TOWN OF CARSTAIRS

DEER RIDGE SUBDIVISION – CONCEPTUAL SCHEME

September 10, 2021

Project # 553-01

Prepared by:

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AUTHORIZATION

This report has been prepared by Lee Maher Engineering Associates Ltd. under authorization of Antler Developments Inc. The content of this report represents the engineering opinions of Lee Maher Engineering Associates Ltd. given the information available at the time of the report. Any future use by a third party or reliance on the information contained in this report is the responsibility of others to verify information contained herein. Lee Maher Engineering Associates Ltd. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions taken based upon this report.

Should any questions or clarifications be required regarding content of this report please contact the undersigned.

LEE MAHER ENGINEERING ASSOCIATES LTD.

Jay Sheen, PL.Eng., PE

Principal

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APPENDICES

1.0 INTRODUCTION

Lee Maher Engineering Associates Ltd. (LMEA) has been retained by the landowner of 1511 Gough Road, being Antler Developments Inc., to complete a Conceptual Scheme in accordance with Town of Carstairs requirements for the creation and development of the Deer Ridge subdivision. This study provides a cursory review of the existing site topography, available transportation network, and the utility systems for sanitary, storm, potable water, and shallow utilities along with recommendations for the extensions of these systems to meet the needs of the proposed Deer Ridge subdivision development. The assessment is based on information gathered from site topographic surveys, previous reports, and information provided by other consultants.

This Conceptual Scheme sets general guidelines for the development of the subject property that conform to Town of Carstairs standards and planning policies.

2.0 SITE INFORMATION

2.1. Site Description

The lands being proposed for development are located at 1511 Gough Road in the Town of Carstairs. The legal description for the land is Plan 9212174, Block A. Refer to Figure 1 for the location of the proposed development.

Figure 1: Project Site Location

The site contains 3.88 Hectares (9.59 Acres) under one title (Appendix A). On the north boundary of the site is Gough Road, the east and south boundaries of the site have the existing West Highlands development, and the west boundary of the site is undeveloped land.

There are two existing access locations to the site. From the north, there is an existing driveway approach from Gough Road. From the south, existing West Highland Drive is stubbed to the property.

2.2. Current and Proposed Land Use

The existing land is located within the Town of Carstairs municipal boundary and has a current land use designation of Urban Reserve (UR). As per the Town of Carstairs Land Use Bylaw, the UR district is applied to lands that are awaiting urban development and utility servicing.

Development exists on the lands located to the east and south of the proposed development and the land use designations are:

- R1: Low Density Residential - Single Detached District
- R2: Low Density Residential – Two Dwelling District
- R3: Medium Density Residential – Attached Dwelling District

The lands located to the north and west of the proposed development are currently undeveloped and have the following land use designation:

- UR: Urban Reserve District

2.3. Natural Features/Conditions

2.3.1. Existing Terrain

The existing topography of the proposed development land can be characterized as flat grass lands that are typical within the Town of Carstairs. The site has a generally consistent natural slope that is higher in the northeast portion of the site with an approximate high point elevation of 1064.5 and slopes to the southwest corner with an approximate low elevation of 1059.0.

2.3.2. Drainage

There are no existing natural depressions on the site that collect surface water and there are no defined drainage courses. The site historical drainage pattern is that all surface storm water sheet-flows overland to the southwest corner and continues off site onto adjacent lands to the south and west.

2.3.3. Soils/Geology

Almor Testing Services Ltd. has completed a geotechnical site investigation that can be found in Appendix C. Two test holes were drilled on June 23, 2021 and are used as the basis for the geotechnical report. Figure 2 shows the location of the test holes on the existing site.

Figure 2: Geotechnical Test Holes Locations

2.3.4. Environmental Site Assessment

Trace Associates Inc. has completed a Phase 1 Environmental Site Assessment (ESA) that can be found in Appendix D. The determination of findings in the Phase 1 ESA included the following actions:

- Site visit on June 23, 2021
- Site interview on June 23, 2021
- Records review

- Regulatory Inquiries
- Previous environmental reporting and document research

Figure 3 shows the location of all features identified in the investigation. The Phase 1 ESA determined that no further investigation or assessment of the site is required.

Figure 3: Environmental Site Assessment Site Plan

2.4. Existing Man-Made Features

2.4.1. Existing Structures

The following structures exist on the site: A two-storey residence, two shops, one carport, one barn, one outhouse, and nine sheds. All structures are located in the north portion of the site. Currently the home is vacant as of the date of this report.

2.4.2. Transportation

An existing driveway approach from Gough Road on the north of the site provides access to the land as well as the existing home, shops, and other structures. The West Highland development to the south is the subject land has constructed West Highland Road which is currently stubbed to the south property line.

2.4.3. Existing Services and Related Connections

The existing home on the site is currently serviced by a septic field and water well. There are no municipal water, wastewater, or stormwater services located within the proposed development site. However, these services are stubbed to the south property boundary in the West Highland Road stub which anticipated this site to be developed as per the West Highlands subdivision.

2.4.4. Existing Oil and Gas Facilities

No oil or gas wells exist on the site.

There is an existing ATCO gas line right of way that crosses the site along its north boundary.

2.5. Site Photos

Below are site photos of the existing property taken on September 10, 2021.

View from southwest corner looking northeast

View from southeast corner looking northwest

View from northeast corner looking southwest

View from northwest corner looking southeast

2.6. Policy Considerations

2.6.1. Municipal Government Act

All the requirements and provisions of the Municipal Government Act pertaining to this proposed development have been met.

2.6.2. Town of Carstairs Land Use Bylaw No. 1044 – Amended

This Conceptual Scheme conforms with the requirements and provisions of the current Town of Carstairs Land Use Bylaw with the following exception:

- A land use redesignation for the site will be required as development moves forward to rezone the land from Urban Reserve to the various land use designations shown in this Conceptual Scheme.

2.6.3. West Highlands Residential Development Concept Plan

This Conceptual Scheme conforms with the requirements and provisions of the West Highlands Residential Development Concept Plan dated April 2004. The previously approved concept plan does not include the subject land; however, transportation and servicing considerations were made for the development of the subject land.

3.0 PROPOSED DEVELOPMENT

3.1. Residential Development Goals and Policies

The Conceptual Scheme has been prepared with the following conformance to section 6.0 of the Town of Carstairs Municipal Development Plan (2020):

- To develop a high standard residential development
- To facilitate a variety of housing types and densities
- To meet the established density targets of 5-10 units per acre
- To develop a maximum of 70% single detached dwellings within the proposed subdivision
- To provide a variety of proposed lot widths and depths
- To provide pathway and sidewalk connections to multiple pedestrian systems

3.2. Land Use

The proposed land use layout of the Deer Ridge subdivision is shown on Figure 4. The Tentative Subdivision Plan to be submitted with the future subdivision application will determine the final sizes, configuration, and geometric layout of the proposed lots and roadways to be subdivided.

3.2.1. Residential District

The layout of the proposed Deer Ridge subdivision is that of a grid pattern. With a smaller confined parcel size, and with a designated roadway entry location along the south property boundary, the roadway network layout is a driving factor in the overall subdivision design. With two access point, one being existing at the south side of the project and one stubbed to connect to a future development to the west, the internal grid pattern of roadways will help create traffic calming patterns to provide privacy and safety within the neighborhood.

