OF LETHBRIDGE
(BYLAW NO. 6015)
INTERMUNICIPAL DEVELOPMENT PLAN

AERIAL PHOTO DATE: 2015
SCALE 1 : 85,000



September 08, 2016
N:\Lethbridge-County\Leth-City Leth-Cty- IDP\1
Lethbridge City&County IDP 2016.dwg

APPENDIX 6

Septic Feasibility Assessment

PROVIDED UNDER SEPARATE COVER

APPENDIX 7

Stormwater Management Plan



**STORMWATER MANAGEMENT PLAN
(SWMP)
MACLAINE ACRES SUBDIVISION
SEC. 28-9-21-W4M
Lethbridge County
Alberta**

Prepared for: Rick Aldoff
Pat Wagner
Ken Smith

File Number: 208645CE

Dated: May 2022

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APPENDIX

- Appendix A – Figures
- Appendix B – SWMM Model Results

I. PROJECT BACKGROUND AND DRAINAGE FEATURES

The MacLaine Acres Subdivision is a proposed group country residential subdivision located along Highway #843 in Lethbridge County, approximately 1 km north of the Lethbridge City Limits. The legal property description is Section 28, Township 9, Range 21 West of the 4th Meridian. The irregularly shaped plan area is bound by an irrigation right of way and cropland to the north, Hwy-843 to the east, group country residential and cropland to the south, and an irrigation canal to the west. The plan location is illustrated in **Figure 1 – Aerial Photo** and provides context for the site and the surrounding lands.

This drainage report is being submitted in support of The MacLaine Acres Area Structure Plan (ASP) and rezoning application, for consideration by the Lethbridge County. The ASP plan area is 83.04 acres (33.61 ha). The proposal is to subdivide into 27 residential lots, 3 Public Utility Lots and road rights-of-way and to rezone the land from Lethbridge Urban Fringe (LUF) to Group Country Residential (GCR). The purpose of this report is to provide stormwater management strategies to guide the future development of the MacLaine Acres Subdivision.

A. Existing Site Features

A topographical site survey has been completed by Martin Geomatic Consultants Ltd and an existing surface terrain model has been created.

The area presently includes 4 parcels zoned LUF with four dwellings, multiple accessory buildings and a dugout. The land is generally flat with ground slopes of 0.5% to 2.0% with the majority of the site draining overland to the east and into the Highway 843 ditch system, with the rest of the site draining to the adjacent property on the north and south, draining to the Township road 94A ditch and two areas that do not drain overland.

Existing soil descriptions for the area include Orthic Dark Brown Chernozem on medium textured (L, SiL) sediments deposited by wind and water (LET)^a.

Fourteen boreholes^b have been completed on site to determine soil conditions for the purpose of geotechnical investigations and general suitability of the proposed development. The fourteen boreholes were drilled to depths of 5.1m to 9.6m and generally found topsoil above clay, with groundwater depths ranging from 0.7m to 5.1m.

B. Existing Drainage Features

Drainage boundaries, storage depressions and flow conveyance routes were interpreted and are shown on **Figure 2 – Existing Site & Drainage Features**.

C. Predevelopment Sub-Catchments

Table 1 presents the existing site (pre-development) the sub-catchments and sub-catchment parameters assumed in the pre-development model.

^a *Alberta Soil Information Viewer*, Alberta Agriculture and Forestry, <http://www4.agric.gov.ab.ca/agrasidviewer>
MacLaine Acres Area Structure Plan, "Appendix 2, Geotechnical Evaluation", report prepared by Tetra Tech Canada Inc., October 2021. Which can be found attached to the ASP.

Table 1 - Pre-Development Sub-Catchment Parameters

Name	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Impervious (%)	Suction Head (mm)	Conductivity (mm/hr)	Initial Deficit (frac.)
Dugout	0.25	50	50	0.5	80	292.2	1	0.229
East	19.93	350	569	0.5	1	292.2	1	0.229
West-Central	10.66	300	355	0.5	10	292.2	1	0.229
West-NW	1.50	100	150	0.5	2	292.2	1	0.229
West-SE	0.68	80	85	0.5	0.5	292.2	1	0.229
West-SW	0.57	150	38	0.5	0.5	292.2	1	0.229
Total	33.58							

A brief description of the pre-development sub-catchment areas follows.

1. East sub-catchment - drains from west to east across the site and discharges to the west ditch of Highway 843. The high point of this catchment area is located on the south end of the west catchment boundary, at an approximate elevation of 907.2 m, and the low point is located at the northeast end of the site at an approximate elevation of 900.0 m. The East sub-catchment has two exiting dwellings and several accessory buildings, a water dugout for farm use, and a gravel access road along the northern boundary.
2. Dugout sub-catchment – this is the area of the existing a water dugout for farm use, that drains to itself. It does not have a discharge location.
3. West-NW sub-catchment drains from south to north and discharges to the property to the north.
4. West-SE sub-catchment drains from the NW to the SE and discharges to the Township road 94A ditch.
5. West SW sub-catchment drains from south to north and discharges to the property to the south.
6. West Central sub-catchment – drains to a topographical depression located in the center of the sub-catchment. The highpoint of this catchment area is along the west boundary at an approximate elevation of 908.6 m. The low point is located near the center of this catchment area at an approximate elevation 905.0 m. The stage storage curve for the depression is presented in Table 2. This sub-catchment spills over a low area to the east approximately where the drainage ROW is located on the properties to the east. Spill elevation is approximately 906.3. Calculations show that this catchment will not spill overland during a major storm event and empties through infiltration and evaporation. The West Central sub-catchment has two existing dwellings and several accessory buildings, a grass field area with a hobby horse track, and a gravel access road along the northern boundary.

Table 2 – Pre-Development West-Trap

Description	Elevation (m)	Depth (m)	Area (m ²)	Volume (m ³)
Bottom	905.0	0.0	0	0
	905.2	0.2	101	7
	905.4	0.4	535	65
	905.6	0.6	3367	414
	905.8	0.8	8015	1519
	906.0	1.0	14276	3718
	906.2	1.2	26001	7688
Spill	906.3	1.3	31539	10560
	906.4	1.4	38436	14054

II. PROPOSED DEVELOPMENT AND DRAINAGE

A. Proposed Development

The proposal is to create 27 Group Country Residential lots ranging from 2.5 to 3 acres (0.8 – 1.2 ha) in area by subdividing the lands.

Drainage patterns, runoff discharge rates and volumes will be affected by development. Development will increase the imperviousness within the plan area due to the addition of hard surfaces including roadways, building roofs, and driveways.

To mitigate increased runoff, the development will include detention storage on site with controlled release. Storage volumes and controlled release rates are to be designed not exceed:

- the pre-development release rate.
- 2.0 lps/ha release rate.

The proposed detention storage areas should be located in natural low areas to minimize material to be moved, area to be disturbed and simplify blending into the existing terrain. Table 3 shows the post - development catchment areas and the proposed stormwater storage pond locations.

Grass swales are planned as the primary conveyance of runoff and carry it away from the buildings and driving surfaces and towards the designated stormwater storage areas. **Figure 3 – Stormwater Management Plan** shows the location of proposed detention ponds, ditches and swales.

B. Proposed Development Sub-catchments

The proposed post-development sub-catchments and there modeling parameters are presented in Table 3

Table 3 – Post Development Sub-Catchment Parameters

Name	Area (ha)	Width (m)	Flow Length (m)	Slope (%)	Impervious (%)	Suction Head (mm)	Conductivity (mm/hr)	Initial Deficit (frac.)
Phase_1A	7.02	160	439	0.5	40	292.2	1	0.229
Phase_1B	14.86	400	372	0.5	40	292.2	1	0.229
Phase_2	8.33	200	417	0.5	40	292.2	1	0.229
Undeveloped_1	1.92	180	107	0.5	1	292.2	1	0.229
Undeveloped_2	1.47	160	92	0.5	1	292.2	1	0.229
Total	33.60							

A brief description of the proposed post-development sub-catchments is provided below:

Phase_1A includes 7 proposed lots and 1 storm pond and lies east of Phase 1B, west of the undeveloped sub-catchments north of Township Rd. 94B and south of Phase 2. Phase 1A drains to Pond_1A. Current level of detail is insufficient to determine how the pond will be drained.

Phase_1B includes the western area and includes 13 proposed lots and 1 storm pond and lies east and south of Irrigation Right-of-Ways, west of Phase 1A and Phase 2 and north of an agricultural site. Phase 1B drains to Pond_1B. Pond_1B is planned drain by gravity through the ditch network to Pond_1A and or Pond_2.

Phase_2 includes 7 proposed lots and 1 storm pond and lies west of the undeveloped sub-catchments, north of Phase 1A, east of Phase 1B, and south of an Irrigation Right-of-Way.

Undeveloped sub-catchments are two parcels of land that are on the east of the site and are undevelopable due to future highway plans. They discharge directly to the west ditch of Highway 843.

C. Proposed Stormwater Management Plan

The stormwater management plan for the MacLaine Acres Development is to drain all the site to the west ditch of Highway 843. All developed areas are proposed to discharge through a ditch system to stormwater detention ponds prior to release to the Highway 843 ditch. There will be some minor exceptions to this rule due to practical grading considerations which are beyond the detail of an ASP to explore. It is proposed that the release rate to the Highway 843 ditch from the whole development including the undevelopable areas immediately west of Highway 843 be less than existing.

D. Stormwater Storage Ponds

It is proposed to construct 3 stormwater storage ponds for the lands to be developed. These ponds are planned as dry ponds and designed following the Alberta Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems, Part 5, Stormwater Management Guidelines. Release from the ponds will be through a pipe and release rates controlled.

III. METHODOLOGY

Drainage analysis of the proposed development was completed to determine runoff, storage, and discharge rates for pre-development and post-development conditions. The existing site runoff (pre-development) has been analyzed to determine a benchmark for allowable release rates at the post development conditions. A stormwater management model^c has been utilized for the analysis. The following parameters are included in the modeling:

1. Synthetic Design Storm – Chicago Method: 24-hour duration, 100-year return period, (IDF Parameters A = 1019.20, B = 0, C = 0.731)^d
2. Rainfall time step = 5 minutes
3. Simulation duration = 24 hrs
4. Routing Method: Dynamic Wave
5. No effect of Evaporation and Groundwater
6. Pre-development Catchment area = 33.61 ha
7. Post-development Catchment area = 33.61 ha
8. Infiltration Method: Green Ampt
9. Manning's N Impervious = 0.015
10. Manning's N Pervious = 0.15 (undeveloped), 0.1 (developed)
11. Depression Storage Pervious = 5mm (undeveloped), 3.8mm (developed)
12. Depression Storage Impervious = $0.77 * (S\%)^{-0.49}$

IV. RESULTS

The model results are presented in the following tables. Details of the rainfall runoff modeling are included in **Appendix B – SWMM Model Results**.

A. Pre-Development Runoff

Table 3 presents the pre-development model results for the sub-catchment runoff generated from a 1 in 100-year storm, 24-hour storm event.

Table 4 – Pre-Development Runoff

Name	Area (ha)	Precipitation (mm)	Runon (mm)	Infiltration (mm)	Runoff Depth (mm)	Runoff Volume (ML)	Peak Runoff (m ³ /s)	Peak Runoff Offsite (m ³ /s)
Dugout	0.25	120.15	0	14.37	105.13	0.26	0.17	0
East	19.93	120.15	0	65.13	48.88	9.75	0.68	0.68
West-Central	10.66	120.15	0	59.41	56.04	5.97	0.62	0
West-NW	1.50	120.15	0	63.91	54.04	0.81	0.14	0.14
West-SE	0.68	120.15	0	64.66	54.39	0.37	0.1	0.1
West-SW	0.57	120.15	0	64.54	55.46	0.32	0.15	0.15

^c EPA Storm Water Management Model – Version 5.0 (Build 5.0.22)

^d 2016 Design Standards, City of Lethbridge.

A. Existing Storage

Table 6 presents the existing storage in response to the 1:100-year 24-hour storm event as shown on **Figure 2 – Existing Site & Drainage Features**.

Table 5 – Existing Storage Unit

Name	Invert Elev. (m)	Rim Elev. (m)	Full Depth (m)	Initial Depth (m)	Initial Volume (m ³)	Max. Depth (m)	Max. Volume (m ³)	Stored Runoff (m ³)
SU1	905	906.5	1.5	0.71	680	0.93	957	277
SU2	905	906.4	1.4	0	0	1.12	5974	5974

B. Post-Development Runoff

As the stormwater management plan is to discharge at one location the pre-development runoff at that location governs the design of the stormwater management system. The total peak release rate off-site is limited to the predevelopment release from the East sub-catchment of 0.69 cubic metres per second.

Table 4 presents the sub-catchment model results for the post-development runoff generated from a 100-year 24-hour storm event. Proposed sub catchment areas are shown in the attached **Appendix C – SWMM Model Results**.

Table 6 – Post-Development Runoff

Name	Area (ha)	Precipitation (mm)	Runon (mm)	Infiltration (mm)	Runoff Depth (mm)	Runoff Volume (ML)	Peak Runoff* (m ³ /s)
Phase_1A	7.02	120.15	0	55.21	65.17	4.58	0.52
Phase_1B	14.86	120.15	0	54.8	65.61	9.75	1.23
Phase_2	8.33	120.15	0	55.07	65.32	5.44	0.64
Undeveloped_1	1.92	120.15	0	67.17	53.17	1.02	0.16
Undeveloped_2	1.47	120.15	0	66.93	53.44	0.79	0.13
Total	33.61					21.58	

* Peak Runoff in this table is the runoff from a sub-catchment area and does not include any reduction in release rate due to the introduction of detention storage.

C. Post Development Release Rates

The post development release rate would be significantly higher than the predevelopment release rate if storage was not introduced.

For the MacLaine Acres Development two unique types of post development catchment areas are identified, first land that is to be developed and second land on the east side that is to remain undeveloped due to future transportation plans. Table 7 - Comparison of Release Rates Presents the various release rate options examined. It is proposed that for the undeveloped lands to not control the release rate, matching the current condition.

Table 7 - Comparison of Release Rates

	Discharge			Percent of Pre-development
	Undeveloped (lps)	Developed (lps)	Total (lps)	
1 in 100-year 24-hour Storm Event				
Pre-development	680	0	680	100%
2.0 lps/ha from Developed Areas	247	42	289	43%

D. Proposed Storage

Three storage ponds are proposed for the development that correspond to proposed phasing. These ponds are proposed to be constructed as dry ponds. Detailed design, location and sizing of the ponds will be determined at detailed design. There is a possibility that two or all the ponds could be combined into a single pond designed to meet the storage required to meet the desired release rate conditions. The number of ponds to be constructed will depend on timing of development for each of the three owners. All attempts will be made to reduce the number of ponds.

Table 8 presents the required storage volume and release rate for each pond.

Table 8 - Pond Storage Volumes and Release Rates

	Pond_1A		Pond_1B		Pond_2	
	Storage Required (m ³)	Pond Release Rate (lps)	Storage Required (m ³)	Pond Release Rate (lps)	Storage Required (m ³)	Pond Release Rate (lps)
1 in 100-year 24-hour Storm Event						
2.0 lps/ha from Developed Areas	2418	43*	8415	29	4620	17

* Pond_1A is planned to receive flows from Pond_1B. The release rate for Pond_1A is for the total area draining to Pond1_A.

E. Analysis

Considering the known drainage and flooding issues downstream of the sites release point, it is not recommended to discharge runoff from the site at a release rate that is comparable to the pre-development release rate. It is proposed to limit the release rate from developed areas to match the existing conditions.

If a larger impact on the downstream drainage is desired a greater impact would be realized by providing detention and a controlled release for the undeveloped areas than by moving to a zero release from the developed areas.

V. RECOMMENDATIONS

It is recommended that the MacLaine Acres Development provide approximately **15,500 m³** of active stormwater storage on-site to detain the runoff. Approval drawings including the detailed designs of detention ponds, outlets, swales, and grading plans are recommended prior to construction, which should generally follow the stormwater concepts outlined in this report.

VI. CLOSING

We trust that this report meets the requirements of the Area Structure Plan. Should you require any further information, please contact the undersigned.

Prepared by:



James Johansen, P.Eng.
Civil Engineer, Project Manager

Reviewed by:



Ray Martin, P.Eng
Vice President Engineering

MARTIN GEOMATIC CONSULTANTS LTD.

Association of Professional Engineers and Geoscientists of Alberta
Permit to Practice P05852

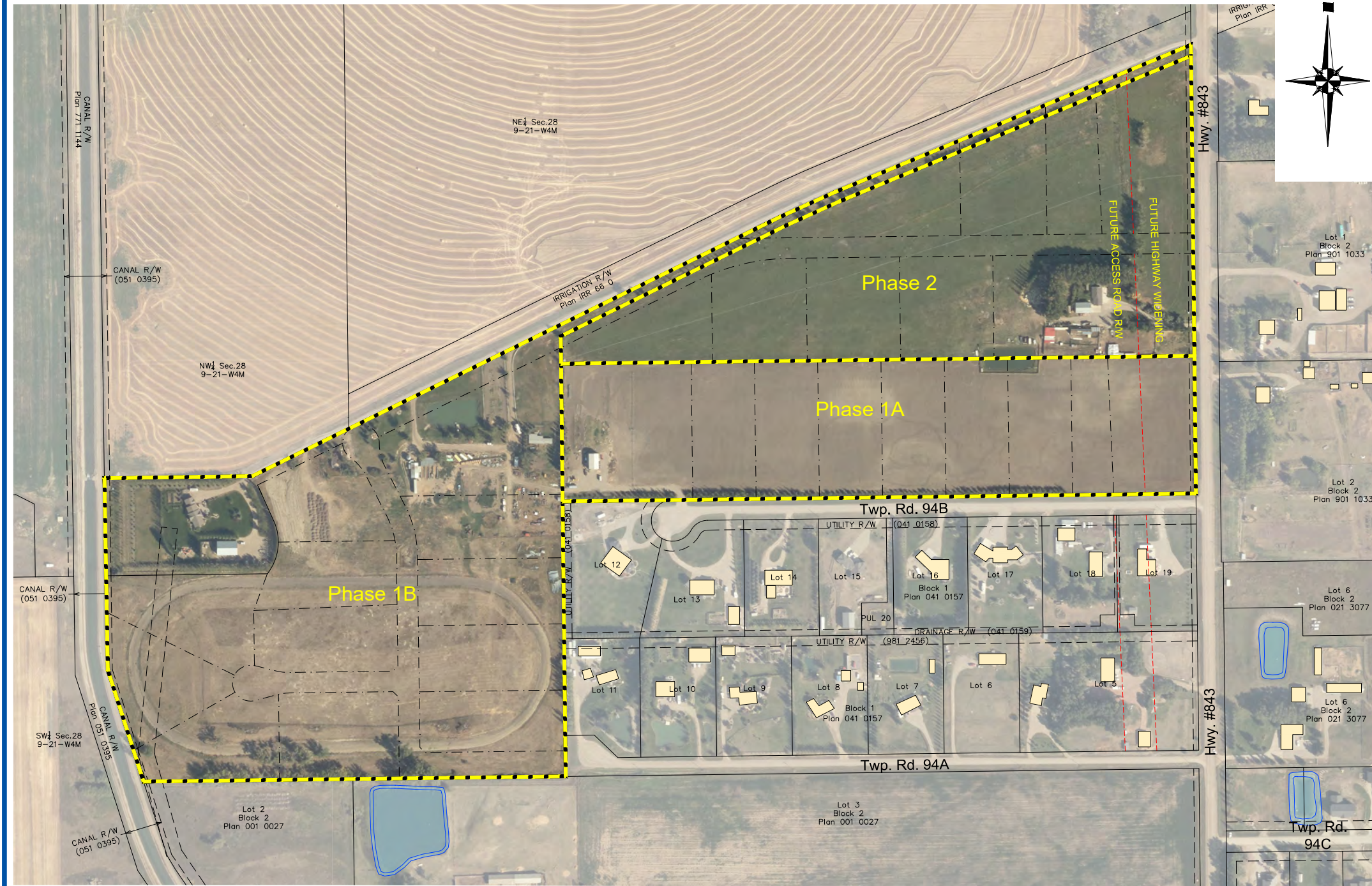


Appendix A

Figure 1 – Aerial Photo

Figure 2 – Existing Site & Drainage Features

Figure 3 – Stormwater Management Plan



LEGEND
PHASE BOUNDARY

MARTIN
GEOMATIC CONSULTANTS
Consulting Engineers, Planners, and Land Surveyors
255-31st Street North Lethbridge, Alberta T1H 3Z4
Ph: (403) 329-0050 E-mail: geomart@mgcl.ca Fax: (403) 329-6594

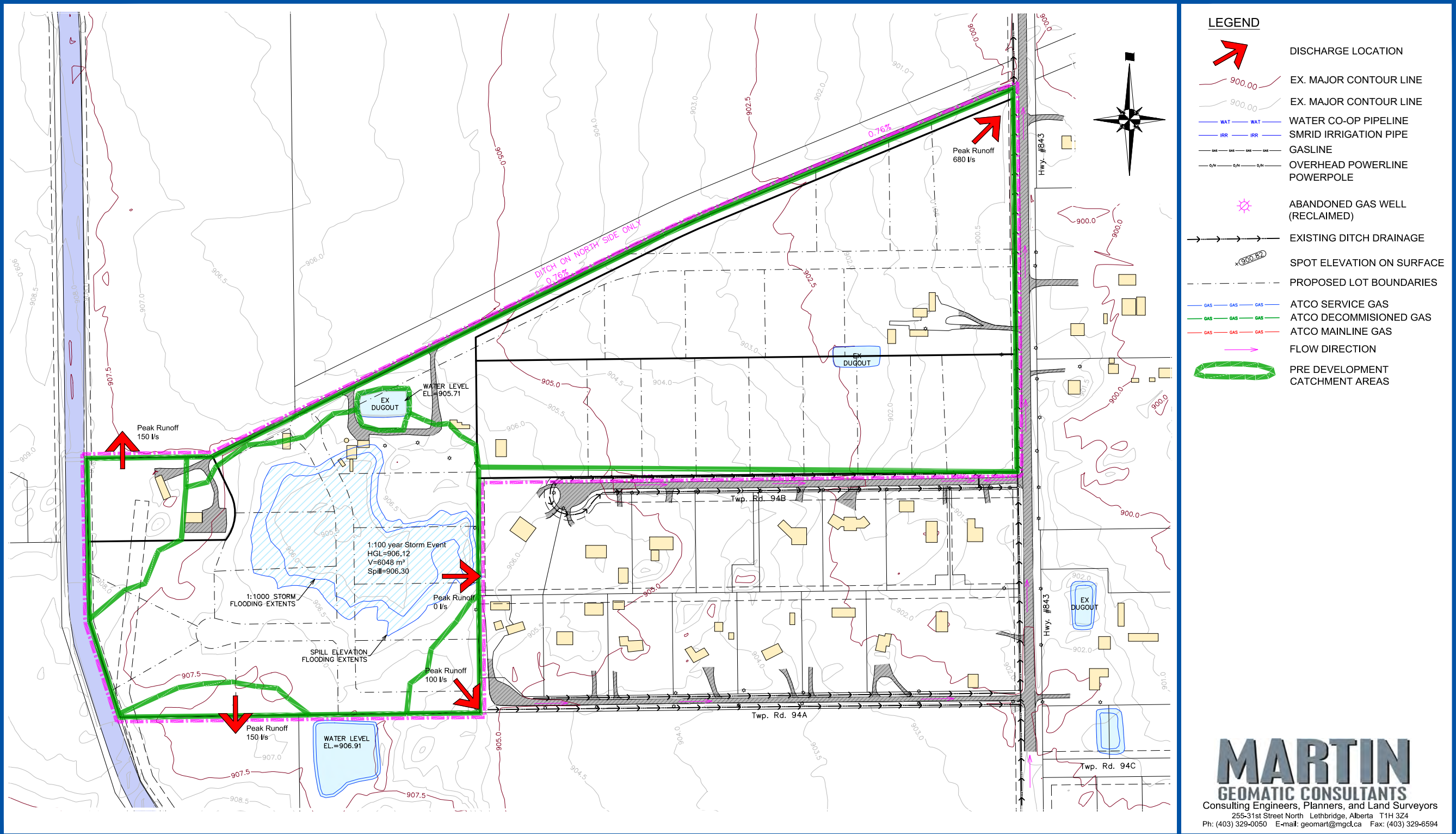
MacLaine Acres

STORMWATER MANAGEMENT PLAN

AERIAL PHOTO
FIGURE 1.0

May 11, 2022

208645CE



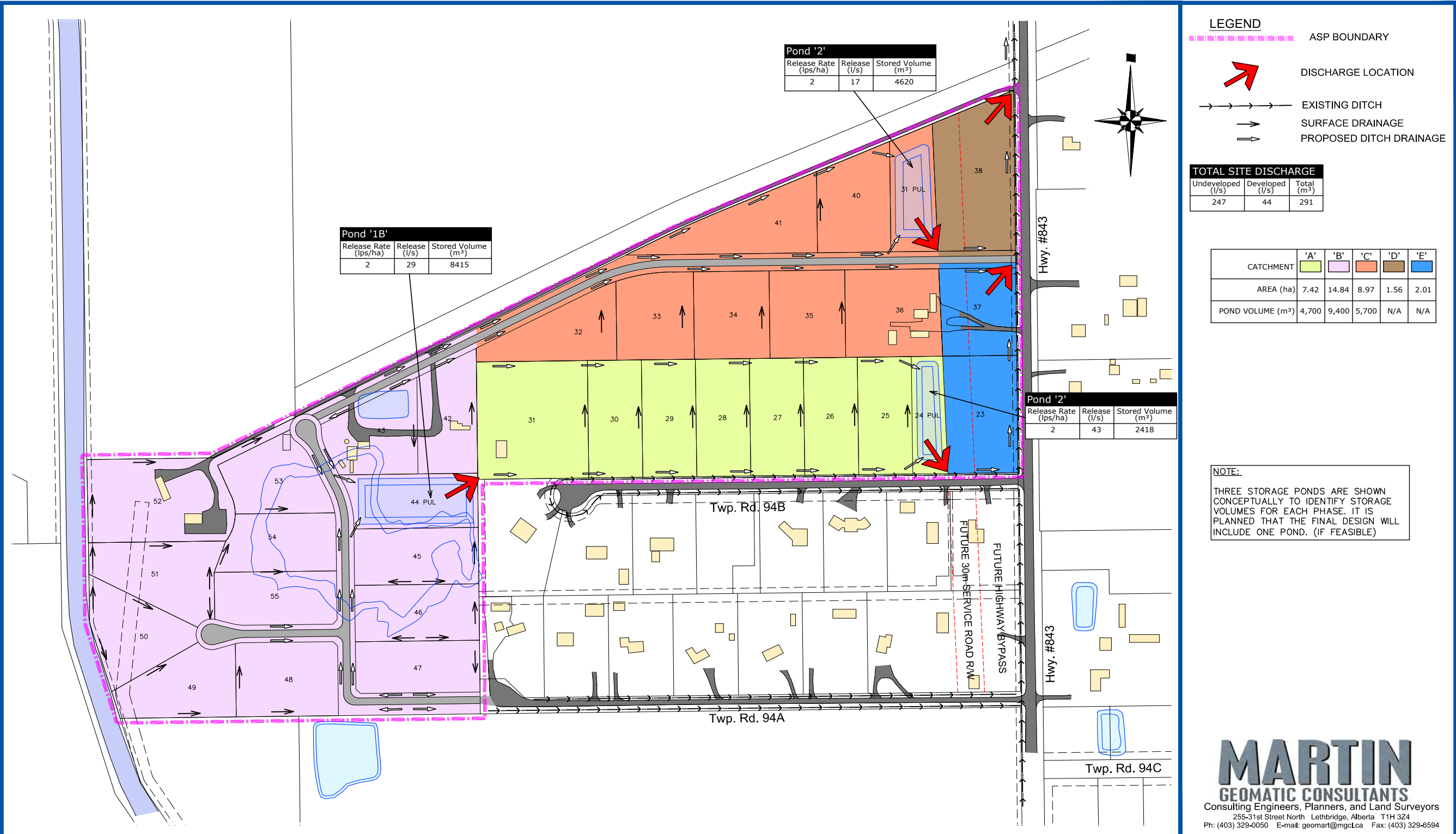
MacLaine Acres

STORMWATER MANAGEMENT PLAN

EXISTING DRAINAGE FEATURES FIGURE 2.0

May 11, 2022

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MacLaine Acres

STORMWATER MANAGEMENT PLAN

STORMWATER MANAGEMENT PLAN FIGURE 3.0

May 11, 2022

208645CE

Appendix B

PCSWWM OUTPUT FILES




```

[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option      Value
FLOW_UNITS    CMS
INFILTRATION  GREEN_AMPT
FLOW_ROUTING   DYNWAVE
LINK_OFFSETS   DEPTH
MIN_SLOPE      0
ALLOW_PONDING  NO
SKIP_STEADY_STATE NO

START_DATE     05/17/2022
START_TIME     00:00:00
REPORT_START_DATE 05/17/2022
REPORT_START_TIME 00:00:00
END_DATE       05/20/2022
END_TIME       00:00:00
SWEEP_START    01/01
SWEEP_END      12/31
DRY_DAYS       0
REPORT_STEP    00:01:00
WET_STEP       00:05:00
DRY_STEP       00:05:00
ROUTING_STEP   5
RULE_STEP      00:00:00

INERTIAL_DAMPING PARTIAL
NORMAL_FLOW_LIMITED BOTH
FORCE_MAIN_EQUATION H-W
VARIABLE_STEP    0.75
LENGTHENING_STEP 0
MIN_SURFAREA     0
MAX_TRIALS       8
HEAD_TOLERANCE   0.0015
SYS_FLOW_TOL     5
LAT_FLOW_TOL     5
MINIMUM_STEP     0.5
THREADS          4

[EVAPORATION]
;;Data Source  Parameters
;;-----
CONSTANT       0.0
DRY_ONLY       NO

[RAINGAGES]
;;Name          Format      Interval SCF      Source
;;-----
Lethbridge_1:100year_Chicago_24h INTENSITY 0:05      1.0      TIMESERIES Chicago_24h
Lethbridge_1:2year_Chicago_4h  INTENSITY 0:05      1.0      TIMESERIES
Lethbridge_1:2year_Chicago_4h
Lethbridge_County_1:100year_24hr INTENSITY 1:00      1.0      TIMESERIES
Lethbridge_County_1:100year_24hr

[SUBCATCHMENTS]
;;Name          Rain Gage      Outlet      Area      %Imperv Width      %Slop

```

```

;;-----
Dugout      Lethbridge_1:100year_Chicago_24h SU1 0.2481 80      50      0.5
0
East        Lethbridge_1:100year_Chicago_24h Outfall_1 19.956 1 350      0.5
0
West-Central Lethbridge_1:100year_Chicago_24h SU2 10.6591 10      300      0.5
0
West-NW     Lethbridge_1:100year_Chicago_24h Outfall_5 1.5023 2 100      0.5
0
West-SE     Lethbridge_1:100year_Chicago_24h Outfall_3 0.6764 0.5 80      0.5
0
West-SW     Lethbridge_1:100year_Chicago_24h Outfall_4 0.5685 0.5 150      0.5
0

[SUBAREAS]
;;Subcatchment N-Imperv N-Perv S-Imperv S-Perv PctZero RouteTo
PctRouted
;;-----
Dugout      0.015      0.15      1      5      25      PERVIOUS
100
East        0.015      0.15      1      5      25      PERVIOUS
100
West-Central 0.015      0.15      1      5      25      PERVIOUS
100
West-NW     0.015      0.15      1      5      25      PERVIOUS
100
West-SE     0.015      0.15      1      5      25      PERVIOUS
100
West-SW     0.015      0.15      1      5      25      PERVIOUS
100

[INFILTRATION]
;;Subcatchment Param1 Param2 Param3 Param4 Param5
;;-----
Dugout      292.2      1      0.229      0      0
East        292.2      1      0.229      0      0
West-Central 292.2      1      0.229      0      0
West-NW     292.2      1      0.229      0      0
West-SE     292.2      1      0.229      0      0
West-SW     292.2      1      0.229      0      0

[OUTFALLS]
;;Name Elevation Type Stage Data Gated Route To
;;-----
Outfall_1   0      FREE      NO
Outfall_2   0      FREE      NO
Outfall_3   0      FREE      NO
Outfall_4   0      FREE      NO
Outfall_5   0      FREE      NO

[STORAGE]
;;Name Elev. MaxDepth InitDepth Shape Curve Name/Params
N/A Fevap Psi Ksat IMD
;;-----
SU1         905      1.5      0.71      TABULAR      Dugout
0           0

```

SU2 905 1.4 0 TABULAR Predevelopment_west_Trap
0 0

```
[WEIRS]
;;Name      From Node      To Node      Type      CrestHt      Qcoeff
Gated      EndCon      EndCoeff      Surcharge      RoadWidth      RoadSurf      Coeff. Curve
;;-----
W1          SU2          Outfall_2      TRANSVERSE      1.3          3.33
NO          0          0          YES
```

```
[XSECTIONS]
;;Link      Shape      Geom1      Geom2      Geom3      Geom4
Barrels      Culvert
;;-----
W1          RECT_OPEN      1          10          0          0
```

```
[CURVES]
;;Name      Type      X-Value      Y-Value
;;-----
Dugout      Storage      0          800
Dugout      1          1306
Dugout      1.5          1541

Predevelopment_west_Trap Storage      0          0
Predevelopment_west_Trap      0.2          100.739
Predevelopment_west_Trap      0.4          534.763
Predevelopment_west_Trap      0.6          3367.153
Predevelopment_west_Trap      0.8          8014.551
Predevelopment_west_Trap      1          14275.847
Predevelopment_west_Trap      1.2          26000.83
Predevelopment_west_Trap      1.3          31539.26
Predevelopment_west_Trap      1.4          38436.106
```

```
[TIMESERIES]
;;Name      Date      Time      Value
;;-----
;Chicago design storm, a = 1019.2, b = 0, c = 0.731, Duration = 1440 minutes, r =
0.3, rain units = mm/hr.
Chicago_24h      0:00      1.352
Chicago_24h      0:05      1.364
Chicago_24h      0:10      1.376
Chicago_24h      0:15      1.388
Chicago_24h      0:20      1.4
Chicago_24h      0:25      1.413
Chicago_24h      0:30      1.426
Chicago_24h      0:35      1.439
Chicago_24h      0:40      1.453
Chicago_24h      0:45      1.466
Chicago_24h      0:50      1.48
Chicago_24h      0:55      1.495
Chicago_24h      1:00      1.51
Chicago_24h      1:05      1.525
Chicago_24h      1:10      1.54
Chicago_24h      1:15      1.556
Chicago_24h      1:20      1.572
Chicago_24h      1:25      1.589
```

Chicago_24h	1:30	1.606
Chicago_24h	1:35	1.624
Chicago_24h	1:40	1.641
Chicago_24h	1:45	1.66
Chicago_24h	1:50	1.679
Chicago_24h	1:55	1.698
Chicago_24h	2:00	1.718
Chicago_24h	2:05	1.739
Chicago_24h	2:10	1.76
Chicago_24h	2:15	1.782
Chicago_24h	2:20	1.804
Chicago_24h	2:25	1.828
Chicago_24h	2:30	1.851
Chicago_24h	2:35	1.876
Chicago_24h	2:40	1.901
Chicago_24h	2:45	1.928
Chicago_24h	2:50	1.955
Chicago_24h	2:55	1.983
Chicago_24h	3:00	2.012
Chicago_24h	3:05	2.042
Chicago_24h	3:10	2.073
Chicago_24h	3:15	2.105
Chicago_24h	3:20	2.138
Chicago_24h	3:25	2.173
Chicago_24h	3:30	2.209
Chicago_24h	3:35	2.247
Chicago_24h	3:40	2.286
Chicago_24h	3:45	2.326
Chicago_24h	3:50	2.369
Chicago_24h	3:55	2.413
Chicago_24h	4:00	2.46
Chicago_24h	4:05	2.508
Chicago_24h	4:10	2.559
Chicago_24h	4:15	2.612
Chicago_24h	4:20	2.669
Chicago_24h	4:25	2.728
Chicago_24h	4:30	2.79
Chicago_24h	4:35	2.856
Chicago_24h	4:40	2.925
Chicago_24h	4:45	2.999
Chicago_24h	4:50	3.077
Chicago_24h	4:55	3.16
Chicago_24h	5:00	3.249
Chicago_24h	5:05	3.344
Chicago_24h	5:10	3.446
Chicago_24h	5:15	3.555
Chicago_24h	5:20	3.673
Chicago_24h	5:25	3.801
Chicago_24h	5:30	3.939
Chicago_24h	5:35	4.091
Chicago_24h	5:40	4.257
Chicago_24h	5:45	4.44
Chicago_24h	5:50	4.642
Chicago_24h	5:55	4.868
Chicago_24h	6:00	5.122
Chicago_24h	6:05	5.409
Chicago_24h	6:10	5.738

Chicago_24h	6:15	6.119
Chicago_24h	6:20	6.565
Chicago_24h	6:25	7.098
Chicago_24h	6:30	7.745
Chicago_24h	6:35	8.553
Chicago_24h	6:40	9.594
Chicago_24h	6:45	10.997
Chicago_24h	6:50	13.01
Chicago_24h	6:55	16.203
Chicago_24h	7:00	22.264
Chicago_24h	7:05	40.822
Chicago_24h	7:10	314.277
Chicago_24h	7:15	62.374
Chicago_24h	7:20	38.336
Chicago_24h	7:25	28.645
Chicago_24h	7:30	23.295
Chicago_24h	7:35	19.837
Chicago_24h	7:40	17.393
Chicago_24h	7:45	15.56
Chicago_24h	7:50	14.128
Chicago_24h	7:55	12.973
Chicago_24h	8:00	12.02
Chicago_24h	8:05	11.217
Chicago_24h	8:10	10.531
Chicago_24h	8:15	9.937
Chicago_24h	8:20	9.416
Chicago_24h	8:25	8.956
Chicago_24h	8:30	8.545
Chicago_24h	8:35	8.177
Chicago_24h	8:40	7.844
Chicago_24h	8:45	7.542
Chicago_24h	8:50	7.265
Chicago_24h	8:55	7.012
Chicago_24h	9:00	6.778
Chicago_24h	9:05	6.563
Chicago_24h	9:10	6.362
Chicago_24h	9:15	6.176
Chicago_24h	9:20	6.002
Chicago_24h	9:25	5.839
Chicago_24h	9:30	5.687
Chicago_24h	9:35	5.543
Chicago_24h	9:40	5.408
Chicago_24h	9:45	5.28
Chicago_24h	9:50	5.159
Chicago_24h	9:55	5.045
Chicago_24h	10:00	4.936
Chicago_24h	10:05	4.833
Chicago_24h	10:10	4.735
Chicago_24h	10:15	4.641
Chicago_24h	10:20	4.552
Chicago_24h	10:25	4.466
Chicago_24h	10:30	4.385
Chicago_24h	10:35	4.307
Chicago_24h	10:40	4.231
Chicago_24h	10:45	4.159
Chicago_24h	10:50	4.09
Chicago_24h	10:55	4.024

Chicago_24h	11:00	3.96
Chicago_24h	11:05	3.898
Chicago_24h	11:10	3.839
Chicago_24h	11:15	3.781
Chicago_24h	11:20	3.726
Chicago_24h	11:25	3.673
Chicago_24h	11:30	3.621
Chicago_24h	11:35	3.571
Chicago_24h	11:40	3.523
Chicago_24h	11:45	3.476
Chicago_24h	11:50	3.43
Chicago_24h	11:55	3.386
Chicago_24h	12:00	3.344
Chicago_24h	12:05	3.302
Chicago_24h	12:10	3.262
Chicago_24h	12:15	3.223
Chicago_24h	12:20	3.185
Chicago_24h	12:25	3.148
Chicago_24h	12:30	3.112
Chicago_24h	12:35	3.077
Chicago_24h	12:40	3.043
Chicago_24h	12:45	3.01
Chicago_24h	12:50	2.977
Chicago_24h	12:55	2.946
Chicago_24h	13:00	2.915
Chicago_24h	13:05	2.885
Chicago_24h	13:10	2.856
Chicago_24h	13:15	2.827
Chicago_24h	13:20	2.799
Chicago_24h	13:25	2.772
Chicago_24h	13:30	2.745
Chicago_24h	13:35	2.719
Chicago_24h	13:40	2.693
Chicago_24h	13:45	2.669
Chicago_24h	13:50	2.644
Chicago_24h	13:55	2.62
Chicago_24h	14:00	2.597
Chicago_24h	14:05	2.574
Chicago_24h	14:10	2.552
Chicago_24h	14:15	2.53
Chicago_24h	14:20	2.508
Chicago_24h	14:25	2.487
Chicago_24h	14:30	2.466
Chicago_24h	14:35	2.446
Chicago_24h	14:40	2.426
Chicago_24h	14:45	2.407
Chicago_24h	14:50	2.388
Chicago_24h	14:55	2.369
Chicago_24h	15:00	2.35
Chicago_24h	15:05	2.332
Chicago_24h	15:10	2.315
Chicago_24h	15:15	2.297
Chicago_24h	15:20	2.28
Chicago_24h	15:25	2.263
Chicago_24h	15:30	2.247
Chicago_24h	15:35	2.23
Chicago_24h	15:40	2.214

Chicago_24h	15:45	2.199
Chicago_24h	15:50	2.183
Chicago_24h	15:55	2.168
Chicago_24h	16:00	2.153
Chicago_24h	16:05	2.138
Chicago_24h	16:10	2.124
Chicago_24h	16:15	2.11
Chicago_24h	16:20	2.095
Chicago_24h	16:25	2.082
Chicago_24h	16:30	2.068
Chicago_24h	16:35	2.055
Chicago_24h	16:40	2.042
Chicago_24h	16:45	2.029
Chicago_24h	16:50	2.016
Chicago_24h	16:55	2.003
Chicago_24h	17:00	1.991
Chicago_24h	17:05	1.979
Chicago_24h	17:10	1.966
Chicago_24h	17:15	1.955
Chicago_24h	17:20	1.943
Chicago_24h	17:25	1.931
Chicago_24h	17:30	1.92
Chicago_24h	17:35	1.909
Chicago_24h	17:40	1.898
Chicago_24h	17:45	1.887
Chicago_24h	17:50	1.876
Chicago_24h	17:55	1.865
Chicago_24h	18:00	1.855
Chicago_24h	18:05	1.844
Chicago_24h	18:10	1.834
Chicago_24h	18:15	1.824
Chicago_24h	18:20	1.814
Chicago_24h	18:25	1.804
Chicago_24h	18:30	1.795
Chicago_24h	18:35	1.785
Chicago_24h	18:40	1.776
Chicago_24h	18:45	1.766
Chicago_24h	18:50	1.757
Chicago_24h	18:55	1.748
Chicago_24h	19:00	1.739
Chicago_24h	19:05	1.73
Chicago_24h	19:10	1.721
Chicago_24h	19:15	1.713
Chicago_24h	19:20	1.704
Chicago_24h	19:25	1.696
Chicago_24h	19:30	1.687
Chicago_24h	19:35	1.679
Chicago_24h	19:40	1.671
Chicago_24h	19:45	1.663
Chicago_24h	19:50	1.655
Chicago_24h	19:55	1.647
Chicago_24h	20:00	1.639
Chicago_24h	20:05	1.631
Chicago_24h	20:10	1.624
Chicago_24h	20:15	1.616
Chicago_24h	20:20	1.608
Chicago_24h	20:25	1.601

Chicago_24h	20:30	1.594
Chicago_24h	20:35	1.587
Chicago_24h	20:40	1.579
Chicago_24h	20:45	1.572
Chicago_24h	20:50	1.565
Chicago_24h	20:55	1.558
Chicago_24h	21:00	1.551
Chicago_24h	21:05	1.545
Chicago_24h	21:10	1.538
Chicago_24h	21:15	1.531
Chicago_24h	21:20	1.525
Chicago_24h	21:25	1.518
Chicago_24h	21:30	1.512
Chicago_24h	21:35	1.505
Chicago_24h	21:40	1.499
Chicago_24h	21:45	1.493
Chicago_24h	21:50	1.487
Chicago_24h	21:55	1.48
Chicago_24h	22:00	1.474
Chicago_24h	22:05	1.468
Chicago_24h	22:10	1.462
Chicago_24h	22:15	1.456
Chicago_24h	22:20	1.451
Chicago_24h	22:25	1.445
Chicago_24h	22:30	1.439
Chicago_24h	22:35	1.433
Chicago_24h	22:40	1.428
Chicago_24h	22:45	1.422
Chicago_24h	22:50	1.417
Chicago_24h	22:55	1.411
Chicago_24h	23:00	1.406
Chicago_24h	23:05	1.4
Chicago_24h	23:10	1.395
Chicago_24h	23:15	1.39
Chicago_24h	23:20	1.384
Chicago_24h	23:25	1.379
Chicago_24h	23:30	1.374
Chicago_24h	23:35	1.369
Chicago_24h	23:40	1.364
Chicago_24h	23:45	1.359
Chicago_24h	23:50	1.354
Chicago_24h	23:55	1.349
Chicago_24h	24:00	0

;Chicago design storm, a = 370.49, b = 4.38, c = 0.736, Duration = 240 minutes, r = 0.3, rain units = mm/hr.

Lethbridge_1:2year_Chicago_4h	0:00	1.845
Lethbridge_1:2year_Chicago_4h	0:05	1.954
Lethbridge_1:2year_Chicago_4h	0:10	2.08
Lethbridge_1:2year_Chicago_4h	0:15	2.227
Lethbridge_1:2year_Chicago_4h	0:20	2.401
Lethbridge_1:2year_Chicago_4h	0:25	2.611
Lethbridge_1:2year_Chicago_4h	0:30	2.869
Lethbridge_1:2year_Chicago_4h	0:35	3.196
Lethbridge_1:2year_Chicago_4h	0:40	3.626
Lethbridge_1:2year_Chicago_4h	0:45	4.219
Lethbridge_1:2year_Chicago_4h	0:50	5.1

Lethbridge_1:2year_Chicago_4h	0:55	6.563
Lethbridge_1:2year_Chicago_4h	1:00	9.546
Lethbridge_1:2year_Chicago_4h	1:05	19.693
Lethbridge_1:2year_Chicago_4h	1:10	71.324
Lethbridge_1:2year_Chicago_4h	1:15	31.686
Lethbridge_1:2year_Chicago_4h	1:20	18.267
Lethbridge_1:2year_Chicago_4h	1:25	12.889
Lethbridge_1:2year_Chicago_4h	1:30	10.06
Lethbridge_1:2year_Chicago_4h	1:35	8.312
Lethbridge_1:2year_Chicago_4h	1:40	7.122
Lethbridge_1:2year_Chicago_4h	1:45	6.258
Lethbridge_1:2year_Chicago_4h	1:50	5.6
Lethbridge_1:2year_Chicago_4h	1:55	5.081
Lethbridge_1:2year_Chicago_4h	2:00	4.661
Lethbridge_1:2year_Chicago_4h	2:05	4.313
Lethbridge_1:2year_Chicago_4h	2:10	4.02
Lethbridge_1:2year_Chicago_4h	2:15	3.769
Lethbridge_1:2year_Chicago_4h	2:20	3.551
Lethbridge_1:2year_Chicago_4h	2:25	3.361
Lethbridge_1:2year_Chicago_4h	2:30	3.193
Lethbridge_1:2year_Chicago_4h	2:35	3.043
Lethbridge_1:2year_Chicago_4h	2:40	2.909
Lethbridge_1:2year_Chicago_4h	2:45	2.787
Lethbridge_1:2year_Chicago_4h	2:50	2.677
Lethbridge_1:2year_Chicago_4h	2:55	2.577
Lethbridge_1:2year_Chicago_4h	3:00	2.485
Lethbridge_1:2year_Chicago_4h	3:05	2.4
Lethbridge_1:2year_Chicago_4h	3:10	2.322
Lethbridge_1:2year_Chicago_4h	3:15	2.249
Lethbridge_1:2year_Chicago_4h	3:20	2.182
Lethbridge_1:2year_Chicago_4h	3:25	2.119
Lethbridge_1:2year_Chicago_4h	3:30	2.06
Lethbridge_1:2year_Chicago_4h	3:35	2.005
Lethbridge_1:2year_Chicago_4h	3:40	1.953
Lethbridge_1:2year_Chicago_4h	3:45	1.905
Lethbridge_1:2year_Chicago_4h	3:50	1.859
Lethbridge_1:2year_Chicago_4h	3:55	1.815
Lethbridge_1:2year_Chicago_4h	4:00	0
Lethbridge_County_1:100year_24hr	1	0.1
Lethbridge_County_1:100year_24hr	2	0.2
Lethbridge_County_1:100year_24hr	3	0.3
Lethbridge_County_1:100year_24hr	4	0.4
Lethbridge_County_1:100year_24hr	5	0.6
Lethbridge_County_1:100year_24hr	6	0.8
Lethbridge_County_1:100year_24hr	7	0.9
Lethbridge_County_1:100year_24hr	8	1.1
Lethbridge_County_1:100year_24hr	9	6.2
Lethbridge_County_1:100year_24hr	10	37
Lethbridge_County_1:100year_24hr	11	21.8
Lethbridge_County_1:100year_24hr	12	15.7
Lethbridge_County_1:100year_24hr	13	9
Lethbridge_County_1:100year_24hr	14	5.6
Lethbridge_County_1:100year_24hr	15	4.5
Lethbridge_County_1:100year_24hr	16	3.4
Lethbridge_County_1:100year_24hr	17	2.8
Lethbridge_County_1:100year_24hr	18	1.7

Lethbridge_County_1:100year_24hr	19	0
Lethbridge_County_1:100year_24hr	20	0
Lethbridge_County_1:100year_24hr	21	0
Lethbridge_County_1:100year_24hr	22	0
Lethbridge_County_1:100year_24hr	23	0
Lethbridge_County_1:100year_24hr	24	0

```
[REPORT]
;;Reporting Options
INPUT      YES
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL
```

```
[TAGS]
```

```
[MAP]
DIMENSIONS      9945.1547      16495.9708      11105.4193      17296.0932
UNITS           Meters
```

```
[COORDINATES]
;;Node          X-Coord          Y-Coord
;;-----
Outfall_1       11052.68          17252.62
Outfall_2       10453.858         16711.232
Outfall_3       10445.385         16546.463
Outfall_4       10121.494         16532.34
Outfall_5       10022.632         16849.639
SU1             10322.984         16889.184
SU2             10229.772         16721.59
```

```
[VERTICES]
;;Link          X-Coord          Y-Coord
;;-----
```

```
[POLYGONS]
;;Subcatchment X-Coord          Y-Coord
;;-----
Dugout          10309.728         16912.795
Dugout          10328.019         16917.215
Dugout          10356.632         16917.111
Dugout          10358.167         16913.465
Dugout          10358.407         16895.956
Dugout          10358.051         16887.175
Dugout          10354.593         16881.191
Dugout          10351.788         16869.772
Dugout          10324.561         16869.158
Dugout          10305.843         16874.547
Dugout          10301.39          16887.273
Dugout          10300.1           16893.227
Dugout          10299.837         16903.312
Dugout          10301.861         16910.964
Dugout          10309.728         16912.795
East            10432.533         16986.754
East            10234.451         16887.209
East            10138.696         16839.078
```

East	10109.454	16838.662
East	10108.65	16804.086
East	10132.858	16810.074
East	10141.665	16827.135
East	10176.779	16852.307
East	10209.47	16855.336
East	10241.517	16861.854
East	10250.424	16869.933
East	10273.179	16888.068
East	10289.867	16890.168
East	10300.068	16894.447
East	10299.837	16903.312
East	10301.861	16910.964
East	10309.728	16912.795
East	10328.019	16917.215
East	10356.632	16917.111
East	10358.167	16913.465
East	10358.407	16895.956
East	10358.132	16889.182
East	10367.964	16884.086
East	10375.427	16880.998
East	10388.551	16875.724
East	10402.118	16876.957
East	10416.238	16862.497
East	10432.662	16852.328
East	10434.517	16837.789
East	10435.65	16814.494
East	11037.777	16822.113
East	11033.059	17259.724
East	10694.241	17116.311
East	10691.891	17115.313
East	10689.545	17114.307
East	10687.201	17113.295
East	10684.86	17112.275
East	10682.523	17111.249
East	10680.188	17110.216
East	10677.857	17109.176
East	10675.528	17108.129
East	10673.203	17107.075
East	10670.881	17106.014
East	10668.562	17104.946
East	10666.246	17103.872
East	10663.933	17102.79
East	10661.624	17101.702
East	10659.317	17100.607
East	10657.014	17099.505
East	10654.715	17098.397
East	10652.418	17097.281
East	10650.125	17096.159
East	10647.835	17095.03
East	10645.549	17093.895
East	10643.265	17092.752
East	10643.265	17092.752
East	10432.533	16986.754
West-Central	10033.989	16544.952
West-Central	10077.293	16564.867
West-Central	10100.035	16574.872

West-Central	10128.003	16579.374
West-Central	10159.675	16581.448
West-Central	10186.822	16576.547
West-Central	10210.576	16574.285
West-Central	10223.207	16562.788
West-Central	10246.883	16543.852
West-Central	10355.488	16545.23
West-Central	10359.19	16579.614
West-Central	10378.557	16594.5
West-Central	10382.731	16618.765
West-Central	10411.157	16650.917
West-Central	10426.22	16672.638
West-Central	10435.888	16680.894
West-Central	10434.423	16814.478
West-Central	10435.65	16814.494
West-Central	10434.517	16837.789
West-Central	10432.662	16852.328
West-Central	10416.238	16862.497
West-Central	10402.118	16876.957
West-Central	10388.551	16875.724
West-Central	10375.427	16880.998
West-Central	10367.964	16884.086
West-Central	10358.132	16889.182
West-Central	10358.051	16887.175
West-Central	10354.593	16881.191
West-Central	10351.788	16869.772
West-Central	10324.561	16869.158
West-Central	10305.843	16874.547
West-Central	10301.39	16887.273
West-Central	10300.1	16893.227
West-Central	10300.068	16894.447
West-Central	10289.867	16890.168
West-Central	10273.179	16888.068
West-Central	10250.424	16869.933
West-Central	10241.517	16861.854
West-Central	10209.47	16855.336
West-Central	10176.779	16852.307
West-Central	10141.665	16827.135
West-Central	10132.858	16810.074
West-Central	10108.65	16804.086
West-Central	10108.395	16793.122
West-Central	10103.644	16744.225
West-Central	10077.795	16731.437
West-Central	10062.872	16694.137
West-Central	10039.688	16686.145
West-Central	10001.048	16653.236
West-Central	10001.104	16649.982
West-Central	10033.989	16544.952
West-NW	10109.454	16838.662
West-NW	9997.894	16837.075
West-NW	10001.048	16653.236
West-NW	10039.688	16686.145
West-NW	10062.872	16694.137
West-NW	10077.795	16731.437
West-NW	10103.644	16744.225
West-NW	10108.395	16793.122
West-NW	10109.454	16838.662

West-SE	10435.888	16680.894
West-SE	10426.22	16672.638
West-SE	10411.157	16650.917
West-SE	10382.731	16618.765
West-SE	10378.557	16594.5
West-SE	10359.19	16579.614
West-SE	10355.488	16545.23
West-SE	10437.364	16546.269
West-SE	10435.888	16680.894
West-SW	10246.883	16543.852
West-SW	10223.207	16562.788
West-SW	10210.576	16574.285
West-SW	10186.822	16576.547
West-SW	10159.675	16581.448
West-SW	10128.003	16579.374
West-SW	10100.035	16574.872
West-SW	10077.293	16564.867
West-SW	10033.989	16544.952
West-SW	10035.174	16541.165
West-SW	10246.883	16543.852

[SYMBOLS]

;;Gage	X-Coord	Y-Coord
;;-----	-----	-----

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

Element Count

Number of rain gages 3
 Number of subcatchments ... 6
 Number of nodes 7
 Number of links 1
 Number of pollutants 0
 Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording Interval
Lethbridge_1:100year_Chicago_24h	Chicago_24h		INTENSITY 5 min.
Lethbridge_1:2year_Chicago_4h	Lethbridge_1:2year_Chicago_4h		INTENSITY 5 min.
Lethbridge_County_1:100year_24hr	Lethbridge_County_1:100year_24hr		INTENSITY 60 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage
Outlet					
Dugout	0.25	50.00	80.00	0.5000	
Lethbridge_1:100year_Chicago_24h SU1					
East	19.96	350.00	1.00	0.5000	
Lethbridge_1:100year_Chicago_24h Outfall_1					
West-Central	10.66	300.00	10.00	0.5000	
Lethbridge_1:100year_Chicago_24h SU2					
West-NW	1.50	100.00	2.00	0.5000	
Lethbridge_1:100year_Chicago_24h Outfall_5					
West-SE	0.68	80.00	0.50	0.5000	
Lethbridge_1:100year_Chicago_24h Outfall_3					
West-SW	0.57	150.00	0.50	0.5000	
Lethbridge_1:100year_Chicago_24h Outfall_4					

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
Outfall_1	OUTFALL	0.00	0.00	0.0	
Outfall_2	OUTFALL	0.00	0.00	0.0	

Outfall_3	OUTFALL	0.00	0.00	0.0
Outfall_4	OUTFALL	0.00	0.00	0.0
Outfall_5	OUTFALL	0.00	0.00	0.0
SU1	STORAGE	905.00	1.50	0.0
SU2	STORAGE	905.00	1.40	0.0

Link Summary

Name	From Node	To Node	Type	Length	%
Slope Roughness					
-----	-----	-----	-----	-----	-----
W1	SU2	Outfall_2	WEIR		

Cross Section Summary

Full		Full	Full	Hyd.	Max.	No. of
Conduit	Shape	Depth	Area	Rad.	Width	Barrels
Flow						
-----	-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----	-----

NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

Analysis Options

Flow Units CMS
Process Models:
Rainfall/Runoff YES
RDII NO
Snowmelt NO
Groundwater NO
Flow Routing YES
Ponding Allowed NO
Water Quality NO
Infiltration Method GREEN_AMPT
Flow Routing Method DYNWAVE
Surcharge Method EXTRAN
Starting Date 05/17/2022 00:00:00
Ending Date 05/20/2022 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step 5.00 sec

Variable Time Step YES
Maximum Trials 8
Number of Threads 1
Head Tolerance 0.001500 m

	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm

Total Precipitation	4.038	120.146
Evaporation Loss	0.000	0.000
Infiltration Loss	2.294	68.247
Surface Runoff	1.749	52.025
Final Storage	0.001	0.033
Continuity Error (%)	-0.133	

	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr

Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	1.749	17.486
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	1.125	11.251
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.070	0.695
Final Stored Volume	0.693	6.930
Continuity Error (%)	0.004	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	4.50 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
5.000 - 3.155 sec	:	100.00 %

3.155 - 1.991 sec : 0.00 %
 1.991 - 1.256 sec : 0.00 %
 1.256 - 0.792 sec : 0.00 %
 0.792 - 0.500 sec : 0.00 %

 Subcatchment Runoff Summary

Perv	Total Runoff mm	Total Precip Runoff mm 10^6 ltr	Total Peak Runoff mm CMS	Total Runoff Coeff	Total Evap mm	Total Infil mm	Imperv Runoff mm
Dugout		120.15	0.00		0.00	15.85	96.57
105.44	105.44	0.26	0.17	0.878			
East		120.15	0.00		0.00	71.32	1.19
48.89	48.89	9.76	0.68	0.407			
West-Central		120.15	0.00		0.00	64.26	12.06
56.04	56.04	5.97	0.62	0.466			
West-NW		120.15	0.00		0.00	66.33	2.39
54.04	54.04	0.81	0.14	0.450			
West-SE		120.15	0.00		0.00	66.16	0.60
54.39	54.39	0.37	0.10	0.453			
West-SW		120.15	0.00		0.00	65.50	0.60
55.46	55.46	0.32	0.15	0.462			

 Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
Outfall_1	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
Outfall_2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
Outfall_3	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
Outfall_4	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
Outfall_5	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
SU1	STORAGE	0.90	0.93	905.93	1 01:05	0.93
SU2	STORAGE	0.99	1.12	906.12	1 00:15	1.12

 Node Inflow Summary

Total Inflow Volume	Flow Balance Error	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr
9.76	0.000	OUTFALL	0.677	0.677	0 07:45	9.76
0	0.000 ltr	OUTFALL	0.000	0.000	0 00:00	0
0.368	0.000	OUTFALL	0.096	0.096	0 07:20	0.368
0.315	0.000	OUTFALL	0.152	0.152	0 07:15	0.315
0.812	0.000	OUTFALL	0.142	0.142	0 07:25	0.812
0.957	0.003	STORAGE	0.165	0.165	0 07:20	0.262
5.97	0.012	STORAGE	0.616	0.616	0 07:30	5.97

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

of Max Occurrence Storage Unit	Maximum Outflow Unit	Average Volume	Avg Full	Evap Loss	Exfil Loss	Maximum Volume	Max Full	Time days
SU1 01:05	0.000	0.922	52	0	0	0.957	54	1
SU2 00:15	0.000	5.158	36	0	0	5.974	42	1

 Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Outfall_1	24.30	0.155	0.677	9.756
Outfall_2	0.00	0.000	0.000	0.000
Outfall_3	14.49	0.010	0.096	0.368
Outfall_4	12.64	0.010	0.152	0.315
Outfall_5	17.08	0.018	0.142	0.812
System	13.70	0.193	0.948	11.251

 Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
W1	WEIR	0.000	0 00:00			0.00

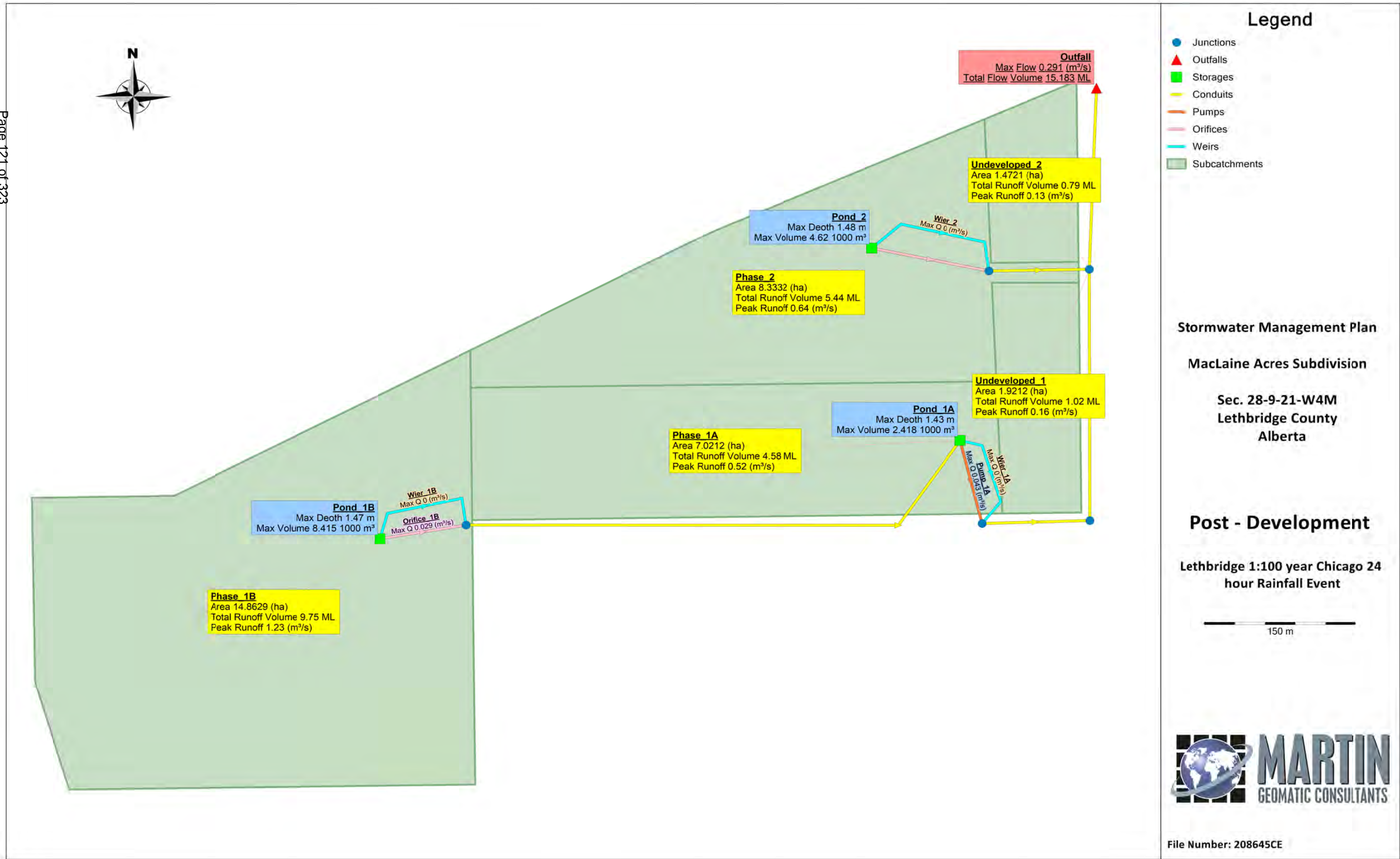
 Flow Classification Summary

	Adjusted	Fraction of Time in Flow Class							
	/Actual	Up	Down	Sub	Sup	Up	Down	Norm	
Inlet									
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd
Ctrl									

 Conduit Surcharge Summary

No conduits were surcharged.

Analysis begun on: Wed May 25 17:12:26 2022
 Analysis ended on: Wed May 25 17:12:26 2022
 Total elapsed time: < 1 sec



```

[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option      Value
FLOW_UNITS    CMS
INFILTRATION  GREEN_AMPT
FLOW_ROUTING  DYNWAVE
LINK_OFFSETS  DEPTH
MIN_SLOPE     0
ALLOW_PONDING NO
SKIP_STEADY_STATE NO

START_DATE    05/17/2022
START_TIME    00:00:00
REPORT_START_DATE 05/17/2022
REPORT_START_TIME 00:00:00
END_DATE      05/20/2022
END_TIME      00:00:00
SWEEP_START   01/01
SWEEP_END     12/31
DRY_DAYS      0
REPORT_STEP   00:01:00
WET_STEP      00:05:00
DRY_STEP      00:05:00
ROUTING_STEP  5
RULE_STEP     00:00:00

INERTIAL_DAMPING PARTIAL
NORMAL_FLOW_LIMITED BOTH
FORCE_MAIN_EQUATION H-W
VARIABLE_STEP    0.75
LENGTHENING_STEP 0
MIN_SURFAREA     0
MAX_TRIALS        8
HEAD_TOLERANCE   0.0015
SYS_FLOW_TOL     5
LAT_FLOW_TOL     5
MINIMUM_STEP     0.5
THREADS          4

[EVAPORATION]
;;Data Source  Parameters
;;-----
CONSTANT       0.0
DRY_ONLY       NO

[RAINGAGES]
;;Name          Format      Interval SCF      Source
;;-----
Lethbridge_1:100year_Chicago_24h INTENSITY 0:05      1.0      TIMESERIES Chicago_24h
Lethbridge_County_1:100year_48hr INTENSITY 1          1.0      TIMESERIES
Lethbridge_County_1:100year_48hr

[SUBCATCHMENTS]
;;Name          Rain Gage      Outlet      Area      %Imperv Width      %
Slope  CurbLen  SnowPack
;;-----

```

Phase_1A 0	Lethbridge_1:100year_Chicago_24h	Pond_1A	7.0212	25	160	0.5
Phase_1B 0	Lethbridge_1:100year_Chicago_24h	Pond_1B	14.8629	25	400	0.5
Phase_2 0	Lethbridge_1:100year_Chicago_24h	Pond_2	8.3332	25	200	0.5
Undeveloped_1 0	Lethbridge_1:100year_Chicago_24h	J3	1.9212	1	107	0.5
Undeveloped_2 0	Lethbridge_1:100year_Chicago_24h	J3	1.4721	1	92	0.5

[SUBAREAS]						
;;Subcatchment	N-Imperv	N-Perv	S-Imperv	S-Perv	PctZero	RouteTo
PctRouted						
Phase_1A 75	0.015	0.15	1	5	25	PERVIOUS
Phase_1B 75	0.015	0.15	1	5	25	PERVIOUS
Phase_2 75	0.015	0.15	1	5	25	PERVIOUS
Undeveloped_1 100	0.015	0.15	1	5	25	PERVIOUS
Undeveloped_2 100	0.015	0.15	1	5	25	PERVIOUS

[INFILTRATION]					
;;Subcatchment	Param1	Param2	Param3	Param4	Param5
Phase_1A	292.2	1	0.229	0	0
Phase_1B	292.2	1	0.229	0	0
Phase_2	292.2	1	0.229	0	0
Undeveloped_1	292.2	1	0.229	0	0
Undeveloped_2	292.2	1	0.229	0	0

[JUNCTIONS]					
;;Name	Elevation	MaxDepth	InitDepth	SurDepth	Apounded
J1	903.4	1	0	0	0
J2	900.303	1	0	0	0
J3	899.711	1	0	0	0
J4	900.619	1	0	0	0
J5	901	1	0	0	0

[OUTFALLS]					
;;Name	Elevation	Type	Stage Data	Gated	Route To
Outfall1	899.5	FREE		NO	

[STORAGE]							
;;Name	Elev.	MaxDepth	InitDepth	Shape	Curve Name/Params		
N/A	Fevap	Psi	Ksat	IMD			
Pond_1A 0	0	900	2	0	FUNCTIONAL	1000	2 1000
Pond_1B 0	0	903.4	2	0	FUNCTIONAL	1000	2 5000

Pond_2 900.5 2 0 FUNCTIONAL 1000 2 2400
0 0

[CONDUITS]

;;Name	From Node	To Node	Length	Roughness	InOffset
OutOffset	InitFlow	MaxFlow			
C1	J1	Pond_1A	533.785	0.035	0
0	0				
C3	J5	J4	106.708	0.035	0
0	0				
C4	J4	J3	254.852	0.035	0
0	0				
C5	J2	J3	99.45	0.035	0
0	0				
C6	J3	Outfall	183.881	0.035	0
0	0				

[PUMPS]

;;Name	From Node	To Node	Pump Curve	Status
Startup	Shutoff			
Pump_1A	Pond_1A	J5	Pump_1A	ON
0				0

[ORIFICES]

;;Name	From Node	To Node	Type	Offset	Qcoeff
Gated	CloseTime				
Orifice_1B	Pond_1B	J1	SIDE	0	0.65
NO	0				
Orifice_2	Pond_2	J2	SIDE	0	0.65
NO	0				

[WEIRS]

;;Name	From Node	To Node	Type	CrestHt	Qcoeff
Gated	EndCon	EndCoeff	Surcharge	RoadWidth	RoadSurf
					Coeff. Curve
Wier_1A	Pond_1A	J5	TRANSVERSE	1.5	3.33
NO	0	YES			
Wier_1B	Pond_1B	J1	TRANSVERSE	1.5	3.33
NO	0	YES			
Wier_2	Pond_2	J2	TRANSVERSE	1.5	3.33
NO	0	YES			

[XSECTIONS]

;;Link	Shape	Geom1	Geom2	Geom3	Geom4
Barrels	Culvert				
C1	TRIANGULAR	1	6	0	0
C3	TRIANGULAR	1	6	0	0
C4	TRIANGULAR	1	6	0	0
C5	TRIANGULAR	1	6	0	0
C6	TRIANGULAR	1	6	0	0
Orifice_1B	CIRCULAR	0.105	0	0	0

Orifice_2	CIRCULAR	0.08	0	0	0
Wier_1A	RECT_OPEN	1	1.2	0	0
Wier_1B	RECT_OPEN	1	1.2	0	0
Wier_2	RECT_OPEN	1	1.2	0	0

[LOSSES]

;;Link	Kentry	Kexit	Kavg	Flap Gate	Seepage
;;-----	-----	-----	-----	-----	-----

[CURVES]

;;Name	Type	X-Value	Y-Value
;;-----	-----	-----	-----
Pump_1A	Pump3	0	0.043
Pump_1A		2	0.035
Pump_1A		3	0.028
Pump_1A		4	0.01
Dugout	Storage	0	800
Dugout		1	1306
Dugout		1.5	1541
Predevelopment_west_Trap	Storage	0	0
Predevelopment_west_Trap		0.2	100.739
Predevelopment_west_Trap		0.4	534.763
Predevelopment_west_Trap		0.6	3367.153
Predevelopment_west_Trap		0.8	8014.551
Predevelopment_west_Trap		1	14275.847
Predevelopment_west_Trap		1.2	26000.83
Predevelopment_west_Trap		1.3	31539.26
Predevelopment_west_Trap		1.4	38436.106

[TIMESERIES]

;;Name	Date	Time	Value
;;-----	-----	-----	-----
;Chicago design storm, a = 1019.2, b = 0, c = 0.731, Duration = 1440 minutes, r = 0.3, rain units = mm/hr.			
Chicago_24h		0:00	1.352
Chicago_24h		0:05	1.364
Chicago_24h		0:10	1.376
Chicago_24h		0:15	1.388
Chicago_24h		0:20	1.4
Chicago_24h		0:25	1.413
Chicago_24h		0:30	1.426
Chicago_24h		0:35	1.439
Chicago_24h		0:40	1.453
Chicago_24h		0:45	1.466
Chicago_24h		0:50	1.48
Chicago_24h		0:55	1.495
Chicago_24h		1:00	1.51
Chicago_24h		1:05	1.525
Chicago_24h		1:10	1.54
Chicago_24h		1:15	1.556
Chicago_24h		1:20	1.572
Chicago_24h		1:25	1.589
Chicago_24h		1:30	1.606
Chicago_24h		1:35	1.624
Chicago_24h		1:40	1.641

Chicago_24h	1:45	1.66
Chicago_24h	1:50	1.679
Chicago_24h	1:55	1.698
Chicago_24h	2:00	1.718
Chicago_24h	2:05	1.739
Chicago_24h	2:10	1.76
Chicago_24h	2:15	1.782
Chicago_24h	2:20	1.804
Chicago_24h	2:25	1.828
Chicago_24h	2:30	1.851
Chicago_24h	2:35	1.876
Chicago_24h	2:40	1.901
Chicago_24h	2:45	1.928
Chicago_24h	2:50	1.955
Chicago_24h	2:55	1.983
Chicago_24h	3:00	2.012
Chicago_24h	3:05	2.042
Chicago_24h	3:10	2.073
Chicago_24h	3:15	2.105
Chicago_24h	3:20	2.138
Chicago_24h	3:25	2.173
Chicago_24h	3:30	2.209
Chicago_24h	3:35	2.247
Chicago_24h	3:40	2.286
Chicago_24h	3:45	2.326
Chicago_24h	3:50	2.369
Chicago_24h	3:55	2.413
Chicago_24h	4:00	2.46
Chicago_24h	4:05	2.508
Chicago_24h	4:10	2.559
Chicago_24h	4:15	2.612
Chicago_24h	4:20	2.669
Chicago_24h	4:25	2.728
Chicago_24h	4:30	2.79
Chicago_24h	4:35	2.856
Chicago_24h	4:40	2.925
Chicago_24h	4:45	2.999
Chicago_24h	4:50	3.077
Chicago_24h	4:55	3.16
Chicago_24h	5:00	3.249
Chicago_24h	5:05	3.344
Chicago_24h	5:10	3.446
Chicago_24h	5:15	3.555
Chicago_24h	5:20	3.673
Chicago_24h	5:25	3.801
Chicago_24h	5:30	3.939
Chicago_24h	5:35	4.091
Chicago_24h	5:40	4.257
Chicago_24h	5:45	4.44
Chicago_24h	5:50	4.642
Chicago_24h	5:55	4.868
Chicago_24h	6:00	5.122
Chicago_24h	6:05	5.409
Chicago_24h	6:10	5.738
Chicago_24h	6:15	6.119
Chicago_24h	6:20	6.565
Chicago_24h	6:25	7.098

Chicago_24h	6:30	7.745
Chicago_24h	6:35	8.553
Chicago_24h	6:40	9.594
Chicago_24h	6:45	10.997
Chicago_24h	6:50	13.01
Chicago_24h	6:55	16.203
Chicago_24h	7:00	22.264
Chicago_24h	7:05	40.822
Chicago_24h	7:10	314.277
Chicago_24h	7:15	62.374
Chicago_24h	7:20	38.336
Chicago_24h	7:25	28.645
Chicago_24h	7:30	23.295
Chicago_24h	7:35	19.837
Chicago_24h	7:40	17.393
Chicago_24h	7:45	15.56
Chicago_24h	7:50	14.128
Chicago_24h	7:55	12.973
Chicago_24h	8:00	12.02
Chicago_24h	8:05	11.217
Chicago_24h	8:10	10.531
Chicago_24h	8:15	9.937
Chicago_24h	8:20	9.416
Chicago_24h	8:25	8.956
Chicago_24h	8:30	8.545
Chicago_24h	8:35	8.177
Chicago_24h	8:40	7.844
Chicago_24h	8:45	7.542
Chicago_24h	8:50	7.265
Chicago_24h	8:55	7.012
Chicago_24h	9:00	6.778
Chicago_24h	9:05	6.563
Chicago_24h	9:10	6.362
Chicago_24h	9:15	6.176
Chicago_24h	9:20	6.002
Chicago_24h	9:25	5.839
Chicago_24h	9:30	5.687
Chicago_24h	9:35	5.543
Chicago_24h	9:40	5.408
Chicago_24h	9:45	5.28
Chicago_24h	9:50	5.159
Chicago_24h	9:55	5.045
Chicago_24h	10:00	4.936
Chicago_24h	10:05	4.833
Chicago_24h	10:10	4.735
Chicago_24h	10:15	4.641
Chicago_24h	10:20	4.552
Chicago_24h	10:25	4.466
Chicago_24h	10:30	4.385
Chicago_24h	10:35	4.307
Chicago_24h	10:40	4.231
Chicago_24h	10:45	4.159
Chicago_24h	10:50	4.09
Chicago_24h	10:55	4.024
Chicago_24h	11:00	3.96
Chicago_24h	11:05	3.898
Chicago_24h	11:10	3.839

Chicago_24h	11:15	3.781
Chicago_24h	11:20	3.726
Chicago_24h	11:25	3.673
Chicago_24h	11:30	3.621
Chicago_24h	11:35	3.571
Chicago_24h	11:40	3.523
Chicago_24h	11:45	3.476
Chicago_24h	11:50	3.43
Chicago_24h	11:55	3.386
Chicago_24h	12:00	3.344
Chicago_24h	12:05	3.302
Chicago_24h	12:10	3.262
Chicago_24h	12:15	3.223
Chicago_24h	12:20	3.185
Chicago_24h	12:25	3.148
Chicago_24h	12:30	3.112
Chicago_24h	12:35	3.077
Chicago_24h	12:40	3.043
Chicago_24h	12:45	3.01
Chicago_24h	12:50	2.977
Chicago_24h	12:55	2.946
Chicago_24h	13:00	2.915
Chicago_24h	13:05	2.885
Chicago_24h	13:10	2.856
Chicago_24h	13:15	2.827
Chicago_24h	13:20	2.799
Chicago_24h	13:25	2.772
Chicago_24h	13:30	2.745
Chicago_24h	13:35	2.719
Chicago_24h	13:40	2.693
Chicago_24h	13:45	2.669
Chicago_24h	13:50	2.644
Chicago_24h	13:55	2.62
Chicago_24h	14:00	2.597
Chicago_24h	14:05	2.574
Chicago_24h	14:10	2.552
Chicago_24h	14:15	2.53
Chicago_24h	14:20	2.508
Chicago_24h	14:25	2.487
Chicago_24h	14:30	2.466
Chicago_24h	14:35	2.446
Chicago_24h	14:40	2.426
Chicago_24h	14:45	2.407
Chicago_24h	14:50	2.388
Chicago_24h	14:55	2.369
Chicago_24h	15:00	2.35
Chicago_24h	15:05	2.332
Chicago_24h	15:10	2.315
Chicago_24h	15:15	2.297
Chicago_24h	15:20	2.28
Chicago_24h	15:25	2.263
Chicago_24h	15:30	2.247
Chicago_24h	15:35	2.23
Chicago_24h	15:40	2.214
Chicago_24h	15:45	2.199
Chicago_24h	15:50	2.183
Chicago_24h	15:55	2.168

Chicago_24h	16:00	2.153
Chicago_24h	16:05	2.138
Chicago_24h	16:10	2.124
Chicago_24h	16:15	2.11
Chicago_24h	16:20	2.095
Chicago_24h	16:25	2.082
Chicago_24h	16:30	2.068
Chicago_24h	16:35	2.055
Chicago_24h	16:40	2.042
Chicago_24h	16:45	2.029
Chicago_24h	16:50	2.016
Chicago_24h	16:55	2.003
Chicago_24h	17:00	1.991
Chicago_24h	17:05	1.979
Chicago_24h	17:10	1.966
Chicago_24h	17:15	1.955
Chicago_24h	17:20	1.943
Chicago_24h	17:25	1.931
Chicago_24h	17:30	1.92
Chicago_24h	17:35	1.909
Chicago_24h	17:40	1.898
Chicago_24h	17:45	1.887
Chicago_24h	17:50	1.876
Chicago_24h	17:55	1.865
Chicago_24h	18:00	1.855
Chicago_24h	18:05	1.844
Chicago_24h	18:10	1.834
Chicago_24h	18:15	1.824
Chicago_24h	18:20	1.814
Chicago_24h	18:25	1.804
Chicago_24h	18:30	1.795
Chicago_24h	18:35	1.785
Chicago_24h	18:40	1.776
Chicago_24h	18:45	1.766
Chicago_24h	18:50	1.757
Chicago_24h	18:55	1.748
Chicago_24h	19:00	1.739
Chicago_24h	19:05	1.73
Chicago_24h	19:10	1.721
Chicago_24h	19:15	1.713
Chicago_24h	19:20	1.704
Chicago_24h	19:25	1.696
Chicago_24h	19:30	1.687
Chicago_24h	19:35	1.679
Chicago_24h	19:40	1.671
Chicago_24h	19:45	1.663
Chicago_24h	19:50	1.655
Chicago_24h	19:55	1.647
Chicago_24h	20:00	1.639
Chicago_24h	20:05	1.631
Chicago_24h	20:10	1.624
Chicago_24h	20:15	1.616
Chicago_24h	20:20	1.608
Chicago_24h	20:25	1.601
Chicago_24h	20:30	1.594
Chicago_24h	20:35	1.587
Chicago_24h	20:40	1.579

Chicago_24h	20:45	1.572	
Chicago_24h	20:50	1.565	
Chicago_24h	20:55	1.558	
Chicago_24h	21:00	1.551	
Chicago_24h	21:05	1.545	
Chicago_24h	21:10	1.538	
Chicago_24h	21:15	1.531	
Chicago_24h	21:20	1.525	
Chicago_24h	21:25	1.518	
Chicago_24h	21:30	1.512	
Chicago_24h	21:35	1.505	
Chicago_24h	21:40	1.499	
Chicago_24h	21:45	1.493	
Chicago_24h	21:50	1.487	
Chicago_24h	21:55	1.48	
Chicago_24h	22:00	1.474	
Chicago_24h	22:05	1.468	
Chicago_24h	22:10	1.462	
Chicago_24h	22:15	1.456	
Chicago_24h	22:20	1.451	
Chicago_24h	22:25	1.445	
Chicago_24h	22:30	1.439	
Chicago_24h	22:35	1.433	
Chicago_24h	22:40	1.428	
Chicago_24h	22:45	1.422	
Chicago_24h	22:50	1.417	
Chicago_24h	22:55	1.411	
Chicago_24h	23:00	1.406	
Chicago_24h	23:05	1.4	
Chicago_24h	23:10	1.395	
Chicago_24h	23:15	1.39	
Chicago_24h	23:20	1.384	
Chicago_24h	23:25	1.379	
Chicago_24h	23:30	1.374	
Chicago_24h	23:35	1.369	
Chicago_24h	23:40	1.364	
Chicago_24h	23:45	1.359	
Chicago_24h	23:50	1.354	
Chicago_24h	23:55	1.349	
Chicago_24h	24:00	0	
Lethbridge_County_1:100year_48hr	1	0.1	
Lethbridge_County_1:100year_48hr	2	0.1	
Lethbridge_County_1:100year_48hr	3	0.1	
Lethbridge_County_1:100year_48hr	4	0.1	
Lethbridge_County_1:100year_48hr	5	0.4	
Lethbridge_County_1:100year_48hr	6	0.9	
Lethbridge_County_1:100year_48hr	7	1	
Lethbridge_County_1:100year_48hr	8	1.1	
Lethbridge_County_1:100year_48hr	9	1.3	
Lethbridge_County_1:100year_48hr	10	1.9	
Lethbridge_County_1:100year_48hr	11	2.5	
Lethbridge_County_1:100year_48hr	12	3.1	
Lethbridge_County_1:100year_48hr	13	4.4	
Lethbridge_County_1:100year_48hr	14	4.7	
Lethbridge_County_1:100year_48hr	15	5	
Lethbridge_County_1:100year_48hr	16	5.2	

Lethbridge_County_1:100year_48hr	17	5.3
Lethbridge_County_1:100year_48hr	18	5.6
Lethbridge_County_1:100year_48hr	19	5.9
Lethbridge_County_1:100year_48hr	20	6.3
Lethbridge_County_1:100year_48hr	21	7.5
Lethbridge_County_1:100year_48hr	22	17.3
Lethbridge_County_1:100year_48hr	23	7.7
Lethbridge_County_1:100year_48hr	24	5
Lethbridge_County_1:100year_48hr	25	4.7
Lethbridge_County_1:100year_48hr	26	4.4
Lethbridge_County_1:100year_48hr	27	3.8
Lethbridge_County_1:100year_48hr	28	3.4
Lethbridge_County_1:100year_48hr	29	3.1
Lethbridge_County_1:100year_48hr	30	2.5
Lethbridge_County_1:100year_48hr	31	2.2
Lethbridge_County_1:100year_48hr	32	1.9
Lethbridge_County_1:100year_48hr	33	1.6
Lethbridge_County_1:100year_48hr	34	1.3
Lethbridge_County_1:100year_48hr	35	0.6
Lethbridge_County_1:100year_48hr	36	0.6
Lethbridge_County_1:100year_48hr	37	0.6
Lethbridge_County_1:100year_48hr	38	0.6
Lethbridge_County_1:100year_48hr	39	0.6
Lethbridge_County_1:100year_48hr	40	0.4
Lethbridge_County_1:100year_48hr	41	0.3
Lethbridge_County_1:100year_48hr	42	0.2
Lethbridge_County_1:100year_48hr	43	0.1
Lethbridge_County_1:100year_48hr	44	0.1
Lethbridge_County_1:100year_48hr	45	0
Lethbridge_County_1:100year_48hr	46	0
Lethbridge_County_1:100year_48hr	47	0
Lethbridge_County_1:100year_48hr	48	0

[REPORT]

;;Reporting Options

INPUT YES

CONTROLS NO

SUBCATCHMENTS ALL

NODES ALL

LINKS ALL

[TAGS]

[MAP]

DIMENSIONS	9944.6547	16505.09225	11115.9193	17298.69275
------------	-----------	-------------	------------	-------------

UNITS	Meters
-------	--------

[COORDINATES]

;;Node	X-Coord	Y-Coord
;;-----	-----	-----

J1	10428.276	16809.562
----	-----------	-----------

J2	10946.19	17067.207
----	----------	-----------

J3	11045.615	17068.893
----	-----------	-----------

J4	11046.104	16814.066
----	-----------	-----------

J5	10939.448	16811.06
----	-----------	----------

Outfall	11052.68	17252.62
---------	----------	----------

Pond_1A	10917.541	16895.318
---------	-----------	-----------

Pond_1B	10342.692	16795.507
Pond_2	10830.278	17090.356

```
[VERTICES]
;;Link      X-Coord      Y-Coord
;;-----
C1           10856.417      16809.217
Wier_1A      10939.467      16890.051
Wier_1A      10958.011      16833.281
Wier_1B      10350.255      16821.316
Wier_1B      10424.375      16836.687
Wier_2       10859.125      17114.752
Wier_2       10942.09      17096.537
```

```
[POLYGONS]
;;Subcatchment X-Coord      Y-Coord
;;-----
Phase_1A      10432.95      16948.747
Phase_1A      10953.596      16955.277
Phase_1A      10959.492      16821.123
Phase_1A      10434.423      16814.478
Phase_1A      10432.95      16948.747
Phase_1B      10001.048      16653.236
Phase_1B      9997.894      16837.075
Phase_1B      10109.454      16838.662
Phase_1B      10138.696      16839.078
Phase_1B      10234.451      16887.209
Phase_1B      10432.533      16986.754
Phase_1B      10435.888      16680.894
Phase_1B      10437.364      16546.269
Phase_1B      10355.488      16545.23
Phase_1B      10246.883      16543.852
Phase_1B      10035.174      16541.165
Phase_1B      10033.989      16544.952
Phase_1B      10001.104      16649.982
Phase_1B      10001.048      16653.236
Phase_2       10432.533      16986.754
Phase_2       10643.265      17092.752
Phase_2       10645.549      17093.895
Phase_2       10647.835      17095.03
Phase_2       10650.125      17096.159
Phase_2       10652.418      17097.281
Phase_2       10654.715      17098.397
Phase_2       10657.014      17099.505
Phase_2       10659.317      17100.607
Phase_2       10661.624      17101.702
Phase_2       10663.933      17102.79
Phase_2       10666.246      17103.872
Phase_2       10668.562      17104.946
Phase_2       10670.881      17106.014
Phase_2       10673.203      17107.075
Phase_2       10675.528      17108.129
Phase_2       10677.857      17109.176
Phase_2       10680.188      17110.216
Phase_2       10682.523      17111.249
Phase_2       10684.86      17112.275
Phase_2       10687.201      17113.295
```

Phase_2	10689.545	17114.307
Phase_2	10691.891	17115.313
Phase_2	10694.241	17116.311
Phase_2	10941.911	17221.144
Phase_2	10948.32	17075.323
Phase_2	11035.035	17076.412
Phase_2	11035.263	17055.329
Phase_2	10949.199	17055.329
Phase_2	10953.596	16955.277
Phase_2	10432.95	16948.747
Phase_2	10432.533	16986.754
Undeveloped_1	10949.199	17055.329
Undeveloped_1	10959.492	16821.123
Undeveloped_1	11037.777	16822.113
Undeveloped_1	11035.263	17055.329
Undeveloped_1	10949.199	17055.329
Undeveloped_2	11035.035	17076.412
Undeveloped_2	11033.059	17259.724
Undeveloped_2	10941.911	17221.144
Undeveloped_2	10948.32	17075.323
Undeveloped_2	11035.035	17076.412

[SYMBOLS]

;;Gage	X-Coord	Y-Coord
;;-----	-----	-----

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)

Element Count

Number of rain gages 2
 Number of subcatchments ... 5
 Number of nodes 9
 Number of links 11
 Number of pollutants 0
 Number of land uses 0

Raingage Summary

Name	Data Source	Data Type	Recording Interval
Lethbridge_1:100year_Chicago_24h	Chicago_24h		INTENSITY 5 min.
Lethbridge_County_1:100year_48hr	Lethbridge_County_1:100year_48hr		INTENSITY 60 min.

Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage
Outlet					
Phase_1A	7.02	160.00	25.00	0.5000	
Lethbridge_1:100year_Chicago_24h Pond_1A					
Phase_1B	14.86	400.00	25.00	0.5000	
Lethbridge_1:100year_Chicago_24h Pond_1B					
Phase_2	8.33	200.00	25.00	0.5000	
Lethbridge_1:100year_Chicago_24h Pond_2					
Undeveloped_1	1.92	107.00	1.00	0.5000	
Lethbridge_1:100year_Chicago_24h J3					
Undeveloped_2	1.47	92.00	1.00	0.5000	
Lethbridge_1:100year_Chicago_24h J3					

Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	903.40	1.00	0.0	
J2	JUNCTION	900.30	1.00	0.0	
J3	JUNCTION	899.71	1.00	0.0	
J4	JUNCTION	900.62	1.00	0.0	
J5	JUNCTION	901.00	1.00	0.0	

Outfall	OUTFALL	899.50	1.00	0.0
Pond_1A	STORAGE	900.00	2.00	0.0
Pond_1B	STORAGE	903.40	2.00	0.0
Pond_2	STORAGE	900.50	2.00	0.0

Link Summary

Name	From Node	To Node	Type	Length	%
Slope Roughness					

C1	J1	Pond_1A	CONDUIT	533.8	
0.6370 0.0350					
C3	J5	J4	CONDUIT	106.7	
0.3571 0.0350					
C4	J4	J3	CONDUIT	254.9	
0.3563 0.0350					
C5	J2	J3	CONDUIT	99.5	
0.5953 0.0350					
C6	J3	Outfall	CONDUIT	183.9	
0.1147 0.0350					
Pump_1A	Pond_1A	J5	TYPE3 PUMP		
Orifice_1B	Pond_1B	J1	ORIFICE		
Orifice_2	Pond_2	J2	ORIFICE		
Wier_1A	Pond_1A	J5	WEIR		
Wier_1B	Pond_1B	J1	WEIR		
Wier_2	Pond_2	J2	WEIR		

Cross Section Summary

Full		Full	Full	Hyd.	Max.	No. of
Conduit	Shape	Depth	Area	Rad.	Width	Barrels
Flow						

C1	TRIANGULAR	1.00	3.00	0.47	6.00	1
4.16						
C3	TRIANGULAR	1.00	3.00	0.47	6.00	1
3.12						
C4	TRIANGULAR	1.00	3.00	0.47	6.00	1
3.11						
C5	TRIANGULAR	1.00	3.00	0.47	6.00	1
4.02						
C6	TRIANGULAR	1.00	3.00	0.47	6.00	1
1.77						

NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.

```

*****
Analysis Options
*****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 05/17/2022 00:00:00
Ending Date ..... 05/20/2022 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:01:00
Wet Time Step ..... 00:05:00
Dry Time Step ..... 00:05:00
Routing Time Step ..... 5.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.001500 m

```

*****	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation	4.038	120.146
Evaporation Loss	0.000	0.000
Infiltration Loss	1.889	56.193
Surface Runoff	2.158	64.202
Final Storage	0.006	0.170
Continuity Error (%)	-0.348	

*****	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
*****	-----	-----
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	2.158	21.579
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	1.518	15.183
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.642	6.417
Continuity Error (%)	-0.096	

```

*****
Time-Step Critical Elements
*****
None

```

```

*****
Highest Flow Instability Indexes
*****
All links are stable.

```

```

*****
Routing Time Step Summary
*****
Minimum Time Step      :    4.50 sec
Average Time Step      :    5.00 sec
Maximum Time Step      :    5.00 sec
Percent in Steady State :    0.00
Average Iterations per Step :    2.00
Percent Not Converging  :    0.00
Time Step Frequencies  :
    5.000 - 3.155 sec : 100.00 %
    3.155 - 1.991 sec :    0.00 %
    1.991 - 1.256 sec :    0.00 %
    1.256 - 0.792 sec :    0.00 %
    0.792 - 0.500 sec :    0.00 %

```

```

*****
Subcatchment Runoff Summary
*****

```

Perv	Total	Total	Total	Total	Total	Total	Imperv
Runoff	Runoff	Precip	Peak	Runoff	Evap	Infil	Runoff
Subcatchment	Runoff	Runoff	Runoff	Coeff	mm	mm	mm
mm	mm	10^6 ltr	mm	mm	mm	mm	mm
		CMS					
Phase_1A		120.15		0.00	0.00	55.21	30.18
57.63	65.17	4.58	0.52	0.542			
Phase_1B		120.15		0.00	0.00	54.80	30.20
58.06	65.61	9.75	1.23	0.546			
Phase_2		120.15		0.00	0.00	55.07	30.19
57.77	65.32	5.44	0.64	0.544			
Undeveloped_1		120.15		0.00	0.00	67.17	1.19
53.17	53.17	1.02	0.16	0.443			
Undeveloped_2		120.15		0.00	0.00	66.93	1.19
53.44	53.44	0.79	0.13	0.445			

```

*****
Node Depth Summary
*****

```

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.13	0.15	903.55	0 18:11	0.15
J2	JUNCTION	0.11	0.13	900.43	0 17:51	0.13
J3	JUNCTION	0.33	0.59	900.30	0 07:43	0.59
J4	JUNCTION	0.19	0.20	900.82	0 15:13	0.20
J5	JUNCTION	0.19	0.21	901.21	0 07:13	0.21
Outfall	OUTFALL	0.14	0.29	899.79	0 07:43	0.29
Pond_1A	STORAGE	0.95	1.43	901.43	0 18:01	1.43
Pond_1B	STORAGE	1.04	1.47	904.87	0 17:51	1.47
Pond_2	STORAGE	1.04	1.48	901.98	0 17:48	1.48

Node Inflow Summary

Total Inflow Volume Node ltr	Flow Balance Error Percent	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr
J1		JUNCTION	0.000	0.029	0 17:51	0
5.79	0.534	J2	0.000	0.017	0 17:48	0
3.55	0.124	J3	0.288	0.329	0 07:25	1.81
15.3	0.501	J4	0.000	0.043	0 10:04	0
9.93	0.233	J5	0.000	0.043	0 09:59	0
9.94	0.057	Outfall	0.000	0.291	0 07:43	0
15.2	0.000	Pond_1A	0.523	0.523	0 07:15	4.58
10.3	0.580	Pond_1B	1.230	1.230	0 07:15	9.75
9.75	0.004	Pond_2	0.641	0.641	0 07:15	5.44
5.44	0.004					

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

of Max		Average	Avg	Evap	Exfil	Maximum	Max	Time
Maximum		Volume	Pcnt	Pcnt	Pcnt	Volume	Pcnt	
Occurrence	Outflow	1000 m3	Full	Loss	Loss	1000 m3	Full	days
Storage Unit	CMS							
hr:min								
Pond_1A		1.402	30	0	0	2.418	52	0
18:01	0.043							
Pond_1B		5.696	45	0	0	8.415	66	0
17:51	0.029							
Pond_2		3.020	40	0	0	4.620	62	0
17:48	0.017							

Outfall Loading Summary

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Outfall	97.88	0.060	0.291	15.183
System	97.88	0.060	0.291	15.183

Link Flow Summary

Link	Type	Maximum Flow CMS	Time of Max Occurrence days hr:min	Maximum Veloc m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.029	0 18:11	0.16	0.01	0.58
C3	CONDUIT	0.043	0 10:04	0.36	0.01	0.20
C4	CONDUIT	0.043	0 12:42	0.22	0.01	0.39
C5	CONDUIT	0.017	0 17:51	0.10	0.00	0.34

C6	CONDUIT	0.291	0	07:43	0.51	0.16	0.44
Pump_1A	PUMP	0.043	0	09:59		1.00	
Orifice_1B	ORIFICE	0.029	0	17:51			1.00
Orifice_2	ORIFICE	0.017	0	17:48			1.00
Wier_1A	WEIR	0.000	0	00:00			0.00
Wier_1B	WEIR	0.000	0	00:00			0.00
Wier_2	WEIR	0.000	0	00:00			0.00

Flow Classification Summary

		Adjusted	Fraction of Time in Flow Class						
		/Actual	Up	Down	Sub	Sup	Up	Down	Norm
Inlet	Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit
Ctrl									Ltd
C1	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.90
0.00									
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.88
0.00									
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.97
0.00									
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.99
0.00									
C6	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00
0.00									

Conduit Surge Summary

Conduit	Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	0.01	0.01	40.23	0.01	0.01

Pumping Summary

Power	% Time Off	Percent	Number of	Min	Avg	Max	Total
Usage	Pump Curve	Utilized	Start-Ups	Flow	Flow	Flow	Volume
Pump	Low High			CMS	CMS	CMS	10^6 ltr

```

-----
Pump_1A      99.81      1      0.00      0.04      0.04      9.938
7.41  0.0    0.0

```

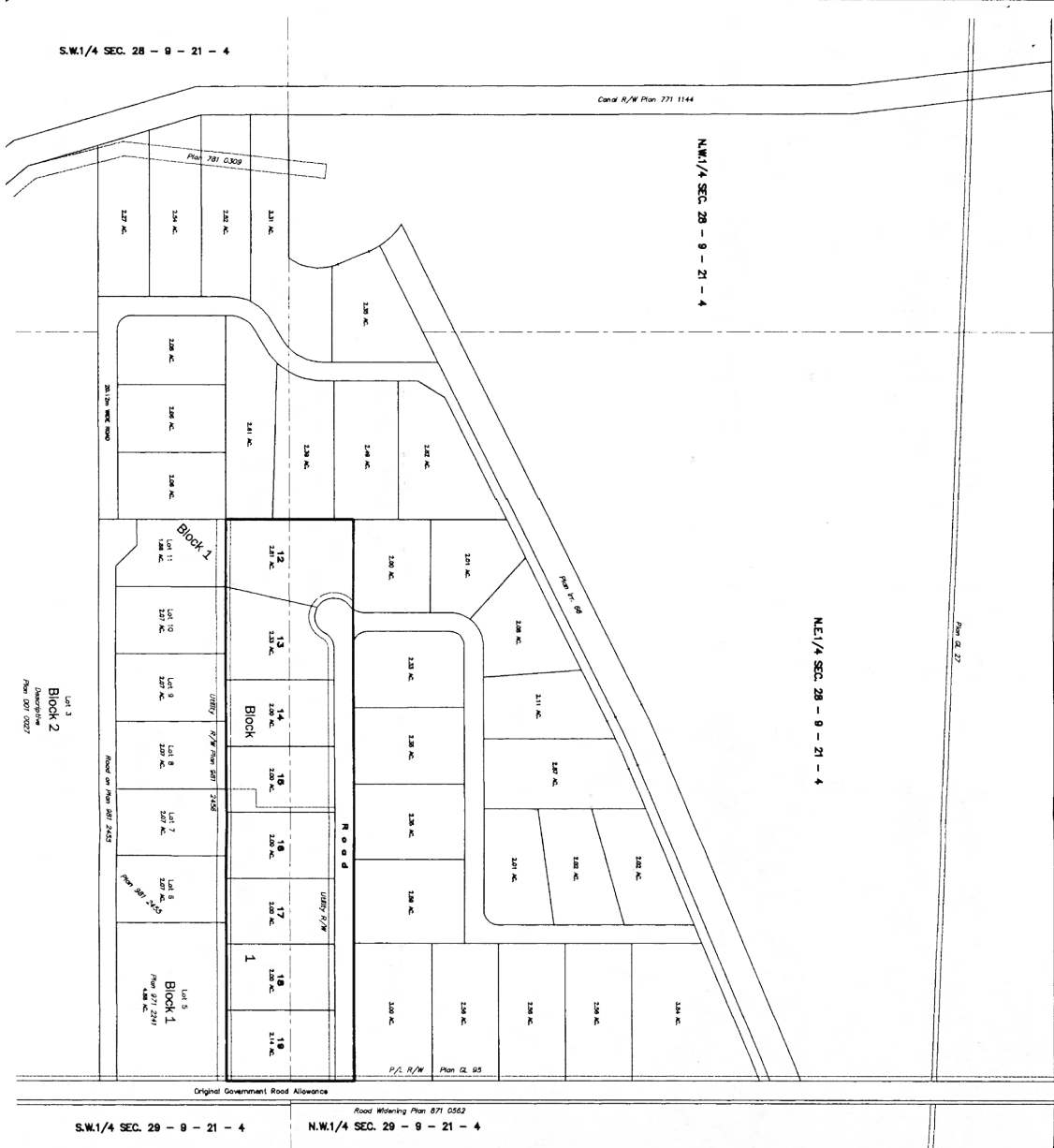
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Analysis begun on:  Wed May 25 16:37:13 2022
Analysis ended on:  Wed May 25 16:37:14 2022
Total elapsed time: 00:00:01

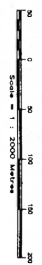
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APPENDIX 8

Sunny View ASP Concept Design



County of Lehigh No. 26
 AREA STRUCTURE PLAN
 Surrounding
 Lot 3, Block 1, Plan 927 LK
 Within
 SEC. 28, TWP. 9, RGE. 21, W. 4M.



Legend:
 Abbreviations:
 1/2" = 1' = 30.48 cm
 1/4" = 1' = 30.48 cm
 1/8" = 1' = 30.48 cm
 1/16" = 1' = 30.48 cm
 1/32" = 1' = 30.48 cm
 1/64" = 1' = 30.48 cm
 1/128" = 1' = 30.48 cm
 1/256" = 1' = 30.48 cm
 1/512" = 1' = 30.48 cm
 1/1024" = 1' = 30.48 cm
 1/2048" = 1' = 30.48 cm
 1/4096" = 1' = 30.48 cm
 1/8192" = 1' = 30.48 cm
 1/16384" = 1' = 30.48 cm
 1/32768" = 1' = 30.48 cm
 1/65536" = 1' = 30.48 cm
 1/131072" = 1' = 30.48 cm
 1/262144" = 1' = 30.48 cm
 1/524288" = 1' = 30.48 cm
 1/1048576" = 1' = 30.48 cm
 1/2097152" = 1' = 30.48 cm
 1/4194304" = 1' = 30.48 cm
 1/8388608" = 1' = 30.48 cm
 1/16777216" = 1' = 30.48 cm
 1/33554432" = 1' = 30.48 cm
 1/67108864" = 1' = 30.48 cm
 1/134217728" = 1' = 30.48 cm
 1/268435456" = 1' = 30.48 cm
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 1/1073741824" = 1' = 30.48 cm
 1/2147483648" = 1' = 30.48 cm
 1/4294967296" = 1' = 30.48 cm
 1/8589934592" = 1' = 30.48 cm
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 1/2199023255552" = 1' = 30.48 cm
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APPENDIX 9

**Alberta Transportation-Portion of Figure 5.2.3
(Lethbridge and Area NHS & NSTC Functional
Planning Study, March 12, 2004 – Stantec)**



APPENDICES



- **APPENDIX 2 - Geotechnical Evaluation**
- **APPENDIX 3 - Environmental Site Assessment**
- **APPENDIX 6 - Septic Feasibility Assessment**

APPENDIX 2

Geotechnical Evaluation



**Geotechnical Evaluation
MacLaine Acres Area Structure Plan
Section 28 TWP 9 RGE 21 W4M
Lethbridge County, Alberta**



PRESENTED TO
Rick Aldoff

OCTOBER 2021
ISSUED FOR USE
FILE: ENG.LGEO04408-01

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APPENDICES

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- Appendix B Borehole Logs
- Appendix C Design and Construction Guidelines

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Rick Aldoff, and his agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Rick Aldoff, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Tetra Tech's Limitations on Use of this Document are provided in Appendix A of this report.

1.0 INTRODUCTION

This report presents the results of a geotechnical evaluation conducted by Tetra Tech Canada Inc. (Tetra Tech) for the proposed subdivision development of the MacLaine Acres Subdivision Area Structure Plan to be located in the Lethbridge County, Alberta (Figure 1). The legal description of the site address is Section 28 TWP 9 RGE 21 W4M.

The scope of work for the geotechnical evaluation was outlined in a revised proposal (Tetra Tech File No. PENG.LGEO04385-01) issued to Mr. Matt Redgrave, of Martin Geomatic Consultants Ltd. (MGCL), on August 20, 2021. The objective of this evaluation was to determine the general subsurface stratigraphy and groundwater conditions in the area of the proposed development and to provide general recommendations for the geotechnical aspects of the development.

A Phase I Environmental Site Assessment was also conducted for the proposed development and issued in a separate report.

A Preliminary Septic Disposal Field Feasibility (PSDFF) was also conducted for the proposed development and issued in a separate report as well.

Authorization to proceed with the evaluation was provided by Mr. Richard Aldoff, the landowner, via a signed Services Agreement dated August 24, 2021.

2.0 PROJECT DESCRIPTION AND SCOPE OF WORK

It is understood that the proposed project will be a residential subdivision with major development components including foundations, stormwater utilities, pavement structures, site grading, and lot development. The total planned area is approximately 32 hectares (79.3 acres).

Shallow foundations with a floor slabs-on-grade system are typically considered for residential structures in the Lethbridge area. A deep pile foundation system, such as bored cast-in-place (CIP) piles or screw piles, is generally considered for commercial structures with heavy load or some residential dwellings where subsurface conditions are not feasible for shallow foundations.

It is understood that the proposed development will be designed and constructed to the Lethbridge County Engineering Guidelines & Minimum Servicing Standards.

The scope of work for this evaluation comprised the drilling of 14 boreholes, a laboratory program to assist in classification of the subsurface soils, and this report providing the following design and construction recommendations:

- Design parameters for shallow foundations and below-grade structures.
- Design parameters for pile foundations including bored CIP concrete piles.
- Casing and dewatering during construction.
- Design and installation of floor slabs-on-grade.
- Site classification for seismic site response.
- Construction for underground utilities.
- Trench excavation and backfill.

- General site grading.
- Special considerations if fill is encountered.
- Volumetric changes of soil due to changes in moisture content and/or frost.
- Mitigation for high water table, if encountered.
- Construction of subgrades, backfill materials, and compaction.
- Concrete type for structured elements in contact with soil.
- Asphalt pavement structure as per the Lethbridge County Engineering Guidelines & Minimum Servicing Standards.

3.0 GEOTECHNICAL FIELD AND LABORATORY WORK

The fieldwork for this evaluation was carried out on September 9, 2021. A truck-mounted drill rig was contracted from Chilako Drilling Services Ltd. of Coaldale, Alberta. The rig was equipped with 150 mm diameter solid stem continuous flight augers. Tetra Tech's field representative was Mr. Victor Okwodu, E.I.T. Buried utility locating was carried out through Alberta One-Call and private utility locating was carried out by LandScan.

A total of 14 boreholes (referred to as 21BH001 through 21BH014) were drilled within the proposed development. The boreholes were drilled to depths ranging from 5.1 m to 9.6 m below existing ground elevation. The borehole locations are depicted on Figure 2.

Borehole locations were laid out using a handheld GPS and borehole ground elevations were obtained by MGCL and provided to Tetra Tech for use in this report. The borehole coordinates and ground elevations are shown on the borehole logs in Appendix B.

In all boreholes, disturbed grab samples were obtained at depth intervals of approximately 600 mm. Standard Penetration Tests (SPT) using an automatic SPT hammer (with an efficiency of 90%) were completed at intervals of 1.5 m. All soil samples were visually classified in the field, and the individual soil strata and the interfaces between them were noted. The borehole logs are presented in Appendix B. An explanation of the terms and symbols used on the borehole logs is also included in Appendix B.

Slotted 25 mm diameter polyvinyl chloride (PVC) standpipes were installed in each of the boreholes in order to monitor the groundwater levels. Auger cuttings were used to backfill around the standpipes and the boreholes were sealed at the ground surface with bentonite chips.

Soil classification tests, including natural moisture content, Atterberg Limits, and soluble sulphate content, were subsequently performed in the laboratory on samples collected from the boreholes to aid in the determination of engineering properties. The results of the laboratory tests are presented on the borehole logs in Appendix B.

4.0 SITE CONDITIONS

4.1 Surface Features

The proposed site configuration is bounded by farmland to the north; by an irrigation channel to the west; by Highway 843 to the east; and by residential properties, a farmstead, and farmland to the south.

According to information provided by MGCL, the proposed site comprises of three lots to be subdivided; Lot 1 Block 1 Plan 927 LK in the northeast, Lot 2 Block 1 Plan 927 LK in the southeast, and Lot 1 Block 2 Plan 8010198 in the southwest.

Lot 1 Block 1 Plan 927 LK comprises of a farmstead and a dugout in the southeast corner of the lot, a fenced off area in the east that appeared to be used for livestock and/or horses with decomposing bails of hay or straw, while the rest of the lot comprises of a vacant field with a wheel irrigation system. The land is relatively flat with drainage tending to the northeast.

Lot 2 Block 1 Plan 927 LK comprises of a barn/shed in the southwest corner, while the rest of the lot comprises of a wheel irrigated agricultural field. South half of the dugout noted above in Lot 1 Block Plan 927 LK was within the northeast extent of the lot. The land is relatively flat with drainage tending to the northeast and east.

Lot 1 Block 2 Plan 8010198 comprises of a farmstead in the northwest corner of the lot, a residence at the north central extent of the lot, a dugout and farm structures in the northeast corner of the lot, an old horse racetrack in the south half of the lot, a dry dugout just north of the horse racetrack, and a pond/dugout at the south-central extent of the lot. The land is relatively flat with the drainage tending to the northeast. From the topography provided by MGCL, a localized low-lying area was noted on the lot near the dry dugout just north of the horse racetrack.

Regional drainage is generally towards the northeast to east.

As part of the evaluation, Tetra Tech reviewed historical aerial photographs of the site and surrounding area from 1950 to 2021. The following observations were noted:

Lot 1 Block 1 Plan 927 LK

- 1950, agricultural land.
- 1960, agricultural land.
- 1970, similar to 1960.
- 1980, a dugout and a structure are visible in the southeast corner of the lot.
- 1991, a farmstead is visible near the dugout in the southeast corner of the lot.
- 1999, the east of the lot above the farmstead is fenced off.
- 1999 to 2021, no visible changes were noted.