3.2.1.1 R-1 Low Density Residential – Single Detached District

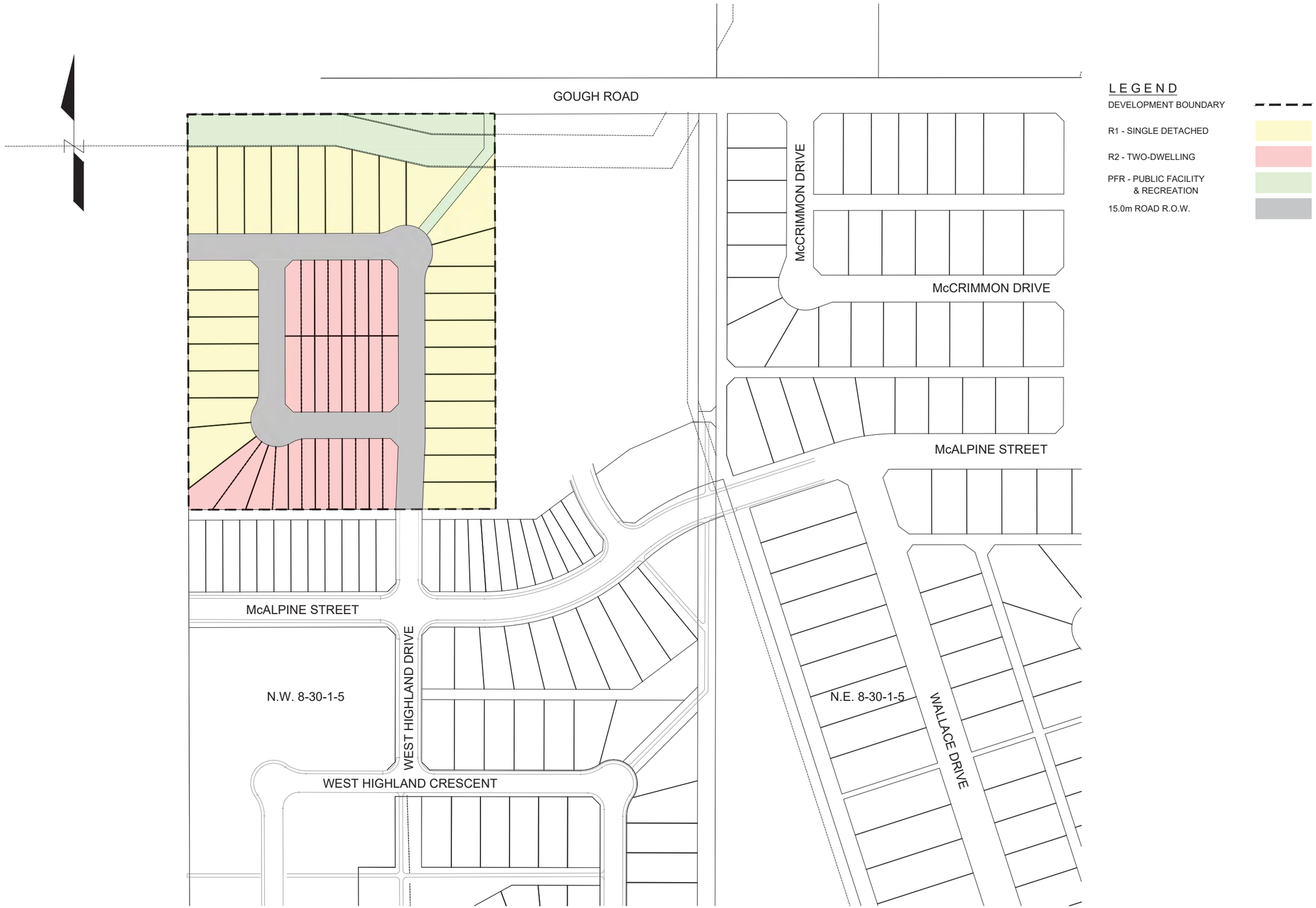
Approximately half of the lots within the proposed development are designated R-1 lots and are proposed to be single family detached dwellings. The Land Use Bylaw specifies that lots within this district be a minimum of 420 m^2 (464 m^2 for corner lots) and have a minimum lot width of 13 meters (14.5 meters for corner lots). The maximum allowable parcel coverage is 55% and a maximum building height of 10 meters applies. The maximum density is 1 unit per parcel.

3.2.1.2 R-2 Low Density Residential – Two Dwelling District

Approximately half of the lots within the proposed development are designated R-2 lots and are proposed to be two dwelling homes. The Land Use Bylaw specifies that semi-detached and duplex lots within this district be a minimum of 470 m^2 (512 m^2 for corner lots) and have a minimum lot width of 15 meters (16.5 meters for corner lots). The maximum allowable parcel coverage is 50% and a maximum building height of 10 meters applies. The maximum density is 2 units per parcel.

3.2.1.3 PFR – Public Facility and Recreation District

A portion of the lands will be designated as PFR district to provide for green spaces and pathways.



CARSTAIRS – 1511 GOUGH ROAD

FIGURE 4: LAND USE PLAN

LEE MAHER
ENGINEERING ASSOCIATES LTD.

3.2.2. Land Use Statistics Summary

The following table summarizes the Land Use statistics for the proposed development as represented on Figure 4.

Land Use Designation	Area (Ha.)	Area (Ac.)	% of Total Land Area
R-1	1.804	4.46	46.6%
R-2	0.958	2.38	24.8%
Roadways	0.693	1.71	17.8%
PFR	0.422	1.04	10.8%
Total	**3.88**	**9.59**	**100%**

3.2.3. Land Use Density and Yields

Densities and yields may vary as the project moves forward to Land Use stage. The following table shows the proposed land use densities and anticipated population yields for the gross developable area of 3.88 Ha. (9.59 Ac.) as shown in this plan:

Land Use Designation	No. of Units	Projected Population*	Gross Area Equivalent %	Area (Ha.)	Area (Ac.)	Proposed Density
R-1	27	73	65.3%	2.53	6.26	4.3 Units/Acre
R-2	28	76	34.7%	1.35	3.33	8.4 Units/Acre
Total	**55**	**149**	**100%**	**3.88**	**9.59**	**5.7 Units/Acre**

*population based on 2.7 persons per unit

3.3. Open Spaces/Reserves

3.3.1. Open Space

The open space concept showing the anticipated dedication areas of Public Facility and Recreation (PFR) land is shown on Figure 4. The open space provided by the proposed subdivision is in the northern portion of the project, and primarily along Gough Road. The open space concept allows for pathway connections from the internal of the subdivision to a future regional pathway along Gough

Road that is contained within the Atco Pipeline Right of Way. This future pathway will connect to lands both on the west and east side of the subject property. The lands to the east and south of this proposed development have an extensive pathway network that this development will gain access to. The pathway connection from within the proposed subdivision will also allow for pedestrians to access Memorial Park located to the north of the Deer Ridge development.

The Pathway leading to Gough Road from within the subdivision will be paved. The green areas adjacent to the pathway as well as along Gough Road will be landscaped with sustainable and low maintenance vegetation such as natural prairie grasses and other drought tolerant vegetation.

Internal roadways will have sidewalks that will create safe walking spaces for pedestrian traffic to connect to pathway systems and adjacent developments.

3.3.2. Reserves

The Municipal Government Act requires that a minimum of 10% reserve be met for development projects. As per the table in section 3.2.2., this development provides for 10.8% of land to be provided as reserve under the land use designation of Public Facility and Recreation (PFR). The reserve will consist of pathway and open space dedications as described in the above section and as shown on Figure 4.

3.4. Landscaping Plan

Landscaping will conform to the Town of Carstairs standards for development and will be addressed at the subdivision stage. The existing trees in the northern portion of the project will be preserved to the extent possible.

3.5. Phasing

Given the smaller size of the site and the need to grade the site at one time to ensure earthwork balance on the project, the site is anticipated to be constructed as one phase.

4.0 PROPOSED SERVICES

4.1. Transportation

The project will connect to the existing West Highland Drive roadway stub at the property's south

boundary line. The existing roadway stub is a standard residential roadway with a 15 meter right of way. The same roadway section will be continued on all roadways through the proposed subdivision as shown on Figure 5. There will be a roadway stub provided as a connection to a future development to the west of this subdivision that is located along the project's west boundary.

Traffic from the subdivision will exit to the south on West Highland Drive which intersects with McAlpine Street approximately 55 meters south of the proposed subdivisions south property line. McAlpine Street is an existing residential collector road that allows traffic to connect to various other Town streets to the east of the project.

The layout of the roadways within the project are on a grid pattern with only 2 connection points. This will allow for traffic calming through the project and create a safer environment to accommodate pedestrian and vehicular interactions.

4.2. Water Supply

The water supply for the proposed development will be connected to the existing Town water grid system. As part of the West Highland development, considerations were made for the development of the subject property and a water stub has been provided in West Highland Drive located at the south boundary of the property. Plate 8 of the West Highland Concept Plan shows the overall water system and can be referenced in Appendix B.

Internal looping of the water system will be completed and watermains will be installed in the roadway network per Town standards as shown on Figure 6. The location of the water loop connection will be determined at the detailed engineering design stage; however, it is intended that the loop will occur to either the property located to the east of the subject lands, or to the north.

4.3. Wastewater

Wastewater servicing for the proposed development will connect to the existing Town sanitary pipe collection system. As part of the West Highland Development, considerations were made for the development of the subject property and a sewer stub has been provided in West Highland Drive located at the south boundary of the property. Plate 9 of the West Highland Concept Plan shows the overall sanitary system and can be referenced in Appendix B.

The internal sewer collection system will consist of gravity sewer mains that will flow south to the existing stubbed connection point. The sewer mains will be installed in the roadway network per Town standards and as shown on Figure 7.

4.4. Stormwater Management Plan

Storm water servicing for the proposed development will connect to the existing Town storm water pipe collection system. As part of the West Highland Development, considerations were made for the development of the subject property and a storm sewer stub has been provided in West Highland Drive located at the south boundary of the property.

The internal storm sewer collection system will consist of gravity storm sewer mains that will flow south to the existing stubbed connection point. The storm sewer mains will be installed in the roadway network per Town standards and as shown on Figure 8.

Storm water flows within the subdivision will flow in the roadway gutter systems to catch basins that will capture the flows and direct them to the storm sewer pipe system. The pipe system within the proposed subdivision will connect to the existing storm sewer system in the West Highlands subdivision. As shown in the West Highlands Residential Development Concept Plan from April 2004, a storm water facility was constructed approximately 300m south of the subject property. Per section 4.4 of the West Highlands Concept Plan, the storm water facility anticipates development of this property and has been sized to include storm water flows from it. As a result, the proposed development does not require its own stormwater facility but will be required to meet the stormwater discharge rates as specified in the storm water design report for the West Highlands development. Plate 10A of the West Highland Concept Plan shows the overall storm system and can be referenced in Appendix B.

4.4.1. Stormwater Management Plan

A stormwater management plan has been completed for the West Highlands Development and has set stormwater design parameters for the proposed development area. As part of detailed design of the proposed subdivision, a stormwater management plan will be completed to verify that storm sewers and trap low areas have been sized per the allowable flow into the storm sewer system from the subdivision.

4.4.2. Stormwater Detention Facility

The West Highlands storm water detention facility is existing and is located approximately 300m south of the proposed development. The West Highlands Concept Plan states that the storm water facility was designed to conform to Alberta Environment standards and was sized to manage runoff from the entire West Highlands development and also included the proposed Deer Ridge development as well as some lands to the north of Gough Road.

Existing Stormwater Detention Facility

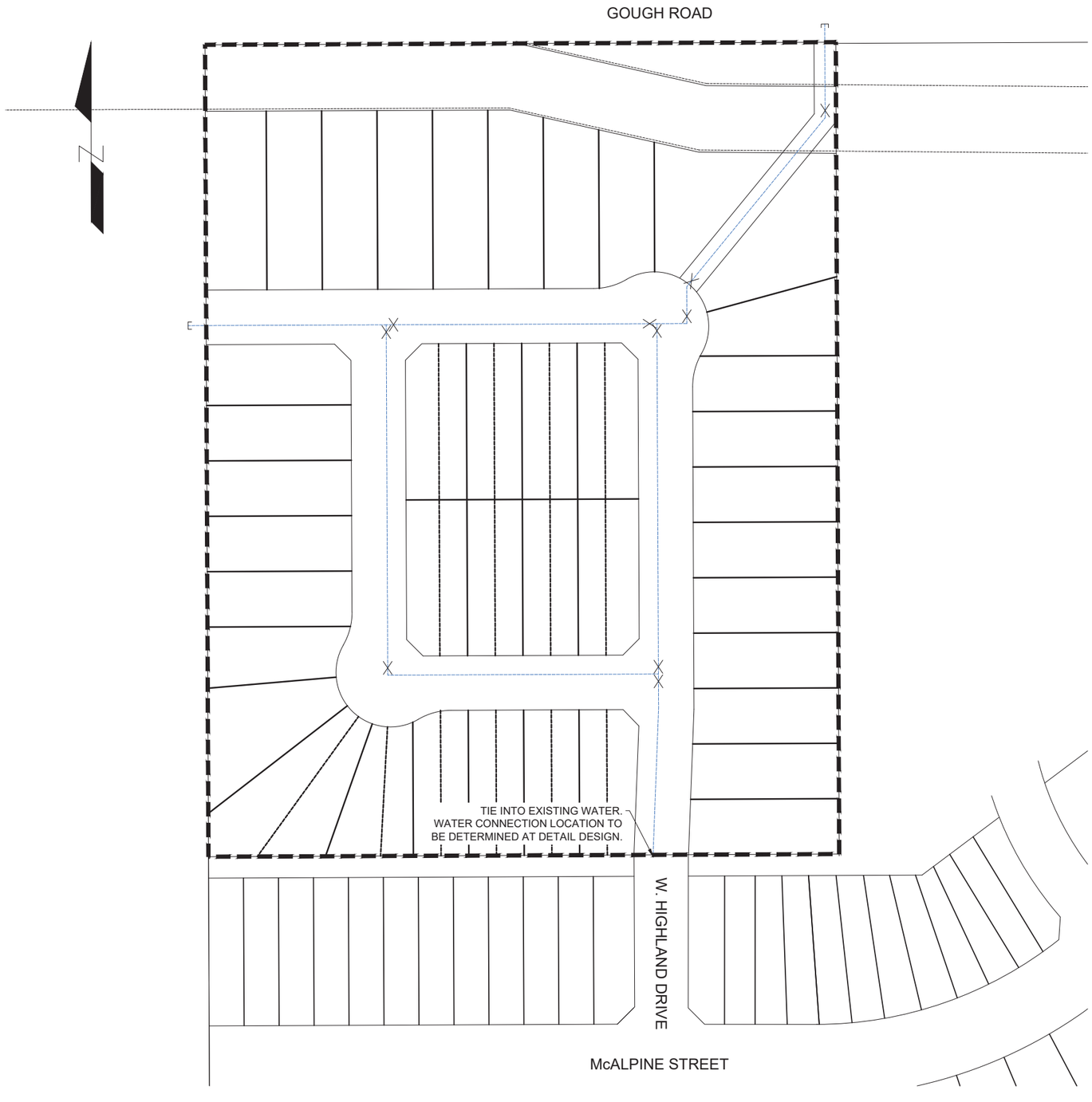
4.5. Site Grading

The proposed grading of the development is anticipated to provide for a balanced earthwork site with minimal to no import or off-hauling of earth material. The internal subdivision roadways and lots will have minor cuts and fills from the existing site grades. As lots are placed around the full perimeter of the proposed development, the grades at the rear of the lots will match existing boundary grades so as to not create any significant cut or fill conditions. The proposed grading of the site can be found on Figure 9. Site grading will be confirmed through the detailed design stage.

CARSTAIRS – 1511 GOUGH ROAD

FIGURE 5: TRANSPORTATION PLAN

LEE MAHER
ENGINEERING ASSOCIATES LTD.



LEGEND

DEVELOPMENT BOUNDARY

PROPOSED WATER MAIN

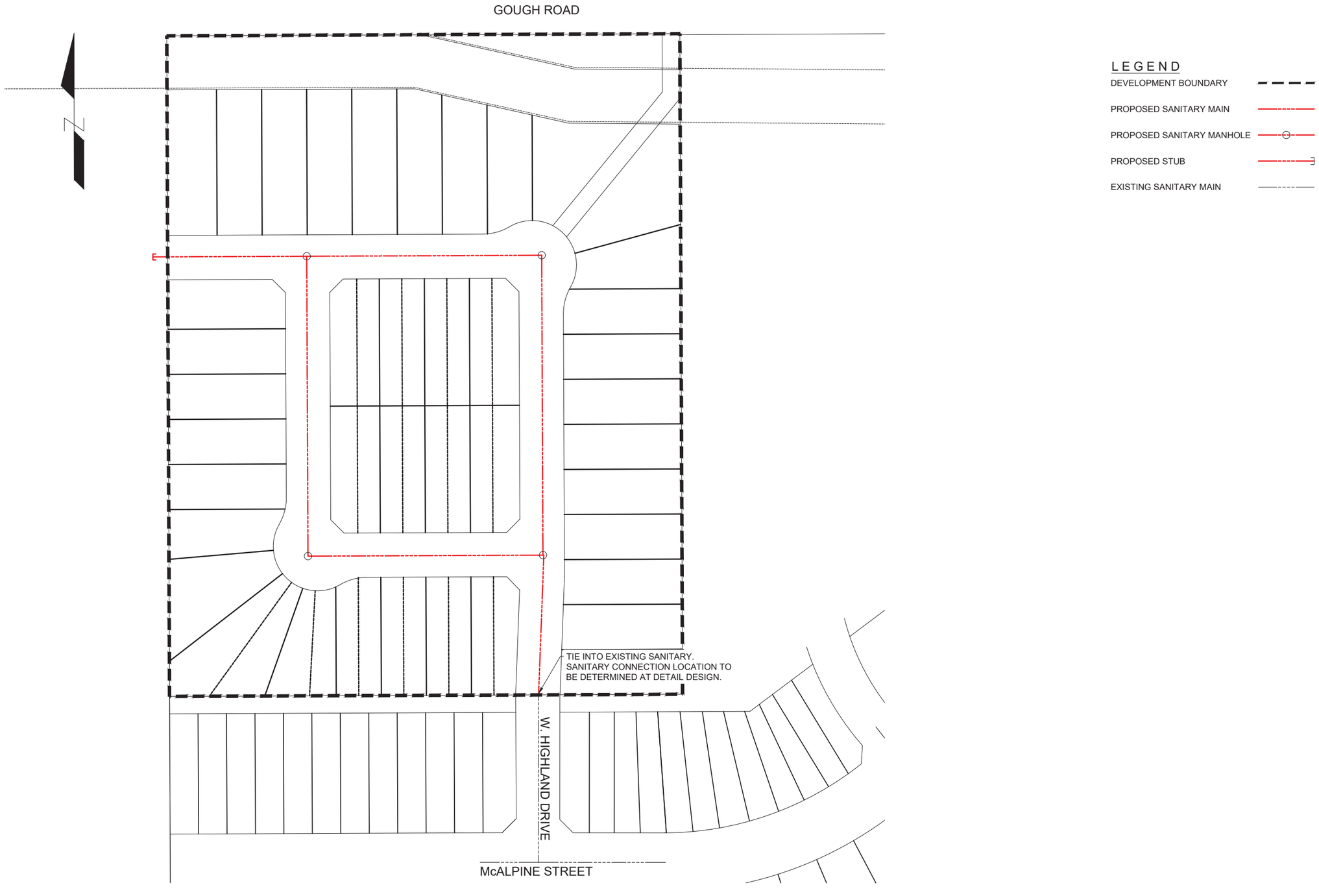
PROPOSED WATER VALVE

PROPOSED STUB

CARSTAIRS – 1511 GOUGH ROAD

FIGURE 6: WATER SERVICE

LEE MAHER
ENGINEERING ASSOCIATES LTD.