Lot 2 Block 1 Plan 927 LK

- 1950, agricultural land.
- 1960, agricultural land, with a structure in the north central extent of the lot.
- 1970, similar to 1960 except the structure is no longer visible.
- 1980 to 2015, no visible changes.
- 2017, a structure is visible in the southwest corner of the lot.
- 2017 to 2021, no visible changes were noted.

Lot 1 Block 2 Plan 8010198

- 1950, a winding irrigation channel runs through the northwest corner of the lot, with a large low-lying area located at the northeast corner of the lot with structures just north of the low-lying area. A dugout is visible at the south-central extent of the lot.
- 1960, a farmstead is visible north of the low-lying area. Water is visible in the low-lying area.
- 1970, a new dugout is visible just east of the farmstead.
- 1980, the irrigation channel no longer runs through the northwest corner of the lot, that has been infilled and the irrigation channel is now on the west extent of the lot. The large low-lying area is no longer visible and appears to be infilled. The farmstead is no longer visible.
- 1991, structures are visible around the dugout in the northeast corner of the lot.
- 1999, a residence is visible at the north-central extent of the lot.
- 2012, a farmstead is visible in the northwest corner of the lot.
- 2015, the horse racetrack is visible at the south half of the lot, with the dugout just north of it.
- 2018, the area just east of the farmstead in the northwest corner appears to be graded.
- 2018 to 2021, no visible changes were noted.

4.2 Mining Activity

Research was conducted on the possible existence of mine workings within the boundary of the site, including a review of the Alberta Energy Regulator (AER) coal mine mapping archive and various documents contained in Tetra Tech's library regarding the coal mining industry in the surrounding area of the proposed development. The literature indicates no mine workings within the vicinity of the proposed site.

4.3 Soil Stratigraphy

The general subsurface stratigraphy of the site comprised of a surficial layer of topsoil or clay fill (likely from historical agricultural activities) underlain by native clay and then clay till deposits with the occasional thin sand layer. The following subsections provide a summary of the stratigraphic units encountered at the specific borehole locations across the site. A more detailed description is provided on the borehole logs presented in Appendix B.

4.3.1 Topsoil/Clay Fill

Topsoil was encountered at the majority of the borehole locations, with a thickness ranging between 50 mm to 350 mm. The thickness of the topsoil layer should be expected to vary across the project site.

Of the 14 boreholes there were four boreholes (21BH001 through 21BH004) that did not have a surficial topsoil layer but rather a surficial clay fill layer ranging in thickness from 200 mm to 350 mm in thickness. The surficial clay fill layer is likely due to historical agricultural activity in the area and should be considered to be variable across the site. Deep clay fill and/or construction debris were not encountered at the borehole locations but may be expected locally (e.g., backfilled low-lying area, areas with historical structures removed).

4.3.2 Clay

A layer of native clay was encountered in the boreholes beneath the topsoil, extending to a depth ranging between 0.5 m and 1.5 m below grade. The clay was generally described as silty, trace to some sand, damp to very moist, very soft to very stiff, medium to high plastic, and light brown to brown or brown with grey brown mottling, dark brown or grey brown. Silt lenses/pockets, precipitates, trace rootlets, and dark brown high plastic clay laminations were noted in the clay. Moisture contents of the clay ranged between 11% and 31%. Atterberg Limits testing (two tests) within the clay indicated a Liquid Limit range between 36% and 47% with a Plastic Limit range between 16% and 17%; indicative of medium plasticity.

4.3.3 Clay Till

Clay till was encountered beneath the native clay at the borehole locations, extending to the borehole termination depths. The clay till was generally described as silty, trace to some sand, trace gravel, damp to very moist, very soft to very stiff, medium to high plastic (occasional high plastic), and light brown, brown, dark brown, or brown with grey brown mottling. Silt and sand pockets/layers up to 700 mm thick, precipitates, and coal and oxide specks/staining or coal fragments were encountered within the clay till. Moisture contents of the clay till ranged between 10% and 31%. Atterberg Limits testing (two tests) within the clay till indicated Liquid Limits ranging between 29% and 32%, and Plastic Limits ranging between 12% and 14%; indicative of low (high end of low plastic) to medium plastic.

SPT "N" values in the clay till ranged between 0 and 19 blows per 300 mm of penetration, indicative of very soft to very stiff consistency and is extremely variable.

4.4 Groundwater Conditions

During the field drilling, some sloughing was encountered in 21BH003 and 21BH004 at depths of 2.4 m and 3.0 m below existing ground elevation. Groundwater seepage was encountered in 21BH003, 21BH004, 21BH005, 21BH007, and 21BH010 at depths of 1.8 m, 1.5 m, 1.5 m, 1.5 m, and 6.1 m, respectively. The groundwater levels were measured on September 16, 2021. Table A summarizes the groundwater monitoring data.

Table A: Groundwater Monitoring Data – September 16, 2021

Borehole Number	Depth of Standpipe (m)	Borehole Elevation (m)	Depth to Groundwater (m)	Groundwater Elevation (m)
18BH001	6.6	901.59	1.44	900.15
18BH002	5.1	902.71	2.16	900.55
18BH003	6.6	903.30	0.77	902.53
18BH004	5.1	904.80	0.74	904.06
18BH005	5.1	900.98	1.21	899.77
18BH006	6.6	902.81	1.62	901.19
18BH007	5.1	904.32	1.54	902.78
18BH008	6.6	905.86	1.56	904.30
18BH009	5.1	906.38	3.38	903.00
18BH010	6.6	905.79	2.59	903.20
18BH011	6.6	906.75	5.21	901.54
18BH012	9.6	907.54	3.33	904.21

Table A: Groundwater Monitoring Data – September 16, 2021

Borehole Number	Depth of Standpipe (m)	Borehole Elevation (m)	Depth to Groundwater (m)	Groundwater Elevation (m)
18BH013	5.1	907.37	Dry	-
18BH014	9.6	907.56	2.91	904.65

5.0 RECOMMENDATIONS

The recommendations that follow provide varying options intended to aid in the development of project concepts and specifications. The recommendations are based on the understanding and condition that Tetra Tech will be retained to review the relevant aspects of the final design (drawings and specifications) and to conduct such field reviews as are necessary to ensure compliance with the geotechnical aspects of the 2019 National Building Code – Alberta Edition, Lethbridge County Engineering Guidelines & Minimum Servicing Standards, this report, and the final plans and specifications. Tetra Tech accepts no liability for any use of this report in the event that Tetra Tech is not retained to provide these review services.

Specific recommendations that apply to this project are provided for site development, compaction, excavations, subgrade preparation, pavement structures, foundation and floor slab systems, and stormwater management facilities.

5.1 Site Development

5.1.1 Topsoil Depth

The initial topsoil stripping depth should be considered as being of particular importance with regard to site subgrade grading design elevations. Based on the findings of the field drilling program, the surficial topsoil (A Horizon) layer thickness generally varies between 50 mm and 300 mm; however, may be variable in thickness due to historical cultivation practices of the land surface and/or depositional processes (i.e., wind). Consideration can be given however, to incorporating the underlying B Horizon layer (organic content <5%) into the fill mass during general site grading. Full-time monitoring by experienced personnel is recommended in order to avoid over-stripping and to ensure appropriate material mixing and placement. A detailed topsoil thickness investigation is suggested for estimation of the topsoil volume for site grading.

5.1.2 Lot Grading

The lot grading should be designed and carried out to the current Lethbridge County Engineering Guidelines & Minimum Servicing Standards. All lots should be graded for drainage at a minimum gradient of 2.0%. Backfill materials and compaction requirements, as to be discussed in Section 5.1.3, should be followed. Any organics, soft and/or wet soils, or deleterious materials must be removed, where encountered, to expose the underlying suitable clay soil. The excavated areas must be backfilled with general engineered fill.

It should be noted that this site will have some challenges with regards to moisture conditioning and competent subgrade soils for construction. Due to the wet and weak subgrade conditions encountered in the majority of the site. Special care and attention needs to be paid during the site grading efforts for the project. Although the low to medium plastic soils are suitable as backfill materials, soil moisture conditioning should be expected due to the wet subgrade conditions as encountered at most borehole locations. If the development is to consider a raised site grading, excessive settlement from weak subgrade soils due to the backfill surcharge may be expected. After the

completion of a raised site grading, if it is to be considered for the development, residence structures should be delayed to allow for the majority of the consolidation settlement to occur prior to construction. For a site increase in elevation or raise of over 1 m, a minimum six (6) months of waiting period should be provided.

5.1.3 Backfill Materials and Compaction

The existing site soils comprising the predominantly low to medium plastic clay and clay till are adequate for use as both landscape fill and general engineered fill materials, as defined in Appendix C. Any soil containing deleterious materials should be removed from site. Sand, silt, and high plastic clay soils should be separated and used for landscape fill. The final decision on approved backfill materials should be made during site construction.

The moisture content of the site soil materials is expected to be highly variable with respect to the optimum moisture content (OMC). It is anticipated therefore, that moisture conditioning will be required at the site for proper backfill placement. The earthworks contractor should make their own estimate of the requirements for moisture conditioning to the recommended standards and should consider such factors as weather and construction procedures. A contingency for importation of general engineered fill is recommended in the event that the site soils cannot be moisture conditioned.

General engineered fill materials should be moisture conditioned to within a range of OMC to +2% of the OMC prior to compaction and compacted to a minimum of 98% Standard Proctor Density (SPD). The compacted thickness of each lift of backfill shall not exceed 150 mm.

Further recommendations regarding backfill materials and compaction are contained in Appendix C.

5.1.4 Construction Excavations

Excavations should be carried out in accordance with Alberta Occupational Health and Safety Regulations. The depth for the trench excavations is unknown at this time and is anticipated to be less than 6 m below existing ground surface for below-grade structures and/or utility infrastructure. The following recommendations notwithstanding, the responsibility of all excavation cutslopes resides with the Contractor, who should take into consideration site-specific conditions concerning soil stratigraphy and groundwater. All excavations should be reviewed by the Contractor prior to personnel working within the base of the excavation.

Based on the findings of the drilling program, soft to stiff clay soils, in moist to very moist conditions, are generally anticipated to be encountered within 6.0 m below grade during excavation. All excavations which are to be deeper than 1.5 m should have the sides shored and braced or the slopes should be cut back no steeper than 1.0 horizontal to 1.0 vertical (1.0H:1.0V) for stiff clay and 1.5H:1V for soft to firm clay soils. In areas where seepage is encountered, or when excavations are deeper than 3.0 m, the cutslope may need to be flatter. When excavations are open for longer than one month, the slopes should be cut back flatter than the aforementioned slopes.

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

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

General recommendations regarding construction excavations are contained in Appendix C.

5.1.5 Trench Backfill and Compaction

Trenches must be backfilled in such a way as to minimize the potential differential settlement and/or frost heave movements. A minimum compaction level of 95% of SPD is recommended for backfill within the pipe zone of the trench (to 300 mm above the top of pipe). For the remainder of the trench backfill, a minimum compaction standard of 98% of SPD should be utilized in all areas. The compacted thickness of each lift of backfill shall not exceed 150 mm. Moisture conditioning to OMC and 2% over OMC of the soils should be specified for general trench backfill. The upper 1.5 m of service trenches should be cut back at a maximum slope of 1.0H:1.0V to avoid an abrupt transition between backfill and in situ soil.

It should be noted that the ultimate performance of the trench backfill is directly related to the uniformity of the backfill compaction. In order to achieve the uniformity, the lift thickness and compaction criteria should be strictly enforced.

General recommendations regarding backfill materials and compaction are contained in Appendix C.

5.2 Pavement

5.2.1 Subgrade Preparation

Subgrade preparation should be undertaken prior to pavement construction. The recommended compaction standard for subgrade preparation is a minimum of 98% of SPD. Cohesive soils should be compacted at optimum to 2% over the OMC. Granular soils (base granular and sub-base granular layers) should be compacted with moisture content $\pm 1\%$ of the OMC. A minimum depth of subgrade preparation of 300 mm within the native clay is recommended for all paved areas.

Backfill to raise these areas to subgrade level should be general engineered cohesive fill materials, as defined in this report, moisture conditioned and compacted as noted previously. Proof-rolling of the prepared surface is recommended to identify localized soft areas and for an indication of overall subgrade support characteristics. Where soft subgrade conditions exist below the design subgrade elevation, these materials should be subexcavated and replaced with general engineered fill.

Depending on the construction scheduling for placement of the granular sub-base and base layers, and the asphalt concrete pavement surface, further subgrade preparation may be required if the placed subgrade materials dry out or weather. This should be determined prior to the placement of the pavement structure. Should the subgrade materials be shown to deteriorate from construction completion, a minimum 300 mm of subgrade preparation is recommended prior to pavement structure placement.

It is recommended to include a contingency for woven geotextile, should localized areas of subgrade instability be encountered. For very soft to soft subgrade area, combigrid reinforcement should be considered, which would be a field decision during construction. Use of a woven geotextile should not be considered as an alternate for subgrade preparation as recommended, but an alternative, should subgrade instability exist after subgrade preparation. The woven geotextile should have a minimum grab tensile strength of 890 N.

The subgrade should be prepared and graded to allow drainage towards drainage trenches or catchbasins if available. It is imperative that positive surface drainage be provided to prevent ponding of water within the pavement structure and subsequent softening and loss of strength of the subgrade materials. Surrounding landscaping should be such that runoff water is prevented from ponding beside paved areas in order to avoid softening and premature failure of the pavement surface.

5.2.2 Pavement Design and Construction

The minimum materials required for the pavement structures of roadways for this project should meet the Lethbridge County Engineering Guidelines & Minimum Servicing Standards. Specific roadway pavement structures should be reviewed by the Transportation Business Unit based on the following: roadway use, traffic volumes, heavy vehicles, and equivalent single-axle loads, which information was not available at the time of writing the report.

For asphalt pavement structure, all asphalt paving lifts should be compacted to a minimum of Marshall Design Density, as per current County of Lethbridge Engineering Guidelines & Minimum Servicing Standards.

The pavement design should include provisions for subsurface drainage of the pavement granular layers. Subdrains will provide a means of evacuating water that infiltrates the pavement structure, either through cracks and vertical details (i.e., face of gutter), or from peripheral surface runoff. The subdrain should comprise a perforated flexible plastic drainpipe (100 mm diameter), complete with filter sock. The drain should be placed along the edge of the pavement section in a recessed area of the prepared subgrade.

5.3 Foundations

5.3.1 General

Based on the soil conditions encountered at the borehole locations, the clay soils at the potential shallow foundation depths were variable with consistency from very soft to very stiff. For areas with subgrade soils with firm or better consistency with SPT blow counts no less than 4, shallow foundations are considered acceptable for the proposed development. For areas with soft to very soft subgrade conditions with SPT blow counts less than 4 (e.g., 21BH003, 21BH005, 21BH007, and 21BH009), shallow foundations are not recommended due to the excessive settlement to be expected for such soils. For soft subgrade areas, deep foundations are technically feasible to transfer the structural load to competent soils in depth; however, due to relatively high cost for installing deep foundations for residence structures and only discrete boreholes drilled across the site, it is recommended that a site-specific geotechnical be completed for each of the proposed lots adjacent to the boreholes to confirm soil conditions within the building footprints. Deep pile foundations are considered to be a technical feasible option for all lots; however, may not be economically preferred due to the relatively high cost compared to a shallow foundation system. Deep pile foundations, such as helical or CIP concrete piles, are typically only considered for commercial buildings with heavy loads, or where foundation soils are not suitable for shallow foundations.

Upon review of the water levels within the boreholes there appears to be a relatively high perched water table, with most readings ranging between 0.7 m and 3.0 m below existing ground elevation. The irrigation, dugout pond, and historical agricultural land usage purposes in the area is likely a contributing factor to the high water table that was encountered. Due to the high water table encountered and its potential fluctuation, it is not recommended to use basement structures for the development.

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

- For shallow foundations; inspection of bearing surfaces prior to placement of concrete or mudslab, and design review during construction.
- For deep foundations, full-time monitoring and design review during construction.
- For earthworks; full-time monitoring and compaction testing.

Suitably qualified persons, independent of the Contractor, should carry out all such monitoring. One of the purposes of providing an adequate level of monitoring is to check that recommendations, based on data obtained at discrete borehole locations, are relevant to other areas of the site.

5.3.2 Limit States Design

The design parameters provided in the following sections may be used to calculate the ultimate foundation capacity in each case. For the Limit States Design (LSD) methodology, in order to calculate the factored load capacity, the appropriate Soil Resistance Factors must be applied to each loading condition as follows:

$$\text{Factored Capacity} = \text{Ultimate Capacity} \times \text{Soil Resistance Factors}$$

In general, the soil resistance factors in Table B should be incorporated into the foundation design. These factors are considered to be in accordance with the Canadian Foundation Engineering Manual (CFEM) (2006) as well as the 2019 National Building Code – Alberta Edition

Table B: Soil Resistance Factors

Item	Soil Resistance Factor
Shallow Foundations	
Bearing Resistance	0.5
Passive Resistance	0.5
Horizontal Passive Resistance	0.5
Deep Foundations - Piles	
Static Axial Compressive Pile Capacity	0.4
Static Axial Uplift Pile Capacity	0.3
Lateral Pile Capacity	0.5

Under LSD methodology, foundations should be designed on the basis of factored Ultimate Limit States (ULS) parameters. In order to determine the applicable working capacity, Serviceability Limit States (SLS) must also be considered.

5.3.3 Shallow Foundations

Recommendations for shallow foundations in this section are only to be applicable for lots where firm to stiff foundations soils are to be encountered. Shallow footings should be constructed a minimum of 1.4 m below the final design ground surface (frost protection requirement for footings under heated structures). For unheated structures, the footings should be constructed a minimum of 2.1 m below grade.

Footings should be founded on native firm to stiff native soils only. The ultimate static bearing pressure may be taken as 150 kPa, subject to other recommendations in this report. Factoring should be considered as noted in the previous section. Footing dimensions should be in accordance with the minimum requirements of the 2019 National Building Code – Alberta Edition.

Specific bearing certification by a geotechnical engineer in conjunction with a site-specific geotechnical evaluation is recommended for each residential structure to ensure that the shallow foundations are placed on competent native soils. If weak soils are locally encountered at footing level, recommendations may be provided to remove the weak materials and bring the subcut back to design elevation with low strength lean mix concrete. Alternatively,

it may be possible to lower the footing elevation to more competent native soils but should be looked at on a case-by-case circumstance.

All fill (except for the general engineered fill, as discussed below) and construction debris materials if encountered, must be removed from the building footprint areas to expose native subgrade.

It is recommended that a grade-all bucket be used for final excavation to the foundation subgrade elevation to minimize disturbance of the founding soils. A 50 mm concrete mudslab should be placed immediately following excavation and inspection, to protect the bearing surface from disturbance and inclement weather.

Recommendations for minimum depth of cover for footings are presented under section heading 'Frost Protection'. Further recommendations regarding shallow foundations are given in Appendix C.

5.4 Bored Cast-In-Place Concrete Piles

Deep foundations may be considered for areas where soft foundation soils are encountered at potential shallow footing elevations. Bored CIP concrete piles, founded in the stiff to very stiff (occasional hard) clay till, may be designed to resist axial compressive loads on the basis of a combination of shaft and base resistances, as provided in Table C. For piles constructed in accordance with the recommendations made in this report, the following ultimate values of shaft and base resistances may be used, factored as recommended in Section 5.3.2

Table C: Geotechnical Design Parameters for Bored Cast-in-Place Concrete Piles

Depth (m)	Ultimate Shaft Resistance (kPa)	Factored Shaft Resistance (kPa)	Ultimate Base Resistance (kPa)	Factored Base Resistance (kPa)
0 to 3.0	N/A	N/A	N/A	N/A
3.0 to 6.0	30	12	N/A	N/A
Below 6.0	40	16	450	180

It is noted that stiff to very stiff clay till will require confirmation at pile bottom elevations for piles with end-bearing consideration, as local sand layers or inclusions may be encountered during pile installation and pose difficulties for bellling if considered. Where weak conditions are encountered, lowering design pile bottom elevations to stiffer soils or only friction straight shaft piles may be considered.

Piles should be a minimum of 400 mm in diameter. Shaft resistance should be neglected for the top 3.0 m or the clay fill depth, whichever is deeper. End-bearing should not be used for small diameter (less than 760 mm base diameter) piles because of the difficulties associated with ensuring a clean base. End-bearing may only be considered in the design of under-reamed or belled piles if facilities are available for an adequate cleaning of the pile base. General recommendations for the design and construction of bored CIP concrete piles are included in Appendix C.

An overall concreted pile shaft length below final grade of not less than 6.0 m is recommended. A minimum ratio of depth of cover versus the base or bell diameter (D/B) of 2.5 has been assumed to determine the above end-bearing pressure. Should less cover be provided, the bearing pressure would have to be reduced. Minimum bell diameters should be twice the shaft diameter. Piles should be spaced no closer than 2.5 times the base diameter measured centre-to-centre.

Groundwater seepage and sloughing should be expected in the pile bores during construction. Casing should be on hand before drilling starts and used to seal off water and/or prevent sloughing of the hole when encountered. The piling contractor should make his or her own estimate of casing requirements and should consider such factors as construction procedures and bore diameter.

5.5 Helical Piles

Helical piles are considered as an alternative option for this development, in particular preferred for light loaded structures. It is recommended that helical piles be considered only for statically loaded foundations (i.e., no dynamic load component). Design and construction recommendations for helical piles are provided in this section; however, it is noted that for the final design of this type of pile consideration should be given to the installation methodology of the specialty contractor, as the design capacity of helical piles is a function of the pile installation methodology.

Tetra Tech recommends using the CFEM (2006) design method for helical piles (CFEM Section 18.2.1.4). Using this methodology, the geotechnical parameters required to calculate the ultimate foundation capacity are provided in Table D. A minimum recommended depth for the upper helix is 2.1 m below the existing grade.

Table D: Geotechnical Parameters for Helical Piles

Depth (m)	Bulk Unit Weight (kN/m ³)	Undrained Shear Strength Cu (kPa)	Friction Angle* (Degrees)
0 to 3.0	18	-	-
3.0 to 6.0	19	25	26
Below 6.0	19	50	27

*Only for long-term strength consideration with zero cohesion.

The total helical pile capacity is presented in the CFEM (Equation 18.10) as follows:

$$R = Q_t + Q_f$$

Where:

R = Total ultimate capacity of the pile (kN).

Q_t = Total ultimate multi-helix pile capacity (kN).

Q_f = Ultimate capacity due to pile shaft skin friction (kN) (for pile shafts greater than 100 mm diameter only).

To calculate the multi-helix bearing capacity, the individual bearing method presented in CFEM Equations 18.11 and 18.12 should be used, provided the helical bearing plates are spaced a minimum of three times the diameter of the largest helix. Otherwise, the cylinder shear method should be used, with consideration of overlapping stress zones between helices. This method sums up the bearing capacity of the bottom plate and the cylindrical shear capacity developed between the upper and lower plate(s).

The factored geotechnical capacity for each pile may be determined as follows, using the soil resistance factors presented in Section 5.2:

- Factored Pile Compression Capacity = $0.4R$
- Factored Pile Uplift Capacity = $0.3R$

For helical piles, the helix or helices should be founded in competent native clay or clay till and below the depth of frost penetration. Vertically installed helical piles generally require an enlarged shaft diameter in order to adequately resist lateral loads, where applicable. For bottom helices with load influence depths lower than the maximum borehole termination depth of 9.6 m, a field drill program should be conducted to confirm the soil conditions in depth. Should any of these parameters become limiting factors in the design, Tetra Tech should be contacted for more detailed review and analysis.

Construction of helical piles should consider, but not be limited to, the following recommendations:

- As the helical piles are installed, the rate of rotation and advancement should match the pitch of the helix plate. This will help to avoid “churning” of the foundation soils. It is critical that the foundation bearing soil is not excessively disturbed in order to minimize the risk of excessive foundation settlement.
- An estimate of pile capacity may be obtained by correlating capacity to installation torque. This method requires that an appropriate torque factor be selected by the pile designer (in consultation with the piling contractor). Torque factors are selected based on soil type as well as pile shaft size and shape. This method of estimating pile capacity should be used as a quality control check and is not suitable to replace proper design procedures. Installation torque should be recorded using calibrated equipment, and the piling contractor should provide a recent calibration certificate (conducted a maximum of 1 year from pile installation) for each piling setup used on site.
- It should be noted that a high torque value can sometimes mislead estimation of bearing capacity. The occurrence of soft zones beneath the final pile depth are not represented in the recorded torque value but may adversely impact the load carrying capacity of the helical pile.
- Pile load testing is recommended. The results of the pile load tests can be correlated to the measured installation torque to develop site-specific installation criteria. In addition, a higher geotechnical resistance factor for compressive loading of 0.6 can be used if pile load testing is conducted prior to construction.

If lateral loading is considered critical to the pile performance, care must be taken during pile installation to identify voids developing around the pile shaft. Due to the nature of the pile installation process, it is common to develop voids that can significantly influence lateral loading on a pile. If voids develop, they should be backfilled with granular fill, sand, fillcrete, or grout depending on the size of the voids.

5.5.1 Surface Grading and Drainage

Drainage of surface water away from residences should be maintained during and after construction. The finished grade of the proposed residences should be designed so that surface water is drained away from residence structures by the shortest route. All drains should discharge well clear of residence structures. For construction of roof drains, caution should be taken where downspouts discharge due to the high probability of ice forming in the winter. Downspouts may be discharged onto landscaped areas, provided the water is carried, by means of a concrete splash pad or extendable section so the point of discharge of the water is at least 2 m from the residence structures. Landscaped surfaces adjacent to buildings should be graded to slope away from the building at a gradient of at least 5% within 2 m of the residence structures' perimeter. General landscaped areas should have grades of no less than 2% to minimize ponding.

5.5.2 Foundation Perimeter Drainage Requirements

It is recommended that a weeping tile and sump system be constructed around the outside perimeter of the buildings (at the base of the footings, if selected) to maintain a relatively consistent moisture profile of the subgrade soils. The weeping tile system should comprise a perforated weeping tile, in turn surrounded with a minimum of 150 mm

thick blanket of washed rock (maximum size 20 mm), with the granular layer wrapped in non-woven geotextile. The weeping tile should have a minimum 0.5% slope leading to a sump.

5.5.3 Below-Grade Walls

All below-grade walls should be designed to resist lateral earth pressures in an “at-rest” condition. This condition assumes a triangular pressure distribution and may be calculated using the following expression:

$$P_o = K_o (\gamma H + Q)$$

Where:

- P_o = Lateral earth pressure “at-rest” condition (no wall movement occurs at a given depth).
- K_o = Coefficient of earth pressure “at-rest” condition (use 0.5 for cohesive backfill and 0.45 for sand and gravel backfill).
- γ = Bulk unit weight of backfill soil (use 19 or 21 kN/m³ for cohesive or granular backfill, respectively).
- H = Depth below final grade (m).
- Q = Surcharge pressure at ground level (kPa).

It is assumed that drainage will be provided for all below-grade walls through the installation of a weeping tile system, as described above, and hydrostatic pressures will not be a factor in design. The weeping tile should have a minimum 0.5% slope leading to a sump. The preferred method would be to have provision to tie the sump into the property’s on-site drainage system.

Backfill around concrete walls should not commence before the concrete has reached a minimum two-thirds of its design strength and first floor framing is in place or the walls are laterally braced. Only hand-operated compaction equipment should be employed within 600 mm of the concrete walls. Caution should be used when compacting backfill to avoid high lateral loads caused by excessive compactive effort. A compaction standard of 95% of SPD is recommended. To avoid differential wall pressures, the backfill should be brought up evenly around the walls. A minimum 600 mm thick clay cap should be placed at the ground surface to reduce the infiltration of surface water.

5.5.4 Floor Slab System

5.5.4.1 Floor Slabs-on-Grade

Construction of floor slabs-on-grade for this project (outside of basements) must consider the surficial clay noted within the development area. Construction may be considered feasible, provided the following precautions and construction recommendations are followed.

In native soils areas, following removal of topsoil, the subgrade should be scarified to a minimum depth of 300 mm, and moisture conditioned to a range of optimum to 2% over OMC. In areas of general engineered fill placed during site grading, a minimum depth of 150 mm subgrade preparation is recommended; if weathering is evident, 300 mm subgrade preparation is required. The minimum compaction should be 98% of SPD. The prepared subgrade should be proof-rolled and any soft or loose pockets detected should be reconditioned, as recommended above, or over-excavated and replaced with general engineered fill.

A levelling course of clean well-graded crushed gravel, at least 150 mm in compacted thickness, is recommended directly beneath the slabs-on-grade, unless a thicker course is required for structural purposes. The subgrade

beneath slabs-on-grade should be protected at all times from moisture or exposure which may cause softening or disturbance of the subgrade soils. This applies during and after the construction period (and before and after placement of the required general engineered fill). Should the exposed surface become saturated or disturbed, it should be reworked to achieve the above standards.

If a raised grading is to be considered, a waiting period prior to installation of floor slabs should be provided to reduce the potential settlement after construction. See Section 5.1.2 for more detailed discussion. Slabs-on-grade should be separated from bearing members to allow some differential movement. If this differential movement is unacceptable, the owner should consider a structurally supported floor.

Recommended procedures for compaction and backfill materials, and further recommendations for floor slabs-on-grade construction are included in Appendix C.

5.5.4.2 Structural Slabs

If slab movements cannot be tolerated, a structurally supported floor slab system is recommended as the preferred option for this development; however, with a structurally supported floor slab system, there is a risk of ground movement relative to the slab. This relative movement can lead to problems if piping and other utilities that are connected to the slab are embedded within the ground beneath the slab. Utilities beneath the structurally supported floor slabs should be protected from differential movement by placing utilities within boxes suspended from the structural slab. In addition, a void form is recommended below the floor slab in order to prevent transfer of uplift pressures due to swelling clay soil.

5.5.5 Seismic Design

The site classification recommended for seismic site response is Classification D, as noted in Table 4.1.8.4.a of the 2019 National Building Code – Alberta Edition.

5.5.6 Concrete Type

Based on soluble sulphate concentration test results from selected samples taken during the field program and Tetra Tech's experience on local soils, the properties of concrete for foundations in contact with soil shall meet the requirements of the Canadian Standards Association (CSA) A23.1-14, Class S-2 exposure including water/cementing materials (w/cm) ratio of 0.45, air entrainment of 4% to 7% (for 14 mm to 20 mm nominal maximum aggregate size), and a minimum specified 56-day compressive strength of 32 MPa.

For this exposure classification, alternatives include the usage of Type HS (sulphate-resistant) Portland Cement or blends of cement and supplementary cementing materials conforming to Type HSb cements.

5.5.7 Frost Protection

For protection against frost action, all perimeter footings must be placed a minimum of 1.4 m below final grade for heated structures, or 2.1 m for unheated structures.

CIP concrete or helical piles, if considered and exposed to frost action, should have a minimum length of 6 m and should have full-length steel reinforcement. A void form is recommended for all grade beams and pile caps, to accommodate movements due to frost or soil swelling.

Pipes buried with less than 2.1 m of soil cover should be protected with insulation to avoid frost effects that might cause damage to, or breakage of, the pipes. Rigid insulation placed under areas subject to vehicular wheel loadings should be provided with a minimum thickness of 600 mm of compacted granular base.

6.0 DESIGN AND CONSTRUCTION GUIDELINES

Recommended general design and construction guidelines are provided in Appendix C, under the following headings:

- Shallow Foundations
- Bored Cast-in-Place Concrete Piles
- Floor Slabs-on-Grade
- Construction Excavations
- Backfill Materials and Compaction

These guidelines are intended to present standards of good practice. Although supplemental to the main text of this report, they should be interpreted as part of the report. Design recommendations presented herein are based on the premise that these guidelines will be followed. The design and construction guidelines are not intended to represent detailed specifications for the works although they may prove useful in the preparation of such specifications. In the event of any discrepancy between the main text of this report and Appendix C, the main text should govern.

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully Submitted,
Tetra Tech Canada Inc.

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Prepared by:
Jackson Meadows, C.E.T.
Project Manager
Engineering Practice
Direct Line: 403.359.6510
jackson.meadows@tetrattech.com

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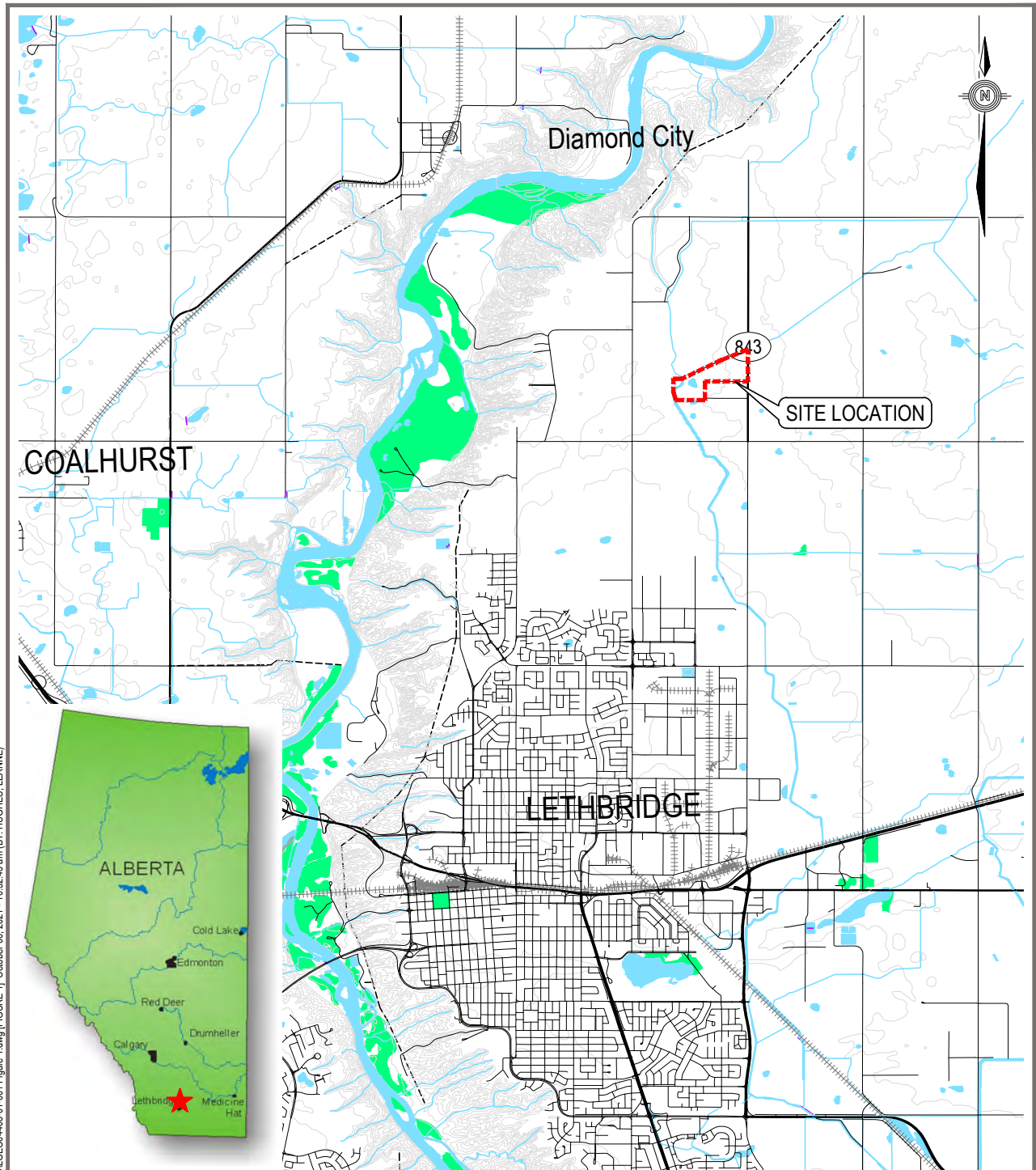
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Reviewed by:
Jiejun Zhao, P.Eng.
Senior Geotechnical Engineer
Engineering Practice
Direct Line: 403.359.6513
jiejun.zhao@tetrattech.com

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FIGURES

Figure 1	Site Location Plan
Figure 2	Borehole Location Plan



NOTES
DRAWING PROVIDED BY "© Department of Natural Resources Canada. All rights reserved."

0 2,500m
Scale: 1:75000 @ 8.5"=1"

CLIENT

Mr. Rick Aldoff



TETRA TECH

GEOTECHNICAL EVALUATION
MacLAINE ACRES ASP

SITE LOCATION PLAN

PROJECT NO.
LGEO04408-01.001

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Figure 1

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C:\Lehbridge\Drafting\ENG\GEO\GEO04408\CAD\GEO04408-01-001 Figure 2.dwg [FIGURE 2] October 06, 2021 - 10:31:31 am (BY: HUGHES, LEANNE)



LEGEND

--- SITE BOUNDARY

● BOREHOLE LOCATION

0 200m

Scale: 1:4,000 @ 11"x17"

NOTES

GOOGLE EARTH IMAGERY DATED 2021.

BASE DRAWING PROVIDED BY CLIENT, DATED JULY 15, 2021.

CLIENT

Mr. Rick Aldoff

TETRA TECH

GEOTECHNICAL EVALUATION

MacLAINE ACRES ASP

BOREHOLE LOCATION PLAN

PROJECT NO.	DWN	CKD	REV
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Figure 2

APPENDIX A

LIMITATIONS ON USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

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Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

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1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this document, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to explore, address or consider and has not explored, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems, methods and standards employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historical environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional exploration and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

Construction activity can impact structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques, and construction sequence are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, and the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function. Where temporary or permanent drainage systems are installed within or around a structure, these systems must protect the structure from loss of ground due to mechanisms such as internal erosion and must be designed so as to assure continued satisfactory performance of the drains. Specific design details regarding the geotechnical aspects of such systems (e.g. bedding material, surrounding soil, soil cover, geotextile type) should be reviewed by the geotechnical engineer to confirm the performance of the system is consistent with the conditions used in the geotechnical design.

1.16 DESIGN PARAMETERS

Bearing capacities for Limit States or Allowable Stress Design, strength/stiffness properties and similar geotechnical design parameters quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition used in this report. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions considered in this report in fact exist at the site.

1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

1.18 APPLICABLE CODES, STANDARDS, GUIDELINES & BEST PRACTICE

This document has been prepared based on the applicable codes, standards, guidelines or best practice as identified in the report. Some mandated codes, standards and guidelines (such as ASTM, AASHTO Bridge Design/Construction Codes, Canadian Highway Bridge Design Code, National/Provincial Building Codes) are routinely updated and corrections made. TETRA TECH cannot predict nor be held liable for any such future changes, amendments, errors or omissions in these documents that may have a bearing on the assessment, design or analyses included in this report.

APPENDIX B

BOREHOLE LOGS

TERMS USED ON BOREHOLE LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

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

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

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

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

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

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

GENERAL DESCRIPTIVE TERMS

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

Data presented hereon is for the sole use of the stipulated client. Tetra Tech EBA is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of EBA. The testing services reported herein have been performed to recognized industry standards, unless noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, EBA will provide it upon written request.



MODIFIED UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA					
COARSE-GRAINED SOILS More than 50% retained on 75 µm sieve*	GRAVELS 50% or more of coarse fraction retained on 4.75 mm sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines GW, GP, SW, SP GM, GC, SM, SC Borderline Classification requiring use of dual symbols Less than 5% Pass 75 mm sieve More than 12% Pass 75 mm sieve 5% to 12% Pass 75 mm sieve	$C_u = D_{60} / D_{10}$ Greater than 4 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3				
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW				
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4		Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols		
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7				
	SANDS More than 50% of coarse fraction passes 4.75 mm sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines		$C_u = D_{60} / D_{10}$ Greater than 6 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3				
			SP	Poorly graded sands and gravelly sands, little or no fines		Not meeting both criteria for SW				
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4		Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols		
			SC	Clayey sands, sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7				
FINE-GRAINED SOILS (by behavior) 50% or more passes 75 µm sieve*	SILTS	Liquid limit	<50	ML	For classification of fine-grained soils and fine fraction of coarse-grained soils. PLASTICITY CHART *Based on the material passing the 75 mm sieve Reference: ASTM Designation D2487, for identification procedure see D2488, USC as modified by PFRA					
			>50	MH						
	CLAYS	Liquid limit	<30	CL						
			30-50	CI						
			>50	CH						
	ORGANIC SILTS AND CLAYS	Liquid limit	<50	OL						
			>50	OH						
	HIGHLY ORGANIC SOILS			PT		Peat and other highly organic soils				
SOIL COMPONENTS					OVERSIZE MATERIAL					
FRACTION	SIEVE SIZE		DEFINING RANGES OF PERCENTAGE BY MASS OF MINOR COMPONENTS		Rounded or subrounded					
	PASSING	RETAINED	PERCENTAGE	DESCRIPTOR	COBBLES 75 mm to 300 mm BOULDERS > 300 mm					
GRAVEL	coarse fine	75 mm 19 mm	19 mm 4.75 mm	>35 % 21 to 35 %	Not rounded	ROCK FRAGMENTS >75 mm ROCKS > 0.76 cubic metre in volume				
		4.75 mm 2.00 mm 425 µm	2.00 mm 425 µm 75 µm	10 to 20 % >0 to 10 %						
SAND	coarse medium fine									
SILT (non plastic) or CLAY (plastic)		75 µm		as above but by behavior						

Tt_Modified Unified Soil Classification.cdr





TETRA TECH










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BOREHOLE KEYSHEET










Water Level Measurement

 Measured in standpipe, piezometer or well
  Inferred




















Sample Types

 A-Casing	 Core	 Disturbed, Bag, Grab	 HQ Core	 Jar
 Jar and Bag	 NQ Core	 No Recovery	 Split Spoon/SPT	 Tube

Backfill Materials

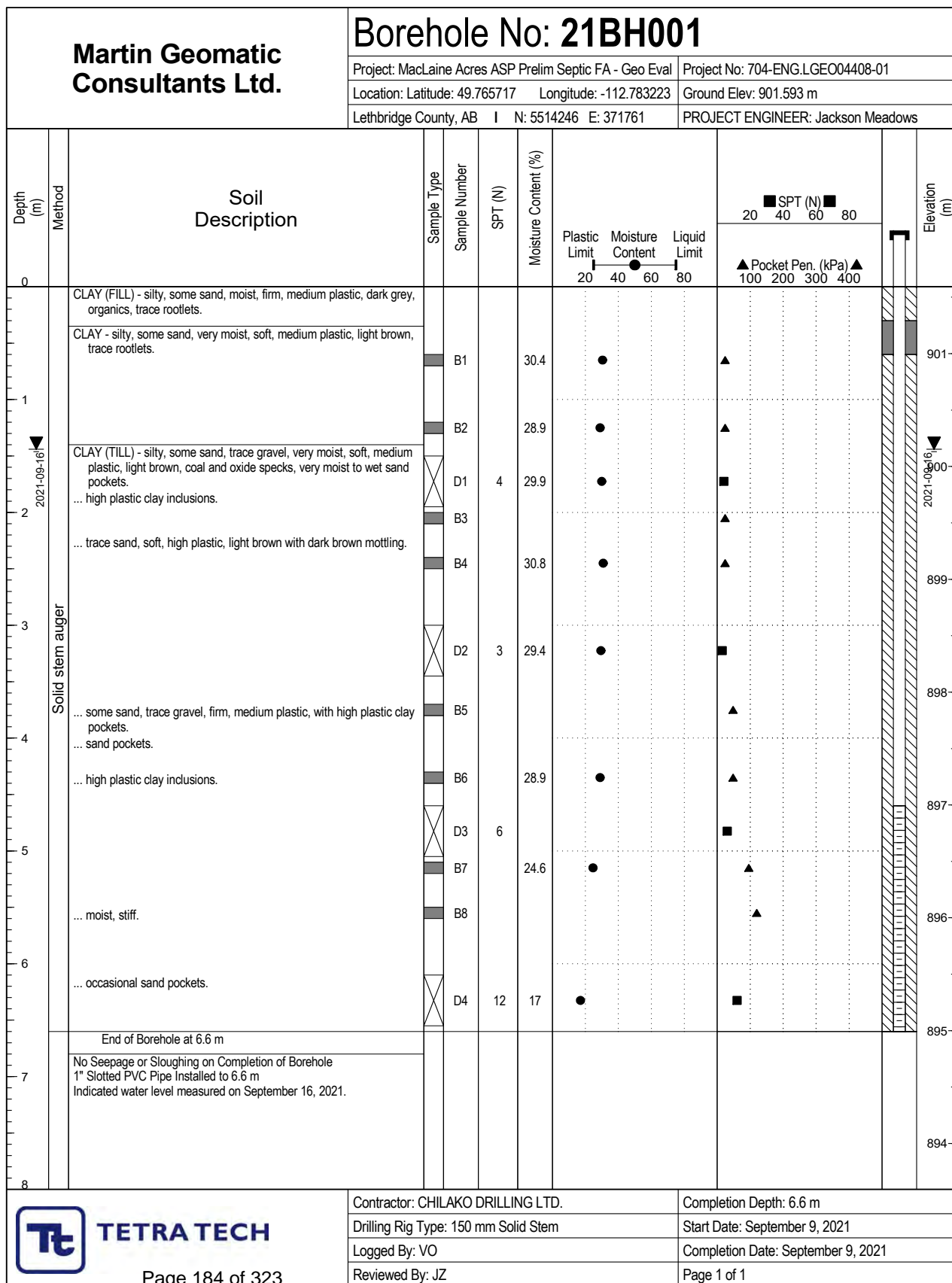
 Asphalt	 Bentonite	 Cement/Grout	 Drill Cuttings	 Grout
 Gravel	 Sand	 Slough	 Topsoil Backfill	

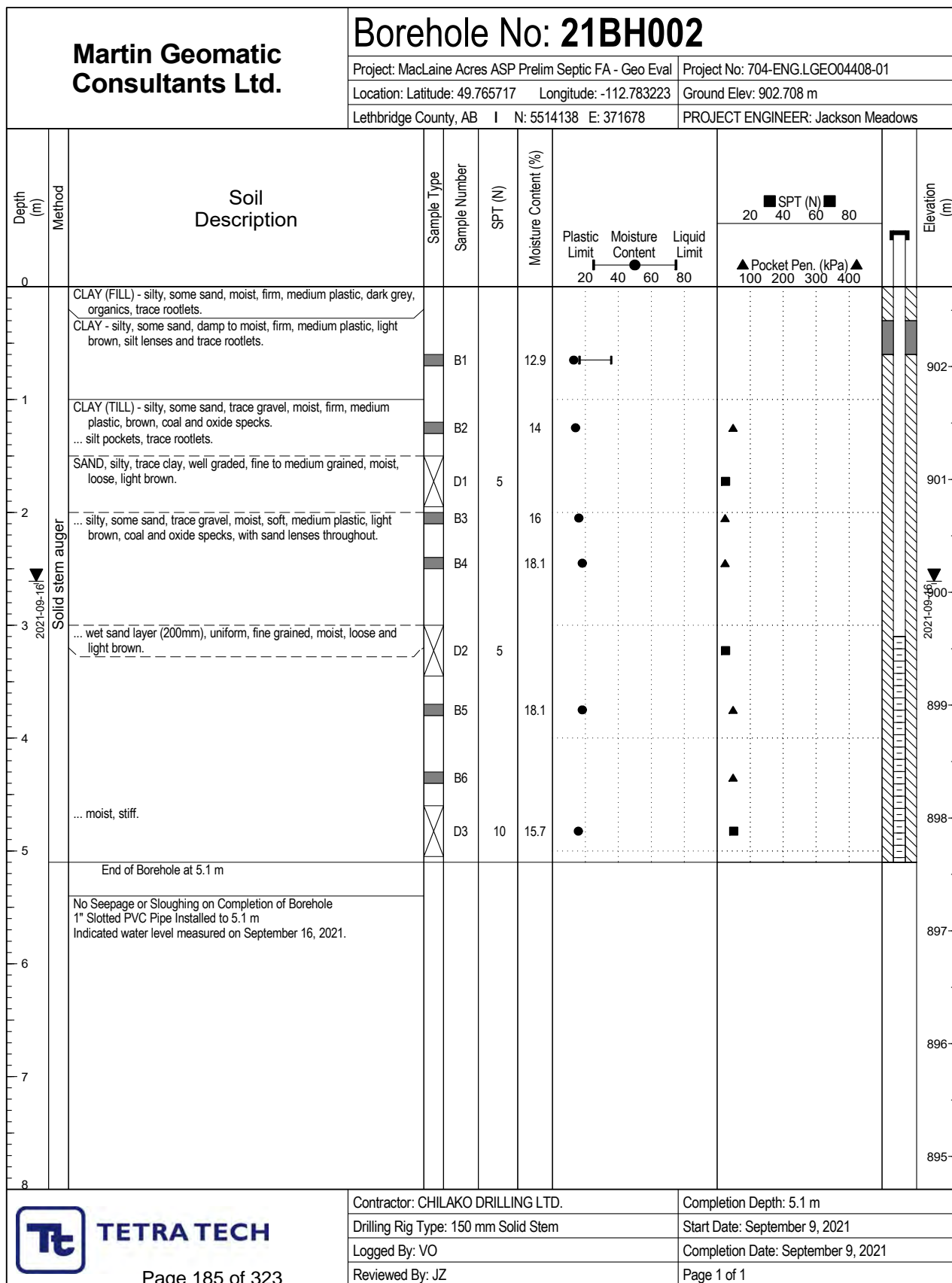
Lithology - Graphical Legend¹

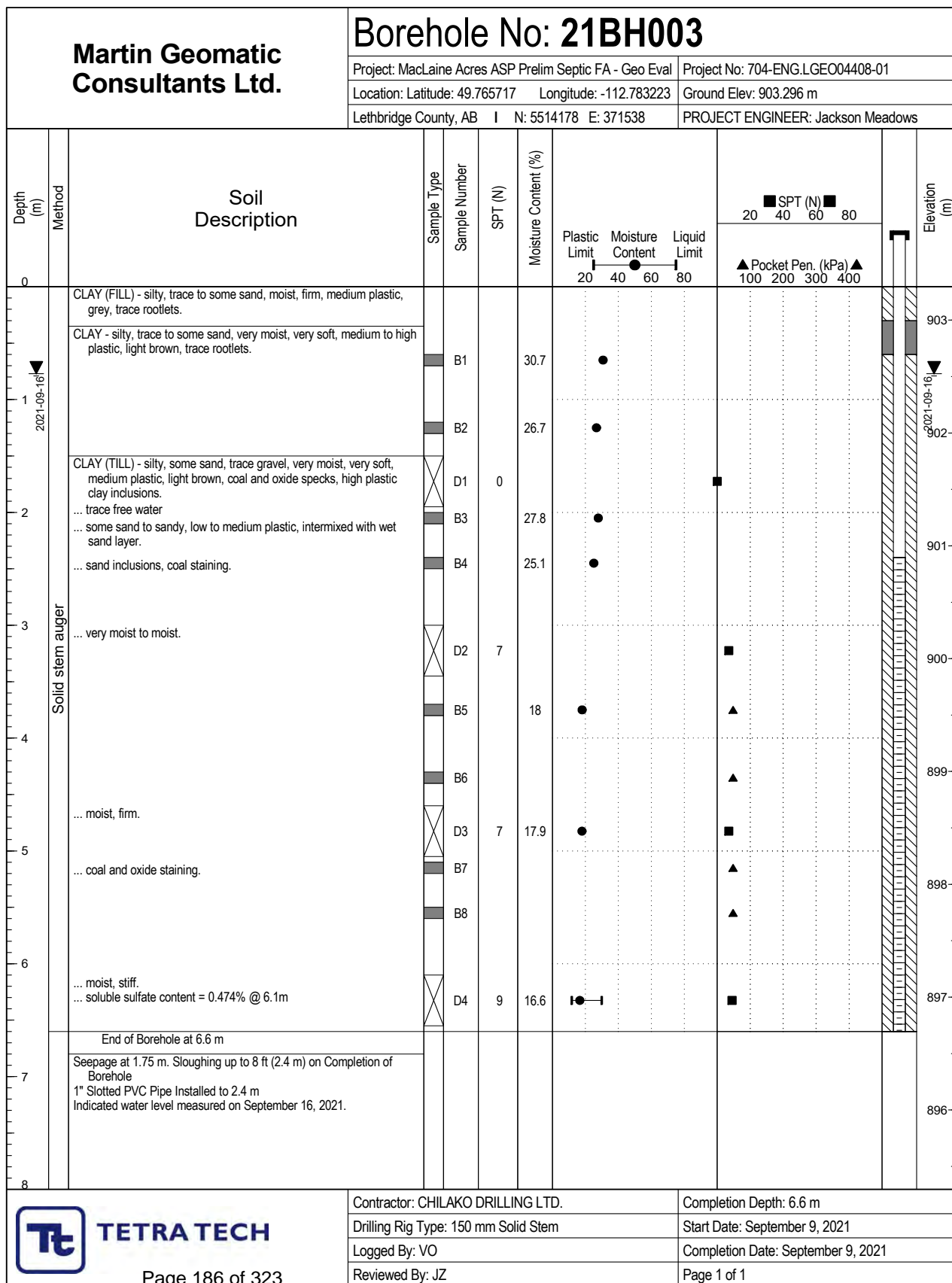
 Asphalt	 Bedrock	 Cobbles/Boulders	 Clay	 Coal
 Concrete	 Fill	 Gravel	 Limestone	 Mudstone
 Organics	 Peat	 Sand	 Sandstone	 Shale
 Silt	 Siltstone	 Till	 Topsoil	

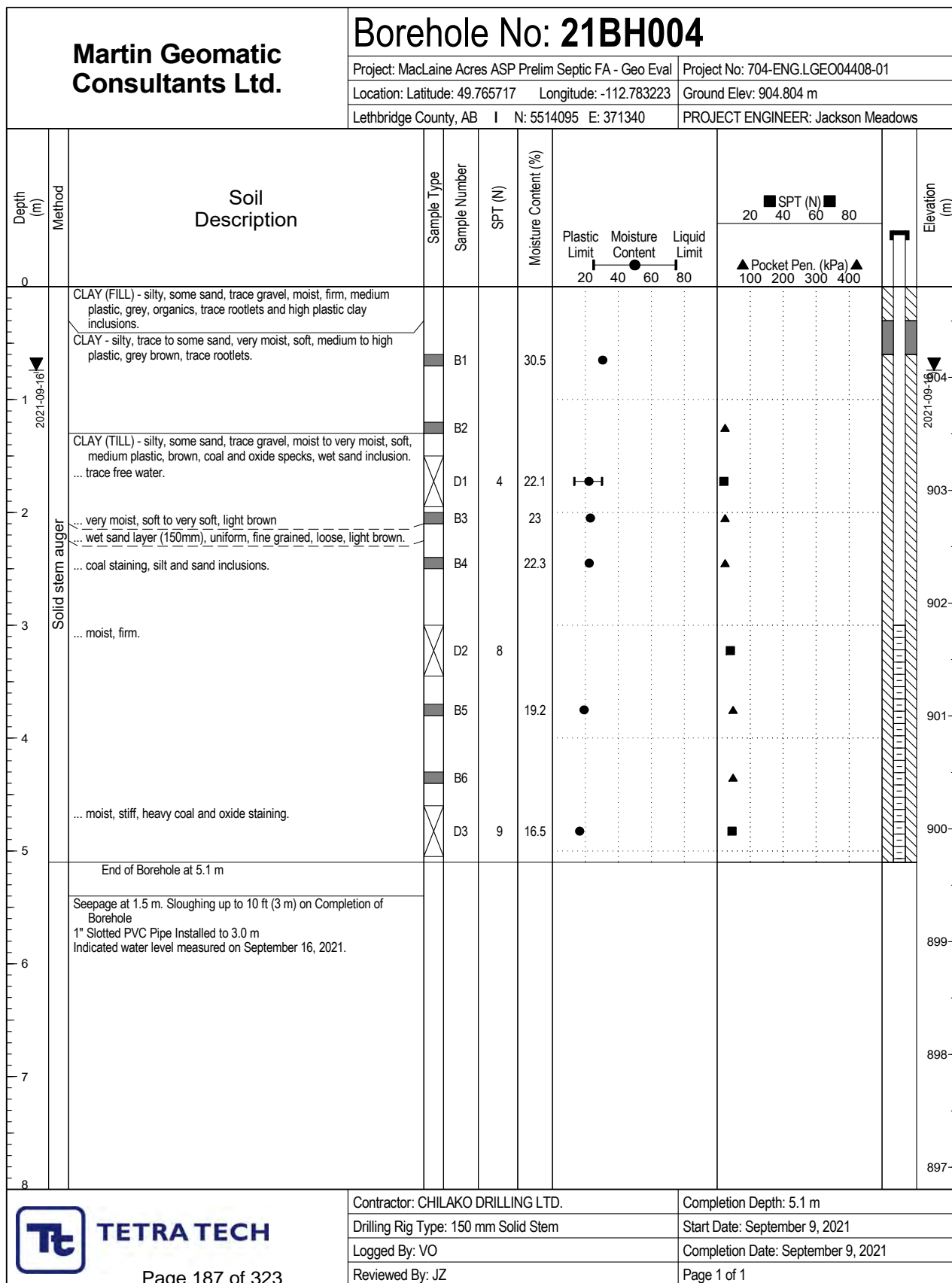
1. The graphical legend is an approximation and for visual representation only. Soil strata may comprise a combination of the basic symbols shown above. Particle sizes are not drawn to scale