LEGEND

- DEVELOPMENT BOUNDARY
- PROPOSED SANITARY MAIN
- PROPOSED SANITARY MANHOLE
- PROPOSED STUB
- EXISTING SANITARY MAIN

CARSTAIRS – 1511 GOUGH ROAD

FIGURE 7: SANITARY SERVICE

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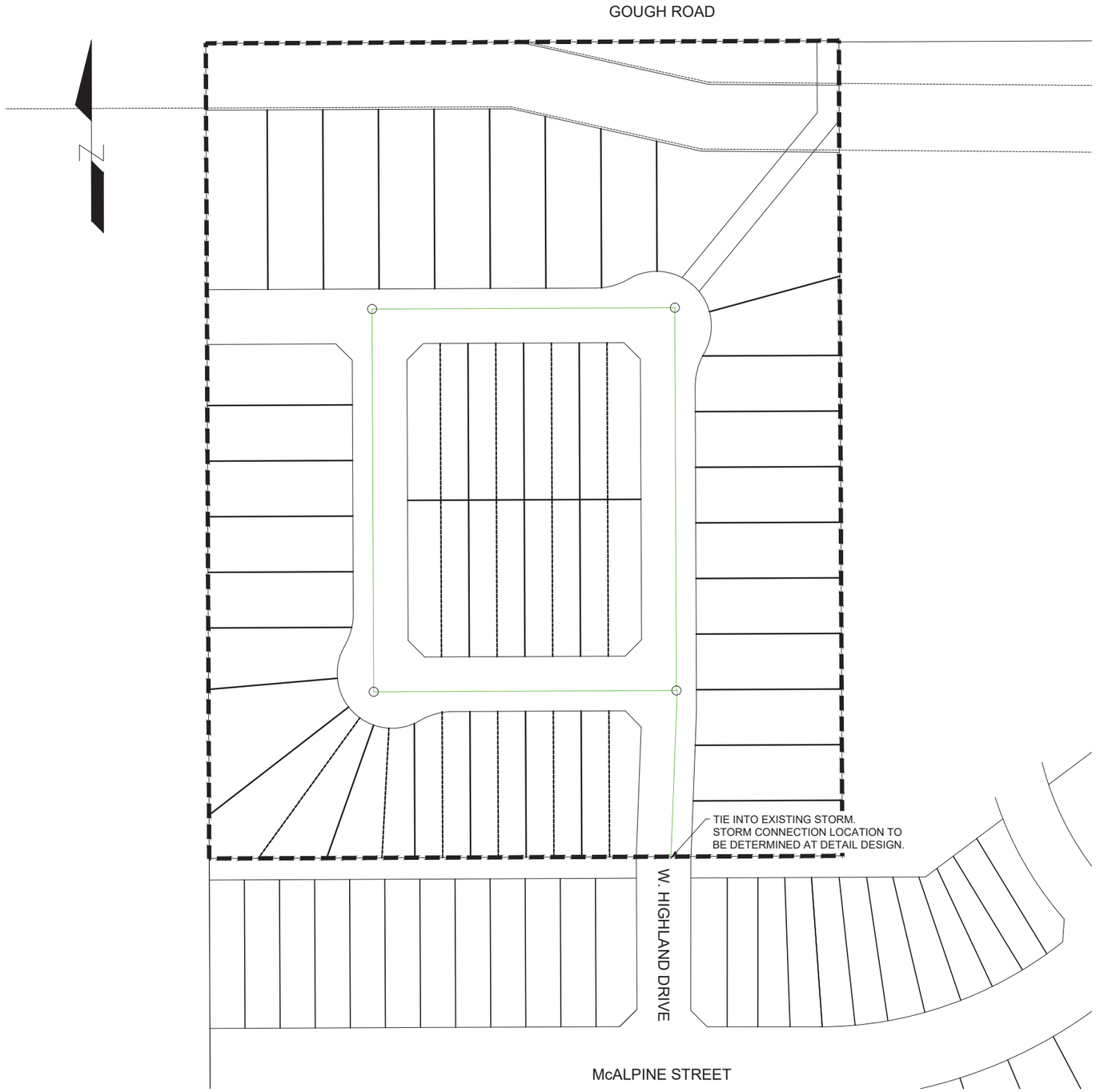


LEGEND

DEVELOPMENT BOUNDARY

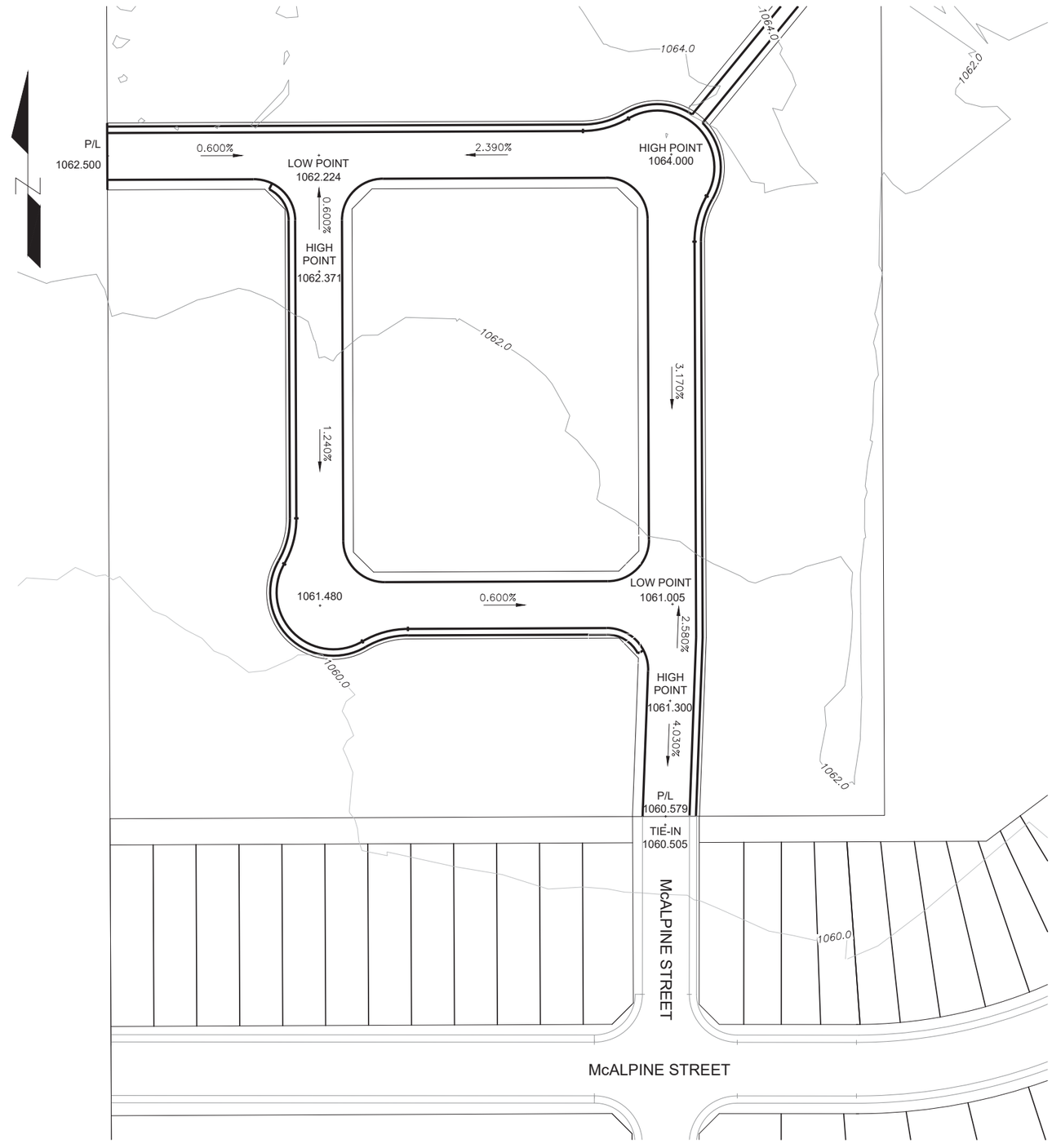
PROPOSED STORM MAIN

PROPOSED STORM MANHOLE

CARSTAIRS – 1511 GOUGH ROAD

FIGURE 8: STORMWATER SERVICE

LEE MAHER
ENGINEERING ASSOCIATES LTD.



CARSTAIRS – 1511 GOUGH ROAD

FIGURE 9: SITE GRADING

LEE MAHER
ENGINEERING ASSOCIATES LTD.

4.6. Solid Waste

The Town of Carstairs provides garbage collection for residential neighborhoods and would be providing collection services to the Deer Ridge development.

4.7. Shallow Utilities

The Deer Ridge subdivision will be serviced by power, gas, and communications networks though extensions of existing facilities located in the West Highlands development. Shallow utility design will be part of the detailed design stage and the respective utility providers will be coordinated with to provide these necessary utility extensions and servicing required for the development.

4.8. Protective Services

4.8.1. Fire Protection

Fire Hydrants will be provided in the proposed subdivision and spaced as per current Town of Carstairs requirements. The spacing will include an analysis of existing hydrant locations in adjacent developments.

Fire protection and response will be provided by the Town of Carstairs. Adequate access to the site for fire service vehicles has been provided through the use of Town standard roadway designs.

4.8.2. Police Protection/Safety Services

The Town of Carstairs has police and safety services provided by both the RCMP and Town Peace Officers.