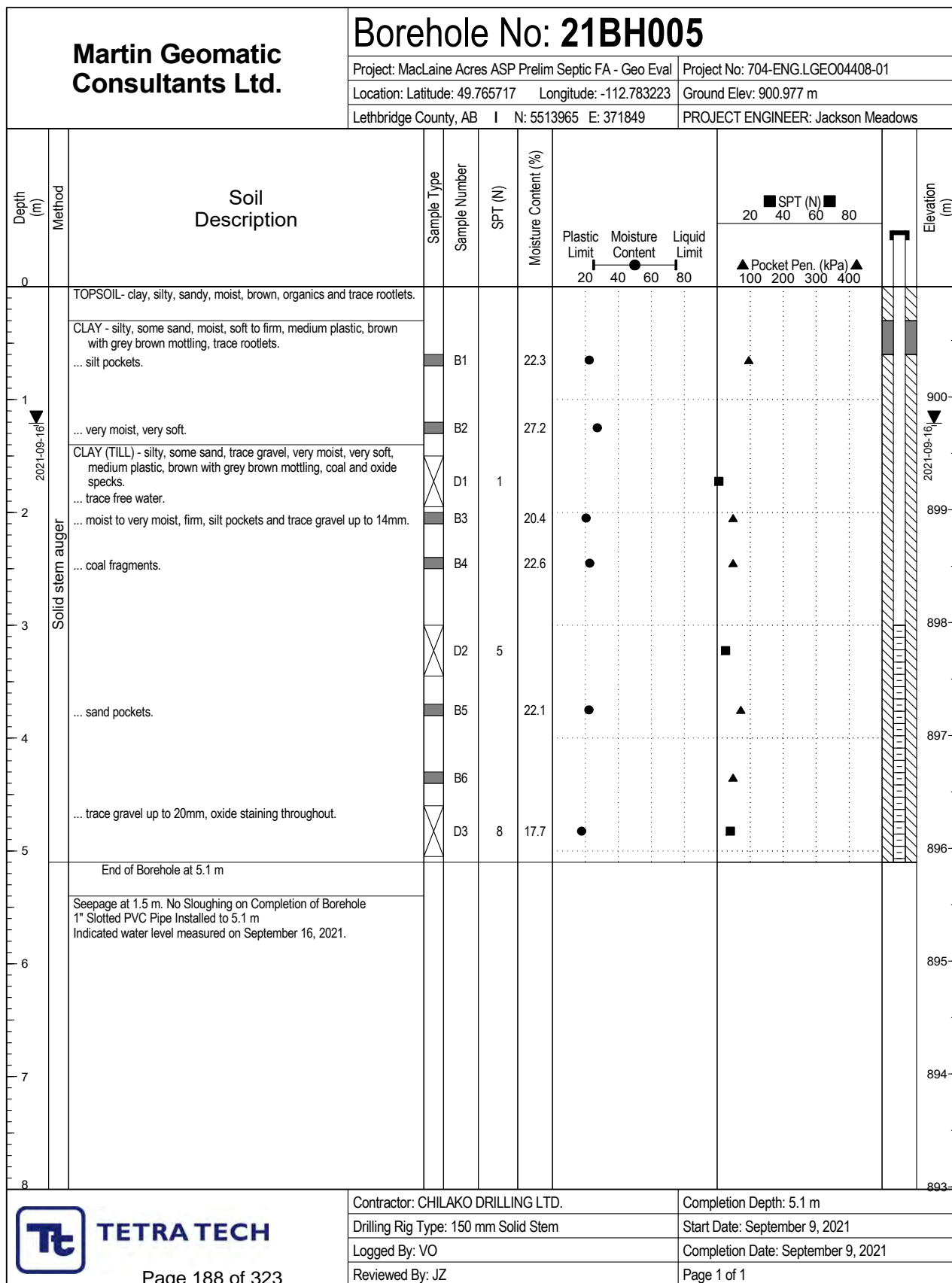


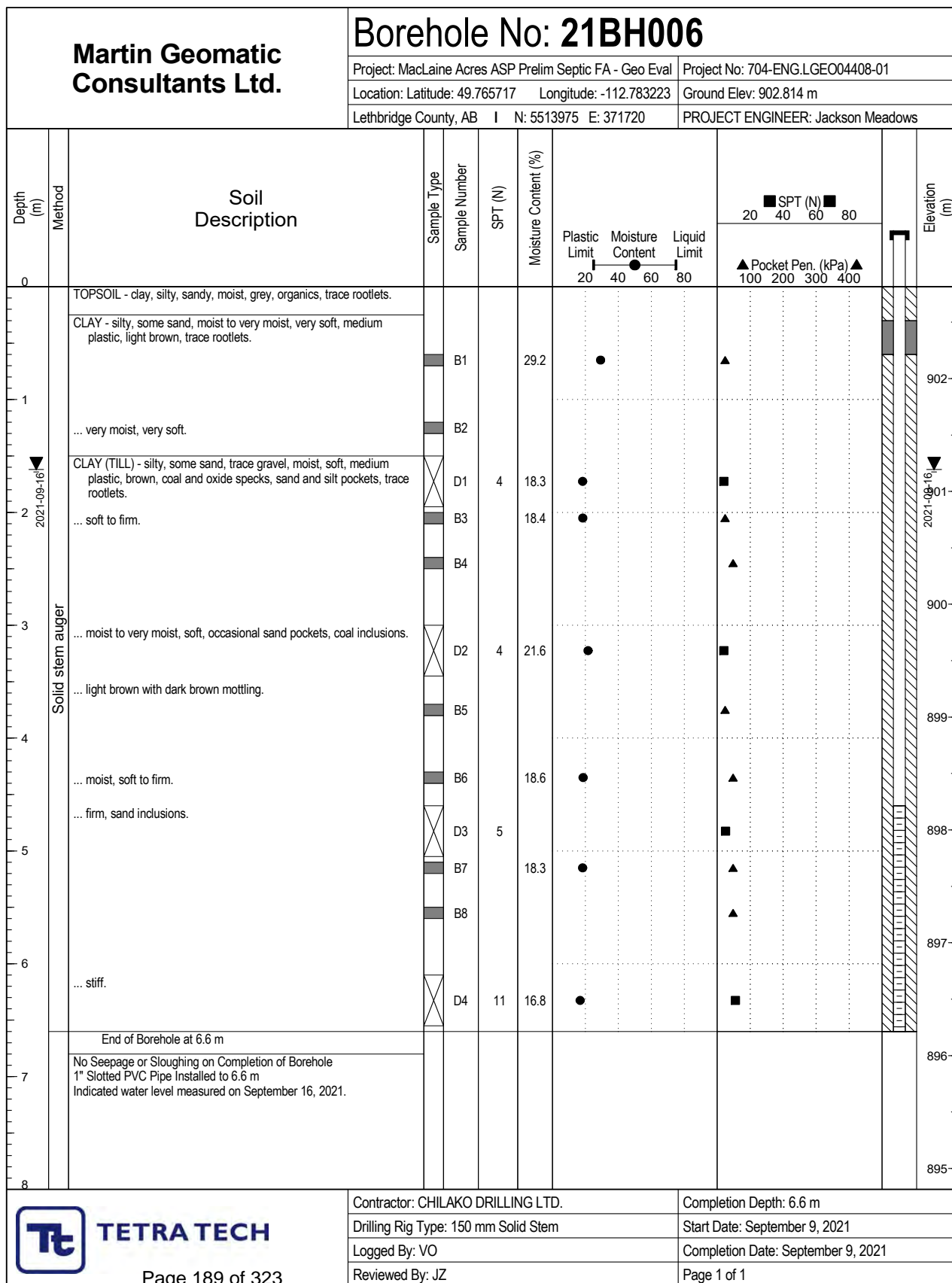


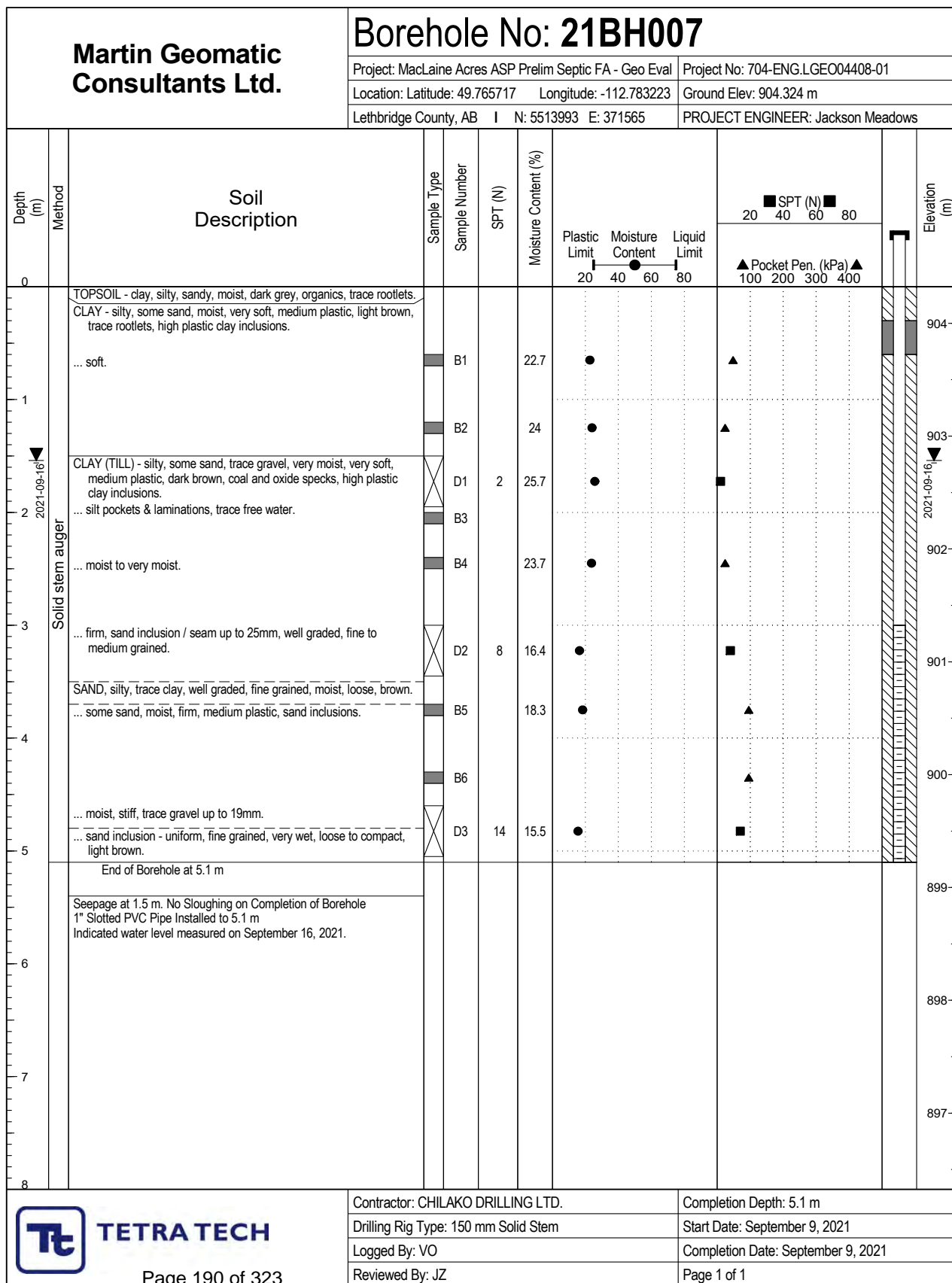




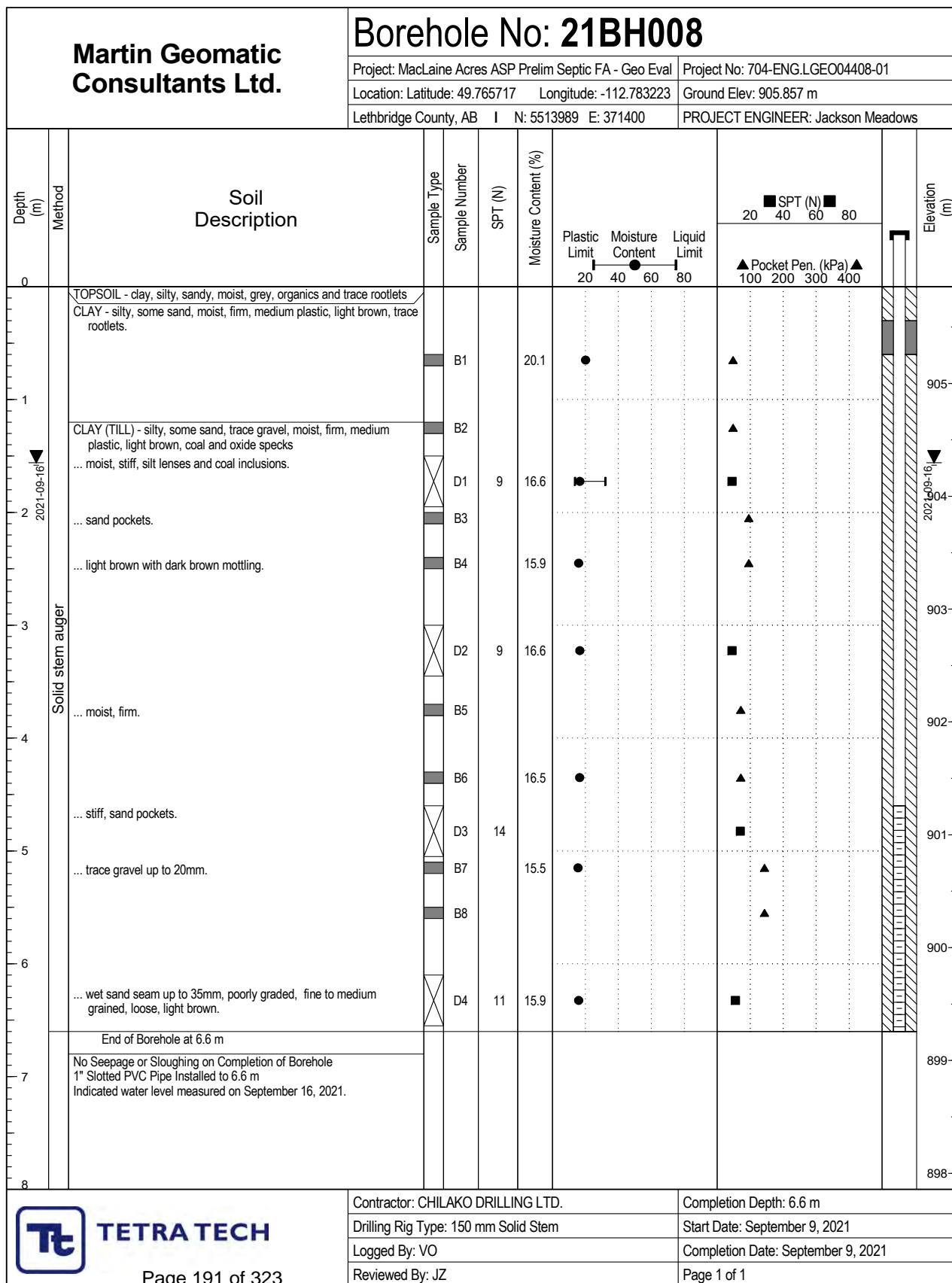


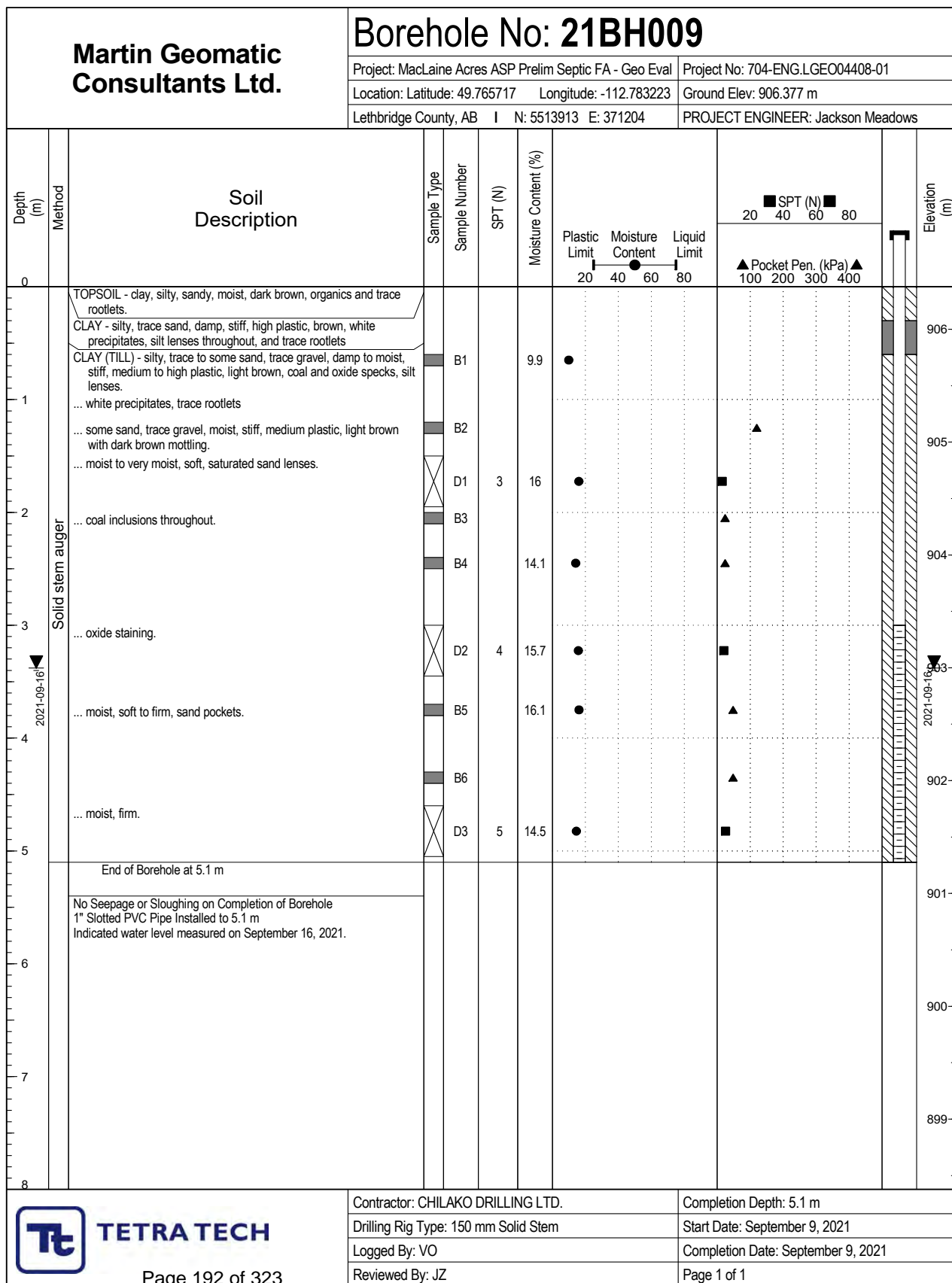


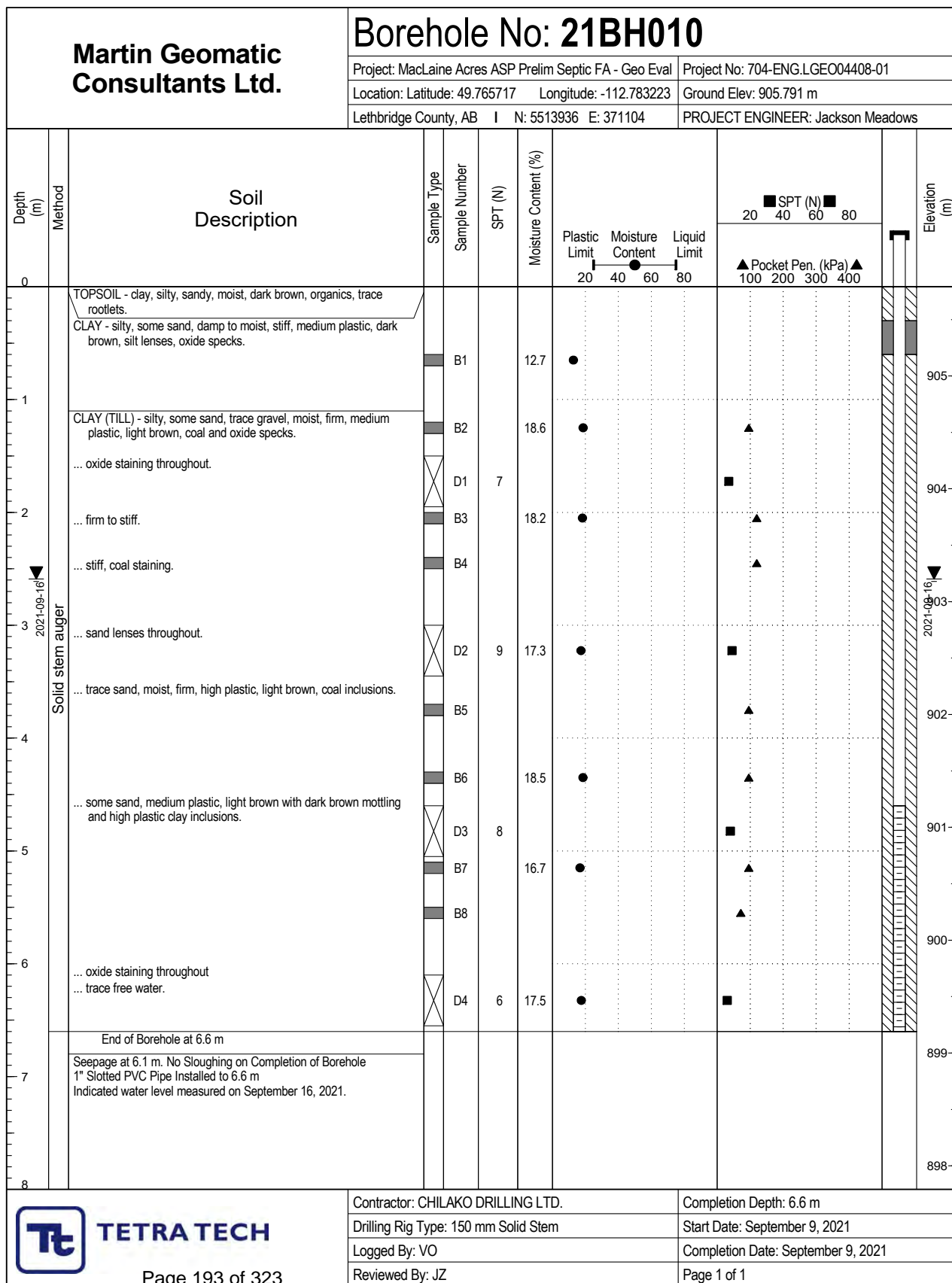




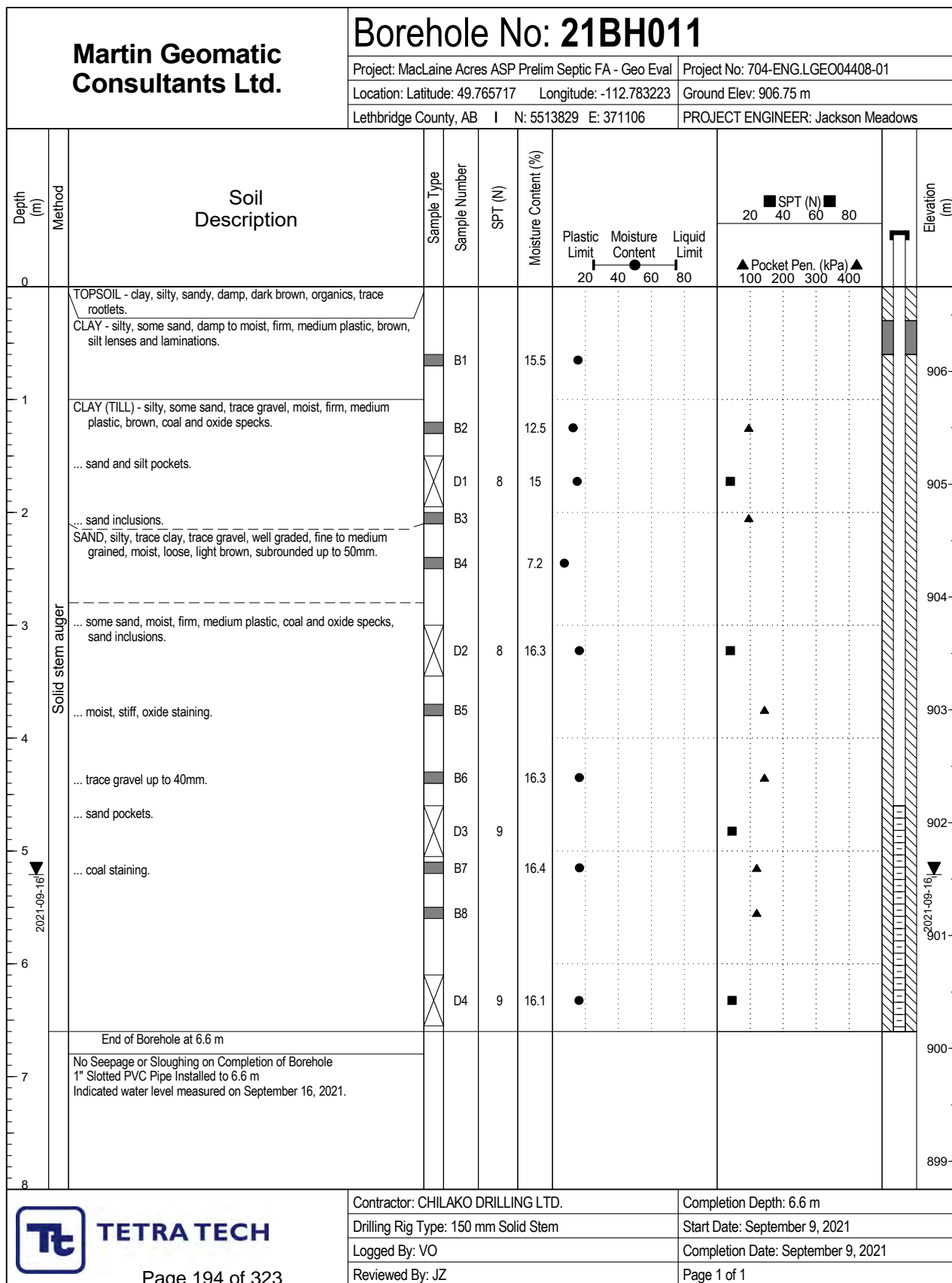
GEOTECHNICAL 704-ENG.LGEO04408-01 MACLAINE ACRES ASP - GEO EVAL.GPJ EBA.GDT 10/4/21

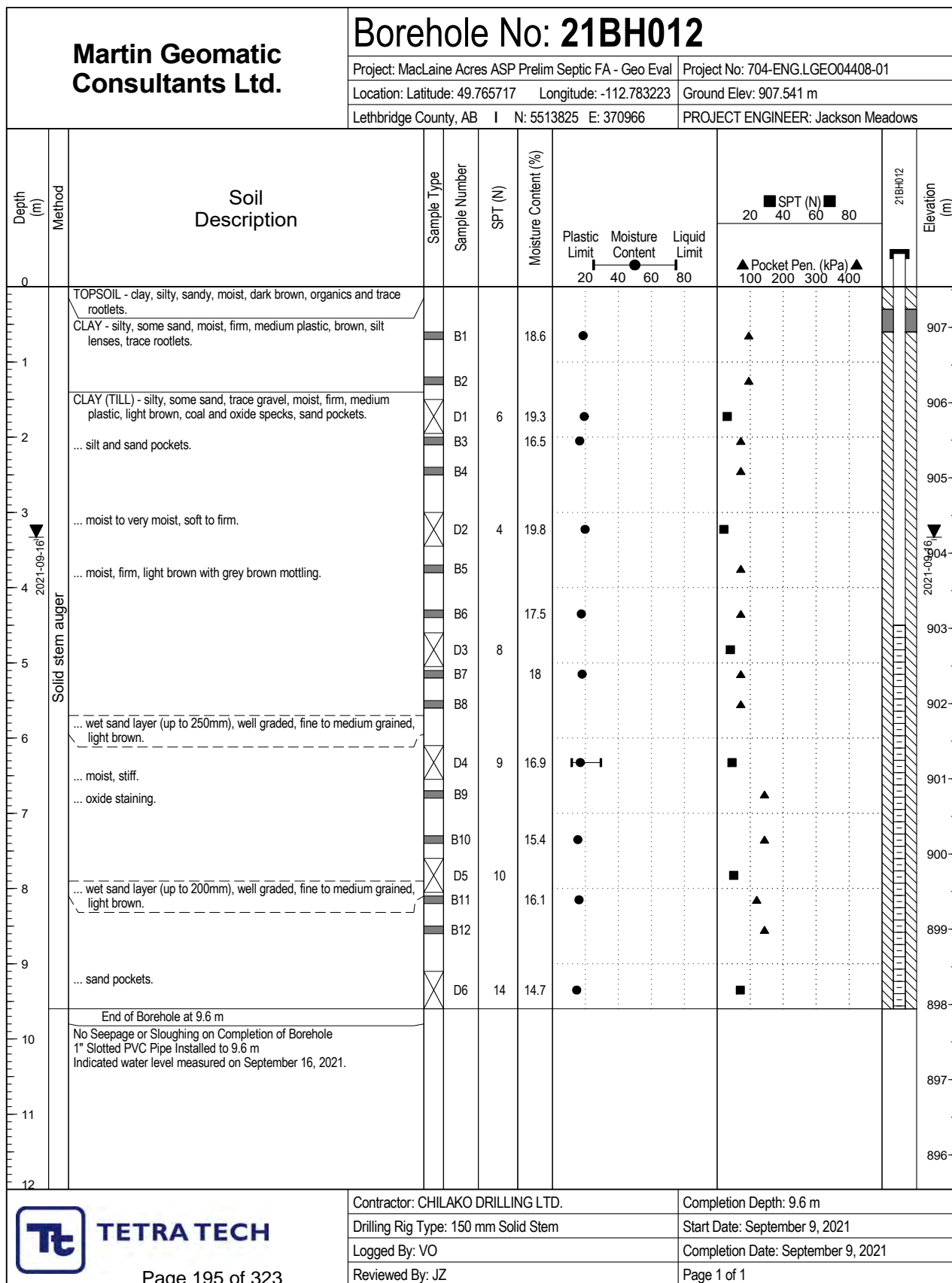


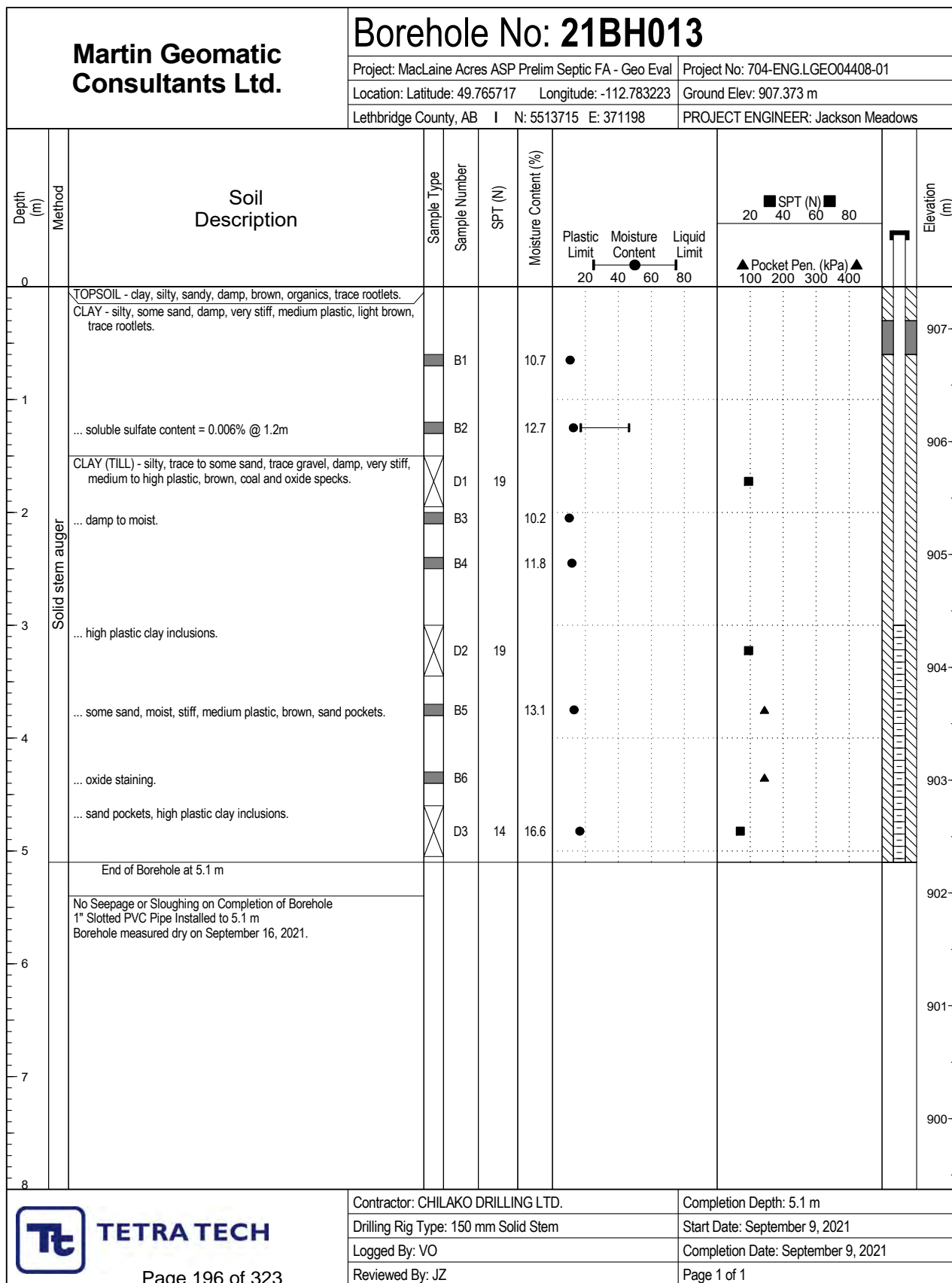


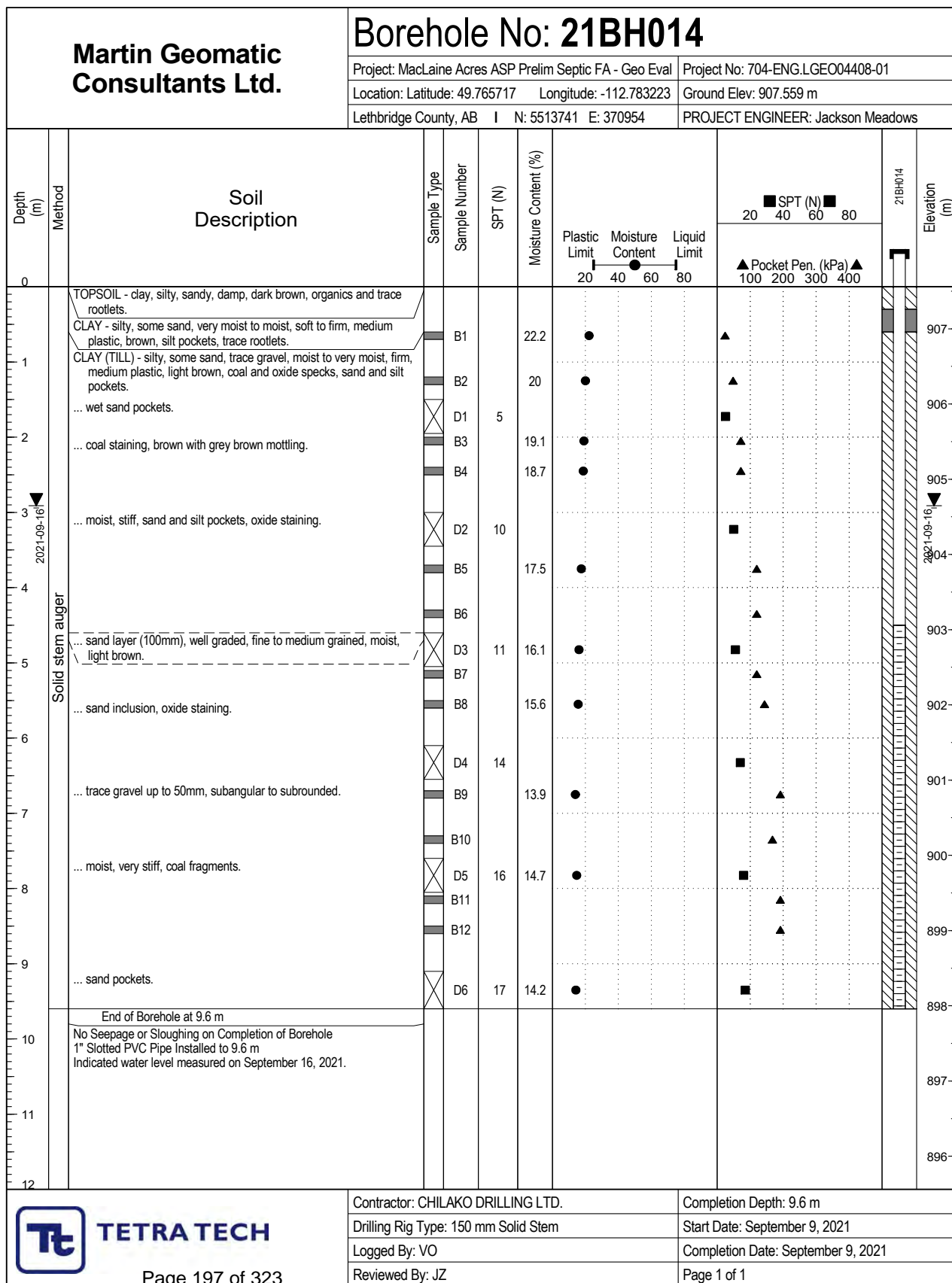


GEOTECHNICAL 704-ENG.LGEO04408-01 MACLAINE ACRES ASP - GEO EVAL.GPJ EBA.GDT 10/4/21









APPENDIX C

DESIGN AND CONSTRUCTION GUIDELINES

CONSTRUCTION GUIDELINES

Revision No: 01 | Last Revised: March 31, 2016

SHALLOW FOUNDATIONS

Design and construction of shallow foundations should comply with relevant Building Code requirements.

The term 'shallow foundations' includes strip and spread footings, mat slab, and raft foundations.

Minimum footing dimensions in plan should be in accordance with the applicable design code of the local jurisdiction.

No loose, disturbed or sloughed material should be allowed to remain in open foundation excavations. Hand cleaning should be undertaken to prepare an acceptable bearing surface.

Foundation excavations and bearing surfaces should be protected from rain, snow, freezing temperatures, excessive drying, and the ingress of free water before, during, and after footing construction.

Footing excavations should be carried down into the designated bearing stratum.

After the bearing surface is approved, a mud slab should be poured to protect the soil against inclement weather and provide a working surface for construction.

All constructed foundations should be placed on unfrozen soils, which should be at all times protected from frost penetration.

All foundation excavations and bearing surfaces should be inspected by a qualified geotechnical engineer to check that the recommendations contained in this report have been followed.

Where over-excavation has been carried out through a weak or unsuitable stratum to reach into a suitable bearing stratum or where a foundation pad is to be placed above stripped natural ground surface such over-excavation may be backfilled to subgrade elevation utilizing either structural fill or lean-mix concrete. These materials are defined below:

- "Structural engineered fill" should comprise clean, well-graded granular soils.
- "Lean-mix concrete" should be low strength concrete having a minimum 28-day compressive strength of 3.5 MPa.

CONSTRUCTION GUIDELINES

Revision No: 01 | Last Revised: March 31, 2016

BORED CAST-IN-PLACE CONCRETE PILES

Design and construction of piles should comply with relevant Building Code requirements.

Piles should be installed under full-time inspection of qualified geotechnical personnel. Pile design parameters should be reviewed in light of the findings of the initial bored shafts drilled on a site. Further design review may be necessary if conditions observed during site construction do not conform to design assumptions.

Where fill material or lenses or strata of sand, silt or gravel are present within the designed pile depth, these may be incompetent and/or water bearing and may cause sloughing. Casing should be on hand before drilling starts and be used, if necessary, to seal off water and/or prevent sloughing of the bore.

If piles are to be underreamed (belled), the underreams should be formed entirely in self-supporting soil and entirely within the competent bearing stratum. Where sloughing occurs at design elevation it may be necessary to extend the base of the pile bell to a greater depth. Piles may be constructed with bells having outside diameters up to approximately three times the diameters of their shafts. Piles with shaft diameters of less than 400 mm should not be underreamed due to difficulties associated with ensuring a clean base.

Prior to pouring concrete, bottoms of pile bells or of straight shaft end bearing piles should be mechanically cleaned of all disturbed material.

Pile bores should be visually inspected after completion to ensure that disturbed materials and/or water are not present on the base so that recommended allowable bearing and skin friction parameters may apply.

Other procedures to inspect the pile shafts may be used where shaft diameters of less than 760 mm (30 inch) are constructed, such as, inspection with a light or with the use of a downhole camera.

For safety reasons, where hand cleaning and/or 'down shaft' inspection by personnel are required, the pile shaft must be cased full length prior to personnel entering the shaft.

Reinforcing steel should be on hand and should be placed as soon as the bore has been completed and approved.

Longitudinal reinforcing steel is recommended to counteract the possible tensile stresses induced by frost action and should extend to a minimum depth of 3.5 m. A minimum steel of 0.5 percent of the gross shaft area is recommended or per applicable building code requirements.

Where a limited quantity of water is present on the pile base (<50 mm), it should be removed. Where significant quantities of water are present (>50 mm), and it is impracticable to exclude water from the pile bore, concrete should be placed by tremie techniques or a concrete pump.

A "dry" pile should be poured by "free fall" of concrete only where impact of the concrete against the reinforcing cage, which can cause segregation of the concrete, will not occur. A hopper should be used to direct concrete down the centre of the pile base and to prevent impact of concrete against reinforcing steel.

Concrete used for "dry" uncased piles should be self-compacting and should have a target slump of 125 mm. Where casing is required to prevent sloughing or seepage, the slump should be increased to 150 mm. The casing should be filled with concrete and then the casing should be withdrawn smoothly and continuously. Sufficient concrete should be placed to allow for the additional volume of the casing and reduction in level of the concrete as the casing is withdrawn. Concrete should not be poured on top of previously poured concrete, after the casing is withdrawn. In order to comply with maximum water:cement ratios for the concrete, the use of chemicals (or superplasticizers) to temporarily increase the slump may be required. Concrete for each pile should be poured in one continuous operation and should be placed immediately after excavation and inspection of piles, to reduce the opportunity for the ingress of free water or deterioration of the exposed soil or rock.

If piles cannot be formed in dry conditions then the concrete should be placed by tremie tube or concrete pump. Concrete placed by tremie should have a slump of not less than 150 mm. A ball or float should be used in the tremie tube to separate the initial charge of concrete from the water in the pile bore. The outlet of the tremie tube should be maintained at all times 1.0 m to 2.0 m below the surface of the concrete. The diameter of the tremie tube should be at least 200 mm. The tube should be water tight and not be made of aluminum. Smaller diameter pipes may be used with a concrete pump. The surface of the concrete should be allowed to rise above the cut off level of the pile, so that when the temporary casing is withdrawn and the surface level of the concrete adjusts to the new volume, the top of the uncontaminated concrete is at or above the cut off level. The concrete should be placed in one continuous smooth operation without any halts or delays. Placing the lower portion of the pile by tremie tube and placing the upper portion of the pile by "free fall" should not be permitted, to ensure that defects in the pile shaft at the top of the tremie concrete do not occur. As the surface of the concrete rises in the pile bore the water in the pile bore will be displaced upwards and out of the top of the pile casing.

When concreting piles by tremie techniques, allowance should be made for the removal of contaminated or otherwise defective concrete at the tops of the piles.

An accurate record of the volume of concrete placed should be maintained as a check that a continuous pile had been formed.

Concrete should not be placed if its temperature is less than 5°C or exceeds 30°C, or if it is more than two hours old.

Where tension, horizontal or bending moment loading on the pile is foreseen, steel reinforcing should be extended and tied into the grade beam or pile cap. The steel should be designed to transfer loads to the required depth in the pile and to resist resultant bending moments and shear forces.

Void formers should be placed beneath all grade beams to reduce the risk of damage due to frost effects or soil moisture changes.

Where the drilling operation might affect the concrete in an adjacent pile (i.e., where pile spacing is less than approximately three diameters) drilling should not be carried out before the previously poured pile concrete has set for at least 24 hours.

Where a group of four or more piles are used the allowable working load on the piles may need to be modified to allow for group effects.

Piles should be spaced no closer than 2.5 times the pile shaft diameter, measured centre-to-centre. Strict control of pile location and verticality should be exercised to provide accurate locations and spacings of piles. In general, piles should be constructed within a tolerance of 75 mm plan distance in any direction and within a verticality of 1%.

A detailed record should be kept of pile construction; the following information should be included, pile number, shaft/base diameter, date and time bored, date and time concreted, elevation of piling platform, depths (from piling platform level) to pile base and to concrete cut off level, length of casing used, details of reinforcement, details of any obstructions, details of any groundwater inflows, brief description of soils encountered in the bore and details of any unusual occurrences during construction.

If a large number of piles are to be installed, it may be possible to optimize the design on the basis of pile load tests or conducting high strain dynamic pile testing.

CONSTRUCTION GUIDELINES

Revision No: 02 | Last Revised: March 31, 2016

FLOOR SLABS-ON-GRADE

All soft, loose or organic material should be removed from beneath slab areas. If any local 'hard spots' such as old basement walls or abandoned pile foundation are revealed beneath the slab area, these should be over-excavated and removed to not less than 0.9 m below underside of slab level. The exposed soil should be proof-rolled and the final grade restored by engineered fill placement. If proof-rolling reveals any soft or loose spots, these should be excavated and the desired grade restored by engineered fill placement. The subgrade should be compacted to a depth of not less than 0.3 m to a density of not less than 98 percent Standard Proctor Maximum Dry Density (ASTM Test Method D698).

If, for economic reasons, it is considered desirable to leave low quality material in-place, such as existing fills, beneath a slab-on-grade, special ground treatment procedures may be considered, Tetra Tech could provide additional advice on this aspect if required.

A levelling course of well graded granular fill (with maximum size of 20 mm), at least 150 mm in compacted thickness, is recommended directly beneath all slabs-on-grade. The type of granular fill should be selected based on the design floor loadings. Alternatively a minimum thickness of 150 mm of 80 mm pit-run gravel overlain by a minimum thickness of 50 mm of 20 mm crushed gravel may be used. Coarse gravel particles larger than 25 mm diameter should be avoided directly beneath the slab-on-grade to limit potential stress concentrations within the slab. All levelling courses directly under floor slabs should be compacted to 100 percent of Standard Proctor Maximum Dry Density (ASTM Test Method D698).

Engineered fill, pit-run gravel and crushed gravel are defined under the heading 'Backfill Materials and Compaction' elsewhere in this Appendix.

The excavated subgrade beneath slabs-on-grade should be protected at all times from rain, snow, freezing temperatures, excessive drying and the ingress of free water. This applies before, during, and after the construction period.

CONSTRUCTION GUIDELINES

Revision No: 00 | Last Revised: October 1, 2014

CONSTRUCTION EXCAVATIONS

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

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

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

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

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

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

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

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

CONSTRUCTION GUIDELINES

Revision No: 02 | Last Revised: October 2, 2015

BACKFILL MATERIALS AND COMPACTION (GENERAL)

1.0 DEFINITIONS

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

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

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

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

“Lean-mix concrete” is typically used to protect a subgrade from weather effects including excessive drying or wetting. “Lean-mix concrete” can also be used to provide a stable working platform over weak subgrades. “Lean-mix concrete” should be low strength concrete having a minimum 28-day compressive strength of 3.5 MPa.

Standard Proctor Density (SPD) as used herein means Standard Proctor Maximum Dry Density (ASTM Test Method D698). Optimum moisture content is defined in ASTM Test Method D698.

2.0 GENERAL BACKFILL AND COMPACTION RECOMMENDATIONS

Exterior backfill adjacent to abutment walls, basement walls, grade beams, pile caps and above footings, and below highway, street, or parking lot pavement sections should comprise “general engineered fill” materials as defined above.

Exterior backfill adjacent to footings, foundation walls, grade beams and pile caps and within 600 mm of final grade should comprise inorganic, cohesive “general engineered fill”. Such backfill should provide a relatively impervious surficial zone to reduce seepage into the subsoil against the structure.

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

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

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

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

Excavation and construction operations expose materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration of performance. Unless otherwise specifically indicated in this report, the walls and floors of excavations, and stockpiles, must be protected from the elements, particularly moisture, desiccation, frost, and construction activities. Should desiccation occur, bonding should be provided between backfill lifts. For fine-grained materials the previous lift should be scarified to the base of the desiccated layer, moisture-conditioned, and recompact and bonded thoroughly to the succeeding lift. For granular materials, the surface of the previous lift should be scarified to about a 75 mm depth followed by proper moisture-conditioning and recompaction.

3.0 COMPACTION AND MOISTURE CONDITIONING

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

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

“Structural engineered fill” material should be placed in compacted lifts not exceeding 150 mm in thickness and compacted to not less than 100% of SPD at slightly below (0 to 2%) the optimum moisture content.

4.0 “GENERAL ENGINEERED FILL”

Low to medium plastic clay is considered acceptable for use as “general engineered fill,” assuming this material is inorganic and free of deleterious materials.

Materials meeting the specifications for “select engineered fill” or “structural engineered fill” as described below would also be acceptable for use as “general engineered fill.”

5.0 “SELECT ENGINEERED FILL”

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

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

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

“Pit-run gravel” and “fill sand” are generally considered acceptable for use as “select engineered fill.” See exact project or jurisdiction for specifications.

The “pit-run gravel” should be free of any form of coating and any gravel or sand containing clay, loam or other deleterious materials should be rejected. No material oversize of the specified maximum sieve size should be tolerated. This material would typically have a fines content of less than 10%.

The materials above are also suitable for use as “general engineered fill.”

6.0 “STRUCTURAL ENGINEERED FILL”

Crushed gravel used as “structural engineered fill” should be hard, clean, well graded, crushed aggregate, free of organics, coal, clay lumps, coatings of clay, silt, and other deleterious materials. The aggregates should conform to the requirement when tested in accordance with ASTM C136 and C117. See exact project or jurisdiction for specifications. This material would typically have a fines content of less than 10%.

In addition to the above, further specification criteria identified below should be met:

“Structural Engineered Fill” – Additional Material Properties

Material Type	Percentage of Material Retained on 5 mm Sieve having Two or More Fractured Faces	Plasticity Index (<400 µm)	L.A. Abrasion Loss (percent Mass)
Various sized Crushed Gravels	See exact project or jurisdiction for specifications	See exact project or jurisdiction for specifications	See exact project or jurisdiction for specifications

Materials that meet the grading limits and material property criteria are also suitable for use as “select engineered fill.”

7.0 DRAINAGE MATERIALS

“Coarse gravel” for drainage or weeping tile bedding should be free draining. Free-draining gravel or crushed rock generally containing no more than 5% fine-grained soil (particles passing No. 200 sieve) based on the fraction passing the 3/4-inch sieve or material with sand equivalent of at least 30.

“Coarse sand” for drainage should conform to the following grading limits:

“Coarse Sand” Drainage Material – Percent Passing by Weight

Sieve Size	Coarse Sand*
10 mm	100
5 mm	95 – 100
2.5 mm	80 – 100
1.25 mm	50 – 90
630 µm	25 – 65
315 µm	10 – 35
160 µm	2 – 10
80 µm	0 – 3

* From CSA A23.1-09, Table 10, “Grading Limits for Fine Aggregate”, Class FA1

Note that the “coarse sand” above is also suitable for use as pipe bedding material. See exact project or jurisdiction for specifications.

8.0 BEDDING MATERIALS

The “Coarse Sand” gradation presented above in Section 7.0 is suitable for use as pipe bedding and as backfill within the pipe embedment zone, however see exact project or jurisdiction for specifications.

APPENDIX 3

Environmental Site Assessment



**Phase I Environmental Site Assessment
MacLaine Acres
Portions of Section 28 TWP 9 RGE 21 W4M
Lethbridge County, Alberta**



PRESENTED TO
Rick Aldoff c/o Martin Geomatic Consultants Ltd.

SEPTEMBER 30, 2021
ISSUED FOR USE
FILE: ENG.LGEO04408-01.002

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EXECUTIVE SUMMARY

Foreword

Rick Aldoff care of Martin Geomatic Consultants Ltd. (MGCL) retained Tetra Tech Canada Inc. (Tetra Tech) to conduct a Phase I environmental site assessment (ESA) on the proposed MacLaine Acres, located within Section 28, Township 9, Range 21, West of the Fourth Meridian (28-009-21 W4M).

Tetra Tech understands this Phase I ESA is being conducted for due diligence in support of an area structure plan (ASP) and that the land proposed for MacLaine Acres consists of four legal properties: Plan 927 LK, Block 1, Lot 1 & Lot 2, Plan 801 0198, Block 2, Lot 1 and a portion of NW 28-009-21 W4M (Title No. 091 049 136).

The objective of the Phase I ESA is to comment on whether any past or present land use, either off -site or on-site, may have a potential to cause environmental impairment to the site.

The Phase I ESA was completed in general accordance with the Alberta Environment and Parks Alberta Environmental Site Assessment Standard and with the methods outlined in the document titled "*Canadian Standards Association Standard (CSA) Z768-01 Phase I ESA*", published by the CSA (reaffirmed 2016).

Findings and Conclusions

In general terms, there are two distinct types of potential environmental risk to any property. The first type of risk is from potential contamination from on-site land use. This would include potential accidental spills or site practices that may contaminate the property directly. The second type of risk is from contamination caused by adjacent property owners, which might then be transported through the subsurface soils by groundwater, or in overland runoff onto the site.

Potential for Impairment from On-Site Source(s)

There was one on-site source that might have potential to cause environmental impairment to the site through the historical or current land use. This source is where the old barrels are currently located on the central area of the southern portion of the site.

It is also noted that the former gas well site and associated infrastructure may be an area of concern if residual contamination was left on-site during reclamation activities in the early 2000s.

Potential for Impairment from Off-Site Source(s)

There were no off-site sources that might have a potential to cause environmental impairment to the site through historical and/or current land use.

Further Action/Rendering an Opinion

Based on the present study, Tetra Tech recommends that no further environmental investigation is required at this time. However, at the time of site re-development or when the old barrels are removed, the surficial soil in the area should be assessed to determine if proper disposal is required.

Tetra Tech recommends the following for consideration:

- Prior to extensive renovations or demolition, a hazardous building materials assessment should be undertaken.
- If buried debris or staining are encountered during future investigation or ground disturbance (i.e., near the former well site), a qualified environmental professional should be contacted.
- If soils containing organics are encountered during future investigation or ground disturbance, they should be removed from building footprints and not be reburied; a qualified environmental professional should be contacted.
- Any disturbance to surface waterbodies should be done in accordance with the Alberta Water Act.
- If encountered during future development, any water wells or septic systems should be appropriately decommissioned according to the relevant regulations.

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APPENDICES

- Appendix A Tetra Tech's Limitations on the Use of This DDocument
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 Appendix C Regulatory Searches and Responses
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LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Rick Aldoff and his agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Rick Aldoff, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in Appendix A or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

1.1 General

Rick Aldoff care of Martin Geomatic Consultants Ltd. (MGCL) retained Tetra Tech Canada Inc. (Tetra Tech) to conduct a Phase I environmental site assessment (ESA) on the proposed MacLaine Acres, located within Section 28, Township 9, Range 21, West of the Fourth Meridian (28-009-21 W4M).

Tetra Tech understands this Phase I ESA is being conducted for due diligence in support of an area structure plan (ASP) and that the land proposed for MacLaine Acres consists of four legal properties: Plan 927 LK, Block 1, Lot 1 & Lot 2, Plan 801 0198, Block 2, Lot 1 and a portion of NW 28-009-21 W4M (Title No. 091 049 136).

The objective of the Phase I ESA is to comment on whether any past or present land use, either off-site or on-site, may have a potential to cause environmental impairment to the site.

The Phase I ESA was completed in general accordance with the Alberta Environment and Parks Alberta Environmental Site Assessment Standard and with the methods outlined in the document titled "*Canadian Standards Association Standard (CSA) Z768-01 Phase I ESA*", published by the CSA (reaffirmed 2016).

1.2 Authorization

Rick Aldoff provided written authorization to proceed with the present study to Tetra Tech on August 24, 2021.

1.3 Scope of Work

Tetra Tech conducted the following scope of work for the Phase I ESA:

- Conducted a records review for the site and surrounding properties, for a minimum search distance of 100 m. The records review included the following current and historical information searches:
 - Provincial regulatory information including the Alberta Safety Codes Authority (ASCA); Alberta Energy Regulator (AER) via Abacus Datagraphics Database (AbaData); Alberta Environment and Parks' (AEP) ESA Repository (ESAR), Online Water Well Database, Authorization Viewer; Historical Environmental Enforcement Search; and the Alberta Land Titles Spatial Information System (SPIN2).
 - Regional and municipal regulatory information, including Lethbridge County.
 - Historical information sources including business directories, fire insurance plans, land titles, and historical aerial photographs.
 - Geological and hydrogeological information including published topographic, geologic, soil, and groundwater maps and reports.
- Conducted a site visit to evaluate the extent and manner that current and historical surrounding activities may impact upon the site and the environment. Sampling was not included as part of the Phase I ESA scope of work.
- Conducted interviews with persons familiar with the site and surrounding properties.

- Evaluated the results and prepared this report discussing the site history and identified any potential for environmental concerns resulting from past or present land use on site and in the surrounding area.

1.4 Qualifications of Assessors

Jaymes Going, B.Sc., EP, conducted the site visit, historical review, and wrote this report. Jaymes is an Environmental Scientist with Tetra Tech's Environment and Water Practice and has over 13 years of experience in the environmental industry.

Henri Carriere, P.Eng., M.N.R.M., provided the senior review of this report. Henri is a Senior Project Engineer with Tetra Tech's Environment and Water Practice in Calgary, Alberta. He has more than 28 years of experience in the environmental industry.

1.5 General Site Details

The irregular shaped site is approximately 33.57 hectares (ha) in size and is located north of the City of Lethbridge within Lethbridge County and is currently zoned Lethbridge Urban Fringe.

The northern portion of the site consists of two legal properties (Plan 927 LK, Block 1, Lots 1 & 2) and is primarily pastureland with a private residence and dugout located on the eastern portion. A farm building (barn) is located near the southwest corner of this portion of the site.

The southern portion of the site also consists of two legal properties (Plan 801 0198, Block 2, Lot 1 and Title No. 091 049 136) and is also primarily pastureland. There are three private residences on these parcels: two on the northeast portion of the parcel that includes several farm buildings, and a dugout; and one on the northwest portion of the parcel. The latter private residence is the former location of a gas well site. On the central-east portion of this parcel were some old barrels and metal debris (pieces of an old grain bin) and a horse racetrack is located on the southern portion.

The site is bound to the north by an access road to the private residence located on the northwest portion of the site followed by agricultural land. Adjacent to the east of the site is Range Road 213 followed by rural residences and agricultural land. South of the northern portion of the site is an existing rural subdivision and south of the southern portion of the site is agricultural land including a small livestock operation. Adjacent to the west of the site is a St. Mary River Irrigation District (SMRID) irrigation canal followed by agricultural land.

Figure 1 shows the site location plan and Figure 2 shows the detailed site plan showing surrounding land use. Photographs of the site are provided in Appendix B.

2.0 RECORDS REVIEW

The results of regulatory searches are provided in Appendix C. Records were reviewed for the site and for adjacent properties within a minimum distance of 100 m from the site boundary.

2.1 Location, Size, and Ownership

The site is located in Lethbridge County, Alberta. The legal description, legal land description, size, and ownership are summarized in Table A.

Table A: Legal Description, Legal Land Description, Size, and Ownership

Legal Description	Legal Land Description	Size (ha)*	Ownership*
Plan 927 LK, Block 1, Lot 1	NE 28-009-21 W4M	8.10	1946291 Alberta Ltd.
Plan 927 LK, Block 1, Lot 2	NE 28-009-21 W4M	9.98	Kenneth Dale Smith
Plan 801 0198, Block 2, Lot 1	NW/NE/SW/SE 28-009-21 W4M	14.1	Richard Michael Aldoff and Carol Ann Aldoff
091 049 136 (title number)	NW 28-009-21 W4M	1.39**	Ryan Garret Van Eeden Petersman and Karen Virginia Van Eeden Petersman

Notes:

* Size and ownership were obtained from the current land title.

** Size obtained from Google Earth

2.2 Historical Records Review

A historical records review was undertaken for the site. The review dates were based on available records.

2.2.1 Historical Land Title Records

A historical and current land title search was initiated for the site. The results of the land title search had not been received at the time of report issuance. Should the review of the historical land titles change the findings, an addendum letter will be issued. The current land titles are included in Appendix C.

Table B: Land Titles Summary

Year(s) of Ownership	Owner(s)	Tetra Tech Evaluation
Plan 927 LK, Block 1, Lot 1		
2016 to present	1946291 Alberta Ltd.	Based on the name, there is no obvious potential for environmental concern.
Plan 927 LK, Block 1, Lot 2		
2016 to present	Kenneth Dale Smith	Based on the name, there is no obvious potential for environmental concern
Plan 801 0198, Block 2, Lot 1		
1991 to present	Richard Michael Aldoff and Carol Ann Aldoff	Based on the name, there is no obvious potential for environmental concern
NW 28-009-021-W4M (Title No. 091 049 136)		
2009 to present	Ryan Garret Van Eeden Petersman and Karen Virginia Van Eeden Petersman	Based on the name, there is no obvious potential for environmental concern

2.2.2 Aerial Photographs

Aerial photographs provide visual evidence of site occupancy, operational activities, and general site details. Aerial photographs capture a view of the site and the surrounding areas at a given time. The results of the aerial photograph review are summarized in Table C.

Table C: Historical Aerial Photo Summary

Year	Scale	Observations
1950	1:40,000	On-site: Site appears to be predominately cultivated agricultural land with the western portion that appears as pastureland. Several small areas that appear to contain water are visible and an irregular shaped linear feature (SMRID canal) transects the western portion of the site.
		Off-site: The surrounding land use in all cardinal directions appears as cultivated agricultural land. Linear features are visible adjacent to the north site boundary (possible irrigation canal and present-day access road to private residences) and east site boundary (Range Road 213). The SMRID canal is visible to the north, west, and south of the site, but does not appear in its current configuration.
1960	1:31,680	On-site: Similar to the previous aerial photograph, although a dugout is visible on the northern area of the south portion of the site and several small structures are visible near this dugout (possible rural residence).
		Off-site: Similar to the previous aerial photograph, although several structures and a dugout are visible to the south of the site at the current location of the small livestock operation and several rural residences are visible on the east side of Range Road 213.
1970	1:31,680	On-site: Similar to the previous aerial photograph, although the dugout noted in 1960 has increased in size, and an additional small dugout is visible to the northeast (current day location).
		Off-site: Similar to the previous aerial photograph.
1981	1:60,000	On-site: The SMRID canal no longer transects the site and it appears in its current configuration. The large dugout is no longer visible and just appears as a low lying area; an additional dugout is visible on the east portion of the site (current day location). The footprint of the former well site is also visible on the western portion of the site.
		Off-site: Similar to the previous aerial photograph, although the SMRID canal has been re-aligned in its current configuration and two residences are visible to the south of the northern portion of the site.
1991	1:30,000	On-site: Some development appears in the area around the dugout on the north area of the southern portion of the site (land appears stripped or disturbed). There is also what appears to be an irregular shaped horse racetrack on the southern portion of the site, and the private residence on the eastern portion of the site is visible.
		Off-site: Similar to the previous aerial photograph, although additional rural residences are visible to the north and east of the site.
1999	1:30,000	On-site: Similar to the previous aerial photograph, although the well site is no longer visible on the western portion of the site and the footprint of the irregular shaped track feature has changed.
		Off-site: Similar to the previous aerial photograph.
2011	*	On-site: Similar to the previous aerial photograph, although various vehicle/equipment storage is visible in the area around the two private residences with the dugouts and the irregular shaped track feature is no longer visible.
		Off-Site: Similar to the previous aerial photograph, although it appears that most rural residences have been constructed to the south of the northern portion of the site.
2020	*	On-site: The private residence on the northwest portion of the site where the former well site was located has been constructed. A large oval shaped track is also visible on the southern portion of the site, and a smaller dugout is visible where the larger dugout was formerly located.
		Off-Site: Similar to the previous aerial photograph.

Notes:

To be read in conjunction with the accompanying report.

The aerial photographs are enlarged (where possible) for the review.

* Aerial photograph was obtained from Google Earth's satellite image archive

Based on the aerial photograph review, the site was predominantly agricultural land since 1950 with several dugouts visible throughout the aerial photograph review. A possible residence was visible as early as 1960 on the north area of the southern portion of the site. The SMRID canal alignment changed to its current configuration around 1981 moving west from onsite to offsite, and three of the four onsite private residences were visible in the 1991 aerial photograph with the third residence visible in the 2020 imagery.

The surrounding area has also been predominantly agricultural land since 1950 with the rural residences to the south of the northern portion of the site being constructed between 1981 to current with most being built around 2011. The small livestock operation to the south of the site with the dugout was visible as early as 1960.

2.2.3 Museum Archives

Tetra Tech inquired with the Galt Museum and Archives for indications of historical land use at the site and the surrounding area. Museum personnel indicated that there was no information specific to the site.

2.2.4 Business Directories

No business directories were available for Tetra Tech to review for the site.

2.2.5 Fire Insurance Plans

No fire insurance plans were available for Tetra Tech to review for the site.

2.2.6 Other Archival Records

No additional archival records were reviewed by Tetra Tech for the site.

2.3 Provincial Regulatory Information

This section describes the results of provincial regulatory searches. Copies of the search results and correspondence are provided in Appendix C.

2.3.1 Alberta Safety Codes Authority

Tetra Tech contacted the Alberta Safety Codes Authority (ASCA) regarding the potential for registered petroleum storage tanks (PSTs) at the site (Plan 927 LK, Block 1, Lot 1; Plan 927 LK, Block 1, Lot 2; Plan 801 0198, Block 2, Lot 1; and NW 28-009-21 W4M).

The ASCA indicated that no records exist for the site.

The ASCA requires that all underground storage tanks (USTs) be registered; however, only above ground storage tanks (ASTs) with a capacity greater than 2,500 L require registration. The database is based on a limited survey conducted in 1992 and voluntary information submitted thereafter; therefore, it is not considered a comprehensive inventory of PSTs in Alberta.

2.3.2 Alberta Energy Regulator

2.3.2.1 AbaData Database

Tetra Tech acquires AER database information through AbaData. The AbaData database was searched to determine if oil/gas wells and/or pipelines exist or have existed at the site and on the surrounding properties. The information provided by the AER indicated that there are available records for two high pressure gas lines (one active and one abandoned) on or transecting the site and one former well site location.

The active high pressure gas line (natural gas) is owned and operated by ATCO and is oriented north to south along the eastern site boundary. The abandoned high pressure gas line (natural gas) is licensed to Husky Oil Operations Limited (Husky) and enters the site from southwest corner and terminates at the former well site located where the current private residence is located. The former well site located on the northwest portion of the site, also licensed to Husky for gas, was drilled in 1976 and abandoned in 1991.

One record for a spill also exists to the north of the site within 16-28-009-21 W4M. This spill record was for a natural gas leak that occurred in 2014.

No other records for oil/gas wells and/or pipelines and spills/complaints were identified within 100 m of the site boundaries.

Several low-pressure gas lines (owned by ATCO Gas) are identified on-site and within 100 m of the site boundaries that service the rural residences.

High-pressure pipeline and well information provided by AbaData is current to September 3, 2021 and information on low-pressure pipelines is current to January 1, 2020.

The Coal Mine Atlas was reviewed, and it was determined that no abandoned or active coal mines are present at the site or within 100 m of the site.

2.3.3 Alberta Environment and Parks

2.3.3.1 Environmental Site Assessment Repository

The AEP ESAR is an online, searchable database that provides scientific and technical information about assessed sites throughout Alberta. The search of ESAR indicated that there was one record available for the site. The record was for a reclamation certificate, dated August 7, 2002 for the Husky well site located on the northwestern portion of the site within 11-28-009-21 W4M.

Tetra Tech notes that the ESAR map provided in Appendix C shows three records in close proximity to the site. All three of the records indicated on the map have the same information, the reclamation certificate for the former well site located on the site.

2.3.3.2 Online Authorization Viewer

The AEP Online Authorization Viewer allows the public to view approvals, licenses, registrations and permits issued under the Water Act and EPEA. There were 27 records available (current and expired) for pesticide service and rural waterworks. All of the records for the pesticide service are held by the SMRID, and the rural waterworks records are held by the County of Lethbridge Rural Water Association Limited.

2.3.3.3 Water Well Information Database

The AEP Water Well Database was searched to view records of water wells within the site or within an approximate 2,000 m radius surrounding the site. The search identified no records of water wells located on- or off-site within a 2,000 m radius.

2.3.4 Alberta Government – Alberta Land Titles Spatial Information System

The SPIN2 website map for the site and surrounding area shows the pipeline rights-of-way (ROWs) on-site and in the surrounding area as well as the irrigation canal ROW for the SMRID canal adjacent to the west and north site boundaries, and as part of the historical SMRID canal alignment. The SPIN2 map also shows utility and drainage ROWs on the rural residences to the south of the northern portion of the site.

2.3.5 Historical Environmental Enforcement Search

The historical environmental enforcement search provides records taken against a company or individual related to AEP's legislation. The search was conducted for each of the current site owners as per the land title records listed in Section 2.2.1. The search resulted in no records for the individuals or companies listed.

2.4 Regional and Municipal Regulatory Information

This section describes the results of regional and municipal regulatory searches. Copies of the search results and correspondence are provided in Appendix C.

2.4.1 Lethbridge County

Tetra Tech requested a site inquiry with Lethbridge County for information on the site. The response provided information on development permits and indicated that there are no records of storage tanks, chemical storage, spills, fires or landfills. The letter also indicated that there is a notice of violation for Plan 801 0198, Block 2, Lot 1 (northern portion of the site) for a large amount of old metal, concrete pipe, construction material, and equipment storage, however, there was no additional information available in the record. It is noted that during the site visit, this area of the site was pasture land.

During the site visit, a small amount of old metal, equipment storage, and several barrels were observed on this property. While most of the barrels appeared empty, one had a small amount of what was observed to be an oily substance and some staining was also observed in the area of this barrel.

A copy of the letter from Lethbridge County is attached in Appendix C.

2.5 Land Forms and Geology

2.5.1 Topography

Surface topography can influence the direction of migration of contaminants at the soil surface. The local topography is the topography at the site, whereas regional topography is the overall expression of the surface in a given region. The local topography of the site was generally flat with overall surface drainage in a north-easterly direction. The track area of the site was also slightly higher than the surrounding land, and a low lying area was apparent in the central area of the south portion of the site where the former larger dugout was located. Regional topography in the area is generally flat to undulating, and slopes northerly towards the Oldman River valley.

2.5.2 Surficial and Bedrock Geology

The surficial geology in the area is characterized by moraine till deposits with sporadic lenses of gravel, sand, and silt (Shetsen 1981).

The stratigraphy of the Lethbridge area is generally comprised of 65 m to 70 m of surficial deposits overlying bedrock. Bedrock in the Lethbridge area consists of strata from the upper Oldman Formation and the lower Bearpaw Formation, both of the late Cretaceous Age (Tokarsky 1974). The bedrock has a relatively flat surface dipping slightly to the northwest and is locally encountered at about geodetic elevation 843 m. The bedrock strata consist of thin beds of predominantly weak mudstones, siltstones, and sandstones with occasional bentonite and coal sea

2.5.3 Hydrogeology

Groundwater has the potential to be of significance as a means of contaminant transport. Regional groundwater flow is the overall direction of groundwater flow in a given region. Groundwater in a local area within the region, may travel in a different direction from the regional flow, due to influence by local topography and/or subsurface soil conditions.

There are currently two dugouts located at the site. Historically, there was an additional larger dugout located on the central area of the southern portion of the site and the SMRID canal also formerly transected a portion of the west side of the site. Several other dugouts and low-lying areas are located on the surrounding properties. The Oldman River is located approximately 3.75 km northwest of the site. Regional groundwater flow is expected to be westerly toward the Oldman River. Local groundwater flow direction is also interpreted to be westerly. Perched groundwater tables are common and have been encountered in many areas of southern Alberta. The depth to these perched tables can vary from approximately 2 m below ground level to considerable depths within gravel, sand, and/or silt seams. The flow of these perched tables can differ from regional flow direction, or be relatively stagnant, depending on the geometry and the extent of the sand and/or silt seams.

It should be noted that topography, geologic materials, land development (including the irrigation canal), and soil disturbances can also cause localized variances in groundwater movement and pattern. Also, groundwater levels will fluctuate seasonally and in response to climatic conditions.

2.6 Previous Reports

No previous environmental reports were available to review for the site.

2.7 Other Information Sources

There were no other information sources reviewed for the site.

3.0 SITE VISIT

Jaymes Going of Tetra Tech visited the site on September 9, 2021. Full access to all areas of the site was granted, however, the private residences and buildings were not accessed. Weather conditions were favorable (i.e., no snow cover) and the site was walked over with visual observations made of adjacent properties from the site boundaries.

3.1 Building Details and Site Servicing

There are currently several buildings on the site including private residences and farm outbuildings such as garages and barns. While the site buildings were not inspected, the dates of construction occurred between 1960 and 2016 based on the aerial photograph review and information provided by Lethbridge County.

The following table describes the site servicing.

Table D: Site Servicing

Item	Present	Type	Comments
Water Supply	Yes	Potable	Supplied by Lethbridge County rural waterworks.
Storm Sewer	No	N/A	Overland surface drainage would follow the local topography.
Sanitary Sewer	No	Septic	Private residences utilize septic systems for sanitary sewer.
Other Storage	Yes	Small amount of miscellaneous equipment storage observed.	Storage at the time of the site visit consisted of a small amount of metal, equipment, and several barrels located on the central area of the southern portion of the site.
Pits	Yes	Dugouts	Two dugouts are currently located at the site.
Lagoons	No	N/A	No lagoons were observed on the site.

3.2 Special Attention Items

Some construction materials contain compounds that may be hazardous to building occupants or users of the site. The following table summarizes these special attention items; further background information on these materials is provided in Appendix D.

Table E: Special Attention Items

Item	Presence/ Potential	Comments
Asbestos	Moderate	Based on age of some of the buildings at the site (prior to 1980), there is a potential that the buildings may contain asbestos and/or lead.
Lead	Moderate	
Urea Formaldehyde Foam Insulation (UFFI)	Low	No indication of UFFI at the site was observed. If this type of insulation was used, the fugitive emissions were likely the most harmful within two years of installation.
Ozone-depleting Substances (ODS)	Low	The private residences at the site may contain items that contain ODS such as air conditioning units. These items should be maintained regularly and disposed of appropriately when no longer functioning or required.
Polychlorinated Biphenyls (PCBs)	Low	Pole mounted transformers were observed at the site in the vicinity of the private residences. These are owned and maintained by the utility company.
Radon	Moderate to High	There was no radon gas testing reported for the site; however, natural radon concentrations are considered moderate to high in Alberta. A radon test was not completed by Tetra Tech as part of this investigation. There were no anthropogenic sources of radon gas identified.

Table E: Special Attention Items

Item	Presence/ Potential	Comments
Methane	Moderate	There was no methane gas testing reported for the site. Based upon information collected during this investigation (i.e., aerial photograph review, site reconnaissance), there is evidence of deposits of buried organics at the site that could produce methane (former large dugout and irrigation canal). Refer to Section 3.3.5 regarding potential fill areas.
Electromagnetic (EM)	Low	No high voltage transmission lines or other infrastructure which could generate significant EMFs were observed. No EMF assessment was completed by Tetra Tech for the site.
Noise and Vibration	Low	There were no major sources of noise or vibration on or adjacent to the site during the site visit.

The above evaluation is based on building age and basic site observations. Intrusive investigation and sampling are not within the scope of a Phase I ESA.

3.3 Site Observations

This section describes observations made of the site during the site visit on September 9, 2021.

3.3.1 Surficial Stains

A small amount of surficial staining was observed on the soil where several barrels were stored on the central area of the southern portion of the site. It is noted that the private residences were not inspected and that the entire site was not walked over due to the size of the site.

3.3.2 Vegetation

Vegetation at the site was predominantly pasture grasses with domestic trees and shrubs throughout. There was no evidence of stressed vegetation at the site, however, a large number of weedy species were observed on the southern portion of the site.

3.3.3 Ponding of Water

There was no ponded water observed other than in the two dugouts at the site. Surface drainage would be overland and follow the surface topography.

3.3.4 Washouts and Erosion

There were no washouts or indications of erosion observed.

3.3.5 Fill Areas and Soil Conditions

There was no evidence of fill materials having been brought to the site; however, the former large dugout and the irrigation canal that formerly transected the western portion of the site would have been filled in. The potential for methane generation is described in Section 3.2.

Further information on soil conditions can be found in the geotechnical evaluation report completed at the site by Tetra Tech (Tetra Tech 2021).

3.3.6 Oil/Gas Wells and Pipelines

There were no well sites observed at the time of the site visit. Signage for the two high pressure gas lines were observed on the western and eastern boundaries of the site.

Refer to Section 2.3.2 for AER information.

3.3.7 Chemical Storage

There were no hazardous chemicals or large drums observed at the site other than the old barrels located on the central area of the southern portion of the site. The majority of the barrels appeared empty; however, one was noted to contain a small amount of an oil substance.

It is also expected that the private residences would contain small amounts of household janitorial type chemicals.

3.3.8 Transformers

There were pole-mounted electrical transformers observed in the vicinity of the private residences. Generally, pole-mounted transformers are owned and maintained by the utility companies.

3.3.9 Hydraulic Elevators and Hoists

There were no hydraulic elevators or hoists observed at the site visit, however, the private residences were not inspected.

3.3.10 Vent Pipes and Underground Storage Tanks (USTs)

There were no vent pipes or USTs identified during the site visit.

3.3.11 Above-Ground Storage Tanks and Drum Storage

Several old barrels were observed to be stored on the central area of the southern portion of the site.

No ASTs were observed during the site visit.

3.3.12 Waste Storage

No waste storage areas were observed at the site during the site visit with the exception of the old barrels and metal debris (pieces of an old grain bin).

3.3.13 General Housekeeping

The general housekeeping of the site was in good condition and no obvious evidence of negligent acts or illegal dumping were observed during the site visit.

3.4 Off-Site Observations

The following table summarizes the surrounding land use.

Table F: Surrounding Land Use

Direction	Zoning*	Observations	Tetra Tech Evaluation
North	Lethbridge Urban Fringe	Agricultural land	No obvious concerns which may cause environmental impairment to the site were identified.
East		Agricultural land and rural residences	
South		Agricultural land and rural residences	
West		SMRID canal and agricultural land	

*Land use obtained from Lethbridge County: [Lethbridge County - Online Maps \(lethcountycity.ca\)](https://lethcountycity.ca/online-maps)

The surrounding land is primarily agricultural. Key surrounding land use is indicated on Figure 2.

4.0 PERSONNEL INTERVIEWS

Tetra Tech interviewed individuals familiar with the site and surrounding properties. Interviews were conducted by telephone. The findings of the personnel interviews, which have been incorporated into this report, are in general agreement with the records review conducted for the site.

Table G: Interview Summary

Item	Description
Interviewer	Jaymes Going
Interviewee Position	Property owner
Company	N/A
Length of Involvement with Site	Greater than 25 years.
Information Provided	The owner provided details of the property history and current activities. These details have been incorporated within this report.

5.0 DISCUSSION AND CONCLUSIONS

5.1 General

In general terms, there are two distinct types of potential environmental risk to any property. The first type of risk is from potential contamination from on-site land use. This would include potential accidental spills or site practices that may contaminate the property directly. The second type of risk is from contamination caused by adjacent property owners, which might then be transported through the subsurface soils by groundwater, or in overland runoff onto the site.

5.2 Potential for Impairment from On-Site Source(s)

There was one on-site source that might have potential to cause environmental impairment to the site through the historical or current land use. This source is where the old barrels are currently located on the central area of the southern portion of the site.

It is also noted that the former gas well site and associated infrastructure may be an area of concern if residual contamination was left on site during reclamation activities in the early 2000s.

5.3 Potential for Impairment from Off-Site Source(s)

There were no off-site sources that might have a potential to cause environmental impairment to the site through historical and/or current land use.

6.0 FURTHER ACTION/RENDERING AN OPINION

Based on the present study, Tetra Tech recommends that no further environmental investigation is required at this time. However, at the time of site re-development or when the old barrels are removed, the surficial soil in the area should be assessed to determine if proper disposal is required.

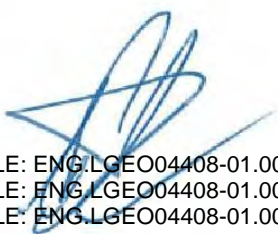
Tetra Tech recommends the following for consideration:

- Prior to extensive renovations or demolition, a hazardous building materials assessment should be undertaken.
- If buried debris or staining are encountered during future investigation or ground disturbance (i.e., near the former well site), a qualified environmental professional should be contacted.
- If soils containing organics are encountered during future investigation or ground disturbance, they should be removed from building footprints and not be reburied; a qualified environmental professional should be contacted.
- Any disturbance to surface waterbodies should be done in accordance with the Alberta Water Act.
- If encountered during future development, any water wells or septic systems should be appropriately decommissioned according to the relevant regulations.

7.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.



FILE: ENG.LGEO04408-01.002
FILE: ENG.LGEO04408-01.002
FILE: ENG.LGEO04408-01.002

Prepared by:
Jaymes Going, B.Sc., EP
Environmental Scientist
Environment & Water Practice
Direct Line: 403.308.4293
Jaymes.Going@tetrattech.com

/cee

FILE: ENG.LGEO04408-01.002
FILE: ENG.LGEO04408-01.002
FILE: ENG.LGEO04408-01.002

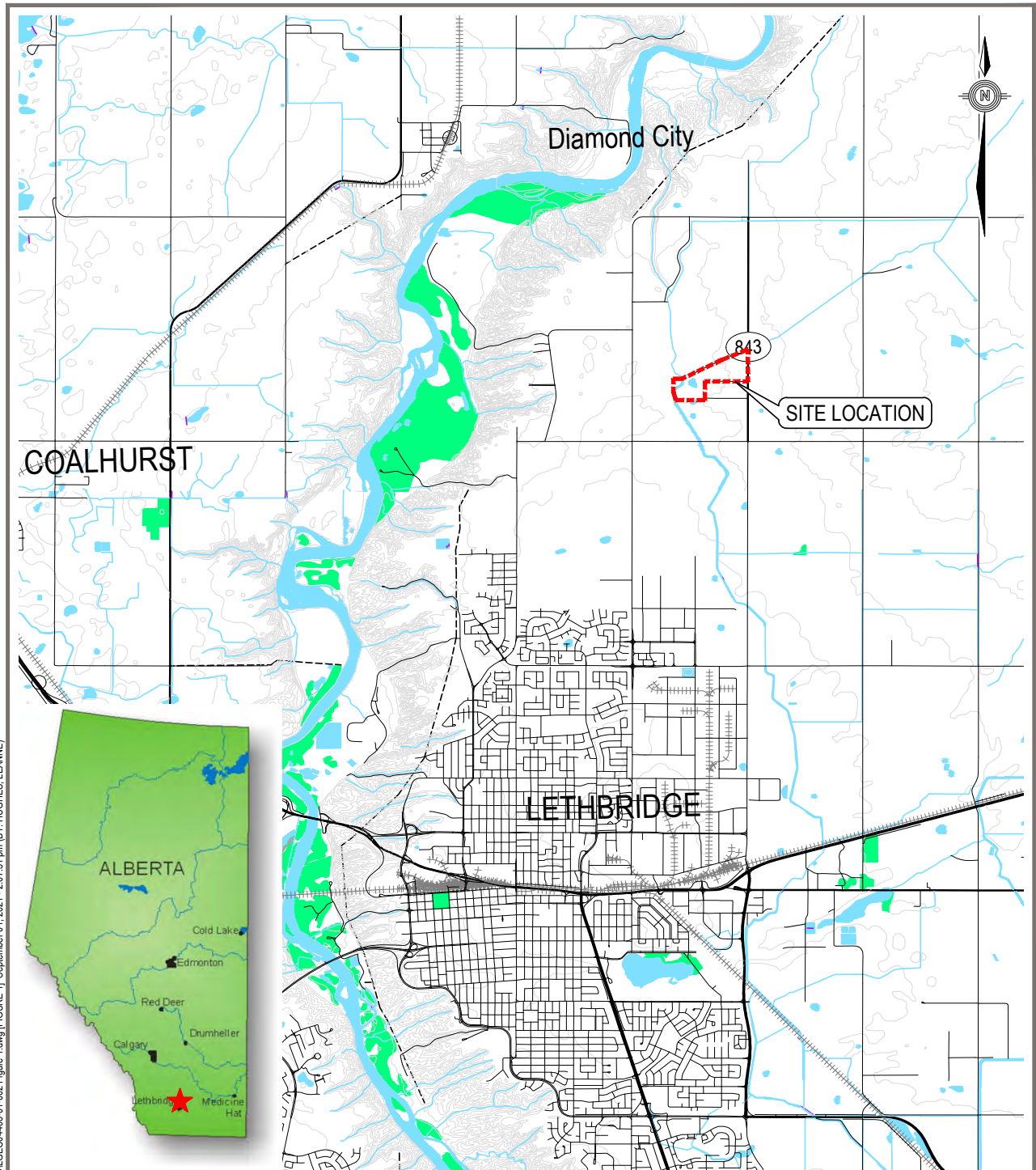
Reviewed by:
Henri Carriere, P.Eng., M.N.R.M.
Senior Project Engineer
Environment & Water Practice
Direct Line: 403.993.4176
Henri.Carriere@tetrattech.com

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FIGURES

- Figure 1 Site Location Plan
Figure 2 Detailed Site Plan Showing Surrounding Land Use



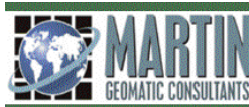
NOTES

DRAWING PROVIDED BY "© Department of Natural Resources Canada. All rights reserved."

0 2,500m

Scale: 1:75,000 @ 8.5"x11"

CLIENT



**PHASE I ENVIRONMENTAL ASSESSMENT
MacLAINE ACRES ASP, LETHBRIDGE COUNTY**

SITE LOCATION PLAN

PROJECT NO.
LGEO04408-01.002

DWN
LCH

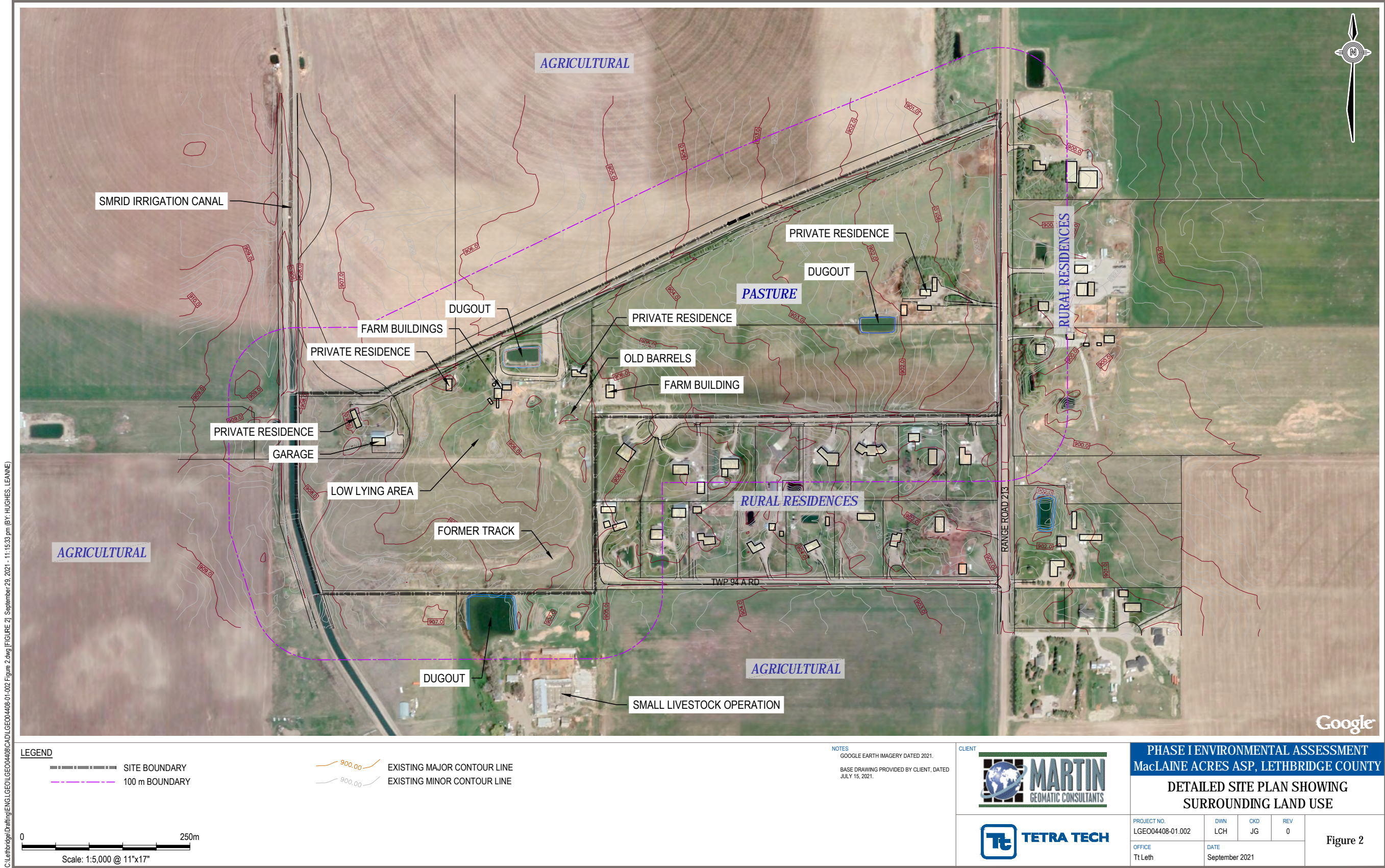
CKD
JG

REV
0

OFFICE
Tt Leth

DATE
August 2021

Figure 1



C:\Leithbridge\Drafting\ENG\LGE004408\CAD\LGE004408-01-002 Figure 2.dwg [FIGURE 2] September 29, 2021 - 11:15:33 pm (BY: HUGHES, LEANNE)

APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

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Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner

consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX B

SITE PHOTOGRAPHS



Photo 1: View of the southern portion of the site looking northeast from the southwest corner of the site.



Photo 2: View of the southern portion of the site looking southeast from the northwest corner of the site.



Photo 3: View of the southern portion of the site looking northwest from the southeast corner of the site.



Photo 4: View looking west at near the central portion of the site. A shallow drainage channel is visible in the centre of the photograph and the visible soil was placed to allow vehicle access.



Photo 5: View looking westerly at the central portion of the site. The drill truck was being used for a geotechnical evaluation for the site.



Photo 6: View of some miscellaneous debris including several 40-gallon drums located near the eastern boundary of the central portion of the site.



Photo 7: View of equipment storage and various buildings on the east-central portion of the site.



Photo 8: View looking easterly at the central portion of the site.



Photo 9: View of private residence located on the northwest portion of the site.



Photo 10: View looking easterly at the northern portion of the site.



Photo 11: View looking east at the fence line located on the northern portion of the site.



Photo 12: View looking west at the northern portion of the site from the east site boundary.



Photo 13: View of the adjacent land use to the northern portion of the site (rural residences).



Photo 14: View of adjacent land use to the west of the site. Irrigation canal followed by agricultural land.



Photo 15: View of adjacent land use to the south of the site. Rural farm buildings and agricultural/pastureland.



Photo 16: View of adjacent land use to the north. Agricultural crop land.

APPENDIX C

REGULATORY SEARCHES AND RESPONSES



LAND TITLE CERTIFICATE

S
LINC SHORT LEGAL TITLE NUMBER
0015 110 463 927LK;1;1 161 045 741

LEGAL DESCRIPTION
PLAN 927LK
BLOCK 1
LOT 1
EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME
AREA: 9.98 HECTARES (24.65 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE
ATS REFERENCE: 4;21;9;28;E

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 121 127 186

REGISTERED OWNER(S)				
REGISTRATION	DATE (DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
161 045 741	18/02/2016	TRANSFER OF LAND	\$600,000	\$600,000

OWNERS

1946291 ALBERTA LTD.
OF 94054 HWY 843
LETHBRIDGE
ALBERTA T1J 5R2
(DATA UPDATED BY: CHANGE OF ADDRESS 171243340)

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION		
NUMBER	DATE (D/M/Y)	PARTICULARS
8048GH	02/01/1952	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. AS TO PORTION OR PLAN:GL95 "16.5 FT. STRIP"

1648LO . 07/07/1972 CAVEAT

ENCUMBRANCES, LIENS & INTERESTS

PAGE 2

161 045 741

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

RE : EASEMENT
CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY
LIMITED.

851 074 023 08/05/1985 CAVEAT
RE : EASEMENT
CAVEATOR - THE BOARD OF DIRECTORS OF ST. MARY RIVER
IRRIGATION DISTRICT.
P.O. BOX 278, LETHBRIDGE
ALBERTA T1J3Y7
AGENT - F J BREWIN

111 123 556 19/05/2011 UTILITY RIGHT OF WAY
GRANTEE - ATCO GAS AND PIPELINES LTD.

161 045 742 18/02/2016 MORTGAGE
MORTGAGEE - SERVUS CREDIT UNION LTD.
151 KARL CLARK RD NW
EDMONTON
ALBERTA T6N1H5
ORIGINAL PRINCIPAL AMOUNT: \$450,000

161 045 743 18/02/2016 CAVEAT
RE : ASSIGNMENT OF RENTS AND LEASES
CAVEATOR - SERVUS CREDIT UNION LTD.
151 KARL CLARK RD NW
EDMONTON
ALBERTA T6N1H5
AGENT - SARAH A BAINBRIDGE

171 029 546 01/02/2017 WRIT
CREDITOR - FRIEDA SANFORD
1601-25 AVE NORTH
LETHBRIDGE
ALBERTA T1H4N8
DEBTOR - PATRICK WAGNER
RR 8, SITE 41, COMP 18
LETHBRIDGE
ALBERTA T1J4P4
AMOUNT: \$1,976 AND COSTS IF ANY
ACTION NUMBER: 1606 00837

TOTAL INSTRUMENTS: 007

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN
ACCURATE REPRODUCTION OF THE CERTIFICATE OF
TITLE REPRESENTED HEREIN THIS 2 DAY OF
SEPTEMBER, 2021 AT 12:04 P.M.

ORDER NUMBER: 42532508

CUSTOMER FILE NUMBER:



END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED
FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER,
SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM
INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION,
APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS
PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING
OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).



LAND TITLE CERTIFICATE

S
LINC SHORT LEGAL TITLE NUMBER
0019 482 926 927LK;1;2 161 154 313

LEGAL DESCRIPTION
PLAN 927LK
BLOCK 1
LOT 2
EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME
AREA: 8.1 HECTARES (20.02 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE
ATS REFERENCE: 4;21;9;28;E

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 121 127 186 +1

REGISTERED OWNER(S)				
REGISTRATION	DATE (DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
161 154 313	05/07/2016	TRANSFER OF LAND	\$405,000	\$405,000

OWNERS

KENNETH DALE SMITH
OF 5710-57 ST
TABER
ALBERTA T1G 1L1

ENCUMBRANCES, LIENS & INTERESTS		
REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
8048GH	02/01/1952	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED. AS TO PORTION OR PLAN:GL95 "16.5 FT STRIP"

1648LO . 07/07/1972 CAVEAT

ENCUMBRANCES, LIENS & INTERESTS

PAGE 2

161 154 313

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

RE : EASEMENT

CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY
LIMITED.

851 073 950 08/05/1985 CAVEAT

RE : EASEMENT

CAVEATOR - THE BOARD OF DIRECTORS OF ST. MARY RIVER
IRRIGATION DISTRICT.

P.O. BOX 278, LETHBRIDGE

ALBERTA T1J3Y7

AGENT - F J BREWIN

111 123 556 19/05/2011 UTILITY RIGHT OF WAY

GRANTEE - ATCO GAS AND PIPELINES LTD.

TOTAL INSTRUMENTS: 004

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN
ACCURATE REPRODUCTION OF THE CERTIFICATE OF
TITLE REPRESENTED HEREIN THIS 2 DAY OF
SEPTEMBER, 2021 AT 12:04 P.M.

ORDER NUMBER: 42532508

CUSTOMER FILE NUMBER:



END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED
FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER,
SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM
INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION,
APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS
PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING
OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).



LAND TITLE CERTIFICATE

S
LINC SHORT LEGAL TITLE NUMBER
0016 608 770 8010198;2;1 911 153 848

LEGAL DESCRIPTION
PLAN 8010198
BLOCK 2
LOT 1
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 14.1 HECTARES (34.84 ACRES) MORE OR LESS

ESTATE: FEE SIMPLE
ATS REFERENCE: 4;21;9;28

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 861 107 528

REGISTERED OWNER(S)				
REGISTRATION	DATE (DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
911 153 848	16/07/1991	TRANSFER OF LAND	\$45,000	SEE INSTRUMENT

OWNERS

RICHARD MICHAEL ALDOFF

AND

CAROL ANN ALDOFF

BOTH OF:

S S 1-2-49

LETHBRIDGE

ALBERTA T1J 4B3

AS JOINT TENANTS

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION		
NUMBER	DATE (D/M/Y)	PARTICULARS
741 021 660	08/03/1974	UTILITY RIGHT OF WAY GRANTEE - FORTISALBERTA INC. 320 - 17 AVENUE S.W.

ENCUMBRANCES, LIENS & INTERESTS

PAGE 2

911 153 848

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

CALGARY

ALBERTA T2S2Y1

"30 FT STRIP"

(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 001298059)

(DATA UPDATED BY: CHANGE OF NAME 051006321)

761 133 668 29/10/1976 CAVEAT

CAVEATOR - CONOCOPHILLIPS CANADA OPERATIONS LTD.

P.O. BOX 4365, POSTAL STATION C

CALGARY

ALBERTA T2T5N2

AGENT - KATHY M TROFIN

(DATA UPDATED BY: CHANGE OF ADDRESS 031242905)

(DATA UPDATED BY: TRANSFER OF CAVEAT

091085519)

(DATA UPDATED BY: TRANSFER OF CAVEAT

091210804)

791 020 979 09/02/1979 UTILITY RIGHT OF WAY

GRANTEE - CONOCOPHILLIPS CANADA OPERATIONS LTD.

"SW 1/4"

(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 091205485)

791 020 980 09/02/1979 UTILITY RIGHT OF WAY

GRANTEE - CONOCOPHILLIPS CANADA OPERATIONS LTD.

"SW 1/4 OF SEC 28-9-21-4"

(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 091205451)

791 020 981 09/02/1979 UTILITY RIGHT OF WAY

GRANTEE - CONOCOPHILLIPS CANADA OPERATIONS LTD.

"SW 1/4 SEC 28-9-21-4"

(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 091205485)

971 093 143 05/04/1997 CAVEAT

RE : EASEMENT

CAVEATOR - THE BOARD OF DIRECTORS OF ST. MARY RIVER
IRRIGATION DISTRICT.

P.O. BOX 278, LETHBRIDGE

ALBERTA T1J3Y7

991 292 262 07/10/1999 MORTGAGE

MORTGAGEE - ALBERTA TREASURY BRANCHES.

601 MAYOR MAGRATH DR.S

LETHBRIDGE

ALBERTA

ENCUMBRANCES, LIENS & INTERESTS

PAGE 3

911 153 848

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

ORIGINAL PRINCIPAL AMOUNT: \$55,000

001 225 359 12/08/2000 AMENDING AGREEMENT

AMOUNT: \$77,300

AFFECTS INSTRUMENT: 991292262

021 035 034 29/01/2002 UTILITY RIGHT OF WAY

GRANTEE - COUNTY OF LETHBRIDGE RURAL WATER
ASSOCIATION LIMITED.

021 365 728 18/10/2002 CAVEAT

RE : OPTION TO PURCHASE

CAVEATOR - ST MARY RIVER IRRIGATION DISTRICT.

P.O. BOX 278

LETHBRIDGE

ALBERTA T1J3Y7

111 222 936 31/08/2011 UTILITY RIGHT OF WAY

GRANTEE - ATCO GAS AND PIPELINES LTD.

TOTAL INSTRUMENTS: 011

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN
ACCURATE REPRODUCTION OF THE CERTIFICATE OF
TITLE REPRESENTED HEREIN THIS 2 DAY OF
SEPTEMBER, 2021 AT 12:04 P.M.

ORDER NUMBER: 42532508

CUSTOMER FILE NUMBER:



END OF CERTIFICATE

THIS ELECTRONICALLY TRANSMITTED LAND TITLES PRODUCT IS INTENDED
FOR THE SOLE USE OF THE ORIGINAL PURCHASER, AND NONE OTHER,
SUBJECT TO WHAT IS SET OUT IN THE PARAGRAPH BELOW.

THE ABOVE PROVISIONS DO NOT PROHIBIT THE ORIGINAL PURCHASER FROM
INCLUDING THIS UNMODIFIED PRODUCT IN ANY REPORT, OPINION,
APPRAISAL OR OTHER ADVICE PREPARED BY THE ORIGINAL PURCHASER AS
PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING
OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S).



LAND TITLE CERTIFICATE

S
LINC SHORT LEGAL TITLE NUMBER
0031 401 425 4;21;9;28;NW 091 049 136

LEGAL DESCRIPTION

MERIDIAN 4 RANGE 21 TOWNSHIP 9
SECTION 28

THAT PORTION OF THE SOUTHERLY 313 FEET IN PERPENDICULAR WIDTH THROUGHOUT OF
THE NORTH WEST QUARTER WHICH LIES BETWEEN THE EAST LIMIT OF CANAL RIGHT OF WAY
ON PLAN 0510395 AND THE EAST LIMIT OF CANAL RIGHT OF WAY ON PLAN IRR55
EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME

ESTATE: FEE SIMPLE

MUNICIPALITY: LETHBRIDGE COUNTY

REFERENCE NUMBER: 061 010 978

REGISTERED OWNER(S)				
REGISTRATION	DATE (DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
091 049 136	23/02/2009	TRANSFER OF LAND	\$345,000	\$345,000

OWNERS

RYAN GARRET VAN EEDEN PETERSMAN

AND

KAREN VIRGINIA VAN EEDEN PETERSMAN

BOTH OF:

R.R. 8, SITE 41, COMP 15

LETHBRIDGE

ALBERTA T1J 4P4

AS JOINT TENANTS

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION	DATE (D/M/Y)	PARTICULARS
NUMBER		

7586LJ	03/11/1972	CAVEAT
--------	------------	--------

ENCUMBRANCES, LIENS & INTERESTS

PAGE 2

091 049 136

REGISTRATION

NUMBER DATE (D/M/Y) PARTICULARS

CAVEATOR - CANADIAN WESTERN NATURAL GAS COMPANY
LIMITED.

731 064 400 22/10/1973 UTILITY RIGHT OF WAY
GRANTEE - FORTISALBERTA INC.
320 - 17 AVENUE S.W.
CALGARY
ALBERTA T2S2Y1
"PORTION DESCRIBED"
(DATA UPDATED BY: TRANSFER OF UTILITY RIGHT
OF WAY 001299373)
(DATA UPDATED BY: CHANGE OF NAME 051006146)

761 094 355 26/07/1976 IRRIGATION ORDER/NOTICE
THIS PROPERTY IS INCLUDED IN THE ST. MARY RIVER
IRRIGATION DISTRICT

911 208 327 17/09/1991 CAVEAT
RE : EASEMENT
CAVEATOR - THE BOARD OF DIRECTORS OF THE ST. MARY
RIVER IRRIGATION DISTRICT
BOX 278
LETHBRIDGE
ALBERTA J1J3Y7

001 070 445 15/03/2000 EASEMENT
OVER AND FOR BENEFIT OF: (SEE INSTRUMENT)

TOTAL INSTRUMENTS: 005

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN
ACCURATE REPRODUCTION OF THE CERTIFICATE OF
TITLE REPRESENTED HEREIN THIS 2 DAY OF
SEPTEMBER, 2021 AT 12:04 P.M.

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PART OF THE ORIGINAL PURCHASER APPLYING PROFESSIONAL, CONSULTING
OR TECHNICAL EXPERTISE FOR THE BENEFIT OF CLIENT(S) .



A Division of the Safety Codes Council

September 7, 2021

Ms. Sophie Fitzowich
Tetra Tech
112 Bay View Dr SW
Calgary AB T2V 3N8

EMAIL: sophie.fitzowich@tetrattech.com

Re: ASCA Storage Tank Search – Your File No. 704-ENGO04406-01

Dear Ms. Fitzowich,

As per your search request dated September 7, 2021, Alberta Safety Codes Authority (ASCA) has searched the storage tank database for existing and former installations of storage tank systems, as defined by the Fire Code, including those known to be inside structures at the following addresses:

1. Lot 1, Block 1, Plan 927LK, Section 28, Township 009, Range 21, Meridian 4, Lethbridge County AB
2. Lot 2, Block 1, Plan 927LK, Section 28, Township 009, Range 21, Meridian 4, Lethbridge County AB
3. Lot 1, Block 2, Plan 8010198, Section 28, Township 009, Range 21, Meridian 4, Lethbridge County AB
4. NW-28-009-21-4, Lethbridge County AB

The search of the storage tank database determined no records were available for the addresses requested.

The Freedom of Information and Protection of Privacy Act governs the information provided. Please note that the database is **not** complete. The main limitation of the database is that it only includes information reported through registration and permitting or a survey of abandoned sites completed in 1992 and should not be considered a comprehensive inventory of all past or present storage tank sites. ASCA's storage tank systems database is solely maintained based on information provided by owners and or operators of storage tank systems; therefore, the database may not reflect information related to all existing or former storage tank systems in Alberta. Further information on storage tank systems or investigations involving a spill/release or contamination may be filed with the local fire service or Alberta Environment.

Regards,

ASCA Associate
ascatanks@safetycodes.ab.ca

MacLaine ASP



Tuesday, August 31, 2021

1:9,825
0 115 230 460 m





Well Information

100 / 11-28-009-21 W4 / 0

HUSKY OIL OPERATIONS LIMITED | 100 / 11-28-009-21 W4 / 0

Government Well Data Current To August 4, 2021

License #:	0056743	License Date:	January 22, 1976
Well Name:	HUSKY ETAL LETH. 11-28-9-21		
License Status:	RecCertified	License Status Date:	June 25, 2002
Within:	11-28-009-21 W4M	H2S (%):	
Spud Date:	January 24, 1976	Final Drill Date:	February 3, 1976
Status:	GAS ABD	Abandoned Date:	September 12, 1991
Surface:		Downhole:	
Offsets:	S 762.3 E 638.9	Offsets:	S 762.3 E 638.9
Latitude:	49.764067	Latitude:	49.764067
Longitude:	-112.792240	Longitude:	-112.792240
Ground Elevation:	908.9 m 2982 '	Total Depth:	1319.80 m 4330 '
Operator:	n/a		



Pipeline Information

HUSKY OIL OPERATIONS LIMITED | AB00012273 - 2

Government Pipeline Data Current to August 6, 2021

Permit Date:		License Date:	October 10, 1991
From Location:	11-28-9-21 W4M WE	To Location:	9-21-9-21 W4M RS
Length:	2.24 kms 1.4 mi	Status:	A
Substance:	NG	H₂S:	0 mol/kmol 0 ppm
Outside Diameter:	88.9 mm 3.5 "	Wall Thickness:	3.18 mm 0.13 "
Material:	S	Type:	5LX
Grade:	X42	Max Operating Pressure:	0 kPa 0 psi
Joints:	W	Internal Coating:	U
Stress Level:	0 %	Environment:	
Original Permit Date:		Construction Date:	
Original License/Line No:	12273 - 2	NEB Registration:	
Last Occurrence Year:	1977	Abacus No:	85054



Pipeline Information

ATCO GAS AND PIPELINES LTD. | AB00002185 - 1

Government Pipeline Data Current to August 6, 2021

Permit Date:	April 30, 2008	License Date:	March 12, 2010
From Location:	16-28-9-21 W4M PL	To Location:	9-16-9-21 W4M PL
Length:	3.81 kms 2.38 mi	Status:	O
Substance:	NG	H₂S:	0 mol/kmol 0 ppm
Outside Diameter:	273.1 mm 10.75 "	Wall Thickness:	6.4 mm 0.25 "
Material:	S	Type:	5L
Grade:	X42	Max Operating Pressure:	2380 kPa 345 psi
Joints:	W	Internal Coating:	U
Stress Level:	18 %	Environment:	
Original Permit Date:		Construction Date:	
Original License/Line No:	2185 - 1	NEB Registration:	
Last Occurrence Year:	1910	Abacus No:	85013



Low Pressure Pipeline Information

NATURAL GAS CO-OPERATIVE CONTACT INFORMATION

Data Current To January 1, 2020

Name:	Rocky Gas Co-op Ltd.	
Address:	Box 697 Rocky Mtn. House, T4T 1A5	
Phone #:	(403) 845-2766	Alternate Phone #:
Website:	http://www.rockygas.ca	



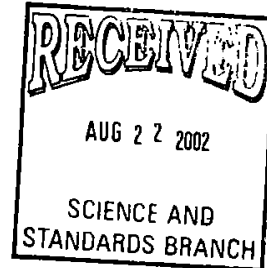
Regional Services
Southern Region

2nd Floor, Provincial Building
200 - 5th Avenue South
LETHBRIDGE, Alberta
T1J 4L1

Telephone: (403) 382-4253
Fax: (403) 382-4428

7 August 2002

Husky Oil Operations Ltd.
707 - 8th Avenue S.W.
Box 6525, Station D
CALGARY, Alberta T2P 3G7




Dear Sir or Madam:

RE: Husky et al Leth 11-28-9-21 well
N Sec. 28 Tp. 009 Rge. 21 W4M
File No.: S-03583

An inquiry was held on this location and enclosed for your records is a copy of the Reclamation Certificate.

If you have any concerns, please contact me at (403) 382-4253.

Sincerely


for Sherry Hazelaar
Conservation and Reclamation Inspector

cc: Richard Henry Boulton and Dorine M. Boulton (NW)
Ronald Olshaski (NW)
Scott Boulton (NE)



Environmental Service

4th Floor, 9820-106th Street
Edmonton, Alberta
Canada T5K 2J6

Telephone (780) 427-5883
Fax (780) 422-4192

RECLAMATION CERTIFICATE NO. 00184781-00-00
EUB LICENSE NO. 0056743

This reclamation certificate is issued pursuant to section 123 of the Environmental Protection and Enhancement Act, following an inquiry on

June 25, 2002 (Date)

This certifies that the surface of the land held by Husky Oil Operations Limited within N Sec. 28 Tp. 009 Rge. 21 W4M

in connection with or incidental to HUSKY ET AL LETH 11-28-9-21 WELL, as shown outlined in yellow on the attached plan(s), complies with the conservation and reclamation requirements of Part 5 of the Act.