APPENDIX A

Land Title

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0023 919 707	9212174;A	211 135 848

LEGAL DESCRIPTION

DESCRIPTIVE PLAN 9212174
BLOCK A
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 3.88 HECTARES (9.59 ACRES) MORE OR LESS

ATS REFERENCE: 5;1;30;8;NW
ESTATE: FEE SIMPLE

MUNICIPALITY: TOWN OF CARSTAIRS

REFERENCE NUMBER: 141 074 760

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
211 135 848	15/07/2021	TRANSFER OF LAND	$660,000	$660,000

OWNERS

2339043 ALBERTA LTD.
OF 30704 CENTRE ROAD
STRATHROY
ONTARIO N7G 3H7

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
761 053 226	30/04/1976	UTILITY RIGHT OF WAY GRANTEE - THE MOUNTAIN VIEW REGIONAL WATER SERVICES COMMISSION. 35566 RGE RD 10 RED DEER COUNTY ALBERTA T4G0H5 (DATA UPDATED BY: TRANSFER OF UTILITY RIGHT OF WAY 961186724)

(CONTINUED)

REGISTRATION
NUMBER DATE (D/M/Y) PARTICULARS

(DATA UPDATED BY: CHANGE OF ADDRESS 141266605)

921 273 304 02/11/1992 CAVEAT
RE : ACQUISITION OF LAND
CAVEATOR - THE COUNTY OF MOUNTAIN VIEW NO. 17.
BAG 100, DIDSBURY
ALBERTA T0M0W0

101 055 038 24/02/2010 UTILITY RIGHT OF WAY
GRANTEE - ATCO GAS AND PIPELINES LTD.

TOTAL INSTRUMENTS: 003

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 8 DAY OF SEPTEMBER, 2021 AT 08:38 A.M.

ORDER NUMBER: 42558901

CUSTOMER FILE NUMBER: 553-01

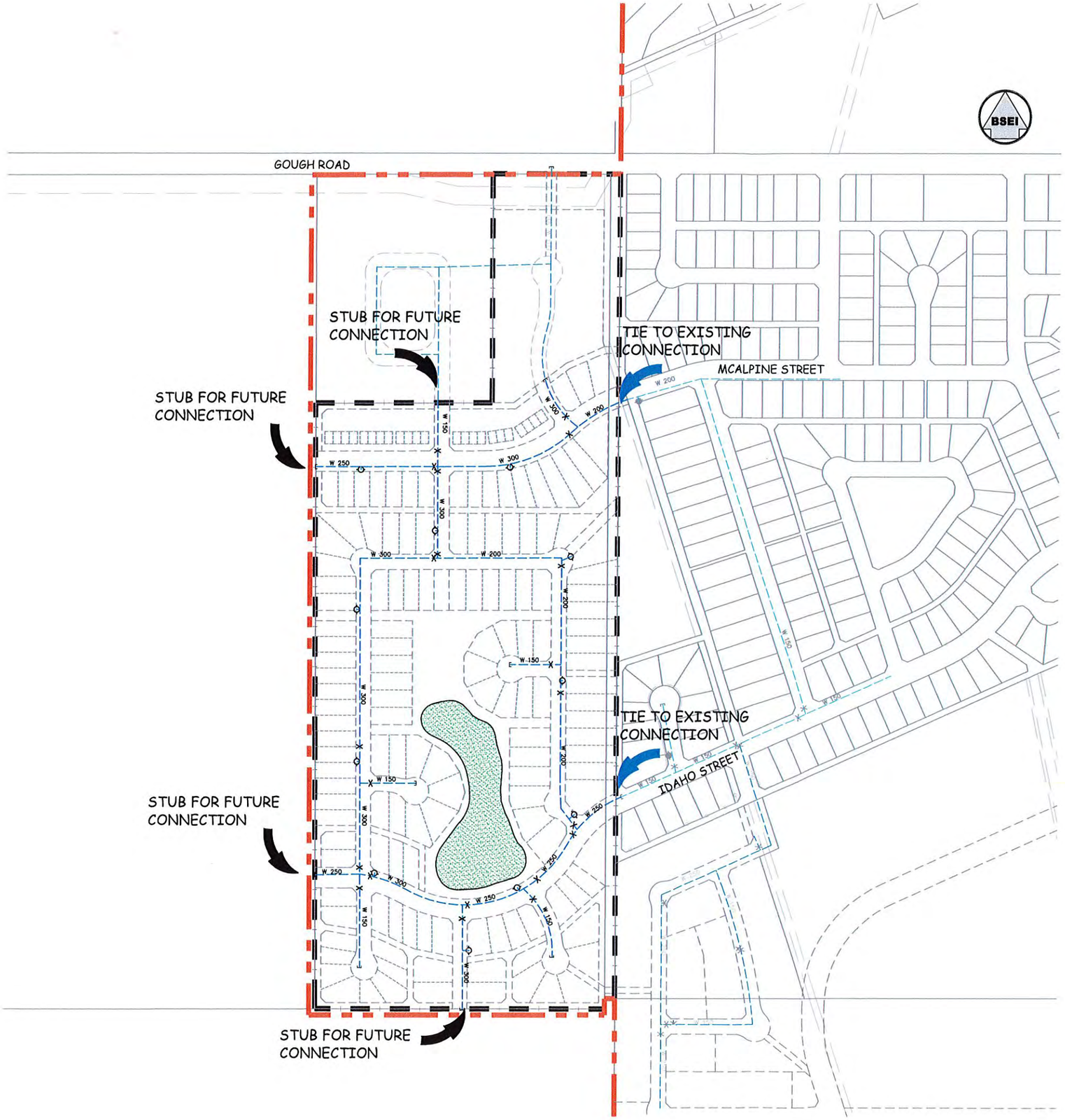
END OF CERTIFICATE

APPENDIX B

Reference Drawings from West Highlands Residential Development Concept Plan

WEST HIGHLANDS
CARSTAIRS, ALBERTA

WATER SERVICING PLAN



LEGEND:

- DEVELOPMENT BOUNDARY
- TOWN BOUNDARY
- W 150 PROPOSED MAIN
- PROPOSED VALVE
- PROPOSED HYDRANT
- PROPOSED PLUG
- EXISTING MAIN
- EXISTING VALVE
- EXISTING PLUG
- TIE TO EXISTING CONNECTION
- FUTURE SERVICE CONNECTION
- FUTURE MAIN