Issued this 25 day of June, 2002

S. Nazelaan
Inspector(s)

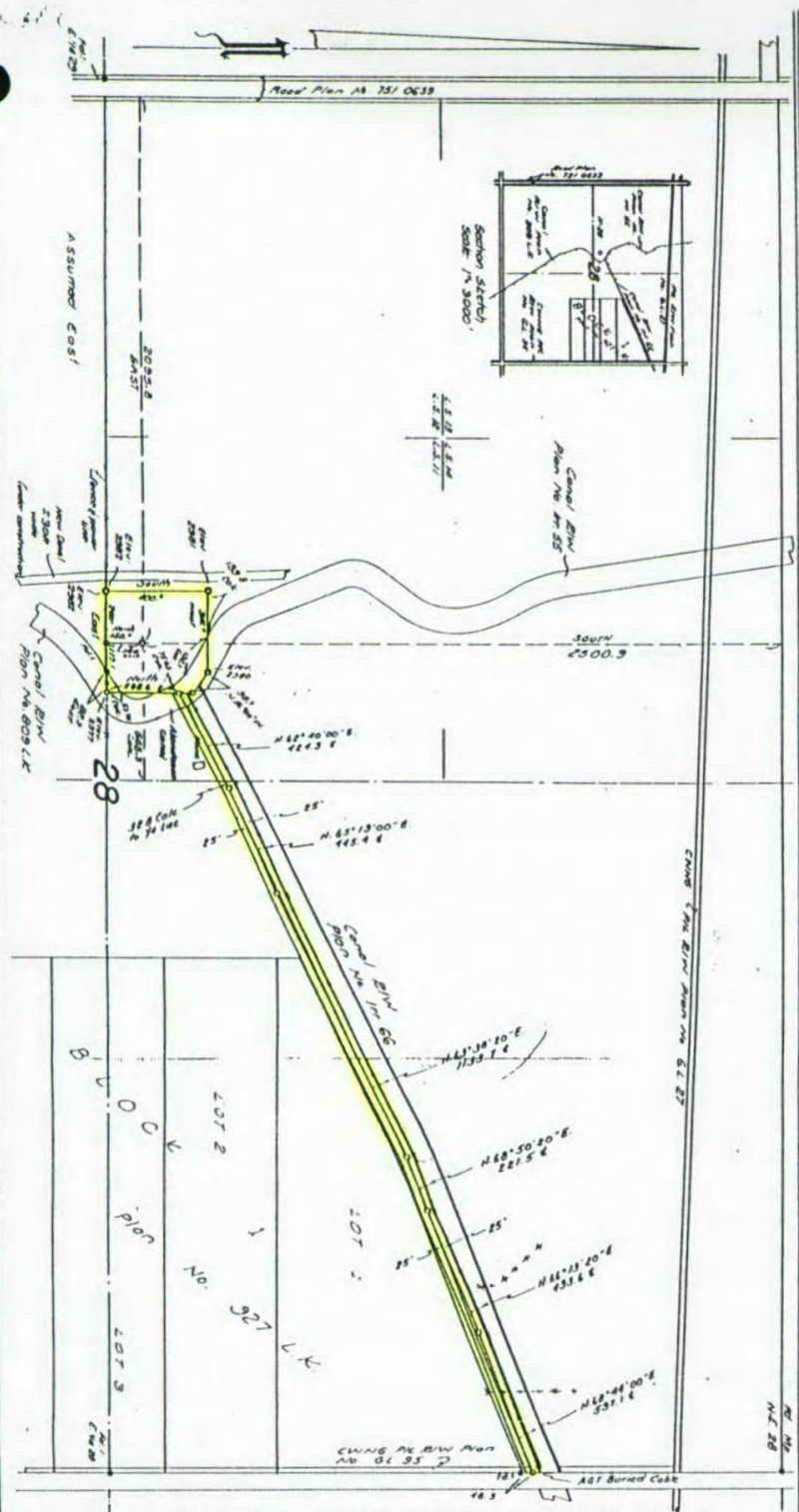
Sherry Hazelaar
382-4253

Operator/Agent:

Husky Oil Operations Limited
BOX 6525 STN D 707 8 AVE SW
Calgary, Alberta
T2P 3G7

Section 84 of the Environmental Protection and Enhancement Act may provide a right of appeal against this decision to the Chair, Environmental Appeal Board. There may be a strict time limit for filing such an appeal. For further information contact the Board Secretary of the Environmental Appeal Board at 3rd Floor, Peace Hills Trust Tower, 10011 - 109 Street, Edmonton, Alberta T5J 3S8, telephone (780)427-6207, fax (780)427-4693.

TERM OR CONDITION ATTACHED _____ YES _____ NO



BEST COPY AVAILABLE

CANHUNTER PCP LETH 11-28-9-21

Well Site and Access Road


L.S. 11 Sec. 28 Tp. 9 Rge. 21 W. 4 M.

I certify that the survey represented by this plan is correct to the best of my knowledge and was completed on 11-28-9-21 A.D. 1976

ELEVATION: 2982 Ground

CO-ORDS. 2500.3 South of North Boundary Sec 28 2095.8 East of West Boundary

Government of Alberta Home | Contact Government | Ministries | Using This Site

Alberta Energy Regulator

Alberta Environment and Parks

Authorization ViewerTraditional Agriculture Registration ViewerPublic Notices ViewerHelp

Authorization Viewer - Search Results

The Search Used the Following Values:

Legal Land Location:28-009-21-W4

Act / Document Type:Water Act, EPEA

Show Inactive Authorizations: Yes











The resulting Authorizations based on the search criteria will be displayed below. A  will appear next to the Authorization when documentation is available for viewing or downloading. Please click [Viewer Help](#) if you encounter problems viewing the Authorization document.








Clear & Return

27 Result(s)

	Document 00016373-00-00 ST. MARY RIVER I.D. PESTICIDE SERVICE, LETHBRIDGE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00016373-01-00 ST. MARY RIVER ID PESTICIDE SERVICE LETHBRIDGE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Registration is currently renewed.
	Document 00016373-02-00 ST. MARY RIVER ID PESTICIDE SERVICE LETHBRIDGE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Registration is currently renewed.
	Document 00016373-03-00 ST. MARY RIVER ID PESTICIDE SERVICE LETHBRIDGE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Registration is currently issued as of Mar. 22, 2016 and expires on Mar. 31, 2025.
	Document 00016376-00-00 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00016376-00-01 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00016376-00-02 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.

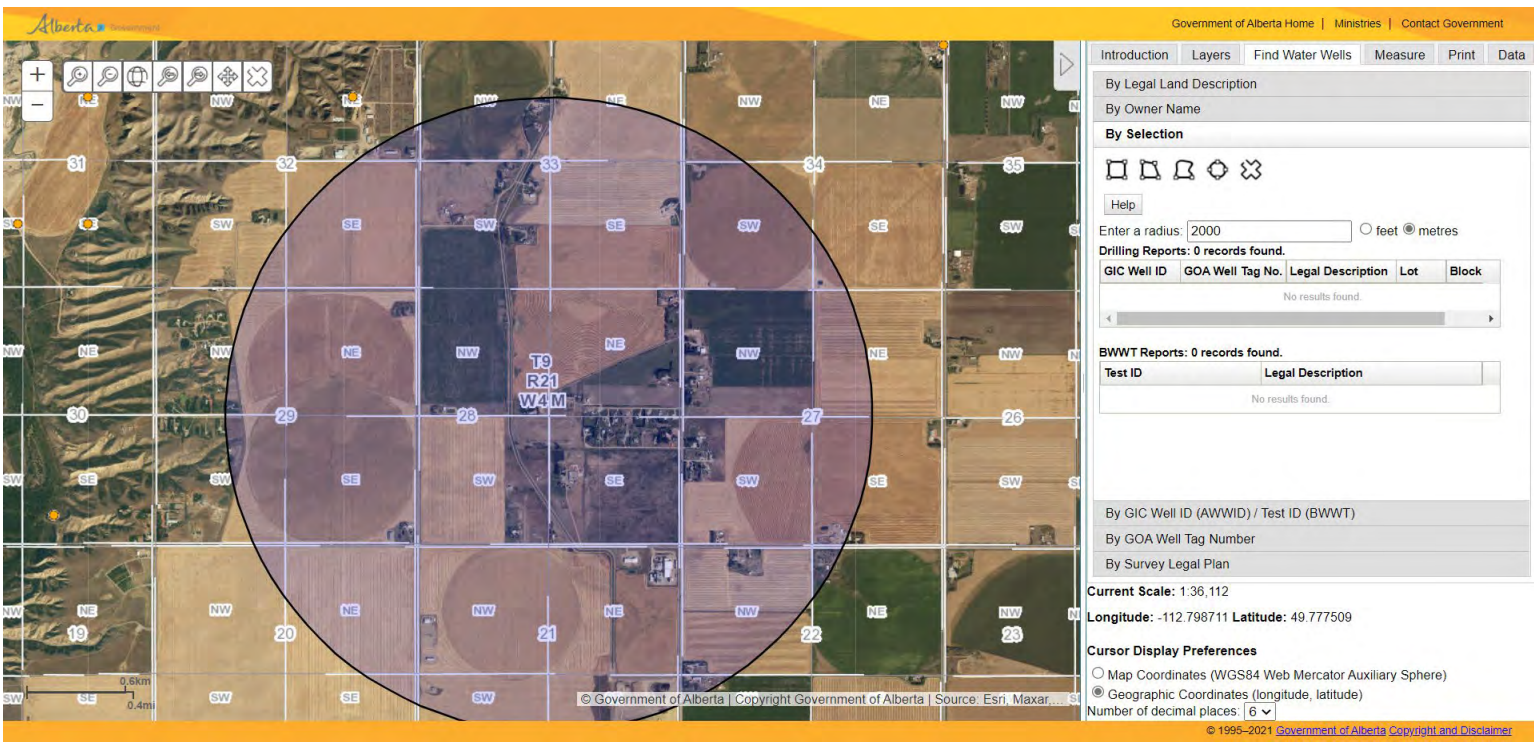
Page 289 of 393

	Document 00016376-00-04 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00016376-01-00 ST. MARY RIVER I.D. PESTICIDE SPECIAL USE, LETHBRIDGE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00016376-01-01 ST. MARY RIVER IRRIGATION DISTRICT, PEST SPECIAL, LETHBRIDGE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00016376-02-00 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00016376-02-01 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE - SPRAY WITHIN 30 METRES OF RESERVOIRS is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently expired.
	Document 00016376-03-00 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00016376-03-01 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE - USE OF ESCORT is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently expired.
	Document 00016376-03-02 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE - USE OF MAGNACIDE H is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently expired.
	Document 00016376-03-03 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE - EXTENSION is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently expired.
	Document 00016376-04-00 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00016376-05-00 ST. MARY RIVER IRRIGATION DISTRICT PESTICIDE SPECIAL USE is held by St. Mary River Irrigation District, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently issued as of May. 13, 2020 and expires on Mar. 31, 2030.

	Document 00143241-00-00 COUNTY OF LETHBRIDGE RURAL WATERWORKS SYSTEM is held by County of Lethbridge Rural Water Association Limited, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00143241-00-01 COUNTY OF LETHBRIDGE RURAL WATERWORKS SYSTEM - PHASE 2 is held by County of Lethbridge Rural Water Association Limited, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Approval is currently renewed.
	Document 00143241-00-02 COUNTY OF LETHBRIDGE RURAL WATERWORKS SYSTEM - LEGISLATIVE CHANGES is held by County of Lethbridge Rural Water Association Limited, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Registration is currently renewed.
	Document 00143241-01-00 COUNTY OF LETHBRIDGE RURAL WATERWORKS SYSTEM - CODE OF PRACTICE is held by County of Lethbridge Rural Water Association Limited, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Registration is currently issued as of Jan. 01, 2006 and does not expire.
	Document 00143241-01-01 COUNTY OF LETHBRIDGE RURAL WATERWORKS SYSTEM - ELECTRONIC REPORTING is held by County of Lethbridge Rural Water Association Limited, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Registration is currently issued as of May. 07, 2012 and does not expire.
	Document 00143241-01-02 COUNTY OF LETHBRIDGE RURAL WATERWORKS SYSTEM - REVISED LEAD MAC NOTICE is held by County of Lethbridge Rural Water Association Limited, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Registration is currently issued as of Feb. 14, 2020 and does not expire.
	Document 00184781-00-00 HUSKY ET AL LETH 11-28-9-21 WELL is held by Husky Oil Operations Limited, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Reclamation Certificate is currently issued as of Jun. 25, 2002 and does not expire.
	Document 00192218-00-00 COUNTY OF LETHBRIDGE RURAL WATERWORKS/MUNICIPAL - TRANSMISSION MAIN EXTENSION, PHASE 2 is held by County of Lethbridge Rural Water Association Limited, under the provisions of the <i>Environmental Protection & Enhancement Act</i> . This Authorization is currently issued as of Jan. 03, 2003 and does not expire.

Clear & Return

Comments regarding the Authorization Viewer page may be directed to the Regulatory Approvals Centre
 RAC.Environment@gov.ab.ca.





#100, 905 - 4th Avenue South, Lethbridge, Alberta T1J 4E4

September 8, 2021

Tetra Tech Environment and Water Practice

Attn: Jaymes Going

442 – 10 Street North

Lethbridge, AB T1H 2C7

Re: Environmental information regarding Portions of NW and NE-28-09-21-W4M

Legal Descriptions: Plan 927LK Block 1 Lot 1; Plan 927LK Block 1 Lot 2; Plan 8010198 Block 2 Lot 1; and Portion of NW-28-09-21-W4M

The following information is the County's response to your questions regarding the above-mentioned properties.

1. Below is a summary of the records the County holds that might potentially be of environmental concern on the above-noted properties.
 - a. Plan 927LK Block 1 Lot 1 and Plan 927LK Block 1 Lot 2
 - i. Both properties have a signed agreement for backslope dated September 26, 1988 in their respective land files. Both simply note that backsloping is required, approximately 1m.
 - b. Plan 8010198 Block 2 Lot 1
 - i. There is a Notice of Violation dated September 25, 2000, in the land file for this property stating that there was a large amount of old metals, concrete pipe, construction material, and equipment being stored on the property. There are no additional notes in the file to indicate if and/or when this matter was resolved.
2. Below is a summary of the developments that have been approved for each of the above-noted properties.
 - a. Plan 927LK Block 1 Lot 1 – nothing in the file.
 - b. Plan 927LK Block 1 Lot 2
 - i. Development Permit 2016-137 – issued for a Farm equipment storage building (1500 sq. ft.), which contains a bathroom.

.../2



- c. Plan 8010198 Block 2 Lot 1
 - i. Development Permit 88-112 – issued for a second mobile home for a hired hand. The notes in the application state there is a barn for horses on the property, a primary residence, and two sheds.
- d. Portion of NW-28-09-21-W4M
 - i. Development Permit 2006-119 – issued for a 40 ft. by 60 ft. Shop, it appears from the application that a small landscaping business may have been run out of this shop/property but there is no Development Permit application for this Home Occupation business in the land file.
 - ii. Development Permit 2007-138 – issued for a residence with attached garage

- 3. Apart from the above-noted documentation the County does not have any records of underground storage tanks, chemical storage, spills, fires, or landfills, for any of the above-noted properties. If a fire or spill has ever occurred on any of these properties they are located in the response area of the City of Lethbridge Fire Department.

If you have any other questions please contact Sarah Mitchell, Development Officer at 403-328-5525.

Regards,

Sarah Mitchell
Development Officer

APPENDIX D

SPECIAL ATTENTION ITEMS – BACKGROUND INFORMATION

D1 Asbestos

Construction materials used prior to the late 1970s were known to possibly contain asbestos (i.e., ceiling or floor tiles, drywall, and insulation for the walls, boiler, piping, and/or ducts). Asbestos is considered a health hazard if it is friable, airborne, and exposed to humans.

D2 Polychlorinated Biphenyls (PCBs)

The federal Environmental Contaminants Act (1976) has restricted the use and controlled the phase out of polychlorinated biphenyls (PCBs) in Canada. Additionally, the storage and disposal of PCBs is regulated. The Act prohibited the use of PCBs in electrical equipment installed after July 1, 1980. PCBs are commonly found in light ballasts, electrical transformers (pole or ground mounted) and various other types of electrical equipment (i.e., rectifiers) dating back to the early 1980s or earlier.

PCB containing light ballasts/electrical equipment should be disposed of appropriately at the end of their useful life.

D3 Ozone-Depleting Substances (ODS)

In December of 1998, The Government of Canada enacted the Ozone-depleting Substances (ODS) Regulations, which governs the use, handling and release of ODS. ODS may include, but are not limited to, chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl bromide. ODS are usually associated with operations such as: fire extinguishing systems; foam manufacturing; fumigant and pesticide application; prescription metered dose inhalers; refrigeration and air conditioning units; and solvent cleaning and degreasing facilities. ODS are not a health issue for people in the building but are more a maintenance issue to limit or prevent their release. This is accomplished by regular maintenance by trained personnel.

D4 Lead

Lead can be associated with paints, plumbing solder, pipes, and other products such as wall shielding in x-ray rooms. Lead-based paint was withdrawn from the market in the late 1970s. If present, lead-based paint is typically concealed beneath multiple layers of paint applied over the years during renovations. Lead-based paint and plumbing equipment are not a direct health risk when concealed (sealed behind layers of non-lead paint) and/or in good condition. It should, however, be considered when planning future renovations, when particles from lead-based paint could be released and/or ingested in the course of the work.

D5 Urea Formaldehyde Foam Insulation (UFFI)

Insulation materials used during the 1970s and 1980s were known to possibly contain urea formaldehyde foam insulation (UFFI). UFFI was banned in 1980 under the federal Hazardous Products Act.

D6 Radon

Radon gas is a product of the decay series that begins with uranium. Radon is produced directly from radium that is often found in bedrock that contains black shale and/or granite. The gas and its by-products occur naturally everywhere, in soil, water, and air, but usually in concentrations too low to pose a threat. Radon gas can migrate through the ground and enter buildings through porous concrete or fractures. Certain building materials including concrete, and gyprock can also release radon. Natural radon concentrations are low in Alberta and radon gas concentrations are usually well below target limits set for Canada. Potential anthropogenic sources of radon gas should be considered.

D7 Methane

Methane gas is a product of anaerobic decomposition of organic material (e.g., buried fill high in organic material). Methane is also associated with natural gas deposits. Methane gas can migrate through the ground and enter buildings through porous concrete, joints or fractures. Methane presents a potential explosive hazard when it accumulates to concentrations greater than the lower explosive limit (LEL) in the presence of an ignition source.

APPENDIX 6

Septic Feasibility Assessment



October 8, 2021

ISSUED FOR USE
FILE: ENG.LGEO04408-01.003

Rick Aldoff
255 – 31 Street North
Lethbridge, AB T1H 3Z4

Subject: Preliminary Septic Disposal Field Feasibility Assessment
Proposed MacLaine Acres Subdivision
Section 28 Range 9 Township 21 West of the 4th Meridian
Lethbridge County, Alberta

1.0 INTRODUCTION

Mr. Rick Aldoff, care of Martin Geomatic Consultants Ltd. (MGCL), retained Tetra Tech Canada Inc. (Tetra Tech) to conduct a septic disposal field feasibility assessment (SDFFA) within three (3) adjoining property parcels located within the Lethbridge County, legally described as Plans 927 LK, Block 1, Lots 1 and 2; as well as Plan 801 0198 Block 2 Lot 1 (hereinafter referred to as the site). The site is located within portions of legal land descriptions 6, 7, 9, 10, and 11 of 28-009-21 W4M, north of Lethbridge, Alberta.

The objective of this assessment was to determine the soil textures and restricting layers across the site in order to assess the feasibility for soil-based septic disposal fields (also known as a sewage treatment system). The SDFFA was completed in general accordance with the Alberta Private Sewage Systems Standard of Practice (APSSoP), Third Edition, December 2015, published by the Safety Codes Council; however, as noted in (Part 3 of Section 7.1.1.3) a hydrogeological study may be required if on-site sewage systems exceeding 9 m³ per day design capacity, which is beyond the work scope of this assessment.

Authorization to proceed with the SDFFA was provided by Mr. Rick Aldoff via a signed Services Agreement with Tetra Tech on August 24, 2021.

2.0 PROJECT SCOPE OF WORK

The scope of work included a field assessment, desktop review, and reporting, which are detailed in the following subsections.

2.1 Field Assessment

The field assessment portion of the project was completed by Mr. Jamie LaMontagne, EP, of Tetra Tech, on September 9, 2021. The field assessment included the following:

- Completion of public above-ground and underground utility locates by Alberta One-Call, prior to the excavation of testpits. It was also identified that a potential abandoned ATCO line may be in the area; therefore, private locates were also completed by LandScan Locating Ltd. on September 7, 2021.
- Preparation of a site-specific safe work form prior to field assessment and a pre-job safety meeting was undertaken prior to the excavation of testpits.
- Excavation of 12 testpits at select locations on the site, to a maximum depth of 3.0 metres below ground surface (mbgs), by S & A Ditching Ltd. (SADL) of Barons, Alberta.

Tetra Tech Canada Inc.
442 - 10 Street N.
Lethbridge, AB T1H 2C7 CANADA
Tel 403.329.9009 Fax 403.328.8817

- Classification of soil profiles at each testpit location using the Canadian System of Soil Classification (CSCS). The individual soil strata and the interfaces between them were noted. In addition to the soil classification, a general description of site topography, vegetation (if observed), landscape position, and slope aspect was also included.
- Obtaining bulk soil samples from each excavation within each potential layer as well as where a restrictive layer¹ was potentially observed to be present. Potential restrictive layers were analyzed in our Lethbridge laboratory for hydrometer analysis.
- Installation of a 25 mm diameter PVC, screened standpipe within each testpit to determine whether seasonal water infiltration was present at each location. Water levels from each standpipe were obtained on September 16, 2021.
- Evaluation of the following:
 - Topography, landscape position, vegetation, and surface drainage characteristics.
 - Surface waters, rock outcrops, and other features of note.
 - Land uses and development within approximately 50 m of the proposed area of the proposed septic disposal fields.

2.2 Desktop Review/Reporting

To meet the objectives of the SDDFA, Tetra Tech undertook the following:

- Completed a site evaluation as per Section 7.1.1.2 of the APSSSoP including the following:
 - Reviewed available published resources including Abacus Datagraphics (AbaData), and the Online Water Well Database.
 - Reviewed geological and hydrogeological information including published topographic, geologic, soil, and groundwater maps and reports.
- Prepared this SDDFA report.

3.0 RESULTS

3.1 General

The proposed subdivision consists of approximately 24 lots which are to be located on vacant, agricultural land, adjacent to an existing 15-lot subdivision located north of the City of Lethbridge. A St. Mary's Irrigation District (SMRID) canal borders the site to the west. Highway 843 borders the site to the east with agricultural activities bordering the site to the north. The existing site has two dugouts that may need special attention during the site grading process if they are to be infilled.

The following subsections outline the results of the field observations and desktop review. The approximate testpit locations and surrounding land use are shown on Figure 1. The results of the hydrometer analysis are presented in Appendix A. Soil profile descriptions are presented in Appendix B.

¹ Defined by the APSSSoP as 'a soil horizon, soil layer, or other condition in the soil profile, or underlying strata, that restricts the downward movement of fluids that could cause a perched water table or saturated soil under the soil infiltration surface of the system'.

3.2 Rights-of-Way and Easements

AbaData identified a high-pressure ATCO natural gas pipeline transecting the far east portion of the site extending north and south through Lots 1 and 2, Block 1, Plan 927 LK. AbaData also identified a Huskey Natural gas pipeline that transects the west portion of Lot 1, Block 2, Plan 801 0198 and traverses the site north to south. It should also be noted that there is a canal right-of-way in the northwest corner of Lot 1, Block 2, Plan 801 0198; as well, there is a SMRID irrigation right-of-way that borders the north portion of the property.

3.3 Vegetation, Topography, and Drainage

The proposed site configuration is bounded by farmland to the north; by an irrigation channel to the west; by Highway 843 to the east; and by residential properties, a farmstead, and farmland to the south in the Lethbridge County.

The proposed site comprises of three parcels: Lot 1 Block 1 Plan 927 LK in the northeast, Lot 2 Block 1 Plan 927 LK in the southeast, and Lot 1 Block 2 Plan 8010198 in the southwest.

Lot 1 Block 1 Plan 927 LK comprises of a farmstead and a dugout in the southeast corner of the lot, a fenced off area in the east that appeared to be used for livestock and/or horses with decomposing bails of hay or straw, while the rest of the lot comprises of a vacant field with a wheel irrigation system. The land is relatively flat with drainage tending to the northeast.

Lot 2 Block 1 Plan 927 LK comprises of a barn/shed in the southwest corner, a dugout in the northeast extent of the lot, while the rest of the lot comprises of a wheel irrigated agricultural field. The land is relatively flat with drainage tending to the northeast and east.

Lot 1 Block 2 Plan 8010198 comprises of a farmstead in the northwest corner of the lot, a residence at the north central extent of the lot, a dugout and farm structures in the northeast corner of the lot, an old horse racetrack in the south half of the lot, a dry dugout just north of the horse racetrack, and a pond/dugout at the south-central extent of the lot. The land is relatively flat with the drainage tending to the northeast. From the topography provided by MGCL, a localized low-lying area was noted on the lot near the dry dugout just north of the horse racetrack.

Regional drainage is northeast to east. See soil profile in Appendix B for detailed descriptions regarding to vegetation, drainage, and slope details at each of the testpit locations.

3.4 Surficial Geology

The surficial geology in the area is characterized by moraine till deposits with sporadic lenses of gravel, sand, and silt (Shetsen 1981).

The stratigraphy of the Lethbridge area is generally comprised of 65 m to 70 m of surficial deposits overlying bedrock. Bedrock in the Lethbridge area consists of strata from the upper Oldman Formation and the lower Bearpaw Formation, both of the late Cretaceous Age (Tokarsky 1973). The bedrock has a relatively flat surface dipping slightly to the northeast and is locally encountered at about Geodetic Elevation 843 m. The bedrock strata consist of thin beds of predominantly weak mudstones, siltstones, and sandstones with occasional bentonite and coal seams.

A geotechnical evaluation was also completed for the site and reported under separate cover (ENG.LGEO04408-01, dated August 2018). The drilling assessment for this geotechnical evaluation identified clay fill material in 4 of the 12 boreholes drilled. The thickness of clay fill ranged from 0.2 m at the four (4) locations to 0.35 m within Lot 1, Block 1 Plan 927 k.

Rock outcrops were not observed across the site. Surficial drainage from the lots is regional and tends towards the northeast to east. No other natural features that could impact the application or design of the proposed treatment system were observed during the field investigation.

3.5 Surface Water and Water Wells

There are two dugouts located on the site, as well as several dugouts present on the adjacent properties. A SMRID canal borders the site to the west. The Oldman River is located approximately 4 kms west of the site. Regional groundwater flow is expected to be westerly, toward the Oldman River.

The Alberta Water Well Information Database² search did not list any record of water wells within the site boundaries; however, the search identified two water well records relating to water wells located off site, within a 3 km radius of the site. The following table summarizes the information of this water well.

Table A: Water Well Details

Location	Distance and Direction from Site*	Owner/Well ID	Drilling Dates	Depth	Use	Tetra Tech's Evaluation
NE 32-009-21 W4M	A minimum of 2 kms northwest of the site	Lethbridge Rendering /106353	1981	Unknown	Domestic	Due to the distance from the site, this well is not considered to be a concern to the site.
LSD 1-04-010-21 W4M	A minimum of 2.5 kms to the north of the site	Biantco Environmental / 1022402 (9 records under I.D)	2013	28.96 m to 64.62 m	Investigation / Monitoring / Other	Due to the distance from the site, these wells are not considered to be a concern to the site.

* Note: Specific well locations may potentially be located at any point within the quarter section provided, as the database will place the well in the centre of the quarter section if no specific location is provided in the drilling report.

3.6 Surrounding Land Use

Table B summarizes the surrounding land use.

Table B: Surrounding land Use

Direction	Land Use*	Observations
North	Agricultural Cropland	Undeveloped agricultural cropland. No buildings or structures noted within 100 m of the site boundaries.
South of Lot 2 Block 1 Plan 927 LK	Rural Residential Subdivision	Residential buildings and local road to the south.
South of Lot 1 Block 2 Plan 801 0198	Agricultural/residential	A dugout is located just south of the centre of the lot with pastureland on either side to the east and west of the remaining south border of the lot.

² Alberta Environment. 2013. Alberta Environment Groundwater Information System (Water Well Reports). Accessed at http://www.telusgeomatics.com/tgpub/ag_water/ May 2013.

Table B: Surrounding land Use

Direction	Land Use*	Observations
East	Secondary highway 843 and residential properties beyond	Secondary highway 843 to the east of the site with rural residential lots and houses beyond the Secondary Highway 843 to the east.
West	SMRID canal and agricultural Cropland Beyond	A SMRID open canal runs along the west side of the property with Agricultural cropland further to the west.

* Land use inferred from observations made during the site visit.

3.7 Laboratory Results

Tetra Tech performed soil texture analysis via hydrometer on 12 selected soil samples. The soil texture test results are summarized in Table C and laboratory certificates are included in Appendix A. The test results are consistent with the soil textures described on site and are considered representative of the soil profiles at the proposed septic disposal field locations.

Table C: Soil Texture Analysis

Testpit Number	Sample Depth (mbgs)	% Sand	% Silt	% Clay	Soil Classification
TP01	0.1 – 0.25	14	55	31	Silty Clay Loam (SICL)
TP02	0.25 – 0.83	3	68	29	Silty Clay Loam (SICL)
TP03	0.27 – 0.9	4	65	31	Silty Clay Loam (SICL)
TP04	0.19 – 1.3	2	72	26	Silty Loam (SIL)
TP05	0.29 – 1.2	23	49	28	Clay Loam (CL)
TP06	0.11 – 0.21	15	57	28	Silty Clay Loam (SICL)
TP07	0.5 – 0.7	20	49	31	Silty Clay Loam (SICL)
TP08	0.2 – 0.6	33	41	24	Loam (L)
TP09	0.3 – 0.95	42	32	25	Loam (L)
TP10	0.31 – 0.9	10	65	25	Silty Loam (SIL)
TP11	0.4 – 0.9	32	40	28	Clay Loam (CL)
TP12	0.45 – 0.7	22	54	24	Silt Loam (SIL)

3.8 Soil Profiles

The site is located in the Dark Brown Soil Zone of Alberta and soils on site consist of Calcareous Dark Brown Chernozems which are differentiated from the Orthic Dark Brown Chernozems by having a Bmk horizon where the primary alkaline earth carbonates have not been removed. Soil observations and soil profile logs for each testpit are included in Appendix B.

Twelve (12) testpits were excavated in the area of the proposed subdivision. The general CSSC profile descriptions of the soils at the site are summarized below:

- **Apk Horizon** (21TP01 through 21TP09) or **Ahk Horizon** (21TP10 to 21TP12) ranging in depths between 0.0 mbgs to 0.27 mbgs. The horizon generally consisted of very dark greyish to very dark brown soil with trace of faint mottling at some locations. The soil was exhibited a weak to moderate (Grades 1 to 2), fine to medium, granular structure. The soil was generally friable and dry to moist with no coarse fragments and weak effervescence. Soil texture within this horizon was described as clay loam. Some difficulty was encountered differentiating between the A and B Horizons at some locations. A buried A Horizon (Ahkb) was observed at 21TP07 (0.31 mbgs to 0.5 mbgs). Additionally, red shale inclusions were observed in the A horizon at 21TP01, 21TP02, 21TP03, and 21TP07 suggesting this horizon has been replaced at each location. This horizon has suitable soil textures and structure for soil-based treatment system.
- **Bmk Horizon** (within most testpits, excluding 21TP03) ranging in depths between 0.07 mbgs to 0.45 mbgs. The horizon generally consisted of brown and very dark brown to black soil with trace of faint mottling at some locations. The soil was exhibited a weak to moderate (Grades 1 to 2), fine to coarse, blocky or subangular blocky structure at most locations. The soil was generally firm to hard, friable, and dry to moist with no coarse fragments and weak to moderate effervescence. Soil texture within this horizon was described as clay loam or silty clay loam. Some difficulty was encountered differentiating between the A and B Horizons at some locations. A buried B Horizon (Bmkb) was observed at 21TP07 (0.5 mbgs to 0.7 mbgs). Additionally, red shale inclusions were observed in the B Horizon at 21TP01 and 21TP02, suggesting this horizon has been replaced at each location. This horizon has suitable soil textures and structure for soil-based treatment system.
- **Cca₁ Horizon** (within all testpits) ranging in depths between 0.19 mbgs to 1.30 mbgs. The horizon generally consisted of greyish brown to light olive brown soil with traces of faint mottling at some locations. The soil was exhibited a weak to moderate (Grades 1 to 2), fine to coarse, granular or blocky structure. The soil was firm to hard, friable, and moist to very moist with no coarse fragments and very strong effervescence. Soil texture within this horizon included loam, clay loam and silty clay loam. This horizon has suitable soil textures and structure for soil-based treatment system.
- **Cca₂ Horizon** (21TP03, 21TP07, 21TP08, 21TP10, 21TP11, and 21TP12) ranging in depths between 0.60 mbgs to 2.30 mbgs. The horizon generally consisted of greyish brown to very dark greyish brown soil with no mottling observed. The soil was structureless (Grade 0), fine to medium, and massive. The soil was friable and firm, and moist to very moist with no coarse fragments and moderate to strong effervescence. Soil texture within this horizon included clay loam, sandy clay loam, and silty clay loam. This horizon has suitable soil textures but massive soil structure and is considered a restricting layer for soil-based treatment system.
- **Ck₁ Horizon** (within all testpits) ranging in depths between 1.0 mbgs and 3.0 mbgs. The horizon generally consisted of dark greyish brown to dark olive brown soil with some faint mottling. The soil was described as structureless (Grade 0), fine to medium, and massive structure. The soil was soft to firm, friable, and moist with 2% to 5% coarse fragments and weak effervescence. Traces of coal and oxide specks were observed in the horizon. Soil textures within this horizon were described as clay loam, silty clay loam, and/or sandy clay loam. The soil within this horizon was saturated at 21TP01, 21TP02, and 21TP03, and groundwater was observed entering these testpits at approximately 1.2 mbgs. This horizon has suitable soil textures but massive structure and locally saturated. This horizon is considered a restricting layer for soil-based treatment system.

- **Ck₂ Horizon** (within 21TP01 through 21TP05, and 21TP09) ranging in depths between 1.8 mbgs and 3.00 mbgs. The horizon generally consisted of very dark greyish brown to dark olive brown soil with some faint mottling. The soil was described as structureless (Grade 0), fine to medium, and massive structure. The soil was friable and moist to very moist, with 2% to 5% coarse fragments and very weak effervescence. Traces of coal and oxide specks, and/or white precipitates were observed in the horizon. Soil textures within this horizon were described as clay loam (21TP02 and 21TP03), silty clay loam (21TP01 and 21TP05), and/or sandy clay loam (21TP04). Impermeable layers, such as bedrock and/or compaction, were not noted within the horizon; however, the soil at this depth was saturated at 21TP01, 21TP02, and 21TP03, and groundwater was observed entering these testpits at approximately 1.2 mbgs. This horizon has suitable soil textures but massive structure and locally saturated. This horizon is considered a restricting layer for soil-based treatment system.

3.9 Groundwater Seepage Conditions

Tetra Tech personnel visited the site on September 16, 2021 to measure the groundwater elevations within the standpipes with measurement results shown in Table D.

Table D: Seepage Conditions and Groundwater Measurement Results on September 16, 2021

Testpit Number	Depth of Standpipe (m)	Depth to Seepage (m)	Depth to Sloughing (m)	Borehole Elevation (m)	Depth to Groundwater (m)	Groundwater Elevation (m)
21TP001	3.0	1.2	1.2	901.17	1.36	899.81
21TP002	2.8	1.2	1.2	903.28	0.77	902.51
21TP003	3.0	1.2	1.2	904.38	0.69	903.69
21TP004	2.9	NE	NE	901.49	1.62	899.87
21TP005	3.0	NE	NE	903.53	2.17	901.36
21TP006	3.0	NE	NE	904.51	2.12	902.39
21TP007	3.0	NE	NE	906.27	NE	-
21TP008	3.0	NE	NE	907.37	NE	-
21TP009	3.0	NE	NE	907.51	NE	-
21TP010	3.0	NE	NE	907.46	NE	-
21TP011	3.0	NE	NE	906.72	NE	-
21TP012	3.0	NE	NE	906.62	NE	-

NE - Not Encountered

4.0 CONCLUSIONS AND RECOMMENDATIONS

In accordance with the requirements of APSSSoP, a minimum vertical separation distance between the soil infiltration surface and a restrictive layer for this site shall be no less than 1,500 mm when receiving primary treated effluent. The separation distance can be reduced to 900 mm when receiving secondary treated effluent (Level 2 or better) and using a pressure distribution lateral pipe system if the site is within 2 km of a lake, river, stream, or creek. If the minimum depth of a restrictive layer is greater than 1,500 mm (600 mm embedded depth plus 900 mm separation), a field system is considered suitable. If the minimum depth of a restrictive layer is less than 1,500 mm, a mound system may be required to maintain 900 mm separation. According to the aforementioned requirement and soil findings at the testpit locations, the assessment results of suitability of the soils for a soil-based treatment and recommended treatment system as well as design parameters are provided in Table E. To obtain Level 2 or better effluent quality, a sand filter of a minimum of 300 mm is generally considered above soil-based treatment system using pressure distribution lateral pipe. The recommended treatment system in Table E is based on the existing site conditions and need to be further reviewed if a site grading is to be conducted for the project.

Table E: Assessment Results of Site Suitability and Soil-Based Treatment System

Testpit Number	Restricting Layer/Depth (mbgs)	Separation Distance (mm)	Feasible Soil-Based Treatment System	Effluent Quality	Effluent Lading Rate (L/Day/sq. m)	Hydraulic Linear Loading Rate (L/Day/m)
21TP001	Massive CL (0.83)	830	Soil-based Treatment with Treatment Mound	Level 2 or better with pressure distribution lateral pipe	13.2	44.7
21TP002	Massive SCL (0.83)	830	Soil-based Treatment with Treatment Mound	Level 2 or better with pressure distribution lateral pipe	13.2	44.7
21TP003	Massive CL (2.3)	2,300	Soil-Based Treatment	Level 1 or better	8.8*	44.7
21TP004	Massive CL (1.3)	1,300	Soil-Based Treatment	Level 2 or better with pressure distribution lateral pipe distribution lateral pipe	13.2	44.7
21TP005	Massive SCL (1.2)	1,200	Soil-Based Treatment	Level 2 or better with pressure distribution lateral pipe	13.2	44.7
21TP006	Massive CL (1.1)	1,100	Soil-Based Treatment	Level 2 or better with pressure distribution lateral pipe	13.2	44.7
21TP007	Massive CL (1.3)	1,300	Soil-Based Treatment	Level 2 or better with pressure distribution lateral pipe	13.2	44.7
21TP008	Massive CL (0.6)	600	Soil-based Treatment with Treatment Mound	Level 2 or better with pressure distribution lateral pipe	13.2	37.3
21TP009	Massive CL (0.95)	950	Soil-Based Treatment	Level 2 or better with pressure distribution lateral pipe	13.2	44.7
21TP010	Massive SICL (0.9)	900	Soil-Based Treatment	Level 2 or better with pressure distribution lateral pipe	13.2	44.7
21TP011	Massive CL&SCL (0.9)	900	Soil-Based Treatment	Level 2 or better with pressure distribution lateral pipe	13.2	44.7

Table E: Assessment Results of Site Suitability and Soil-Based Treatment System

Testpit Number	Restricting Layer/Depth (mbgs)	Separation Distance (mm)	Feasible Soil-Based Treatment System	Effluent Quality	Effluent Lading Rate (L/Day/sq. m)	Hydraulic Linear Loading Rate (L/Day/m)
21TP012	Massive SICL (0.7)	700	Soil-based Treatment with Treatment Mound	Level 2 or better with pressure distribution lateral pipe	13.2	44.7

*May increase to 13.2 if level 2 or better effluent quality to be applied.

It is understood that the local municipal authority having jurisdiction will be contacted to determine what will be accepted for septic disposal field installation. Depending on the requirements of the local municipal authority, further assessment of the soil conditions at the specific locations of proposed septic systems; as well, further site evaluation to meet the requirements of Part 7 within the APSSSoP may be required. This may include, but is not limited to, the following:

- Hydrogeological site and soil evaluation for on-site sewage systems exceeding 9 m³ per day design capacity as per Section 7.1.1.3 of the APSSSoP.

5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Mr. Rick Aldoff, and his agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Mr. Rick Aldoff or his representatives., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on Use of this Document attached in Appendix C or Contractual Terms and Conditions executed by both parties.

6.0 CLOSURE

We trust this document meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully Submitted,
Tetra Tech Canada Inc.

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Prepared by:
Jackson Meadows, C.E.T.
Project Manager
Engineering Practice
Direct Line: 403.359.6510
jackson.meadows@tetrattech.com



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Reviewed by:
Jiejun Zhao, P.Eng.
Senior Geotechnical Engineer
Engineering Practice
Direct Line: 403.359.6513
jiejun.zhao@tetrattech.com

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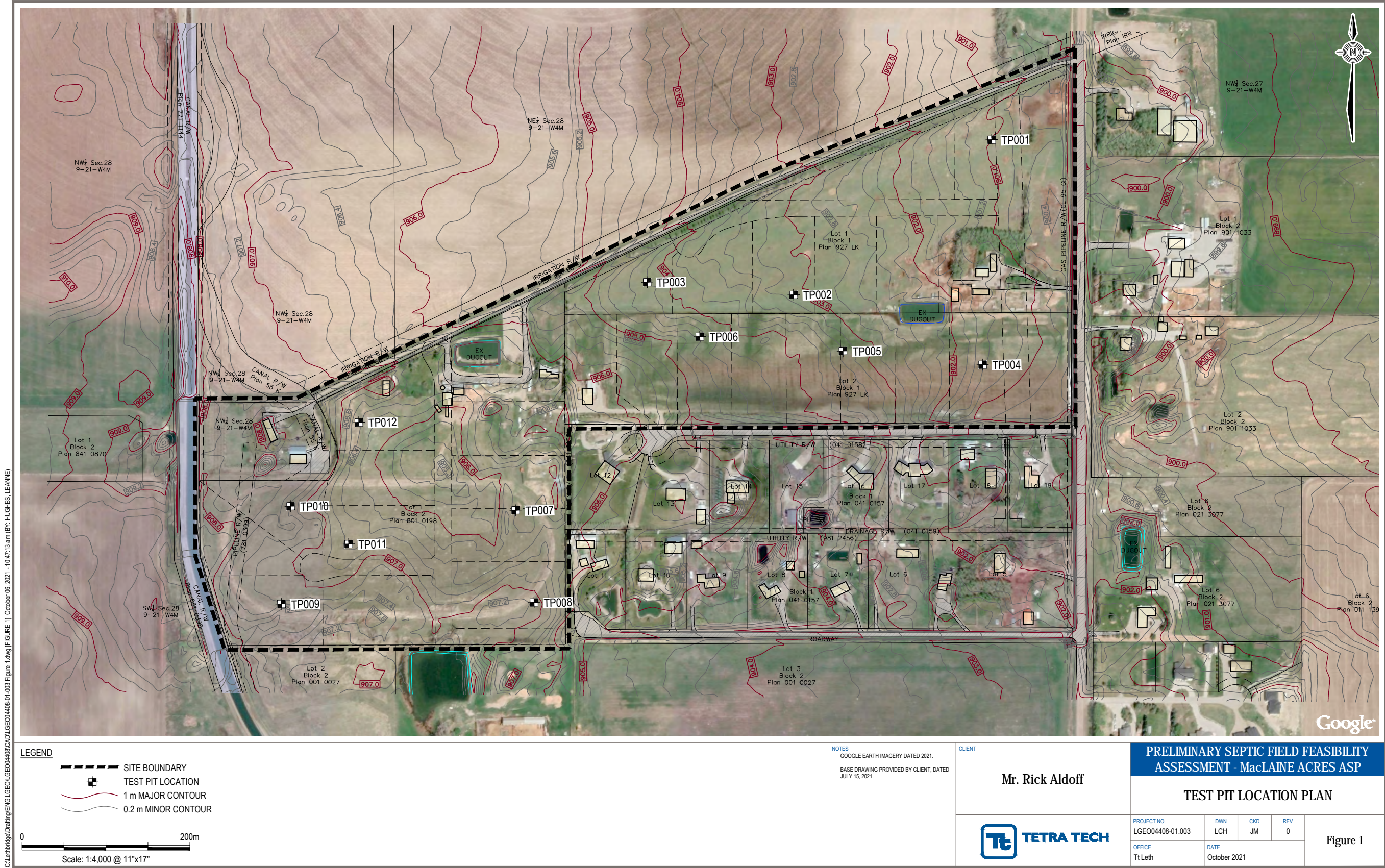
Attachments: Figure 1: Testpit Location Plan
Appendix A: Hydrometer Results
Appendix B: Soil Observation and Soil Profile Descriptions
Appendix C: Limitation on Use of This Document

REFERENCES

- ABACUS DataGraphics Website. Updated October 31, 2017. AbaData database
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FIGURES

Figure 1 Testpit Location Plan



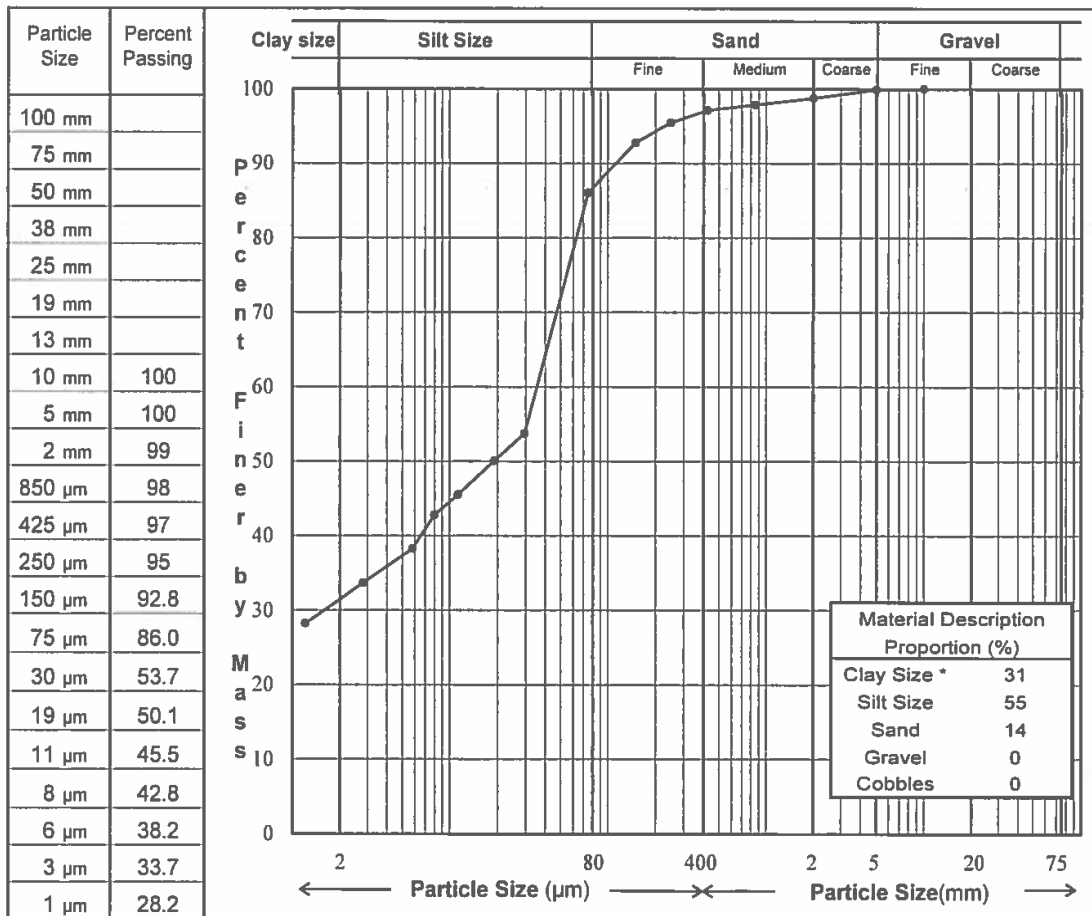
APPENDIX A

HYDROMETER RESULTS

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	MacLaine Acres ASP - PSDFFA	Sample No.:	1
Client:	Rick Adolf	Borehole/ TP:	21TP01
Project No.:	704-ENG.LGEO04408-01.003	Depth:	0.10 -0.25 m
Location:		Date Tested	September 21, 2021
Description **:	Silty Clay Loam (SICL)	Tested By:	VO



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By: P.Eng.

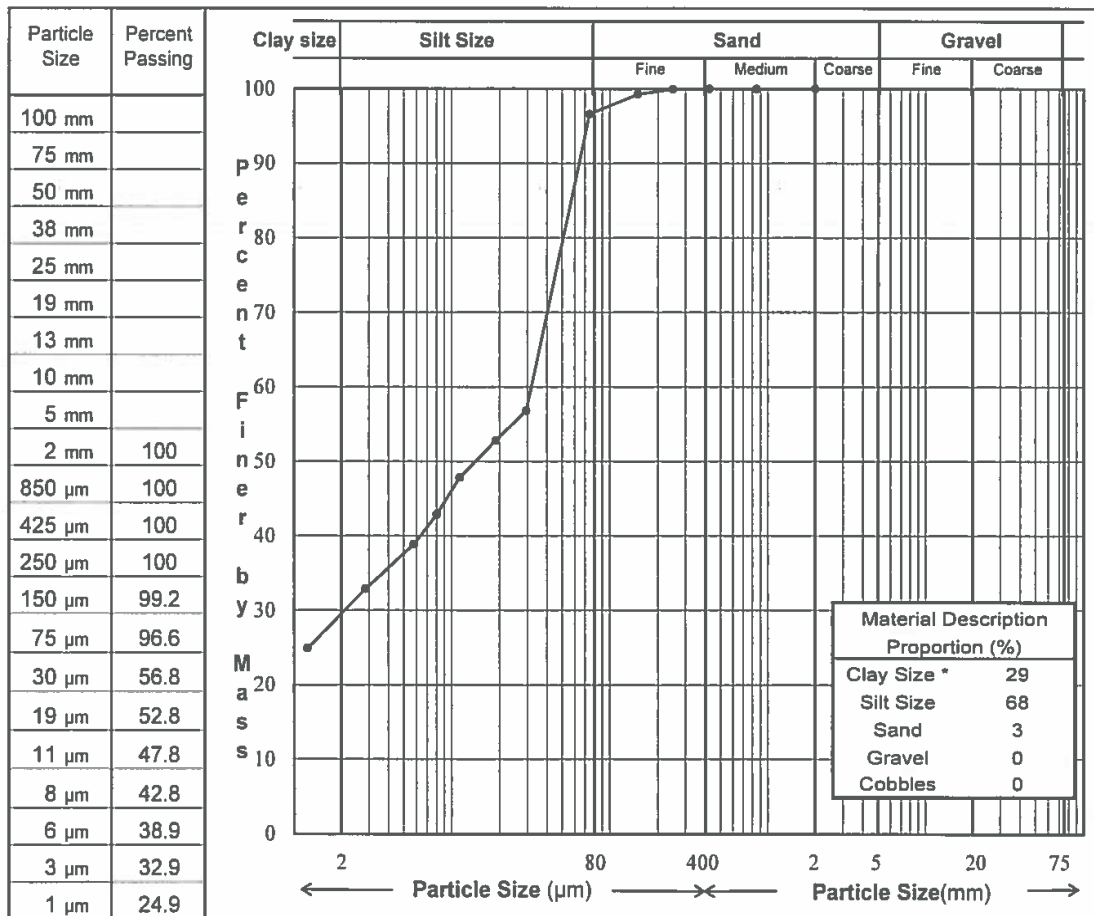
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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	MacLaine Acres ASP - PSDFFA	Sample No.:	2
Client:	Rick Adolf	Borehole/ TP:	21TP02
Project No.:	704-ENG.LGEO04408-01.003	Depth:	0.25 - 0.83m
Location:		Date Tested	September 21, 2021
Description **:	Silty Clay Loam (SICL)	Tested By:	VO



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is behaviour based & subject to Tetra Tech description protocols.

Reviewed By: _____ P.Eng.

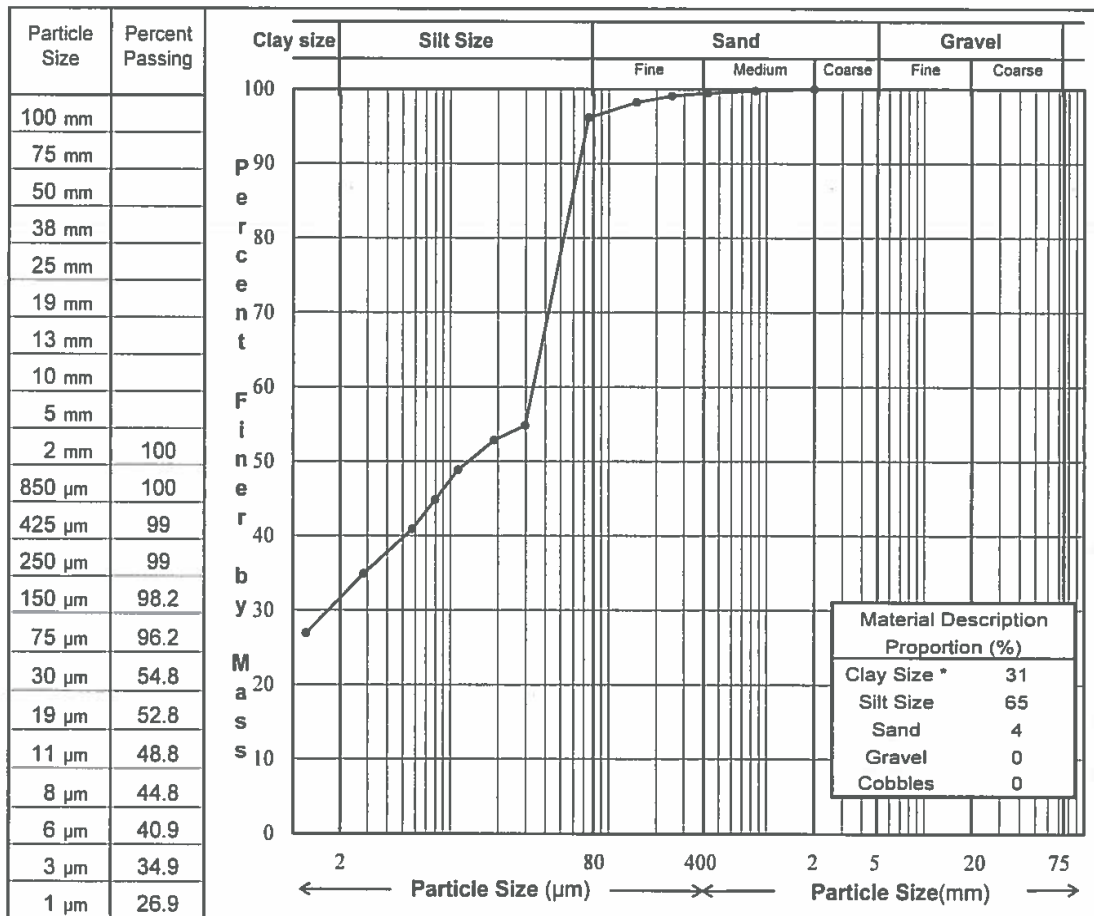
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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	MacLaine Acres ASP - PSDFFA	Sample No.:	3
Client:	Rick Adolf	Borehole/ TP:	21TP03
Project No.:	704-ENG.LGEO04408-01.003	Depth:	0.27 - 0.9m
Location:		Date Tested	September 21, 2021
Description **:	Silty Clay Loam (SICL)	Tested By:	VO



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By: P.Eng.

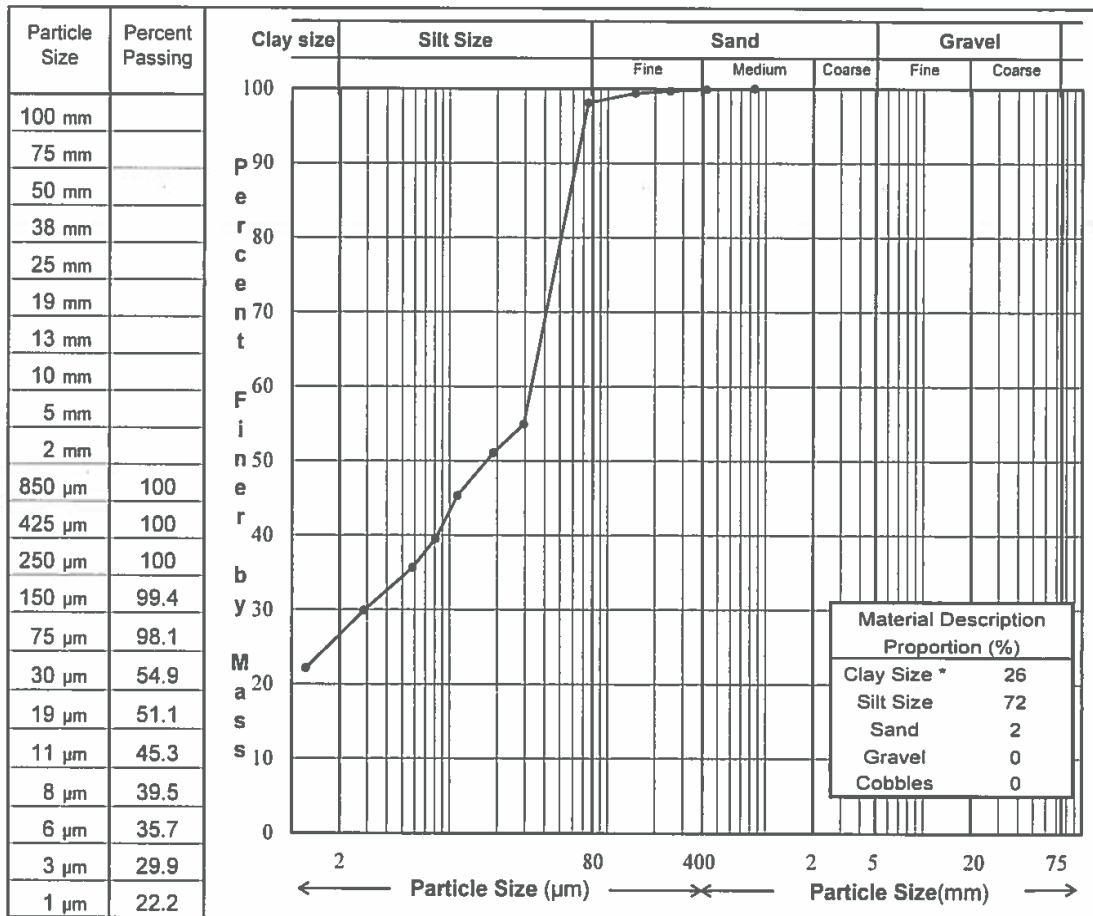
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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	MacLaine Acres ASP - PSDFFA	Sample No.:	4
Client:	Rick Adolf	Borehole/ TP:	21TP04
Project No.:	704-ENG.LGEO04408-01.003	Depth:	0.19 - 1.30 m
Location:		Date Tested	September 21, 2021
Description **:	Silt Loam (SIL)	Tested By:	VO



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By: _____ P.Eng.

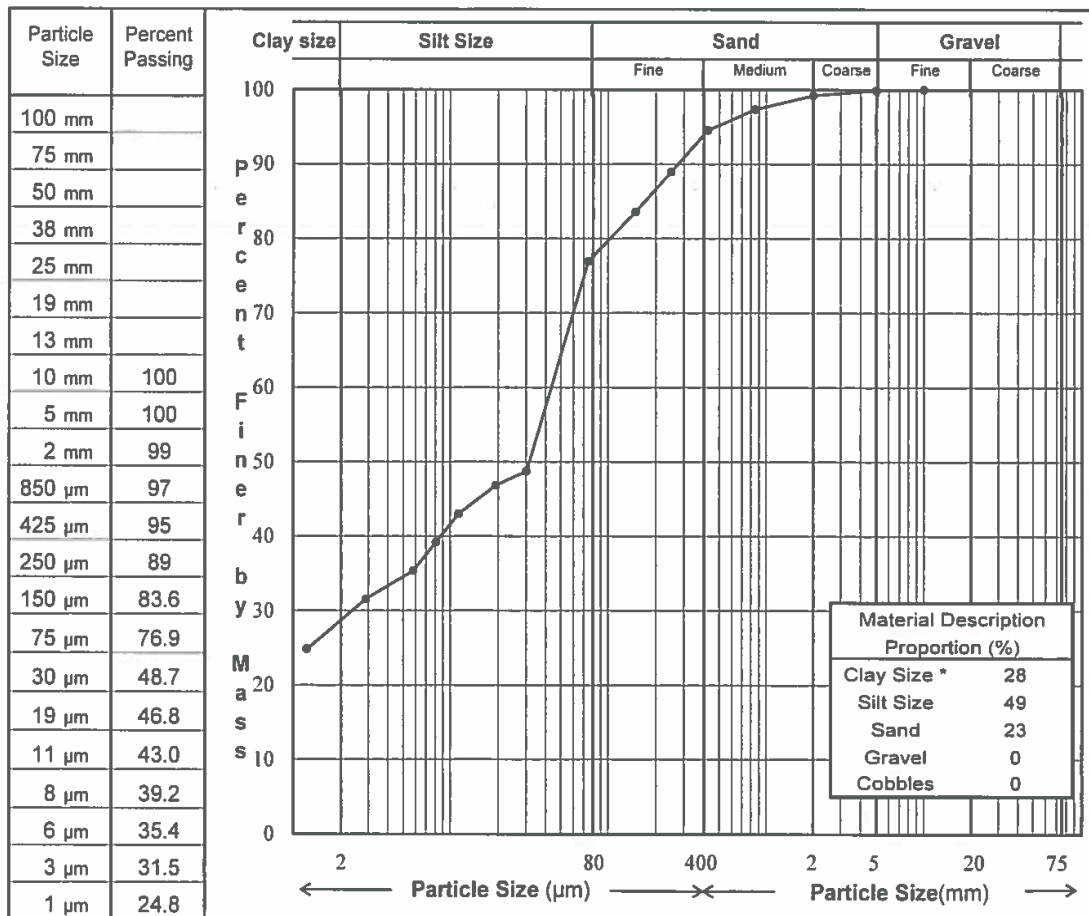
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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: <u>MacLaine Acres ASP - PSDFFA</u>	Sample No.: <u>5</u>
Client: <u>Rick Adolf</u>	Borehole/ TP: <u>21TP05</u>
Project No.: <u>704-ENG.LGEO04408-01.003</u>	Depth: <u>0.29 - 1.2 m</u>
Location: _____	Date Tested: <u>September 22, 2021</u>
Description **: <u>Clay Loam (CL)</u>	Tested By: <u>VO</u>



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By: _____ P.Eng.

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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: MacLaine Acres ASP - PSDFFA

Sample No.: 6

Client: Rick Adolf

Borehole/ TP: 21TP06

Project No.: 704-ENG.LGEO04408-01.003

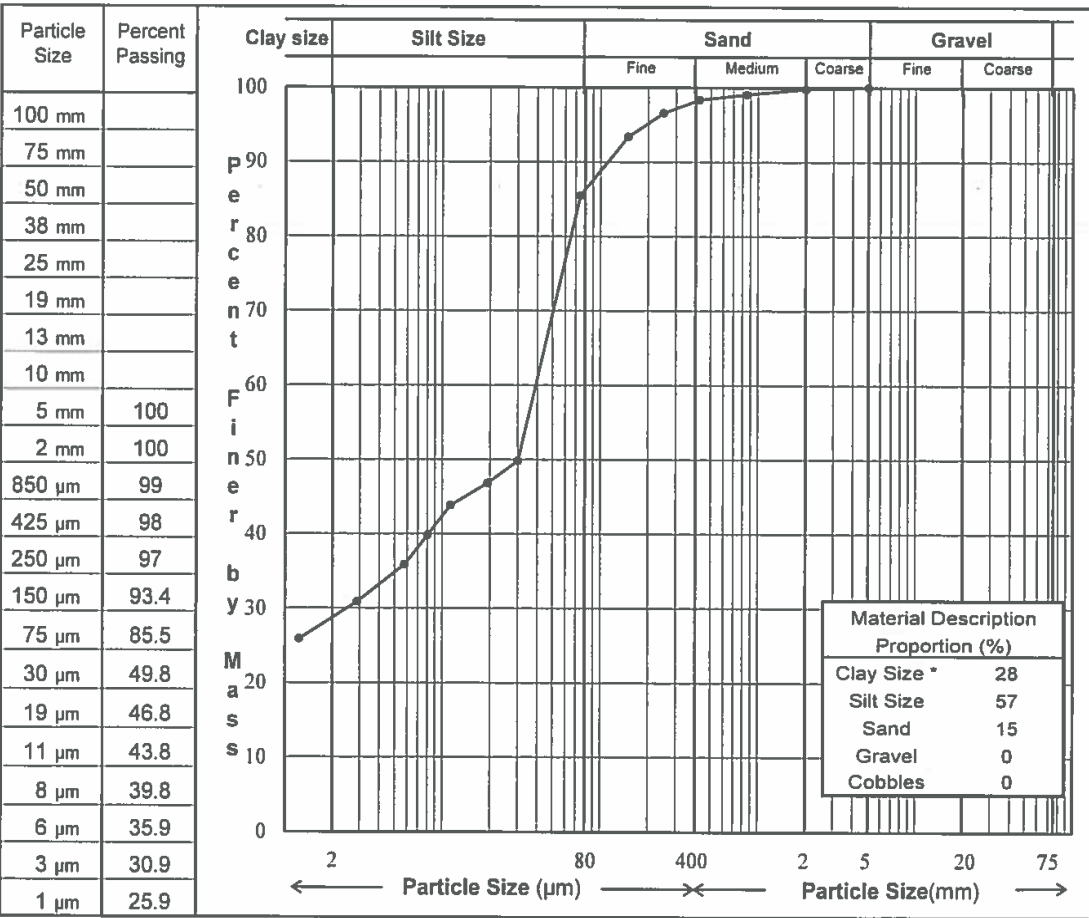
Depth: 0.11 - 0.21m

Location: _____

Date Tested September 22, 2021

Description **: Silty Clay Loam (SICL)

Tested By: VO

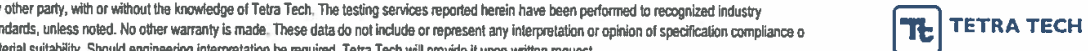


Remarks: * The upper clay size of 2 μm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By:  P.Eng.

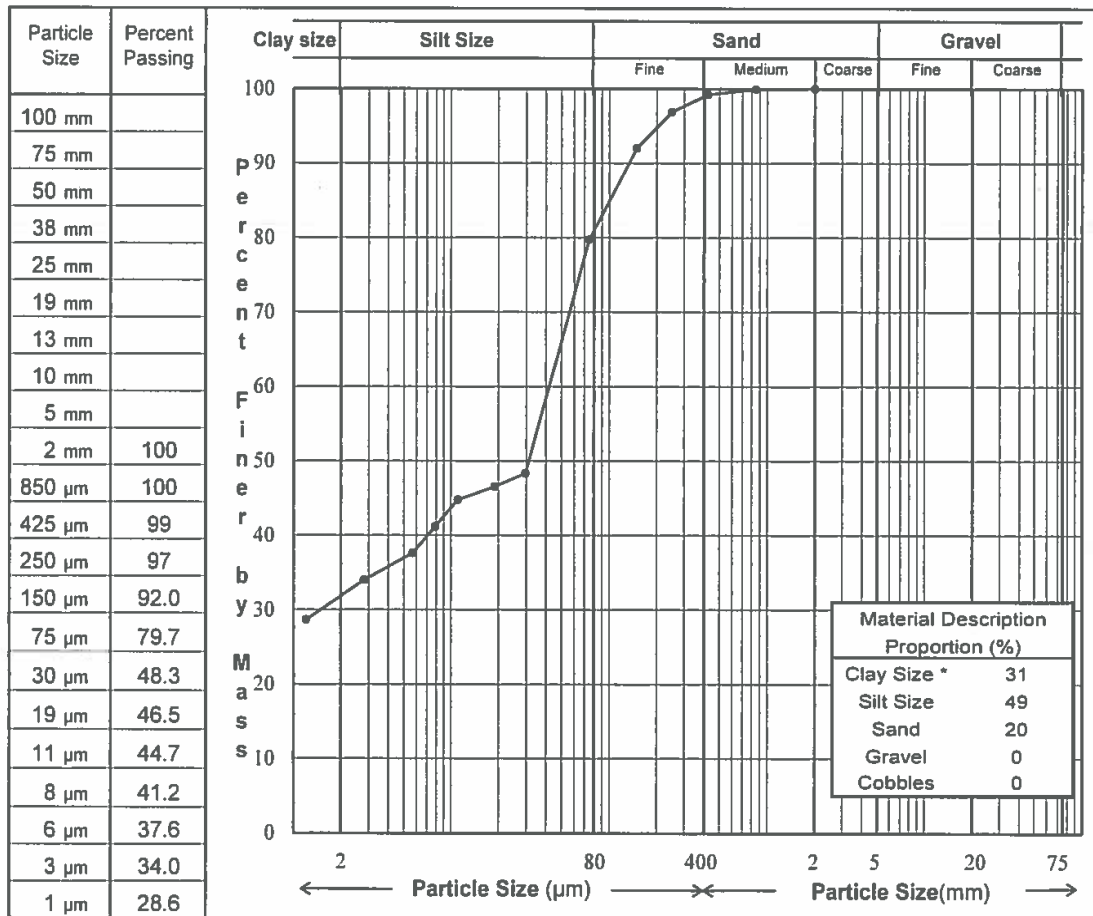
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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project: MacLaine Acres ASP - PSDFFA Sample No.: 7
 Client: Rick Adolf Borehole/ TP: 21TP07
 Project No.: 704-ENG.LGEO04408-01.003 Depth: 0.5 - 0.7m
 Location: Date Tested: September 22, 2021
 Description **: Silty Clay Loam (SICL) Tested By: VO



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By: _____ P.Eng.

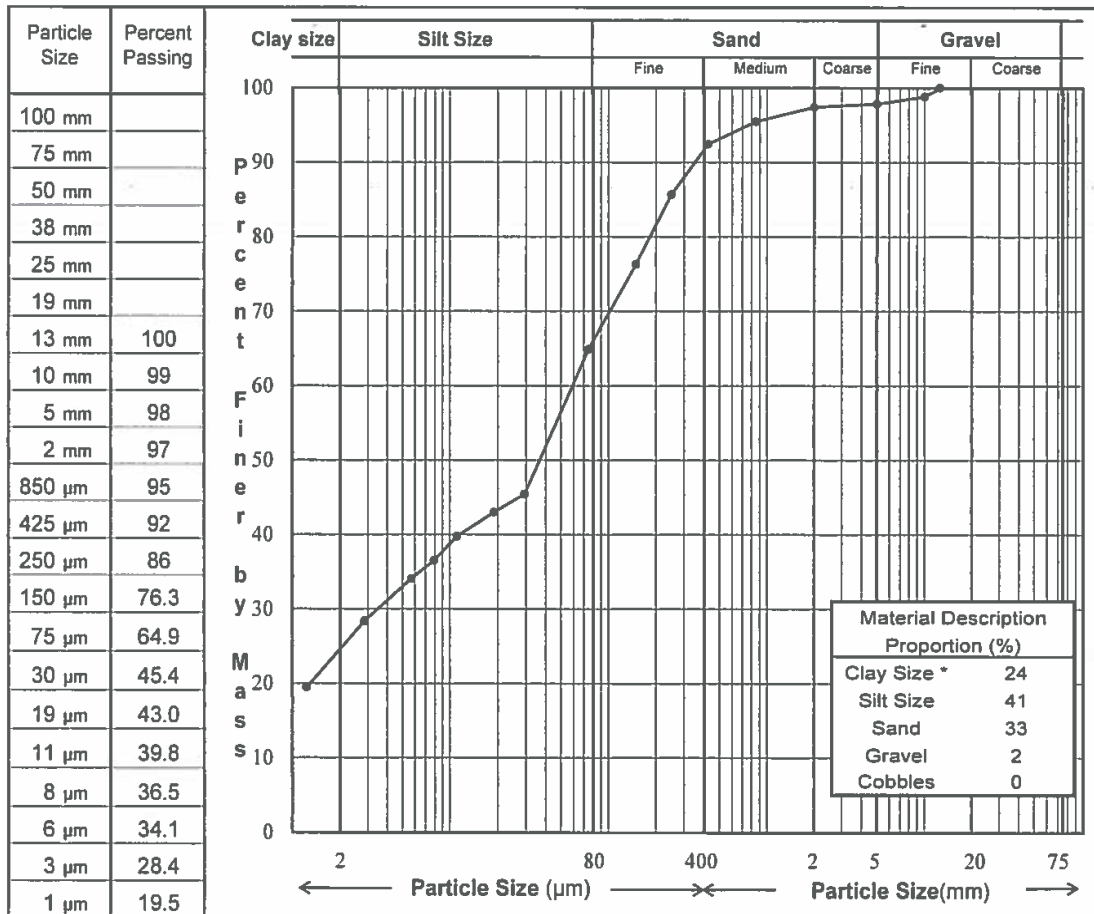
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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	MacLaine Acres ASP - PSDFFA	Sample No.:	8
Client:	Rick Adolf	Borehole/ TP:	21TP08
Project No.:	704-ENG.LGEO04408-01.003	Depth:	0.2 - 0.6m
Location:		Date Tested	September 23, 2021
Description **:	Loam (L)	Tested By:	VO



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By: _____ P.Eng.

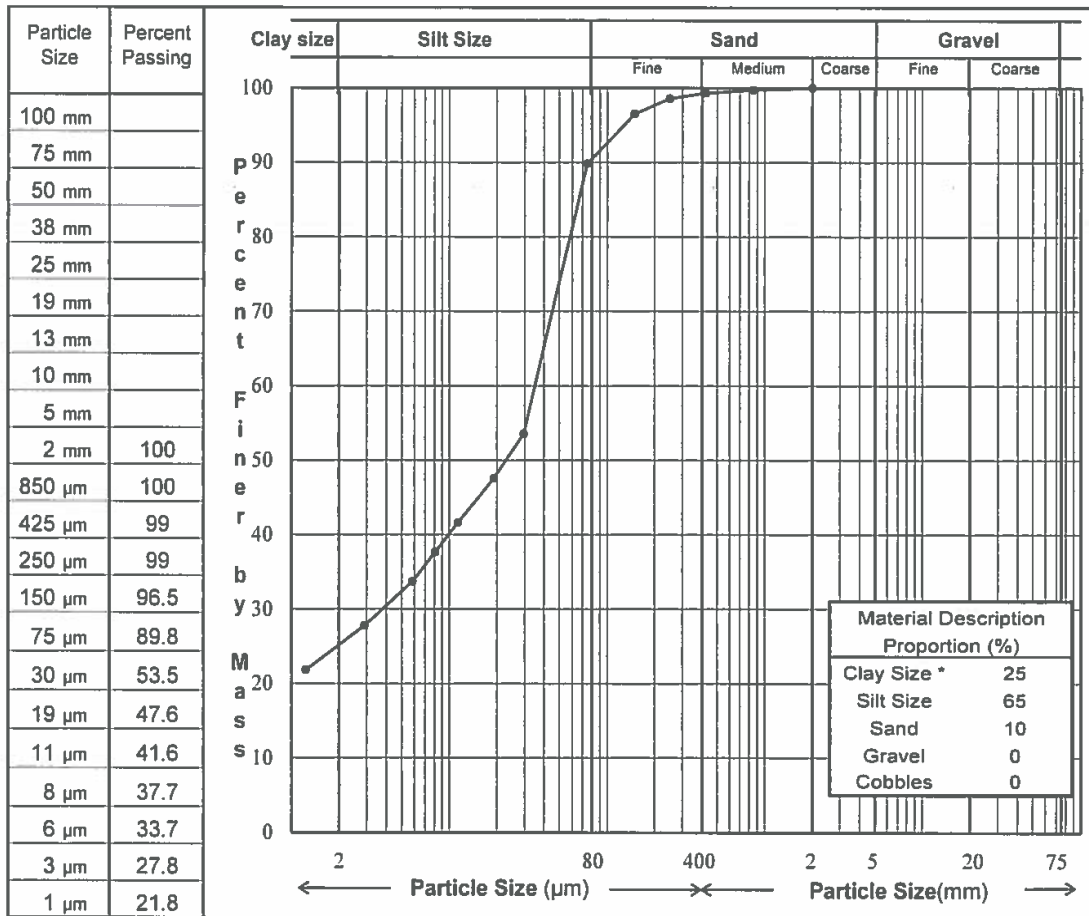
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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	MacLaine Acres ASP - PSDFFA	Sample No.:	10
Client:	Rick Adolf	Borehole/ TP:	21TP10
Project No.:	704-ENG.LGEO04408-01.003	Depth:	0.31 - 0.90m
Location:		Date Tested	September 23, 2021
Description **:	Silt Loam (SIL)	Tested By:	VO



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By: [Signature] P.Eng.

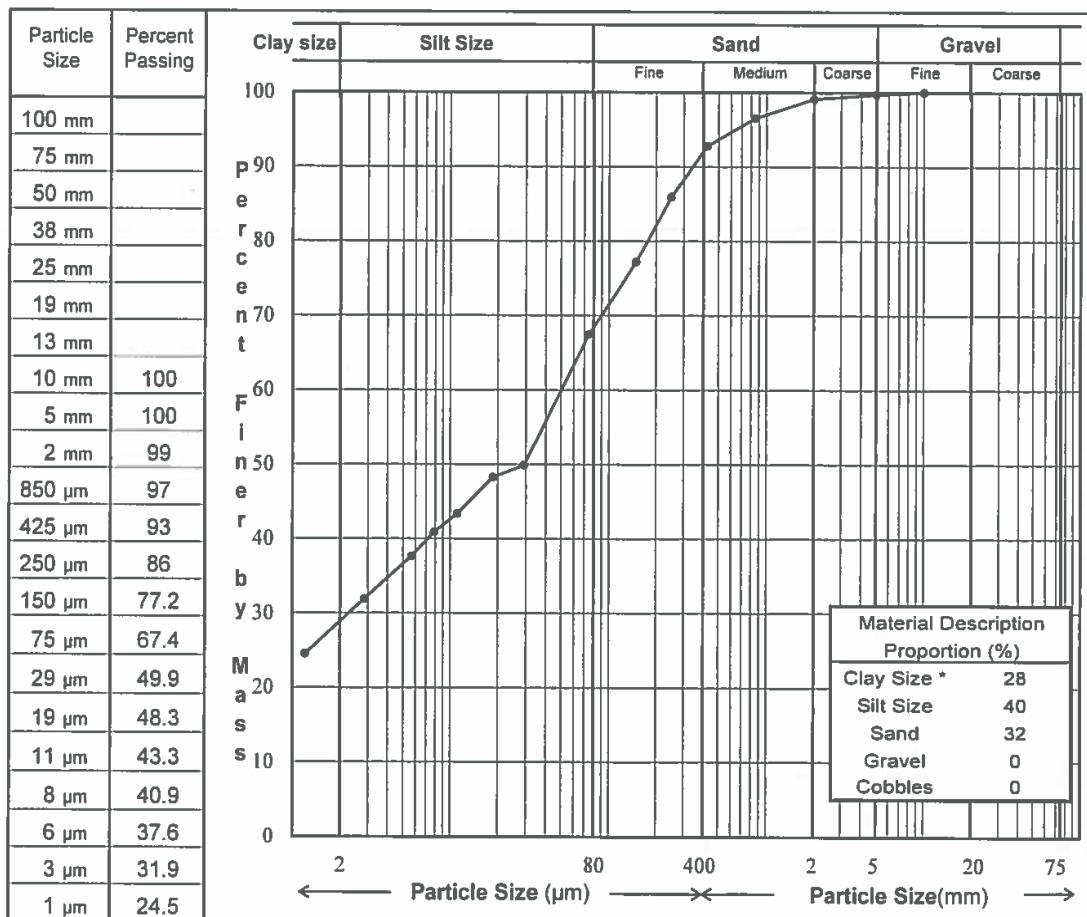
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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	MacLaine Acres ASP - PSDFFA	Sample No.:	11
Client:	Rick Adolf	Borehole/ TP:	21TP11
Project No.:	704-ENG.LGEO04408-01.003	Depth:	0.4 - 0.9m
Location:		Date Tested	September 24, 2021
Description **:	Clay Loam (CL)	Tested By:	VO



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By: _____ P.Eng.

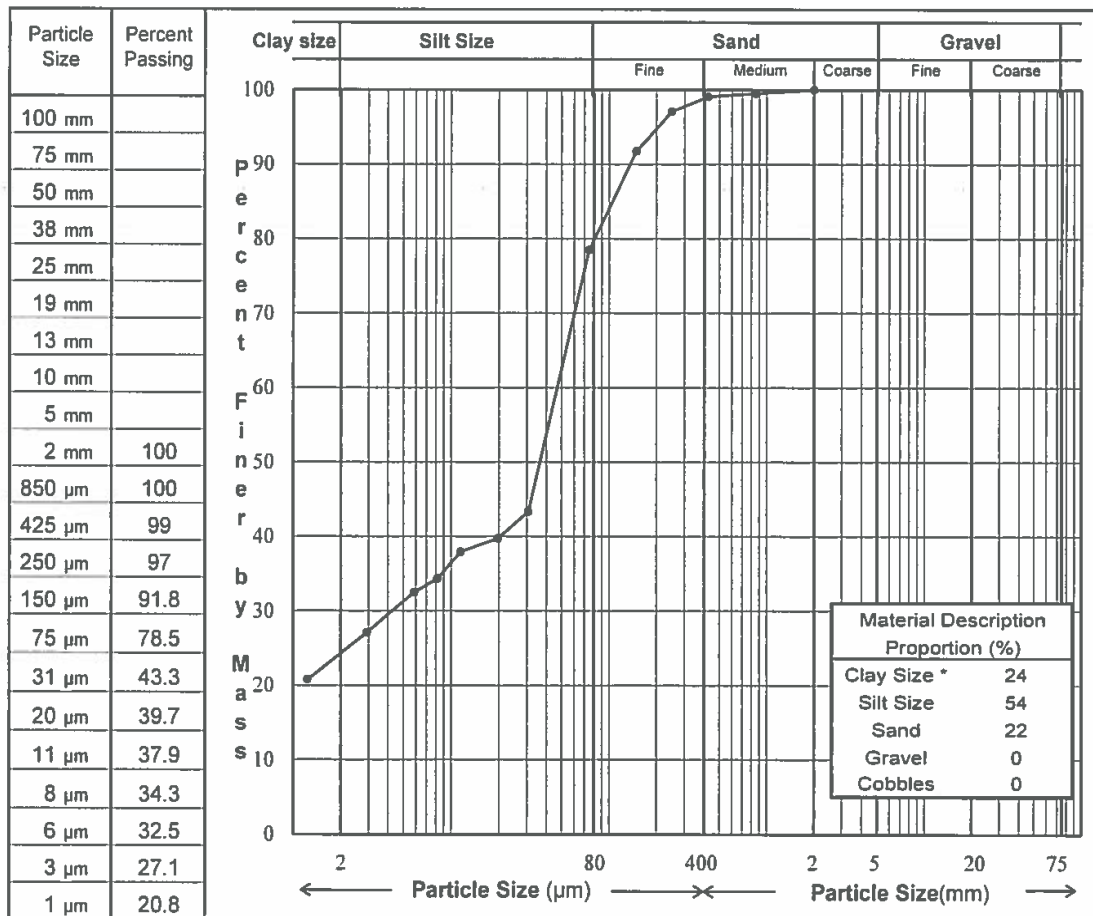
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PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D422

Project:	MacLaine Acres ASP - PSDFFA	Sample No.:	12
Client:	Rick Adolf	Borehole/ TP:	21TP12
Project No.:	704-ENG.LGEO04408-01.003	Depth:	0.45 - 0.7m
Location:		Date Tested	September 24, 2021
Description **:	Silt Loam (SIL)	Tested By:	VO



Remarks: * The upper clay size of 2 µm is as per the Canadian Foundation Manual.

** The description is based off the Canadian System of Soils Classification.

Reviewed By: P.Eng.

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APPENDIX B

SOIL OBSERVATION AND SOIL PROFILE DESCRIPTIONS

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP01			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
NE 1/4	28	009	21	W4	Lot 1; Block 1; Plan 927		Pasture – healthy, thick veg.

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Imperfect	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Apk (Fill)	0-0.10	Clay Loam		10YR 3/2	No	Weak	Medium	Granular	Friable	Moist	0
Bmk (Fill)	0.10-0.25	Silty Clay Loam	Hyd.	10YR 3/3	Faint Mottle	Moderate	Medium	Blocky	Friable / Firm	Moist	0
Cca	0.25-0.83	Silty Clay Loam		2.5Y 5/2	Faint Mottle	Moderate	Medium	Subangular Blocky	Firm / Friable	Very Moist	0
Ck1	0.83-2.4	Clay Loam		2.5Y 3/2	Faint Mottle	Structureless	Medium	Massive	Friable / Soft	Very Moist to Wet	2-5
Ck2	2.4-3.0	Silty Clay Loam		2.5Y 3/3	Faint Mottle	Structureless	Medium	Massive	Friable / Soft	Very Moist to Wet	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
1.36 mbgs	Saturated soil observed at approximately 0.83 m.	Free water entering test pit at 1.2 m	Soil texture / grade / structure

Comments:

Faint mottling noted in B and C horizon, increased soil moisture at 0.25 m with free water entering test pit at 1.2 m (saturated soil). A and B horizons are replaced as traces of red shale observed in horizons, however, structure observed. Thick, lush vegetation in pasture and area appears to have been irrigated. 1 inch standpipe installed to 3.0 in test pit.

Dugout approximately 175 m to the southwest of the test pit.

Residence approximately 100 m to the south of test pit.

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP02			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
NE 1/4	28	009	21	W4	Lot 1; Block 1; Plan 927		Pasture – healthy, thick veg.

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Imperfect	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Apk (Fill)	0-0.11	Clay Loam		10YR 1/1	Faint Mottle	Moderate	Fine	Granular	Friable	Moist	0
Bmk (Fill)	0.11-0.25	Clay Loam		10YR 2/1	Faint Mottle	Weak	Fine	Blocky	Friable / Firm	Moist	0
Cca	0.25-0.83	Silty Clay Loam	Hyd.	2.5Y 4/3	No	Weak	Fine	Granular	Friable	Very Moist	0
Ck1	0.83-2.4	Sandy Clay Loam		2.5Y 3/3	No	Structureless	Fine	Massive	Friable / Soft	Wet	0-2
Ck2	2.4-3.0	Clay Loam		2.5Y 3/3	Faint Mottle	Structureless	Fine	Massive	Friable / Soft	Wet	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
0.77 mbgs	Saturated soil observed at approximately 0.85 m.	Free water entering test pit at 1.2 m	Soil texture / grade / structure

Comments:

Faint mottling noted in A, B, and Ck horizon, increased soil moisture at 0.25 m with free water entering test pit at approximately 1.2 m (saturated soil). A and B horizons are replaced as traces of red shale observed in horizons, however, structure observed. Thick, lush vegetation in pasture and area appears to have been irrigated. 1 inch standpipe installed to 3.0 in test pit Dugout approximately 80 m to the southeast of the test pit.

Residences approximately 150 m to the east and 190 m to the south, respectively, of test pit.

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP03			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
NE 1/4	28	009	21	W4	Lot 1; Block 1; Plan 927		Pasture – healthy, thick veg.

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Imperfect	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Apk (Fill)	0-0.27	Clay Loam		10YR 3/3	No	Moderate	Medium	Granular	Friable	Moist	0
Cca1	0.27-0.9	Silty Clay Loam	Hyd.	2.5Y 4/3	No	Weak	Fine	Granular	Friable	Very Moist	0
Cca2	0.9-2.3	Sandy Clay Loam		2.5Y 5/2	No	Weak	Fine	Single-Grained	Friable	Wet	0
Ck1	2.3-3.0	Clay Loam		2.5Y 3/2	Faint Mottle	Structureless	Medium	Massive	Friable	Wet	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
0.69 mbgs	Saturated soil observed at approximately 0.9 m.	Free water entering test pit at 1.2 m	Soil texture / grade / structure

Comments:

Faint mottling noted in Ck horizon, increased soil moisture at 0.27 m with free water entering test pit at approximately 1.2 m (saturated soil). No distinct B horizon, A horizon is replaced as traces of red shale observed. Thick, lush vegetation in pasture and area appears to have been irrigated. 1 inch standpipe installed to 3.0 in test pit

Dugout approximately 175 m to the southwest of the test pit.

Residences approximately 125 m to the south of test pit.

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP04			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
NE 1/4	28	009	21	W4	Lot 2; Block 1; Plan 927		Pasture – shortgrass, dry

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Well Drained	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Apk	0-0.10	Clay Loam		10YR 3/2	No	Weak	Fine	Granular	Friable	Dry to Damp	0
Bmk	0.1- 0.19	Clay Loam		10YR 4/3	No	Moderate	Fine to Medium	Blocky	Friable / Firm	Damp to Moist	0
Cca	0.19-1.3	Silty Loam	Hyd.	2.5Y 4/3	Faint Mottling	Weak	Fine	Subangular Blocky	Firm	Moist	0
Ck1	1.3-1.8	Clay Loam		2.5Y 3/3	No	Structureless	Medium	Massive	Soft to Firm	Moist to Very Moist	2-5
Ck2	1.8-3.0	Sandy Clay Loam		2.5Y 4/3	No	Structureless	Fine to Medium	Massive	Soft to Firm	Moist to Very Moist	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
1.62 mbgs	N/A	N/A	Soil texture / grade / structure

Comments:

Faint mottling noted in Cca horizon, increased soil moisture at 1.3 m. No evidence of free water upon completion.

Dugout approximately 70 m to the northeast of the test pit. 1 inch standpipe installed to 3.0 m.

Residences approximately 100 m to the north and south of test pit.

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP05			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
NE 1/4	28	009	21	W4	Lot 2; Block 1; Plan 927		Pasture – shortgrass, dry

Depth of Laboratory Samples:							
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %		Site Topography
Ca DBC		Till		Well Drained	1-2 % East		Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Apk	0-0.17	Clay Loam		10YR 3/3	No	Weak	Medium	Granular	Friable	Dry	0
Bmk	0.17-0.29	Clay Loam		10YR 4/3	No	Moderate	Medium	Blocky	Friable / Firm	Dry	0
Cca	0.29-1.2	Clay Loam	Hyd.	2.5Y 3/2	No	Weak	Fine	Granular	Friable	Moist	0
Ck1	1.2-2.4	Sandy Clay Loam		2.5Y 3/2	Faint Mottle	Structureless	Medium	Massive	Friable / Firm	Moist to Very Moist	2-5
Ck2	2.4-3.0	Silty Clay Loam		2.5Y 3/3	No	Structureless	Medium	Massive	Friable / Soft	Moist to Verv Moist	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading	
2.17 mbgs	N/A	N/A	Soil texture / grade / structure	

Comments:

Faint mottling noted in Ck horizon, increased soil moisture at 0.29 m. No evidence of free water upon completion.

Dugouts approximately 75 m to the northeast and south of the test pit. 1 inch standpipe installed to 3.0 m.

Residences approximately 125 m to 150 m to the south and northeast, respectively, of test pit.

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP06			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
NE 1/4	28	009	21	W4	Lot 2; Block 1; Plan 927		Pasture – shortgrass, dry

Depth of Laboratory Samples:							
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %		Site Topography
Ca DBC		Till		Well Drained	1-2 % East		Level

Profile Description												
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments	
						Grade	Class	Kind				
Apk	0-0.11	Clay Loam		10YR 2/2	No	Weak	Fine	Granular	Friable	Dry	0	
Bmk	0.11-0.21	Silty Clay Loam		10YR 4/3	No	Weak	Fine to Medium	Granular	Friable	Dry	0	
Cca	0.21-1.1	Silty Clay Loam	Hyd.	2.5Y 4/2	No	Moderate	Fine to Medium	Subangular Blocky	Firm / Friable	Moist	0	
Ck	1.1-3.0	Clay Loam		2.5Y 4/2	No	Structureless	Coarse	Massive	Firm / Friable	Moist to Very Moist	2-5	

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading	
2.12 mbgs	N/A	N/A	Soil texture / grade / structure	

Comments:

Increased soil moisture at 0.21 m. No evidence of free water upon completion. 1 inch standpipe installed to 3.0 m.

Dugouts approximately 250 m to the east and west of the test pit.

Residences approximately 130 m to the west and 160 m to the south, respectively, of test pit.

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP07			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
SE 1/4	28	009	21	W4	Lot 1; Block 2; Plan 801 0198		Pasture – shortgrass, dry

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Well Drained	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Apk (Fill)	0-0.08	Clay Loam		10YR 3/2	No	Weak	Fine	Granular	Friable	Dry	0
Fill	0.08-0.31	Clay Loam		10YR 4/2	No	Moderate	Medium	Blocky	Friable / Firm to Hard	Dry	0-2
Ahkb	0.31-0.5	Clay Loam		10YR 2/1	Faint Mottling	Moderate	Medium	Blocky	Friable / Firm to Hard	Dry	0
Bmkb	0.5-0.7	Silty Clay Loam	Hyd.	10YR 2/2	Faint Mottling	Moderate	Medium	Blocky	Friable / Firm to Hard	Dry	0
Cca1	0.7-1.3	Clay Loam to Silty Clay Loam		2.5Y 4/2	Faint Mottling	Weak	Fine	Subangular Blocky	Firm	Moist	0
Cca2	1.3-1.6	Clay Loam		2.5Y 3/2	No	Structureless	Fine to Medium	Massive	Friable / Firm	Moist	0
Ck	1.6-3.0	Clay Loam to Sandy Clay Loam		2.5Y 4/3	No	Structureless	Medium	Massive	Friable / Firm	Moist	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
Dry to 3.0 mbgs	N/A	N/A	Soil texture / grade / structure

Comments:

Faint mottling noted in buried A and B horizons, and in Cca horizon. Increased soil moisture at 0.7 m. No evidence of free water upon completion. 1 inch standpipe installed to 3.0 m

Dugouts approximately 175 m to the north and south of the test pit. Residences approximately 100 m to the east of test pit.

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP08			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
SE 1/4	28	009	21	W4	Lot 1; Block 2; Plan 801 0198		Pasture – shortgrass, dry

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Well Drained	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Apk	0-0.07	Clay Loam		10YR 3/2	No	Weak	Fine	Granular	Friable	Dry	0
Bmk	0.07-0.2	Clay Loam		10YR 3/1	No	Moderate	Coarse	Blocky	Firm	Dry	0
Cca1	0.2-0.6	Loam	Hyd.	2.5Y 5/3	No	Moderate	Fine	Subangular Blocky	Firm	Damp to Moist	0
Cca2	0.6-1.2	Clay Loam		2.5Y 5/2	No	Structureless	Fine	Massive	Friable / Firm	Moist	0
Ck	1.2-3.0	Clay Loam		2.5Y 4/2	No	Structureless	Medium	Massive	Friable / Firm	Moist	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
Dry to 3.0 mbgs	N/A	N/A	Soil texture / grade / structure

Comments:

Increased soil moisture at 0.6 m. No evidence of free water upon completion. 1 inch standpipe installed to 3.0 m
Dugout approximately 80 m to the southwest of the test pit.
Residence approximately 80 m to the northeast of test pit.

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP09			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
SW 1/4	28	009	21	W4	Lot 1; Block 2; Plan 801 0198		Pasture – shortgrass, dry

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Well Drained	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Apk	0-0.09	Clay Loam		10YR 2/2	Faint Mottle	Moderate	Medium	Granular	Friable	Dry to Damp	0
Bmk	0.09-0.3	Clay Loam		10YR 3/2	Faint Mottle	Weak	Medium	Blocky	Firm	Dry to Damp	0
Cca	0.3-0.95	Loam	Hyd.	2.5Y 4/3	Faint Mottle	Moderate	Medium	Subangular Blocky	Firm	Moist	0
Ck1	0.95-2.3	Clay Loam		2.5Y 4/2	No	Structureless	Fine	Massive	Friable / Firm	Moist	2-5
Ck2	2.3-3.0	Clay Loam		2.5Y 3/3	No	Structureless	Fine	Massive	Friable	Moist	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
Dry to 3.0 mbgs	N/A	N/A	Soil texture / grade / structure

Comments:

Faint mottling noted in A, B and Cca horizon. Increased soil moisture at 0.95 m. No evidence of free water upon completion.

Dugout approximately 160 m to the southeast of the test pit. Irrigation canal approximately 65 m to the west of test pit.

Residence approximately 200 m to the north of test pit. 1 inch standpipe installed to 3.0 m

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP10			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
SW 1/4	28	009	21	W4	Lot 1; Block 2; Plan 801 0198		Pasture – shortgrass, dry

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Well Drained	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Ahk	0-0.09	Clay Loam		10YR 3/2	No	Weak	Fine	Granular	Friable	Dry	0
Bmk	0.09-0.31	Clay Loam		10YR 4/3	No	Moderate	Coarse	Blocky	Firm to Hard	Dry	0
Cca1	0.31-0.9	Silty Loam	Hyd.	2.5Y 4/2	No	Moderate	Coarse	Subangular Blocky	Firm to Hard	Damp to Moist	0
Cca2	0.9-2.3	Silty Clay Loam		2.5Y 4/3	No	Structureless	Fine	Massive	Friable	Moist	0
Ck	2.3-3.0	Clay Loam		2.5Y 3/2	Faint Mottle	Structureless	Medium	Massive	Friable	Moist	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
Dry to 3.0 mbgs	N/A	N/A	Soil texture / grade / structure

Comments:

Faint mottling noted in Ck horizon. Increased soil moisture at 0.9 m. No evidence of free water upon completion.
Dugout approximately 230 m to the southeast of the test pit. Irrigation canal approximately 115 m to the west of test pit.
Residence approximately 50 m to the north of test pit. 1 inch standpipe installed to 3.0 m

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP11			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
SW 1/4	28	009	21	W4	Lot 1; Block 2; Plan 801 0198		Pasture – shortgrass, dry

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Well Drained	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Ahk	0-0.13	Clay Loam		10YR 3/2	No	Weak	Fine	Granular	Friable	Dry	0
Bmk	0.13-0.4	Clay Loam		10YR 4/3	Faint Mottling	Moderate	Coarse	Blocky	Firm	Dry	0
Cca1	0.4-0.9	Clay Loam	Hyd.	2.5Y 3/2	Faint Mottling	Moderate	Coarse	Subangular Blocky	Firm	Damp to Moist	0
Cca2	0.9-1.2	Clay Loam to Sandy Clay Loam		2.5Y 3/3	No	Structureless	Fine to Medium	Massive	Friable	Moist	0
Ck	1.2-3.0	Clay Loam to Sandy Clay Loam		2.5Y 3/3	No	Structureless	Fine to Medium	Massive	Friable / Firm	Moist	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
Dry to 3.0 mbgs	N/A	N/A	Soil texture / grade / structure

Comments:

Faint mottling noted in B and C horizon. Increased soil moisture at 0.6 m. No evidence of free water upon completion.

Dugout approximately 175 m to the southeast of the test pit. Irrigation canal approximately 130 m to the west.

Residence approximately 100 m to the north of test pit. 1 inch standpipe installed to 3.0 m

Site Observations and Soil Profile

Job ID			Testpit Identification			Date	Weather Condition
ENG.LGEO04408-01.003			21TP12			September 9, 2021	Clear, Sunny, Warm
Site Information:							
LSD/1/4	Sec.	Twp.	Rg.	Mer.	Proposed Lot Number		Vegetation
NW 1/4	28	009	21	W4	Lot 1; Block 2; Plan 801 0198		Pasture – shortgrass, dry

Depth of Laboratory Samples:						
Soil Subgroup		Parent Material		Drainage	Slope Position and Slope %	Site Topography
Ca DBC		Till		Well Drained	1-2 % East	Level

Profile Description											
Horizon	Depth (mbgs)	Texture	Lab/HT	Colour	Gleying/ Mottling?	Structure			Consistence	Moisture	% Coarse Fragments
						Grade	Class	Kind			
Ahk	0-0.16	Clay Loam		10YR 3/2	No	Weak	Fine	Granular	Friable	Dry	0
Bmk	0.16-0.45	Clay Loam		10YR 3/1	No	Moderate	Coarse	Blocky	Firm to Hard	Dry	0
Cca1	0.45-0.7	Silty Loam	Hyd.	2.5Y 3/3	No	Moderate	Coarse	Subangular Blocky	Firm to Hard	Dry	0
Cca2	0.7-1.0	Silty Clay Loam		2.5Y 4/3	No	Structureless	Fine	Massive	Friable	Moist	0
Ck	1.0-3.0	Clay Loam to Silty Clay Loam		2.5Y 4/2	Faint Mottling	Structureless	Medium	Massive	Friable / Firm	Moist	2-5

Depth to Groundwater	Restricting Soil Layer Characteristic	Depth to Highly Permeable Layer Limiting Design	Key Soil Characteristics Applied to System Design Effluent Loading
Dry to 3.0 mbgs	N/A	N/A	Soil texture / grade / structure

Comments:

Faint mottling noted in Ck horizon. Increased soil moisture at 0.7 m. No evidence of free water upon completion.

Dugout approximately 130 m to the northeast of the test pit. Irrigation canal approximately 190 m to the west of test pit.

Residence approximately 50 m to the southwest of test pit. 1 inch standpipe installed to 3.0 m.

APPENDIX C

LIMITATIONS ON USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by persons other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary investigation and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

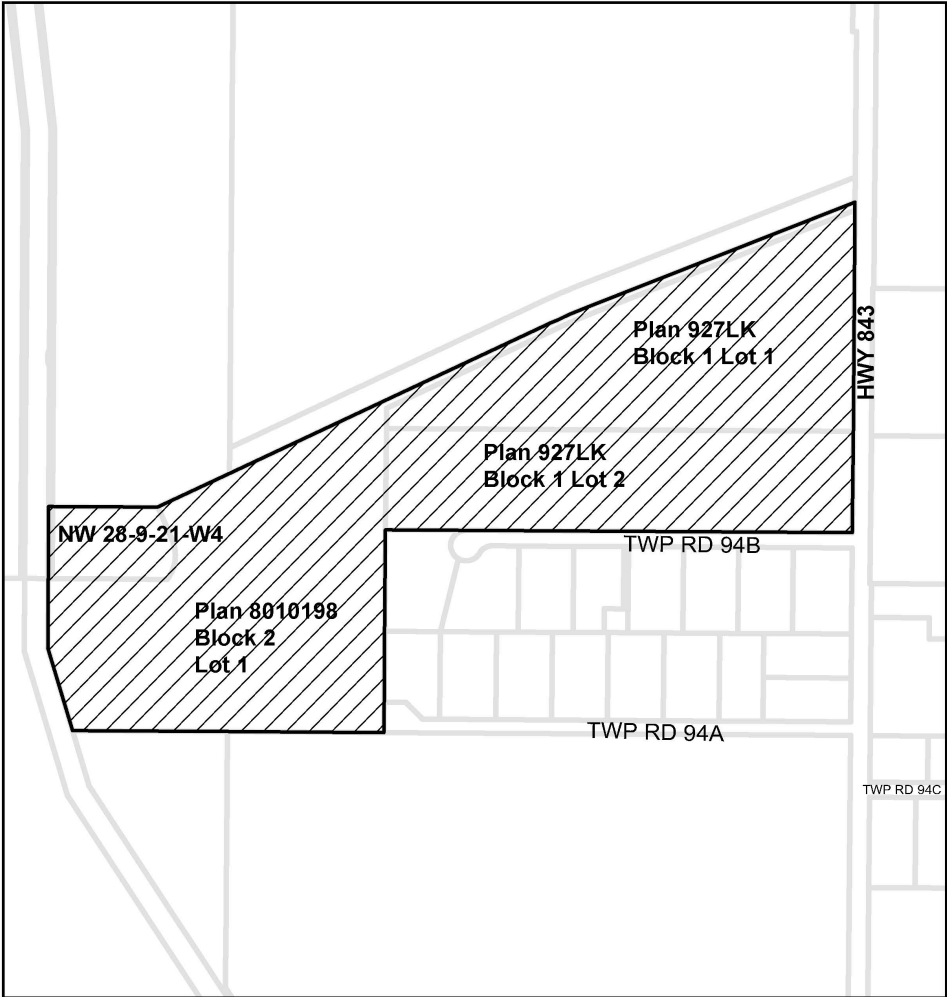
**LETHBRIDGE COUNTY
IN THE PROVINCE OF ALBERTA
BYLAW NO. 22-010**


Bylaw 22-010 of Lethbridge County being a bylaw for the purpose of amending Land Use Bylaw 1404, in accordance with Sections 230, 606 and 692 of the Municipal Government Act, R.S.A. 2000, Chapter M-26.

WHEREAS the purpose of Bylaw 22-010 is to re-designate portions of the NW 28-9-21-W4 (3.5 acres), Plan 927LK, Block1, Lots 1 and 2, and Plan 8010198, Block 2, Lot 1, from Lethbridge Urban Fringe (LUF) to Grouped Country Residential (GCR) as shown below;

AND WHEREAS the re-designation of the lands will allow for future residential subdivision and development of the parcels;

AND WHEREAS the municipality must prepare an amending bylaw and provide for its notification and consideration at a public hearing;



Land Use Redesignation
Bylaw 22-010 Lethbridge Urban Fringe (LUF) to Grouped Country Residential (GCR)
All of Plan 927LK Block 1 Lot 1, All of Plan 927LK Block1 Lot 2,
All of Plan 8010198 Block 2 Lot 1, Portion of NW 28-9-21-W4 (3.5 Acres)
 Lethbridge Urban Fringe (LUF) to Grouped Country Residential (GCR)

AND WHEREAS the re-designation of the lands will allow for future residential subdivision and development of the parcels;

AND WHEREAS the municipality must prepare an amending bylaw and provide for its notification and consideration at a public hearing;

NOW THEREFORE, under the authority of the Municipal Government Act, R.S.A. 2000, C-26, as amended, the Council of Lethbridge County in the Province of Alberta duly assembled does hereby enact the following, with the bylaw only coming into effect upon three successful reading thereof;

GIVEN first reading this 15th day of September 2022.

Reeve

Chief Administrative Officer

GIVEN second reading this _____ day of _____, 20____.

Reeve

Chief Administrative Officer

GIVEN third reading this _____ day of _____, 20____.

Reeve

Chief Administrative Officer

1 st Reading	September 15, 2022
2 nd Reading	
Public Hearing	
3 rd Reading	

AGENDA ITEM REPORT



Title: Bylaw 22-012 - Re-designate a portion of NE/NW 12-9-19-W4 from Rural Agriculture to Rural Recreation- Third Reading
Meeting: Council Meeting - 15 Sep 2022
Department: Community Services
Report Author: Hilary Janzen

APPROVAL(S):

Larry Randle, Director of Community Services,
Ann Mitchell, Chief Administrative Officer,

Approved - 06 Sep 2022
Approved - 07 Sep 2022

STRATEGIC ALIGNMENT:



Governance



Relationships



Region



Prosperity

EXECUTIVE SUMMARY:

An application has been made to re-designate portions of the NE/NW 12-9-19-W4 from Rural Agriculture to Rural Recreation to allow for the expansion of the existing campground and recreational area. County Council postponed third reading of Bylaw 22-012 to obtain further information from County Administration prior to third reading.

RECOMMENDATION:

That Bylaw 22-012 be read a third time.

REASON(S) FOR RECOMMENDATION(S):

The proposed bylaw will allow for the future expansion of an existing recreational area which would be beneficial to the county and the region.

PREVIOUS COUNCIL DIRECTION / POLICY:

- The Municipal Development Plan policy 4.13 states that landowners/developers may apply to Lethbridge County to initiate a re-designation process for parcels of land in support of development proposals that may not conform to the existing land use designation.
- Bylaw 22-012 was read a first time on August 4, 2022
- A Public Hearing was held on September 1, 2022
- Bylaw 22-012 was read a second time on September 1, 2022

BACKGROUND INFORMATION:

An application has been made to re-designate portions of the NE/NW 12-9-19-W4 from Rural Agriculture to Rural Recreation. The intent of this application is to allow for the expansion of the existing Stafford Park area including the campground as noted on the application submitted.

At the public hearing held on September 1, 2022. County council had the opportunity hear comments from the general public that included 10 in-person presentations. Many of the concerns expressed were with regards to Township Road 9-2 and the concerns with dust, traffic speed, and maintenance of the road. Other major concerns included noise coming from the campsite area and the watercraft on the reservoir.

Council proceeded with second reading of the bylaw but postponed consideration of third reading until September 15, 2022. County Council requested that additional information be brought forward by Administration with regards to the road including:

1. Traffic Counts on Township Road 9-2
 - o Friday July 29, 2022 count - 541
2. Costs associated with upgrading Township Road 9-2
 - o Approximately \$1,700,000 for pavement, \$800,000 for cement stabilization
3. Haul Route Status of Township Road 9-2
 - o Not a designated haul route, from highway 512 to the park is a light, standard-base stabilized road

ALTERNATIVES / PROS / CONS:

County Council may refuse third reading of the bylaw.

Pros: Refusing the bylaw would alleviate some concerns of the adjacent residents by not having additional amenities and users at the park.

Cons: The County and region would not benefit from an enhanced recreational area and tourism development. The refusal of the bylaw will not stop the current use of the recreational area which has an existing development permit.

FINANCIAL IMPACT:

If the bylaw was approved, future development would be taxed at the County's recreation property tax rate.

LEVEL OF PUBLIC PARTICIPATION:

☒ **Inform** ☐ **Consult** ☐ **Involve** ☐ **Collaborate** ☐ **Empower**

ATTACHMENTS:

[Bylaw 22-012 RA to RR Application](#)

[Stafford Park expansion letter](#)

[Bylaw 22-012 Signed Second Reading](#)



LETHBRIDGE COUNTY
APPLICATION FOR A
LAND USE BYLAW AMENDMENT
Pursuant to Bylaw No. 1404

Form C

OFFICE USE		
Date of Application: <u>July 5, 2022</u>	Assigned Bylaw	No. <u>22-012</u>
Date Deemed Complete: <u>July 6, 2022</u>	Application & Processing Fee:	\$ <u>1500.00</u>
Redesignation <input checked="" type="checkbox"/> Text Amendment <input type="checkbox"/>	Certificate of Title Submitted:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

A refusal is **not** appealable and a subsequent application for amendment involving the same lot and/or the same or similar use may not be made for at least 18 months after the date of refusal. (Refer to sections 53(1))

IMPORTANT NOTE: Although the Development Officer is in a position to advise on the principle or details of any proposals, such advice must not be taken in any way as official consent.

APPLICANT INFORMATION

Name of Applicant: 1911371 Alberta Ltd Nelson Porter

Mailing Address: Box 69 Barnwell AB

Phone: 403 634 4997

Phone (alternate): 403 223 2277

Email: staffordlakeresort@gmail.com

Postal Code: T0K 0B0

Is the applicant the owner of the property? ☒ Yes ☐ No
IF "NO" please complete box below

Name of Owner: _____	Phone: _____
Mailing Address: _____ _____ _____	Applicant's Interest in the property: <input type="checkbox"/> Agent <input type="checkbox"/> Contractor <input type="checkbox"/> Tenant <input type="checkbox"/> Other _____
Postal Code: _____	

PROPERTY INFORMATION

Municipal Address: 190057 Twp Rd 9-2, Lethbridge County, AB T0K0B0

Legal Description: Lot(s) _____ Block _____ Plan _____
OR Quarter NW&NE Section 12 Township 9 Range 19

AMENDMENT INFORMATION

What is the proposed amendment?

☐ Text Amendment

☒ Land Use Redesignation

IF TEXT AMENDMENT:

For text amendments, attach a description including:

- The section to be amended;
- The change(s) to the text; and
- Reasons for the change(s).

IF LAND USE REDESIGNATION:

Current Land Use Designation (zoning):

Rural Agricultural

Proposed Land Use Designation (zoning) (if applicable):

Rural Recreational

SITE DESCRIPTION:

Describe the **lot/parcel dimensions** _____ and **lot area/parcel acreage** total RE Area 97 acres
Indicate the information on a scaled PLOT or SITE PLAN: (0-4 acres at 1" = 20'; 5-9 acres at 1" = 100'; 10 acres or more at 1" = 200')

☒ **Site or Plot Plan Attached**

☒ **Conceptual Design Scheme or Area Structure Plan Attached**

OTHER INFORMATION:

Section 52 of the *Land Use Bylaw* regulates the information required to accompany an application for redesignation. Please **attach a descriptive narrative** detailing:

- The existing and proposed future land use(s) (i.e. details of the proposed development);
- If and how the proposed redesignation is consistent with applicable statutory plans;
- The compatibility of the proposal with surrounding uses and zoning;
- The development suitability or potential of the site, including identification of any constraints and/or hazard areas (e.g. easements, soil conditions, topography, drainage, etc.);
- Availability of facilities and services (sewage disposal, domestic water, gas, electricity, fire protection, schools, etc.) to serve the subject property while maintaining adequate levels of service to existing development; and
- Access and egress from the parcel and any potential impacts on public roads.

In addition to the descriptive narrative, an Area Structure Plan or Conceptual Design Scheme may be required in conjunction with this application where:

- redesignating land to another district;
- multiple parcels of land are involved;
- four or more lots could be created;
- several pieces of fragmented land are adjacent to the proposal;
- new internal public roads would be required;
- municipal services would need to be extended; or
- required by Council, or the Subdivision or Development Authority if applicable.