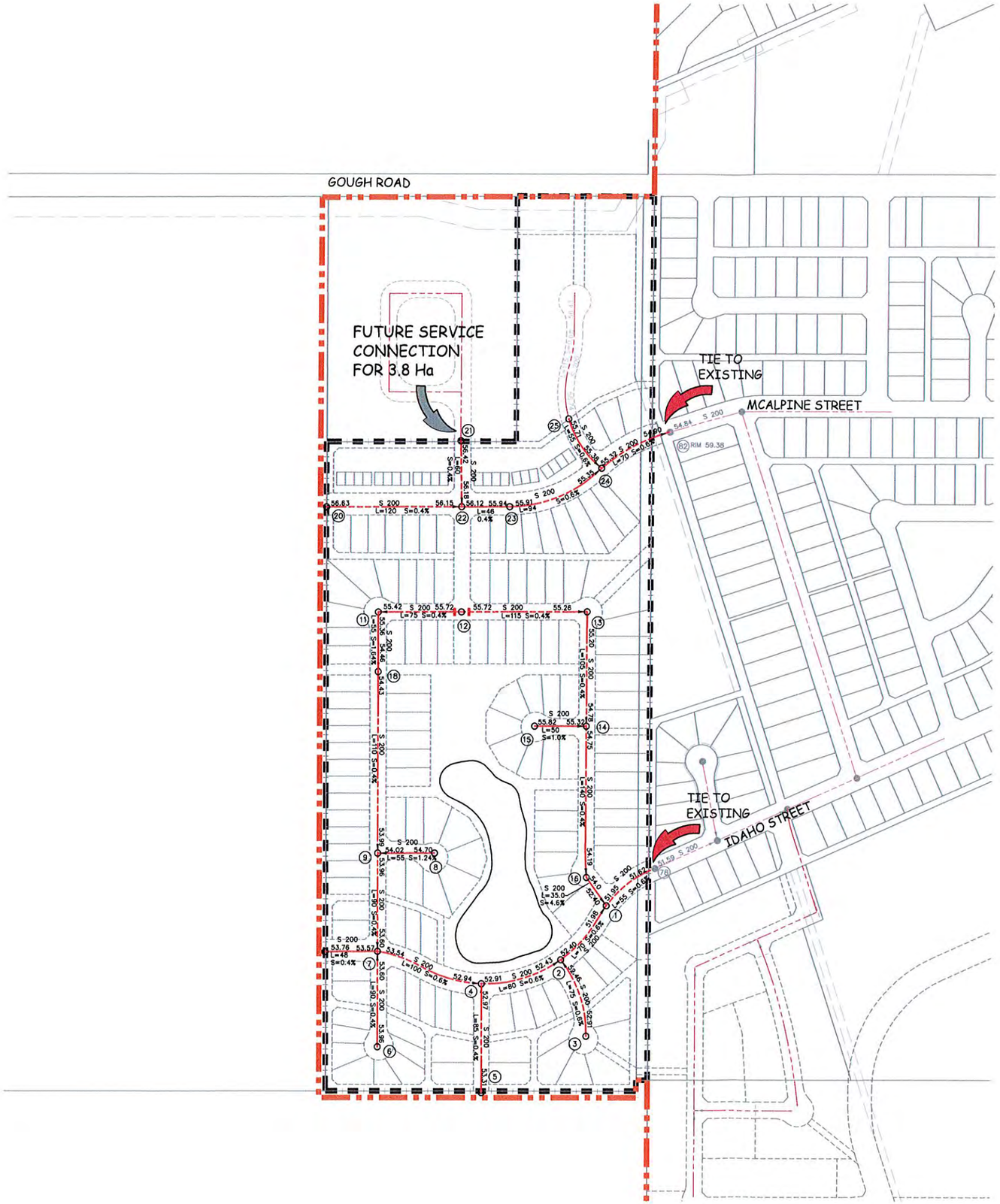
DATE : April 2004	SCALE : 1:4000

BSEI
Municipal Consulting Engineers

PROJECT No : W796-002	*PLATE 8*

WEST HIGHLANDS
CARSTAIRS, ALBERTA

WASTEWATER SERVICING PLAN



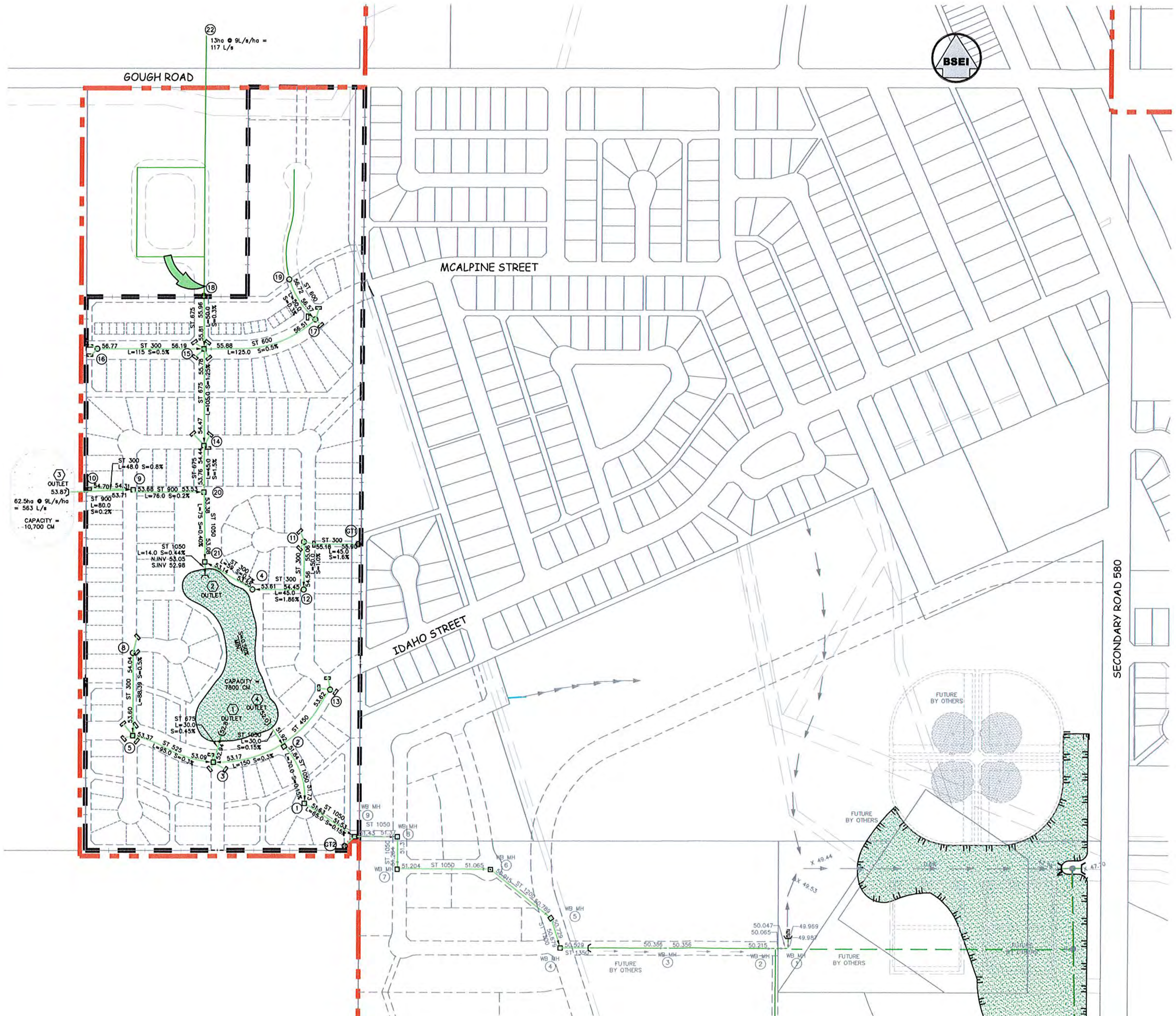
LEGEND:

- DEVELOPMENT BOUNDARY
- TOWN BOUNDARY
- PROPOSED MAIN
- PROPOSED MANHOLE
- PROPOSED PLUG
- FLOW DIRECTION
- EXISTING MAIN
- EXISTING MANHOLE
- EXISTING PLUG
- TIE TO EXISTING CONNECTION
- FUTURE SERVICE CONNECTION
- ⑫ MANHOLE REFERENCE NUMBER

DATE : April 2004	SCALE : 1:4000

BSEI
Municipal Consulting Engineers

PROJECT No : W796-002	*PLATE 9*



WEST HIGHLANDS

CARSTAIRS, ALBERTA

STORMWATER SERVICING PLAN

LEGEND:

- DEVELOPMENT BOUNDARY
- TOWN BOUNDARY
- PROPOSED MAIN
- PROPOSED MANHOLE
- PROPOSED CATCHBASIN
- PIPE FLOW DIRECTION
- PROPOSED STORM OUTLET
- STORMWATER DETENTION FACILITY HIGH WATER LEVEL (HWL
- EXISTING MAIN
- EXISTING MANHOLE
- EXISTING DITCH
- FUTURE TIE-IN CONNECTION
- OUTLET REFERENCE NUMBEI
- MANHOLE REFERENCE NUMBEI
- WEST BAY MANHOL REFERENCE NUMBEI (SEE APPROVED CONCEPT PLAN)

DATE : April 2004	SCALE : 1:4000

BSEI

Municipal Consulting Engineers

PROJECT No : W796-002	PLATE 10A

APPENDIX C

Geotechnical Site Investigation

GEOTECHNICAL SITE INVESTIGATION

10 Acre Parcel, NW Corner
West Highlands Subdivision, Carstairs, Alberta

Prepared for:

Lee Maher Engineering Associates Ltd.

July, 2021

062-01-21

ALMOR TESTING SERVICES LTD.
7505 – 40 STREET SE
CALGARY, ALBERTA T2C 2H5
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E) GENERAL@ALMOR.COM

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APPENDICES

1.0 INTRODUCTION

Almor Testing Services Ltd. was retained to perform a Geotechnical Site Investigation for a proposed residential subdivision located in Carstairs, Alberta. The site covers an area of 10 acres and is located at the northwest corner of West Highlands subdivision and lies within NW¼, Sec 8, Twp 30, Rge 1, W5M. Refer to the Site Plan, Plate 1, presented in Appendix "A", indicating the location of the site and approximate test hole locations. Authorization to proceed with the investigation was received via an email dated June 7, 2021, from Jay Sheen, P.L.Eng, PE, of Lee Maher Engineering Associates Ltd., on behalf of Antler Developments Inc. Almor has also reviewed a report completed by Almor Engineering Associates Ltd., dated January, 2004, consisting of nine (9) test holes completed to the south of the site.

The purpose of the geotechnical investigation was to advance test holes to evaluate subsurface soil and groundwater conditions, within the project boundaries to confirm similar conditions to the south. This report summarizes the results of the field and laboratory tests and presents geotechnical recommendations for the design and construction of underground services, concrete foundations, and asphaltic concrete pavement structures.

1.1 Site Description

The proposed development is bounded by Gough Road in the north, Clover Condominium development to the east, West Highland subdivision in the south and a farmland in the west. The north portion of the site is occupied by a two-storey dwelling, a shop and other structures (stable, storage, etc). At the time of the current investigation, the site was covered with prairie grass. Google Maps indicates the site has been used for farming. Overall, the site has a gentle slope, in a north to south direction.

2.0 INVESTIGATION DETAILS

2.1 Field Program

Two (2) test holes were advanced in accessible locations within the project boundaries on June 23, 2021. The approximate test hole locations are indicated on the Site Plan, included in Appendix “A”.

The test holes were drilled, using a truck mounted solid stem auger drill rig operated by Almor Testing Services Ltd. of Calgary, Alberta. Test Hole Logs are provided in Appendix "B", Plates 1 and 2.

The test holes were logged and samples classified in accordance with the Modified Unified Soil Classification System described in Appendix "B", Plate 3. Pocket Penetrometer tests were obtained at regular intervals, during drilling. Disturbed soil samples were returned to Almor's Calgary laboratory for further classification and testing.

Open-end static standpipe was installed in each test hole on completion of drilling, to facilitate future groundwater level monitoring. The standpipe consisted of 25mm diameter perforated PVC pipe, backfilled with soil cuttings and 0.5m bentonite plugs were placed at the surface to limit water infiltration.

2.2 Laboratory Program

A laboratory testing program meeting applicable ASTM and/or CSA standards was undertaken on the samples secured in the field. The laboratory testing consisted of the following:

- Soil classification;
- Determination of the natural moisture content;
- Atterberg Limit testing on a selected sample;
- Grain size distribution, and
- Water soluble sulphate testing on selected samples.

The results of the laboratory program are presented graphically on the Test Hole Logs in Appendix "B". All soil samples will be stored for 60 days following issuance of this report. The samples will then be discarded unless Almor is instructed otherwise.