The applicant may also be required to provide other professional reports, such as a:

- geotechnical report; and/or
 - soils analysis; and/or
 - evaluation of surface drainage or a detailed storm water management plan;
 - and any other information described in section 52(2) or as deemed necessary to make an informed evaluation of the suitability of the site in relation to the proposed use;
- if deemed necessary.

SITE PLAN

Plans and drawings, in sufficient detail to enable adequate consideration of the application, must be submitted in **duplicate** with this application, together with a plan sufficient to identify the land. It is desirable that the plans and drawings should be on a scale appropriate to the development. However, unless otherwise stipulated, it is not necessary for plans and drawings to be professionally prepared. Council may request additional information.

DECLARATION OF APPLICANT/AGENT

The information given on this form is full and complete and is, to the best of my knowledge, a true statement of the facts in relation to the application. I also consent to an authorized person designated by the municipality to enter upon the subject land and buildings for the purpose of an inspection during the processing of this application. *I/We have read and understand the terms noted below and hereby certify that the registered owner of the land is aware of, and in agreement with this application.*



APPLICANT



REGISTERED OWNER
(If not the same as applicant)

DATE: July 4 2022

FOIP STATEMENT: Personal information on this form is collected under the authority of section 33(c) of the Freedom of Information and Protection of Privacy (FOIP) Act. The information collected here will be used to by Lethbridge County for the purposes of reviewing this application. This form is a public record that is available to anyone. All information contained on this form (including personal information) is disclosed by Lethbridge County to anyone requesting a copy in accordance with Lethbridge County Policy No. 173 (Freedom of Information and Protection of Privacy (FOIP)). For further information about the collection and use of this information please contact the Lethbridge County FOIP Coordinator at: foip@lethcounty.ca or call (403) 328-5525 or come into the office #100, 905-4th Avenue South, Lethbridge Alberta, T1J 4E4.

TERMS

1. Subject to the provisions of the Land Use Bylaw No. 1404 of Lethbridge County, the term "development" includes any change in the use, or intensity of use, of buildings or land.
2. Pursuant to the municipal development plan, an area structure plan or conceptual design scheme may be required by Council before a decision is made.
3. A refusal is not appealable and a subsequent application for redesignation (reclassification) involving the same or similar lot and/or for the same or similar use may not be made for at least 18 months after the date of a refusal.
4. An approved redesignation (reclassification) shall be finalized by amending the land use bylaw map in accordance with section 692 of the Municipal Government Act, Revised Statutes of Alberta 2000, Chapter M-26.

Note: Information provided or generated in this application may be considered at a public meeting.

LETHBRIDGE COUNTY
 #100, 905 - 4 AVENUE SOUTH
 LETHBRIDGE, ALBERTA
 T1J 4E4
 TELEPHONE: (403) 328-5525
 FAX: (403) 328-5602
O F F I C I A L R E C E I P T

1581959 ALBERTA LTD.

GST Reg. #: R106989023
 Receipt #: 0330690
 Date: 2022/07/05

Account #	Description	Opening Bal	Payment	Amount Due
1.3.599.10.5.00	LAND USE BYLAW AMENDMENT		1,500.00	

		** Payment Total:	1,500.00	
000020	Cheque			1,500.00



Stafford Lake Resort

Rezoning Proposal

July 2022

Introduction

Stafford Park opened as a campground and beach in 1985. It has served the Lethbridge and county community for almost 40 years. Despite various periods of closure over the years it has been a great summer escape for the local community. A new ownership group reopened the park in 2015 and operated for 2 summers making slight improvements to the boat launch and beach. In 2018 the park underwent another corporate restructuring, and the park is now owned and operated by one entity. Over the past 5 years various upgrades and changes have occurred. Below are a few before and after pictures of these upgrades:

2015 - Before



2022 - After



After a lot of planning, hard work and investment the park has been brought back into full operation. We often get feedback from members of the community who used the park as youth and are glad that it is once again reopened so they can come with their families to enjoy it:

Stafford Park Reviews:

"Tidy and clean beach with decent sand! A good find for southern Alberta."

"Glad these guys got their stuff together and reopened this park!" 🥰

"Congrats to the new owners and team at Stafford lake!! The place looks amazing and the upkeep is fantastic!! Well done! We've enjoyed almost every weekend there all summer long!"

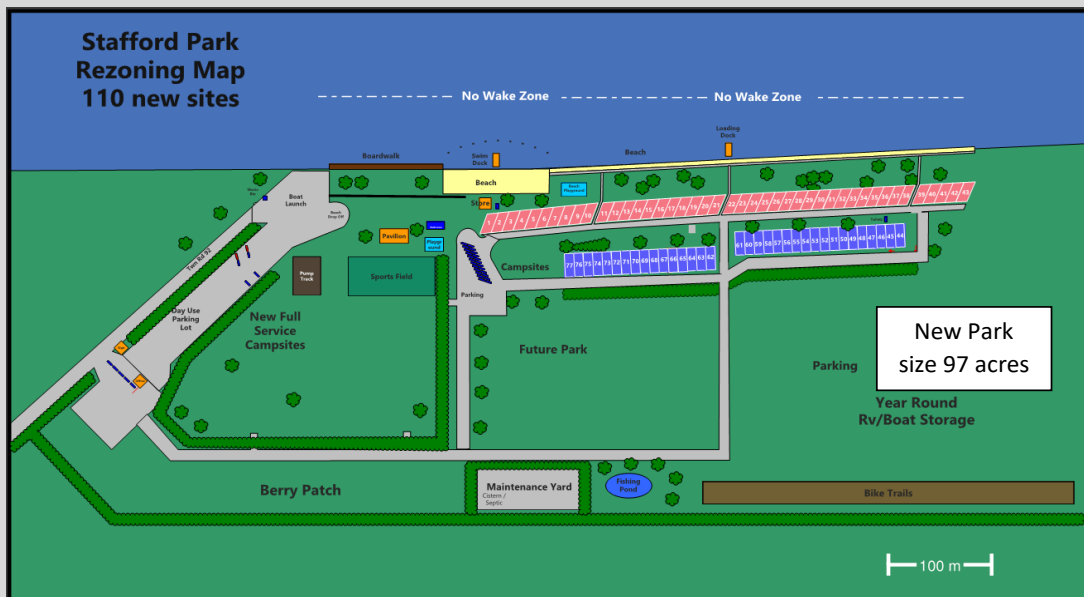
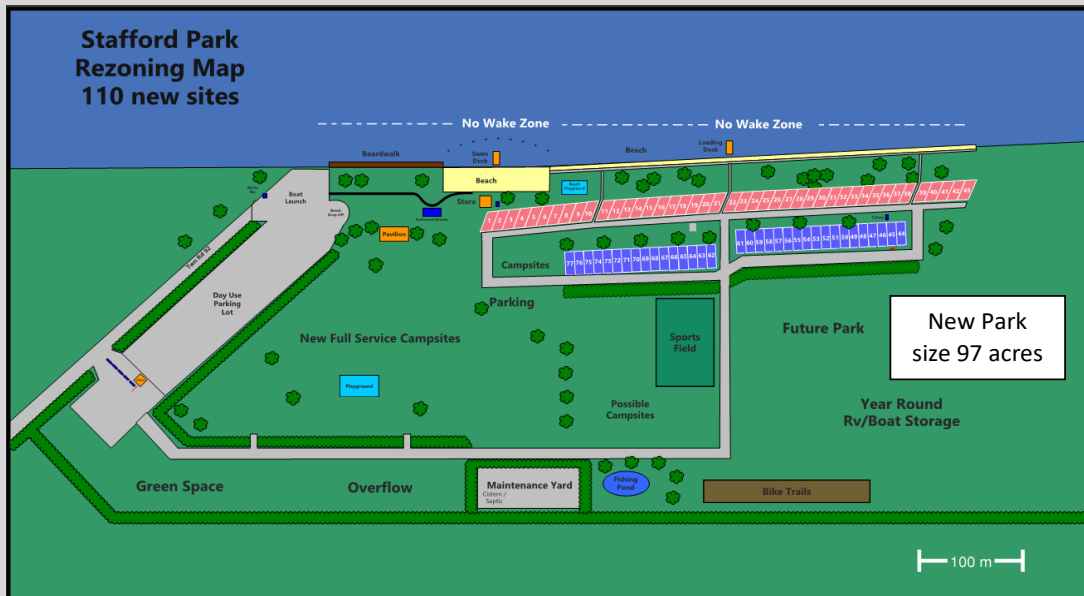


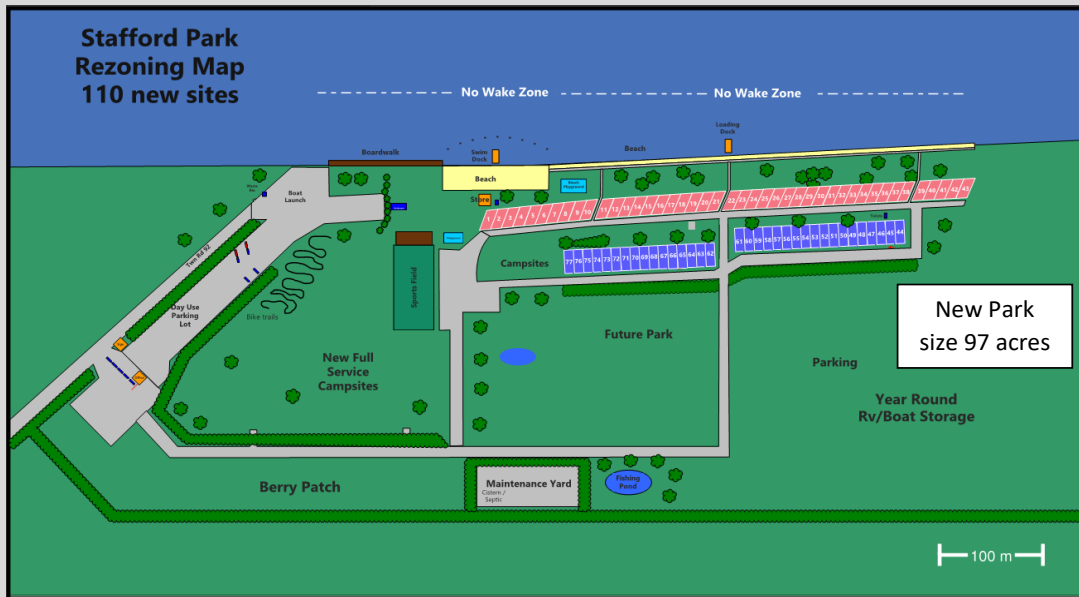
Proposal

With so much positive feedback and strong demand for more campsites we are proposing a rezoning and expansion to the park. This expansion would include:

- *110 additional fully serviced campsites*
- *New Day use parking lot*
- *More amenities (playgrounds, bike trails, fishing pond, sport court, pavilion, further improvements to beach, soccer field etc.)*
- *Space for future campsites*

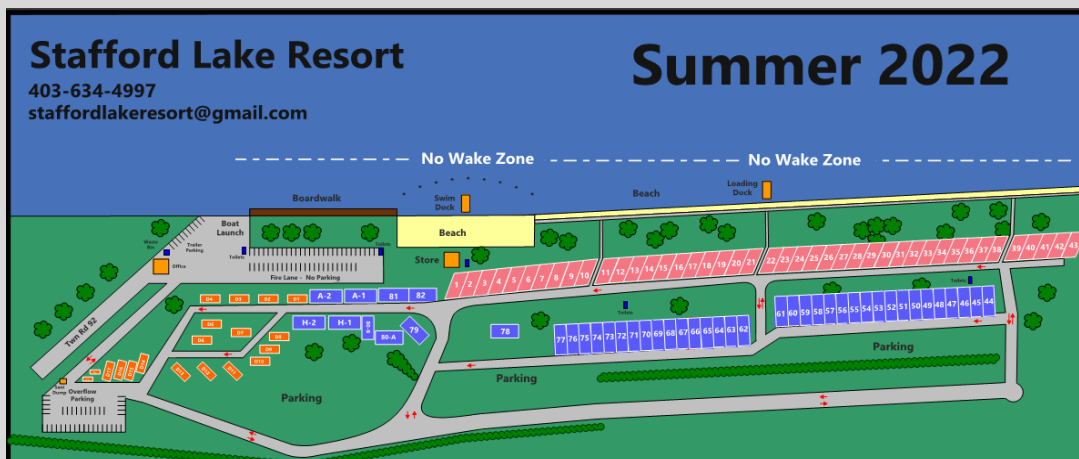
A few different site designs are being considered:



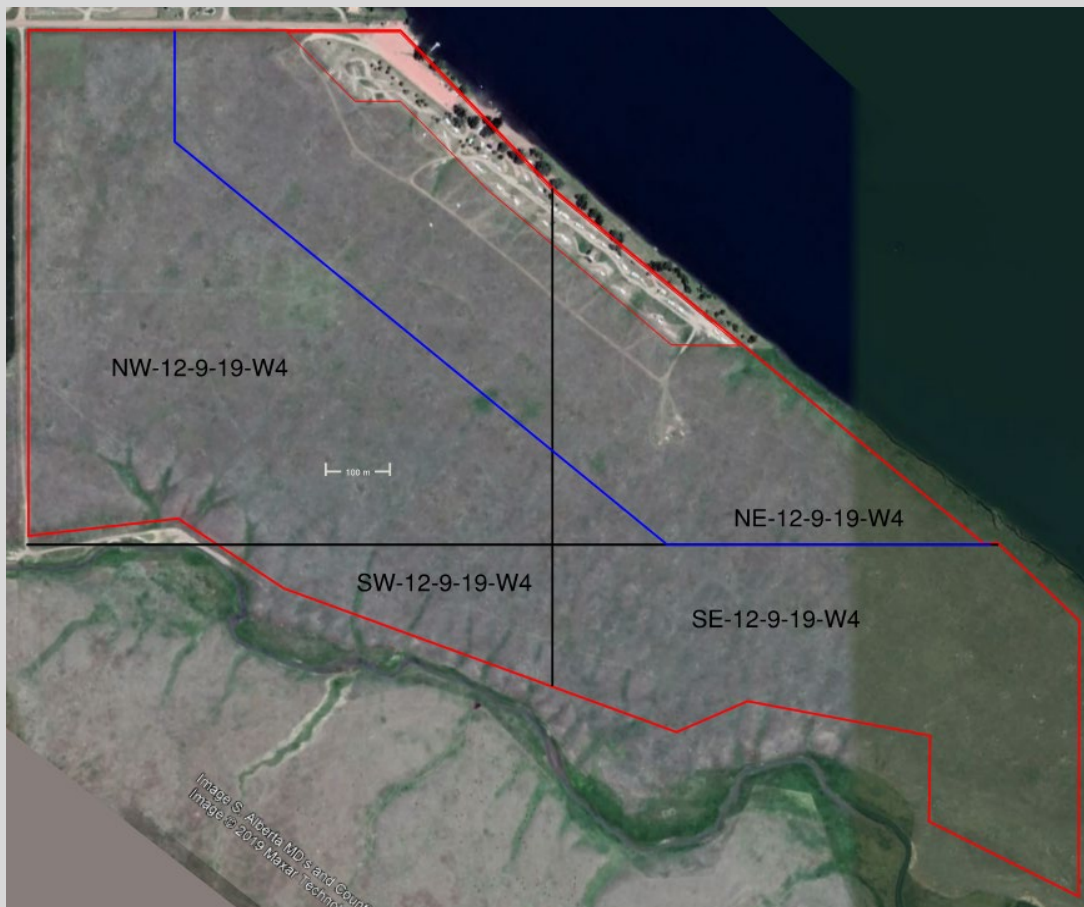


The expansion would take place in 2-3 phases with 25-50 campsites at a time.

Current Park map for reference:



Proposed new rezoning boundary in blue:



Community Feedback



In March of 2022 we sent out a newsletter to the neighboring Stafford Estates community detailing our proposal for park expansion and rezoning. We asked for feedback on our expansion proposal and how they thought the park was being managed.

Out of the 19 neighboring residents we received eight responses. We were pleased to find that six were for expansion and only two were against it. The following are some general comments we received:

Positive:

- "Thank you for your letter, we have no problem with expansion"
- "We are not against expansion and are happy with the park so far"
- "Thanks for your letter, it shows good corporate responsibility"
- "We like the landscaping you have done, please do more"
- "Generally supportive, the park looks awesome"

Suggestions:

- Seasonal campers are fine but the day use people are not respectful
- Can you landscape your entrance, make sure you have a good emergency exit plan
- What can we do to slow down traffic?
- Provide a landscape buffer along 9-2 please
- "Dust control the entrance to your park"

Negative:

- "We oppose expansion"
- "Too much traffic and too fast"
- "Boaters have too loud of music"
- "We have seen alcohol consumption on the lake"

This feedback has been useful to see where improvement can be made. Below are some solutions to some of these concerns:

Concern - Traffic speed on 9-2

By moving the park entrance 200 meters south west on range road 9-2 traffic there is less distance for vehicles to maintain or build speed when driving to and from the park. This will encourage vehicles to slow down to 30km/hr sooner instead of speeding down the hill to the lake.



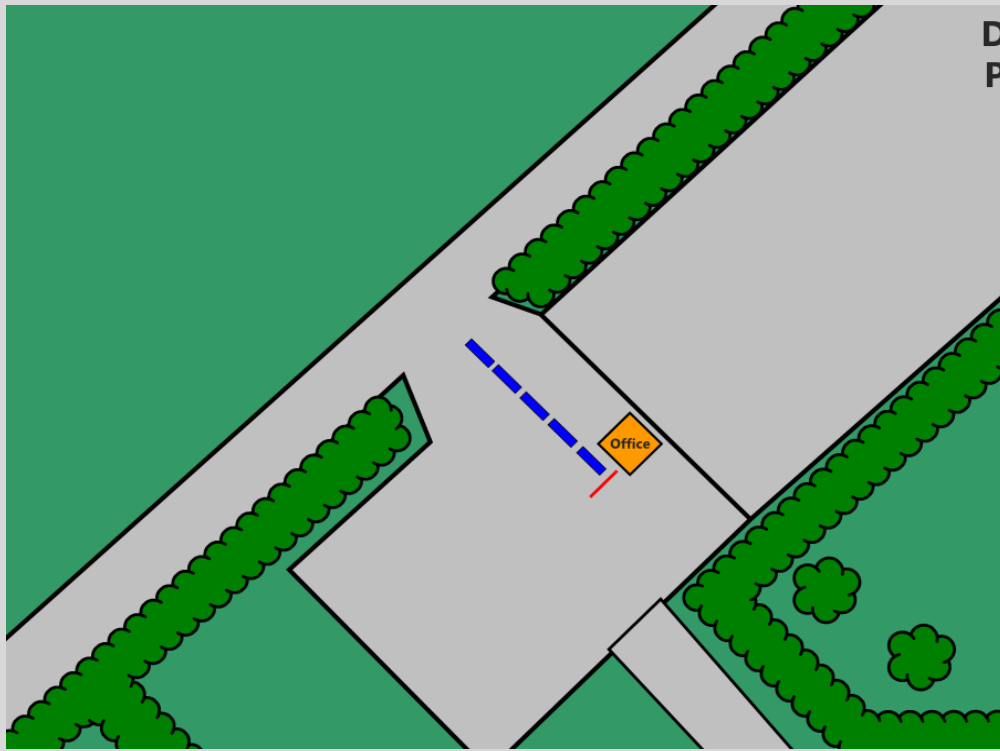
Concern – Park entrance landscaping and dust control

The new park design shows a landscape buffer along all of road 9-2. This has already been started with a row of caragana bushes. We will continue to add to this landscape buffer to hopefully provide a sound and visual barrier to the park. In addition to a landscape barrier we would like to do more custom landscaping at the park entrance with rock, trees and grass. Finally, the entrance road and all of the park roads will be dust controlled.



Concern – don't put park office too close to 9-2 so traffic backup doesn't spillover onto 9-2

The office will be moved further into the park as to prevent vehicle backups onto 9-2.



Concern – Day use public is not respectful, loud music on lake and alcohol consumption on lake

The campground has rules regarding alcohol consumption and quiet hours after 11pm. These rules are strictly enforced, and our campers have been receptive. In our experience seasonal campers and season pass holders are usually the most respectful and considerate of others. Public disturbances while rare typically come from day use participants. We have had reports of alcohol consumption by boaters on the lake. In discussions with the police, they have advised that the best thing to do is report any violation to them immediately. Park policy is now to report any alcohol consumption on a watercraft immediately to the police as well as the park host. Park management will also be keeping track of any reports of this behavior and watercraft & license plates can be banned from returning to the park. The park has also put up new signs at the boat launch reminding the public that boating and drinking is against the law. New policies including closing the boat launch and park gate after 11 will be enforced.

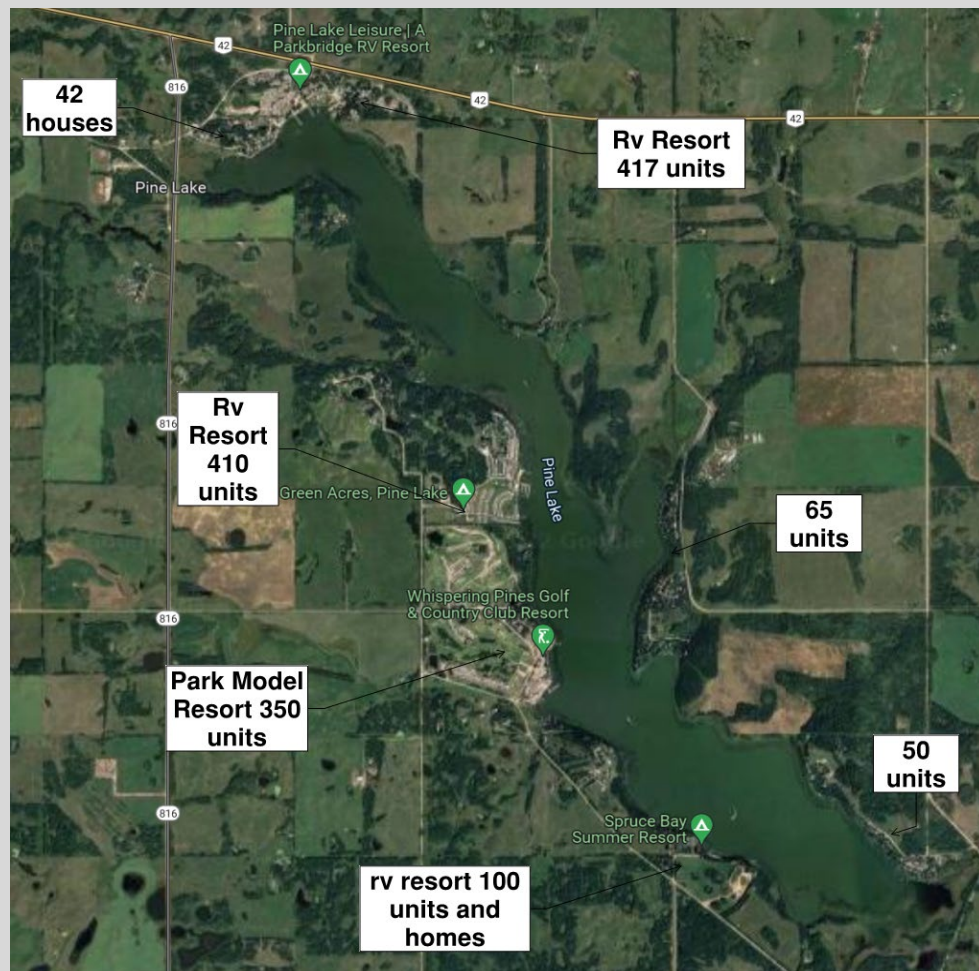


Comparables - Density of units/lake size

Pine Lake Alberta – Lake size – 4 square km

Units (rv lots/houses) **1400+**

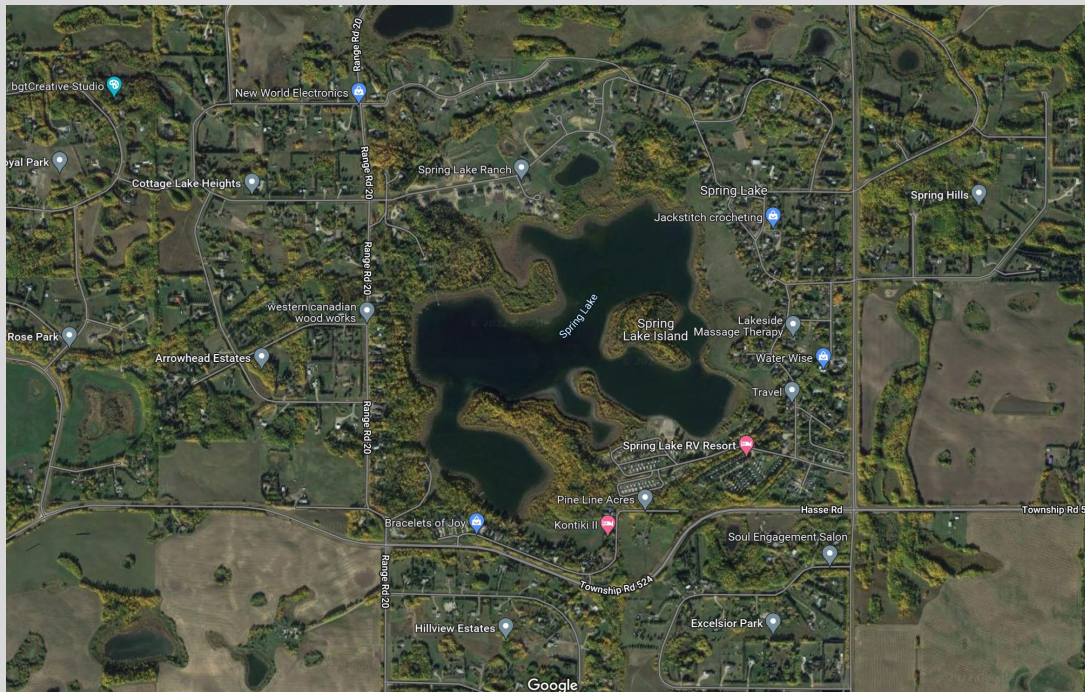
Density - Units/sq km of lake = **400**



Spring Lake Alberta – Lake size 2 square km

Units (rv lots/houses) **442**

Density - Units/sq km of lake = **221**



Stafford Lake – Lake size 5 square km

Units (rv lots/houses) - 47 homes, 107 campsites = **154** total

Density - Units/sq km of lake = **31**



Utilities:

Water/Power/Sewer

Currently the campground gets potable water from the COLRWA. There is sufficient potable water from this source to supply the additional 110 campsites. All sewage is pumped to a sewage holding tank and then hauled off site to be disposed of to a local municipality. This would also continue as currently operated.

A new power meter would likely be installed by Fortis to support the additional 30 amp sites.

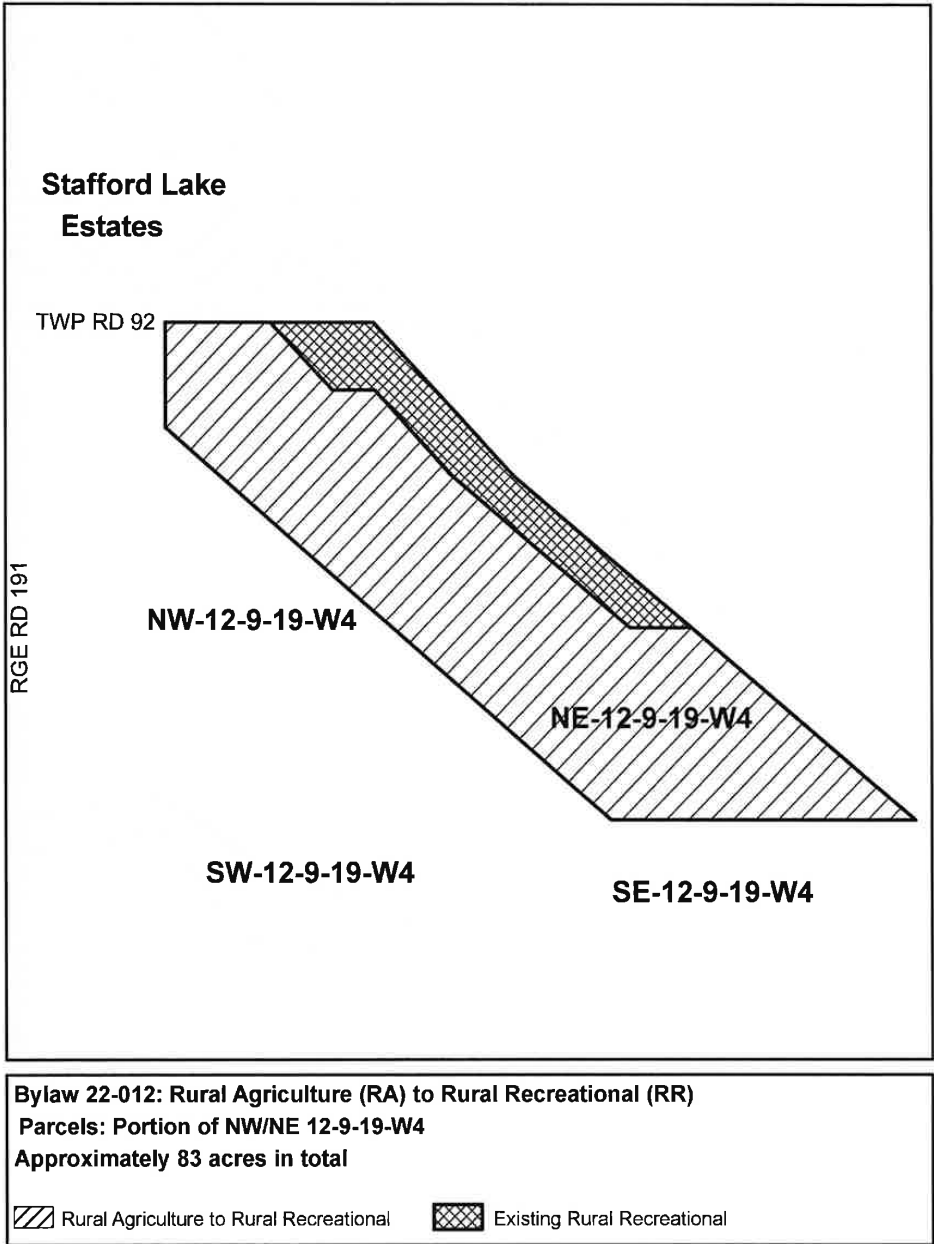


**LETHBRIDGE COUNTY
IN THE PROVINCE OF ALBERTA**

BYLAW NO. 22-012

Bylaw 22-012 of Lethbridge County being a bylaw for the purpose of amending Land Use Bylaw 1404, in accordance with Sections 230, 606 and 692 of the Municipal Government Act, R.S.A. 2000, Chapter M-26.

WHEREAS the purpose of Bylaw 22-012 is to re-designate portions of the NW and NE 12-9-19-W4 (83 acres), from Rural Agriculture (RA) to Rural Recreation (RR) as shown below;



AND WHEREAS the re-designation of the lands will allow for the expansion of the existing recreational development on the parcel;

AND WHEREAS the municipality must prepare an amending bylaw and provide for its notification and consideration at a public hearing;

NOW THEREFORE, under the authority of the Municipal Government Act, R.S.A. 2000, C-26, as amended, the Council of Lethbridge County in the Province of Alberta duly assembled does hereby enact the following, with the bylaw only coming into effect upon three successful reading thereof;

GIVEN first reading this 4th day of August 2022.




Reeve



Chief Administrative Officer

GIVEN second reading this 1 day of September, 2022.



Reeve



Chief Administrative Officer

GIVEN third reading this _____ day of _____, 20____.

Reeve

Chief Administrative Officer

1 st Reading	August 4, 2022
2 nd Reading	SEPTEMBER 1, 2022
Public Hearing	SEPTEMBER 1, 2022
3 rd Reading	

AGENDA ITEM REPORT



Title: Alberta Development Officers Week - September 18-24
Meeting: Council Meeting - 15 Sep 2022
Department: Community Services
Report Author: Hilary Janzen

APPROVAL(S):

Larry Randle, Director of Community Services,
Ann Mitchell, Chief Administrative Officer,

Approved - 05 Sep 2022
Approved - 06 Sep 2022

STRATEGIC ALIGNMENT:



Governance



Relationships



Region



Prosperity

EXECUTIVE SUMMARY:

September 18-24, 2022 is Alberta Development Officers Week

RECOMMENDATION:

That County Council proclaim the week of September 18-24, to be designated as Alberta Development Officers Week within Lethbridge County.

REASON(S) FOR RECOMMENDATION(S):

This will acknowledge the hard work and efforts of the County's Development Officer (Nathan Hill).

PREVIOUS COUNCIL DIRECTION / POLICY:

None

BACKGROUND INFORMATION:

In recognition of Development Officers in Alberta, the Alberta Development Officer Association (ADOA) has proclaimed September 18-24 as the Alberta Development Officers Week.

Development Officers are current planning and development specialists with expertise in current provincial legislation, municipal policies and bylaws, and technical requirements for physical development within Alberta communities.

In order to acknowledge the importance of Development Officers, County Administration requests that County Council proclaim the week of September 18-24, 2022, to be designated as Alberta Development Officers Week within Lethbridge County.

ALTERNATIVES / PROS / CONS:

None

FINANCIAL IMPACT:

None

LEVEL OF PUBLIC PARTICIPATION:



Inform



Consult



Involve



Collaborate



Empower

ATTACHMENTS:

[Proclamation for Alberta Development Officers Week September 2022](#)

PROCLAMATION
ALBERTA DEVELOPMENT OFFICERS WEEK
September 18th to September 24th

WHEREAS, A Development Officer is a current planning and development specialist with knowledge in current legislation, policy and bylaws, systems and technical requirements for physical development within communities in the Province of Alberta. A Development Officer enforces and administers land use regulations and policies on behalf of a municipality and is designated to the position of Development Authority by the municipality as defined by the Municipal Government Act, RSA 2000, Chapter M-26.

WHEREAS the Alberta Development Officers Association, representing professional Development Officers in Alberta, endorses Alberta Development Officers Week to recognize sound development and planning practices and the contribution made by Development Officers to the quality of development within our communities and environment; and,

WHEREAS Alberta Development Officers Week helps us to publicly recognize the work of our municipal colleagues in planning and development for the improvement of Lethbridge County; and,

WHEREAS we recognize Development Officers and their commitment to public service; and,

NOW, THEREFORE, I, _____, do hereby proclaim the week of September 18th to September 24th, to be designated as Alberta Development Officers Week in Lethbridge County.

Proclaimed this ____ day of _____, 2022

SEAL

Reeve

AGENDA ITEM REPORT



Title: Agricultural Service Board Bylaw 22-017 and Terms of Reference
Meeting: Council Meeting - 15 Sep 2022
Department: Municipal Services
Report Author: Jeremy Wickson

APPROVAL(S):

Ann Mitchell, Chief Administrative Officer,

Approved - 09 Sep 2022

STRATEGIC ALIGNMENT:



Governance



Relationships



Region



Prosperity

EXECUTIVE SUMMARY:

After an administrative review, it was discovered that the ASB committee was not operating under an approved bylaw.

The Agricultural Service Board (ASB) has recommended the Bylaw and a revised Terms of Reference be forwarded to Council. The formation of the ASB committee is in conjunction with the MGA Section 146 Composition of Council Committees, and the ASB Act Sections 2 and 3 for duties, roles and establishment. The Bylaw and Terms of Reference will clearly identify the ASB Committee's role and how it is to be structured and function.

Policy recommendations from internal committees, in this case the ASB, are forwarded to regular meetings of Council for approval.

RECOMMENDATION:

Moved that Bylaw 22-017 be read a first time.

Moved that Council adopt the ASB Terms of Reference with amendments.

REASON(S) FOR RECOMMENDATION(S):

Bylaw is in conjunction with the Municipal Government Act for committees approved and established by Council. The Bylaw and Terms of Reference provide Council with a template that clearly defines the structure and roles of the Agricultural Service Board.

PREVIOUS COUNCIL DIRECTION / POLICY:

Previous Council direction asked to change the committee structure to have public representation within the committee. The formation was to include 4 members of Council designated from the annual organizational meeting and 3 at-large public members.

BACKGROUND INFORMATION:

Previously the ASB Committee was operating without a bylaw. As part of the internal policy review with the administration, the need for a Bylaw and Terms of Reference for all council committees was evaluated, and the ASB was identified as not having one in place.

Bylaws and Terms of Reference clearly define the legislated structure of the committee and the members it is composed of. Under the direction of Council from the MGA Section 145, council committees such as the ASB can be formed through a bylaw. Only Council has the power to pass bylaws and can not delegate that authority to a committee as per MGA Section 203.

ALTERNATIVES / PROS / CONS:

Council approves the structure and roles of the ASB. The ratio of council members to the public can be as an approved bylaw, which in turn can be amended in the future if Council deems it otherwise.

Regarding the ASB Chair, the ASB Act Section 3 (2) states that Council is to determine the Chair, the number of members and the voting status.

Options for consideration:

1. Council can appoint the Chair from a member of Council, during the annual organizational meeting or at a later date; or
2. Council can appoint a member of the ASB committee who is an at-large public member; or
3. Allow voting members of the ASB to nominate a Chair to Council, at which point Council could the appoint the Chair.

For the provincial ASB voting delegates, any appointed member of the ASB can be the provincial delegates as voted on during their committee meeting, unless designated otherwise through the bylaw.

FINANCIAL IMPACT:

The ASB Act Section 3 discusses reasonable allowances for attending meetings of the board. This should be extended to at-large public members appointed to the ASB committee as detailed per County policy.

LEVEL OF PUBLIC PARTICIPATION:

☒ Inform ☒ Consult ☒ Involve ☒ Collaborate ☒ Empower

ATTACHMENTS:

[DRAFT ASB Bylaw September 8, 2022](#)
[2022 ASB Terms of Reference](#)

**LETHBRIDGE COUNTY
IN THE PROVINCE OF ALBERTA**

**BYLAW NO. 22-017
AGRICULTURAL SERVICE BOARD
BYLAW**

Whereas, Section 145 of the *Municipal Government Act*, RSA 2000, c M-26 allows a council to pass bylaws in relation to the establishment and function of council committees and other bodies;

Whereas, Section 203 of the *Municipal Government Act*, RSA 2000, c M-26 allows council to delegate, by bylaw, any powers, duties, or functions under any enactment to a council committee; and

Whereas, Section 2 of the *Agricultural Service Board Act*, RSA 2000, c A-10, sets out the duties of an agricultural service board;

Now Therefore, Council enacts:

**PART I – PURPOSE,
DEFINITIONS, AND
INTERPRETATION**

Purpose	1 The purpose of this bylaw is to establish a council committee named the Agricultural Service Board, and to prescribe a mandate, terms of reference, composition and procedural rules for the Board.
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Definitions	2 In this bylaw: (a) “Administrative Representative” means the member of administration appointed by the Chief Administrative Officer
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- to provide administrative support to the Board;
- (b) "Board" means the Agricultural Service Board;
- (c) "Chief Administrative Officer" means the chief administrative officer of the County or delegate;
- (d) "Council" means the Council of Lethbridge County
- (e) "Councillor" means a Councillor of Lethbridge County;
- (f) "County" means the municipal corporation of Lethbridge County as established under the authority of the *Municipal Government Act*, RSA 2000, c M-26;
- (g) "Public Member" means an individual who is not a member of Council and is appointed by Council to the Board; and
- (h) "Vice Chair" means the individual elected annually to fulfill the Chair's duties in the absence of the Chair.

Interpretation: 3 The following rules apply to interpretation of this bylaw:

- (a) headings and margin notes in this bylaw are for ease of reference only;
- (b) every provision of

this bylaw is independent of all other provisions and if any provision of this bylaw is declared invalid by a Court, all other provisions of this bylaw remain valid and enforceable; and

- (c) references to bylaws and enactments in this bylaw include amendments and replacement bylaws and enactments, and regulations and orders thereunder.

PART II – BOARD ESTABLISHMENT AND MANDATE

Establishment 4 The Agricultural Service Board is established as a council committee.

Mandate the Board is to: 5 The mandate of

(a) provide advice to Council on agricultural matters generally;

(b) comply with the duties as set out in the *Agricultural Service Board Act*, RSA 2000, c A-10 or any replacement thereof;

- (c) serve as an appeal body for appeals made pursuant to the *Soil Conservation Act* RSA 2000, c S-15 or any replacement thereof;
- (d) make decisions and provide written consent on behalf of the County on the destruction of growing crops greater than 20 acres as set out in the *Weed Control Act* SA 2008, c W-5.1 or any replacement thereof;
- (e) prevent the establishment of, or control or destroy pests in the municipality pursuant to the *Agricultural Pests Act* RSA 2000, c A-8; and
- (f) assist in the control of animal disease under the *Animal Health Act* RSA 2000, c A-40.2.

6 In order to fulfill its mandate, the Board may:

- (a) identify and engage stakeholder groups and seek their input on the work of the Board;
- (b) conduct research and prepare reports on issues or opportunities related to agriculture in

- Lethbridge County;
and
- (c) provide advice to Council on County policies, programs, or services that impact economic development and agriculture.

PART III – MEMBERSHIP

Members 7 The Board
will be comprised of:

- (a) four members of Council;
- (b) one alternate member of Council; and
- (c) three public members

Public 8 Public Members
 must be residents of
 Lethbridge
members County.

9 Public Members
shall be appointed
by Council for a
two-year term or
until their successor
is appointed.

10 Council shall
advertise for Public
Members to apply
for appointment on
an as-needed basis
and appoint to the
Board whomever
they deem most
appropriate.

11 Public Members
must not have
been employed by
Lethbridge County
for a minimum of
12 months prior to
applying for a

	Public position.	Member
	12 Public are members.	Members are voting members.
Councillors	13 Councillors appointed to the Board are voting Members.	
	14 When making appointments to the Board, Council will consider knowledge and familiarity with agricultural issues relevant to the County.	
Vacancy	15 If a Public Member vacancy occurs at any time during a two-year term, the Public Member appointed to fill the vacancy will hold office for a two-year term commencing on the date of their appointment.	
Reeve	16 The Reeve is an Ex-officio member of the Board and is a non-voting member.	
Termination	17 A Public Member's appointment is terminated if the Public Member misses three meetings in a twelve-month period without the consent	

of the Board by
way of resolution.

Vice-Chair 18 The Board will elect
a Vice-chair from its
voting members
annually (Council
appoints the Chair in
accordance with the
ASB Act).

PART IV - PROCEDURES

Regular annual 19 The Board
will:
Meetings

- (a) hold regular
meetings as
needed, at least
twice per year
and publicize
the date, time,
and place of
each regular
Board meeting;
- (b) provide notice
of meetings to
the Chief
Administrative
Officer; and
- (c) post scheduled
meetings on the
County's
website to
provide notice
to the public.

Special 20 The Chair may call
a special meeting by giving at
Meetings least 24 hours' notice
to:

- (a) the members of
the Board by
email; and
- (b) the public by
posting a notice
on the County's

webpage and
the County's
notice board at
the
administration
office.

21 The Board may
vote to change the
date, time, or place
of a scheduled
meeting as long as
the Board provides
at least 24 hours'
notice of the
change to the
Board members
and the public.

Quorum 22 Four voting
members will constitute
a quorum at a
Board meeting.

Procedures 23 The Board
will follow the meeting procedures set
out
in the Lethbridge
County Council
Procedural Bylaw.

Public 24 Board meetings will be held in
public unless the meeting
meetings is closed for reasons permitted
by the Municipal Government
Act.

PART V – ANNUAL WORK PLAN AND REPORTING

Annual 25 The Board will develop an
annual work plan that identifies
Work plan key priorities and goals based
on its mandate and Terms of
Reference.

Reports to 26 The Board shall
provide reports which include
Council recommendations on
matters related to the
Board's mandate and
Terms of Reference to
Council, as appropriate.
Council shall approve all
directives, policies, bylaws
and Terms of Reference
related to the ASB.

Annual 27 At least once per
Report year, the Board will report
to Council on the
following:

- (a) review of its work plan;
- (b) update on progress
and initiatives; and
- (c) recommendations and
updates on issues and
matters within its
mandate.
- (d) Council may deny,
approve, or amend and
approve any
recommendation
presented by the
Board.

The Bylaw shall come into effect upon third
and final reading hereof.

GIVEN first reading this _____ day of
_____ 20____.

Reeve

Chief Administrative Officer

GIVEN second reading this _____ day of
_____, 20____.

Reeve

Chief Administrative Officer

GIVEN third reading this _____ day of
_____, 20____.

Reeve

Chief Administrative Officer



Lethbridge County
Agricultural Service Board
Terms of Reference

Purpose

The purpose of the Agricultural Service Board (ASB) is to advise and assist County Council on matters that relate to agriculture-related activities and regulatory service issues. The ASB was formed as a working group to facilitate decisions and policy making with respect to the administrative and governance opportunities and challenges of the Agriculture Services Department. The ASB has the responsibility of providing Administration with direction on development of administrative directives, policies and bylaws for the Board's consideration before being presented to Council for final consideration.

The ASB will provide recommendations to Council designed to support sustainable farming practices, improve the economic welfare and prosperity of local and regional farming activities, and to develop agricultural policies to meet the needs and level of service requirements of the municipality.

Scope

The Agricultural Service Board Act Section 2 provides the legislated authority and lays out the roles of ASBs in Alberta. The following duties and responsibilities described in the ASB Act will apply:

- To act as an advisory body, and to assist the council and the Minister of Agriculture and Forestry in matters of mutual concern.
- To advise on and to help organize and direct weed and pest control and soil and water conservation programs under Provincial legislation.
- To assist in the control of livestock disease under the Animal Health Act.
- To promote, enhance and protect viable and sustainable agriculture with a view to improving the economic viability of the agricultural producer.
- To promote and develop agricultural policies to meet the needs of the municipality.

Official Formation & Participants

The Board is established as per the ASB Act Section 3, in conjunction with the Municipal Government Act stipulation in Section 146 Composition of council Boards whereby a council Board may consist of a combination of councilors and other persons.

The Board is comprised of four members of Council to be appointed at the Annual Organizational Meeting and three Public Members appointed by Council. A Board Chair shall be appointed by Council in accordance with the ASB Act. The Board will appoint a Vice-Chair. The Chair and one other Council-appointed Board member will act as the provincial ASB County delegates for voting purposes, with a designated alternate.



The Board will also include the Chief Administrative Officer (CAO), Director of Public Operations, Environmental Services Manager and the Supervisor of Agricultural Services (appointed as per Section 8 of the ASB Act), who will be responsible as the Board's administrators. The administrative positions are non-voting and will only provide the Board with the administrative and technical support necessary to meet the Board's needs.

The Director of Public Operations, or their designate, in conjunction with the Executive Assistant to the CAO or delegate will be responsible for scheduling meetings, preparing agendas and keeping meeting minutes.

Goals and Objectives

The ASB will evaluate current levels of service and recommend applicable service changes to be presented to County council. The objective is to address local and regional challenges, research new opportunities and make recommendations that support the County's Strategic Plan.

The Agriculture Service Department's Mission Statement and Department Core Activities are in support of the goals and objectives designed to meet the needs of its residents and local stakeholders effectively and efficiently. The role of the ASB is to encourage sustainable farming practices while performing all the duties and responsibilities of an accountable ASB.

Governance

Decisions of the Board will be reached by majority vote of the Board members present and at a properly called meeting.

The Board is responsible to Council and will report its deliberations to Council through its minutes and the Board Chair as needed. The Board will review its terms of reference at its final meeting of each fiscal year and submit any recommendations for change to the Council.

Meetings

Meetings will be held regularly as needed and a minimum of twice per year. Additional meetings will be as determined by the Chair.

Agendas for the meetings will be emailed to each Board member and Administration prior to the meeting date. On the day of a meeting, a hard copy will be provided if requested by a Board member in advance of meeting.

Authority and Responsibilities

The Board is accountable to Council and is not authorized to delegate any of the powers and authority delegated to it. The Board may not implement or authorize any action that is the responsibility of Council.

Quorum

A quorum is four voting members of the Board.

AGENDA ITEM REPORT



Title: South Region Agricultural Service Board Conference in Crowsnest Pass & 2023 Agriculture Service Board Conference in Grand Prairie
Meeting: Council Meeting - 15 Sep 2022
Department: Municipal Services
Report Author: Jeremy Wickson

APPROVAL(S):

Ann Mitchell, Chief Administrative Officer,

Approved - 09 Sep 2022

STRATEGIC ALIGNMENT:



Governance



Relationships



Region



Prosperity

EXECUTIVE SUMMARY:

The South Region Agricultural Service Board Conference is being held in the Crowsnest Pass on October 25, 2022. The 2023 Agricultural Service Board Conference is being held in Grand Prairie on January 17 - 20, 2023.

RECOMMENDATION:

That any member of the ASB Board wishing to attend the South Region ASB Conference in Crowsnest Pass or the 2023 ASB Conference in Grande Prairie be authorized to do so.

REASON(S) FOR RECOMMENDATION(S):

To be a participating member of the South Region Agricultural Service Boards and foster good working relationships in the agriculture community. To take part in the Regional Resolution Process as a voting member of the Provincial Agriculture Service Board and to remain current on agriculture issues facing municipalities and the province.

PREVIOUS COUNCIL DIRECTION / POLICY:

Previously any member of the Agriculture Service Board were authorized to attend.

BACKGROUND INFORMATION:

The South Region Agricultural Service Board Conference rotates around the South Region each year. This years' Conference will be held in the MD of the Crowsnest Pass.

Each year the provincial Agriculture Service Board Conference rotates through each of the five regions in the province. This years conference will be hosted at Evergreen Park in Grande Prairie from January 17th to 20th , 2023 and will be hosted by the Peace Region. The focus of the

Conference is to address resolutions related to agriculture. Often these resolutions are focused on the Provincial Acts that are administered by Agriculture Service Board including the Weed Control Act, Pest Act and Soil Conservation Act.

The Conference also includes an educational component that includes relevant presentations for advancing agriculture. As further details become available they will be provided.

ALTERNATIVES / PROS / CONS:

That there be a limit to the number of attendee's we send to take in this event.

FINANCIAL IMPACT:

The cost to attend the South Region Conference is usually under \$60 with lunch included for each member of the Agriculture Service Board or Staff to attend.

The following are estimates for each individual to attend the Provincial ASB Conference in Grande Prairie:

Flight- \$1100
Registration-\$700
Hotel-\$800
Total: \$2600

LEVEL OF PUBLIC PARTICIPATION:

☐ Inform ☐ Consult ☐ Involve ☒ Collaborate ☐ Empower



Picture Butte High School

Principal:

Mr. M. Lowe

mark.lowe@pallisersd.ab.ca

Box 1280

Picture Butte, AB

T0K 1V0

Fax No: (403) 732 – 4757

Phone: (403) 732 – 4404

June 22, 2022

Dear Sponsor:

Lethbridge County

On November 24-26, 2022, Picture Butte High School will be hosting the ASAA 1A Girls Volleyball Provincials. The tournament will consist of 12 of the top volleyball teams from all of Alberta. This is our first time hosting a girl's provincial volleyball event and we are very excited for this opportunity. Our girls' team attended provincials last year and they will be working hard to represent our school and community with pride.

This year we are going out of our way to make the tournament a memorable one for the athletes, parents, school and community by providing live streaming, an outstanding banquet, and exciting opening ceremonies. Live video streaming has become a must at Provincials, as many teams are traveling extremely far and family and friends are unable to make the journey. This year Picture Butte High School is going the extra mile to provide a top notch, sports experience that will include: instant replay, video extras during time outs, and advertising for all of our sponsors throughout the event. We have hired Feature Productions to help with the event.

This endeavor does come at a cost; however, we are now able to showcase and advertise local businesses throughout the games with live feed, as long as they are not in direct competition with the major sponsors that continually support all ASAA Provincials at all levels. Your sponsorship of this event will allow us to showcase your logos, or short ads for your business, which will be displayed in the gym and on the internet. In turn, this opportunity has the potential to increase your businesses exposure throughout Alberta, Canada, and virtually the world.

Sponsorship Packages:

Diamond: 26 games (round robin and championship)- \$2500

The Round Robin: 20 games (all around robin)- \$1500

Gold: 6 games (all championship)- \$1000

The Daily: 10 games (Thursday or Friday round robin)- \$750

Per Games Rates:

Games 1-15 - \$250/game

Consolation Game - \$300

3rd Place Game - \$400

Fun-Cam (weekend) - \$500

Instant Replay (weekend) - \$1000

Championship Game - \$500

We will also be accepting donations for raffle prizes at our banquet or other gifts in kind. Please speak to Casey Scheidegger, our Athletic Director, or myself at 732-4404, if you would like to gain some quality air time and be involved in this exciting opportunity. We look forward to working with you!

Yours sincerely,

Mark Lowe, Principal
Picture Butte High School

Summer Contact
Joanna Johnson
403-315-9601

AGENDA ITEM REPORT



Title: Lethbridge County Council Attendance Update - August 2022
Meeting: Council Meeting - 15 Sep 2022
Department: Administration
Report Author: Ann Mitchell

APPROVAL(S):

Ann Mitchell, Chief Administrative Officer,

Approved - 04 Sep 2022

STRATEGIC ALIGNMENT:



Governance



Relationships



Region



Prosperity

EXECUTIVE SUMMARY:

To remain transparent to its citizens. Lethbridge County Council report on their activities and events attended throughout the month.

RECOMMENDATION:

No motion required.

REASON(S) FOR RECOMMENDATION(S):

To remain transparent to the citizens of Lethbridge County.

PREVIOUS COUNCIL DIRECTION / POLICY:

A County Council update is provided monthly.

BACKGROUND INFORMATION:

Lethbridge County Council in order to remain transparent to its citizens, provides a monthly report on their activities and events for the prior month.

ALTERNATIVES / PROS / CONS:

By not reporting activities and events attended by members of Council, citizens are unaware of the events occurring within the region and are unaware of the participation of Council with regards to Community events.

FINANCIAL IMPACT:

None at this time.

LEVEL OF PUBLIC PARTICIPATION:



Inform



Consult



Involve



Collaborate



Empower

ATTACHMENTS:

[Lethbridge County Council Attendance - August 2022](#)

**Lethbridge County Council Attendance
August 2022**

Division 1

Councillor Lorne Hickey

August 4	Lethbridge County Council Meeting
August 9	Triple W Gas Co-op 50 th Anniversary Celebration
August 22	Lethbridge County Promotional Video Shoot
August 23	Whoop-Up Days Pancake Breakfast & Parade
August 24	Council/CAO Budget Input Session
August 25	Council Legal Orientation

Division 2

Reeve Tory Campbell

August 4	Lethbridge County Council Meeting
August 5	CAO/Reeve Meeting
August 5	Meeting with MP Thomas
August 6	Town of Coaldale Parade
August 12	CAO/Reeve Meeting
August 22	Lethbridge County Promotional Video Shoot
August 22	Media, re: Proposed Alberta Police Service
August 23	Whoop-Up Days Pancake Breakfast & Parade
August 24	Council/CAO Budget Input Session
August 25	Council Legal Orientation
August 25	CAO/Reeve Meeting
August 26	Whoop-Up Days Rodeo with Council & City Council
August 27	Exhibition Park Whoop-Up Days President's/Past President's Supper & Rodeo
August 31	Lethbridge County/Town of Coaldale IDP Meeting

Division 3

Councillor Mark Sayers

August 4	Lethbridge County Council Meeting
August 23	Whoop-Up Days Pancake Breakfast & Parade
August 24	Council/CAO Budget Input Session
August 25	Council Legal Orientation
August 26	Whoop-Up Days Rodeo with Council & City Council

Division 4**Councillor John Kuerbis**

August 4	Lethbridge County Council Meeting
August 23	Whoop-Up Days Pancake Breakfast & Parade
August 24	Council/CAO Budget Input Session
August 25	Council Legal Orientation
August 27	Town of Coalhurst Parade

Division 5**Councillor Eric Van Essen**

August 4	Lethbridge County Council Meeting
August 23	Whoop-Up Days Pancake Breakfast & Parade
August 24	Council/CAO Budget Input Session
August 25	Council Legal Orientation
August 27	Town of Coalhurst Parade

Division 6**Deputy Reeve Klaas VanderVeen**

August 4	Lethbridge County Council Meeting
August 20	Picture Butte Parade
August 23	Whoop-Up Days Parade
August 24	Council/CAO Budget Input Session
August 25	Council Legal Orientation
August 26	SAEWA Meeting

Division 7**Councillor Morris Zeinstra**

August 4	Lethbridge County Council Meeting
August 20	Picture Butte Parade
August 23	Whoop-Up Days Pancake Breakfast & Parade
August 24	Council/CAO Budget Input Session
August 25	Council Legal Orientation