3.0 SUBSURFACE CONDITIONS

3.1 General

The soil conditions encountered in the test holes were generally uniform across the site and excluding topsoil and browns, consisted of silty clay (till). Silty sand was noted, underlying silty clay (till) deposit in TH2. The following is a general description of the soil units encountered. Detailed descriptions of the soil strata encountered are provided on the Test Hole Logs in Appendix “B”.

Surficial topsoil/browns were present in both test holes advanced and ranged in depth from 250mm to 300mm. The thickness of the topsoil/browns deposit may vary from that encountered in the test holes, especially in drainage low areas.

Underlying the topsoil/browns was a glacial sandy silty clay (till) deposit encountered in both test hole locations. The material contained various amounts silt and sand in a clay matrix. These soils were described as olive to olive-brown in colour, damp to moist and in a stiff to very stiff condition, in terms of consistency. An Atterberg Limit Index Property test conducted on these soils indicated a Liquid Limit of 31 and a Plastic Limit of 11, resulting in a Plasticity Index of 20. The test classifies these soils as medium plastic clay (CI). Natural moisture of content of these soils arranged between 13.9% and 18.9%. This deposit was encountered below topsoil/browns and extended to a depth of 6.4m below existing grade.

A silty sand deposit was encountered in TH2. This deposit contained trace amounts of gravel, was olive in colour, damp and was in a dense density condition. Natural moisture content of this soil was 10.6%.

Bedrock was not encountered to the depths advanced, during the current geotechnical program.

Table 1 summarizes the depths of each of the major stratigraphic units detailed on the Test Hole Logs, presented in Appendix "B". It should be noted that the transitions between the classified soil units are gradual, rather than the distinct unit boundaries as shown on the Test Hole Logs.

TABLE 1
STRATIGRAPHY TABLE

Test Hole No.	--- Depth Below Existing Ground Surface (m) --- Topsoil/Browns	Sandy Silty Clay (Till)	Silty Sand
1	0.0 - 0.3	0.3 – 6.4	--
2	0.0 - 0.3	0.3 – 5.6	5.6 – 6.2

3.2 Groundwater Conditions

Monitoring of the groundwater conditions was conducted, during drilling operations. After completion of drilling, no groundwater seepage was noted in each of the standpipes. Groundwater conditions are provided on the Test Hole Logs in Appendix “B”.

Table 2 summarizes the water level readings recorded, within the standpipes, to date.

TABLE 2
GROUNDWATER CONDITIONS

Test Hole No.	--- Depth Below Existing Ground Surface (m) --- Depth of Standpipe	At Completion June 23/21	July 7/21
1	6.4	dry	2.7
2	6.2	dry	2.0

It should be noted that groundwater levels fluctuate seasonally in response to climatic conditions and are highest in the June to August recharge period. It is apparent perched groundwater is present in the till soils and will be reduced to the depth of utilities, upon installation and controlled overland drainage.

4.0 GEOTECHNICAL RECOMMENDATIONS

4.1 General

Development of the facility using balanced cut/fill earth quantities is feasible, depending on local variations in soil stratigraphy and topography. Based on the soils encountered in the test holes, the exposed subgrade soils over most cut areas are expected to consist of sandy silty clay (till). In those areas where fill is required, it is anticipated that the local soil will be used.

The majority of the native soils, in the upper 3.0m of the soil profile, is at/or above the optimum moisture content. Moisture conditioning and mixing it with drier material may be required, during site grading. Perched groundwater was encountered at shallow depths of 2.0m and 2.7m below existing grade, within the development and is not expected to have an impact on the site grading operations. Based on the soil conditions, generally favorable site grading conditions are anticipated.

The subsurface conditions are considered to be suitable, relative to foundation support for the development. The geotechnical factors believed to be pertinent for the design and construction of the proposed development are presented below. These factors are based on the interpretation of subsoil conditions found in the current two (2) test holes advanced within the project boundaries. The recommended design values are subject to engineering observations and approval by a qualified geotechnical engineer.

4.2 General Site Grading

The composition and consistency of the surficial soils encountered at the site indicated excavation with conventional earthmoving equipment, and/or hydraulic excavators, is considered feasible. Based on groundwater conditions noted during the current geotechnical program, earthworks associated with site grading are not expected to be hampered by groundwater seepage. In general, where native soils are to be used as general engineered fill, moisture conditioning may be required. Extensive fill placement required for general site grading should not be performed during freezing conditions or using frozen soils. The native inorganic soils encountered in the test holes are

suitable material for use as general engineered fill. General engineered fill should be uniformly placed and compacted to a minimum of 97.0% of the Standard Proctor maximum dry density (SPMDD) at a moulding moisture of ±2.0% OMC for cohesive soils.

Where the subgrade will support roadways, all organic and fill material should be completely removed to the depth of insitu mineral soils. Excavated fill, free of deleterious materials, may be re-used as general engineered fill as noted above. Following the stripping, the exposed subgrade should be proof rolled to identify any soft, loose or non-uniform areas. Any areas detected should be over-excavated and replaced with approved material. If extensive deep, soft soil deposits are encountered, a geogrid and/or geotextile may be incorporated to improve the condition of the subgrade soils. The use of such methods to improve poor subgrade conditions will have to be made at the time of construction.

4.3 Utility Trench and Excavation Stability

Based on the topography of the site, excavation stability is not a concern for the construction of the proposed development. However, if seepage is encountered during construction, the flows should be manageable with conventional trenching and sump pumps.

In context with preliminary design depths, it is anticipated that utilities will range in depth from 2.5m to 4.0m below the existing grades. This will be within the sandy silty clay (till) soils. Excavation of the site soils can be readily completed with large backhoe equipment.

Periodic cleaning of debris at the base of the slope may be required, if sloughing occurs. Care will be required to avoid sloughing and failure of the sidewalls. Temporary surcharge loads, such as stocks of material or heavy equipment, should be kept back from excavation faces, a distance equal to at least one half the excavation depth.

For excavations deeper than 1.2m, side slopes must be cut back as required by the Occupational Health and Safety Act. If space does not permit the slopes to be cut back, some form of temporary shoring must be installed to protect workers in the trench. Almor can forward recommendations for shoring, upon request.

The latest edition of the Construction Safety Regulations of the Occupational Health and Safety Act of Alberta should be followed for all excavations.

4.4 Foundation Requirements

4.4.1 Continuous and Spread Footings

Continuous and spread footings for the structures, supported on the native soils may be designed based on a maximum allowable static bearing pressure of 120 kPa (2500 psf) for combined total dead and live loads. General engineered fill, as noted in section 4.2, would also be suitable for maximum allowable static bearing pressure of 120 kPa (2500 psf). A geotechnical resistance factor of 0.5 has been applied for the recommended bearing pressure parameters provided above in accordance with the Canadian Foundation Engineering Manual (CFEM) 4th Edition, 2006.

The bearing surfaces must be cleaned of all loosened or softened soils. Foundation excavation bearing surfaces are to be protected from the ingress of free water and frost, during and after footing construction. Soil bearing observations are to be performed for all lots, so as to verify footing subgrade conditions and consider specific foundation construction recommendations. Footings are to be constructed in accordance with the current Alberta Building Code, National Building Code, and any relevant local requirements. Provided that the recommendations contained herein are followed, the anticipated settlement of the footings should be well within generally acceptable tolerances. Footing settlements are anticipated to be limited to a total of 25mm or less, bearing on the native soils.

Should other foundation types or retaining walls be incorporated in the subdivision design, further review of the soil conditions may be required to provide soil design parameters.

4.4.2 Weeping Tile and Damp Proofing

Due to the presence of shallow water table, weeping tile is recommended. Basements require weeping tile to be provided around the exterior of the foundation walls, with adequate connections to the storm sewer system or pumped to the surface and directed to overland surface drainage collectors. It should be installed with positive slope away from foundation elements and in accordance with the current Alberta Building Code requirements.

Basement foundation walls, if utilized, should be damp-proofed in accordance with current Alberta Building Code requirements.

4.5 Frost Protection

For protection against frost action, exterior footings should have at least 1.2m of soil cover above top-of-footing for footings supporting heated structures. In the case of an unheated structure, the footings should be provided with a minimum ground cover of 2.1m. Interior footings in a permanently heated structure may be constructed at any depth, provided suitable soils with the design allowable bearing capacity are available.

Based on the native materials, the water lines should be provided with a minimum of 2.7m soil cover, as per the current City of Calgary's Standard Specifications for Waterworks Construction.

If the minimum soil cover cannot be achieved practically, a properly designed insulation system could be used to reduce the thickness of soil cover required. Almor can provide additional recommendations for the use of rigid insulation, if required, after the foundation details are available.

4.6 Concrete Type

Water soluble sulphate content tests were conducted on the insitu soils encountered, within the project boundaries and indicate the potential degree of sulphate attack may be considered low (as per CSA A23.1-19, Table 3). However, severe contents are experienced in the area from other testing, therefore a minimum HS cement at 32 MPa compressive strength concrete, with a maximum water/cementitious ratio of 0.45 and +5% air entrainment is required. In addition, all concrete must be designed in accordance with the CSA A23.1-19 e.g. air-entraining agents are required in freeze/thaw zones. Should any fine grained soils be imported to the site, it should be tested for the presence of sulphates and the above recommendations modified, if required.

All concrete must be supplied in accordance with the current Alberta and National Building Code requirements. All concrete mix design, and construction, should be carried out in accordance with the CAN/CSA A23.1-19 and A23.2-19 specifications.

4.7 Seismic Consideration

As per the current National Building Code of Canada Table 4.1.8.4A titled *Site Classification for Seismic Site Response*, the native soils encountered may be classified as *stiff soil* (average shear wave velocity 180<360 m/s). Subsequently, Almor recommends that the proposed project area may be classified as Site Class “D”.

4.8 Erosion Control

We have completed a Grain Size Analysis of the stiff surficial soil consisting of sandy silty clay. See attached Grain Size Distribution, in Appendix “C”. The soil texture result indicated the subgrade soils have an organic content of 1.51%, a very fine sand and silt content of 37.2% and a sand content of 30.6% (0.1 - 2mm). The moderate blocky soils have a clay content of 32.2% and is considered to be slow to moderate in an undisturbed condition.

4.9 Structural Pavement Designs

The following preliminary residential and collector street structural pavement design sections are presented, as evaluated with City of Calgary guidelines. The proposed structural pavement designs are based on an engineered "soaked condition" C.B.R. value of 2.0% and construction on similar subgrade materials in the area.

	Materials	Minimum Thickness of Material (mm)
A.	Residential Streets	
	Type B Asphaltic Concrete	*80
	25mm Granular Base Crushed Gravel	100
	100mm Granular Subbase Gravel	250
B.	Collector Streets	
	Type B Asphaltic Concrete	**40
	Type A Asphaltic Concrete	100
	25mm Granular Base Crushed Gravel	100
	100mm Granular Subbase Crushed Gravel	250

* May be completed with staged construction of a 50mm base lift and 30mm surface lift at the F.A.C. period.

** Staged surface at the F.A.C. period.

4.9.1 Construction Recommendations

The recommendations for subgrade construction provided in Section 4.2 should be followed in the preparation of the subgrade beneath the roadways. Prior to gravel placement, the exposed subgrade is to be proof rolled to identify soft, loose or non-uniform areas. Areas detected may be over-excavated and replaced with approved granular material. Soft soil deposits may require a geotextile fabric to be incorporated, to improve the condition of the subgrade soils.

The final subgrade elevation and any sub cut sections are to permit positive subgrade drainage to the catch basins, manholes or ditches. Implementation of these measures will significantly reduce the moisture content ingress into the subgrade following construction, minimizing saturation and degradation.

The performance and maintenance requirements for these designs are highly dependent upon proper subgrade preparation and subgrade drainage and these must constitute part of the design. These structural pavement sections are limited in that they do not contain an insulating component or total granular thickness to completely eliminate the potential of minor isolated frost heave effects. They are designed to provide a life expectancy of 20 years.

Granular sub-base coarse and granular base coarse gravels should be uniformly compacted in lift thicknesses not exceeding 300mm to a minimum of 98% at moulding moisture of ±3% OMC and contain no more than 10% passing the 80µm sieve. All materials supplied and placed in subbase, base and pavement construction must comply with the minimum requirements in the current City of Calgary Standard Specifications, Street Construction.

The proposed structural pavement designs are to be confirmed, during service utility backfill construction in the roadways and proof rolling subgrade preparation.

4.10 Quality Control and Observations

The recommendations presented in this report assume an adequate level of observations will be provided, during construction performed by contractors experienced in residential construction. The recommended design values are subject to engineering and approval by a qualified geotechnical engineer

It is recommended that a qualified and experienced geotechnical firm, such as Almor, be engaged to evaluate designs, observe grading and roadway construction, installation of underground utilities and to perform the specified materials engineering and testing services.

The frequency of materials engineering and testing services can be provided, once site development concepts, schedules and specifications are established.

5.0 CLOSURE

Information presented herein is based on the findings in two (2) test holes drilled within the proposed development area, and recognized foundation engineering principles and practice. If conditions other than those reported are noted during subsequent phases of the project, Almor should be notified and given the opportunity to review the current information in light of the new findings. Construction monitoring is required and should be undertaken by qualified personnel to verify that at least the minimum requirements contained in this report, as well as the project specifications, are achieved. Recommendations presented herein may not be valid, if an adequate level of observations are not provided, during construction, or if relevant building code requirements are not met.

Although subsurface conditions are not expected to vary significantly from those shown encountered during the geotechnical program, it should be appreciated that extrapolation of subsurface conditions between boreholes is subject to interpretation and could be at variance with actual field conditions. Similarly, ground conditions below the depth of exploration are expected to be generally as discussed, herein. However, any extrapolation of data does carry a risk that actual ground conditions could differ from those shown.

This report has been prepared for the exclusive use the Lee Maher Engineering Associates Ltd. and its agents for specific application to the proposed development described within this report. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Almor accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

Respectfully submitted,
ALMOR TESTING SERVICES LTD.

12/7/21

*APEGA Permit to Practice #P2260

J.B. Montgomery, P.Eng.
AA:rn:A07692

APPENDIX A


#
TH1
TH2
McAlpine St
Google Earth
Image © 2021 Maxar Technologies
© 2021 Google
500 ft
N

Plate 1

APPENDIX B

PROJECT: WEST HIGHLANDS SUBDIVISION
CARSTAIRS, ALBERTA

CLIENT: LEE MAHER ENGINEERING ASSOCIATES

PROJECT NO.

HOLE NO. TH1

DRILL TYPE SOLID STEM AUGER

GEODETIC ELEVATION (m)

DATUM

DEPTH (m)	SOIL DESCRIPTION	DEPTH (ft)
	TOPSOIL/ORGANICS	
	Silty CLAY (TILL) stiff to very stiff, medium plastic, trace to some sand, trace gravel, mottled olive/brown, moist	2
	- trace coaly pieces below 0.7 m	
1	- occasional fine grained sand/silt lens below 0.9 m	4
		6
2	- becoming stiff, some sand, moist to wet	8
3		10
	- stiff to very stiff, trace to some sand, moist below 3.4 m	12
4		14
		16
5		18
6		20
	END OF TEST HOLE AT 6.4m	22
	- standpipe installed to 6.4m	
	- test hole dry at completion	
	- test hole backfilled with soil cuttings	
7	- bentonite seal placed, 0.3m	

SAMPLE TYPE: B

MOD UNIFIED SOIL CLASS

WATER CONTENT (%) ●
PLASTIC LIMIT / LIQUID LIMIT
20 40 60

COMPRESSIVE STRENGTH
Unconfined ▲
Pocket Pen △
TSF 2 3 4 5
KPa 200 300 400

OTHER TESTS

Gravel 0 %
Sand 34 %
Silt 33.8 %
Clay 32.2 %

- Sulphate Content <0.10 %

ALMOR TESTING SERVICES LTD.

TEST HOLE LOG

KN/m³ 16 18 20 22
PCF 100 120 140
WET UNIT WEIGHT ○

PENETRATION RESISTANCE ■
20 40 60
□ SPT ◪ Case
■ Cone ◹ BT Pen

GROUNDWATER
Date Measured

COMPLETION DEPTH 6.4 m

DATE DRILLED June 23, 2021

LOGGED BY Andy Richardson

PLATE NO. 1

PROJECT: WEST HIGHLANDS SUBDIVISION
CARSTAIRS, ALBERTA

CLIENT: LEE MAHER ENGINEERING ASSOCIATES

PROJECT NO.

HOLE NO. TH2

DRILL TYPE SOLID STEM AUGER

GEODETIC ELEVATION (m)

DATUM

DEPTH (m)	SOIL DESCRIPTION	DEPTH (ft)
	TOPSOIL/ORGANICS	
	Silty CLAY (TILL) stiff to very stiff, medium plastic, trace to some sand, trace gravel, trace coaly pieces, olive, moist	2
1		4
		6
2		8
3	- becoming stiff, some sand, moist to wet	10
	- stiff to very stiff, trace to some sand, moist below 3.5 m	12
4		14
		16
5		18
	Silty SAND dense, trace gravel, trace sandstone pieces, fine grained, poorly graded, olive, damp to moist	20
6	**END OF TEST HOLE AT 6.2m** - standpipe installed to 6.2m - test hole dry at completion - test hole backfilled with soil cuttings - bentonite seal placed, 0.3m	22
7		

SAMPLE TYPE: B

MOD UNIFIED SOIL CLASS: CI

WATER CONTENT (%) ●
PLASTIC LIMIT 11 — LIQUID LIMIT 31
20 40 60

COMPRESSIVE STRENGTH
Unconfined ▲
Pocket Pen △
TSF 2 3 4 5
KPa 200 300 400

OTHER TESTS
- Sulphate Content <0.10 %

KN/m³ 16 18 20 22
PCF 100 120 140
WET UNIT WEIGHT ○

PENETRATION RESISTANCE ■
20 40 60
□ SPT ◪ Case
■ Cone ◹ BT Pen

GROUNDWATER
Date Measured

ALMOR TESTING SERVICES LTD.

TEST HOLE LOG

COMPLETION DEPTH 6.2 m

DATE DRILLED June 23, 2021

LOGGED BY Andy Richardson

PLATE NO. 2

EXPLANATION OF SOIL DESCRIPTIONS AND SYMBOLS SHOWN ON TEST HOLE LOGS

The test hole logs summarize the results of field investigations and, if applicable, also laboratory test data. It should be appreciated that conditions established at a test hole location may not be representative of subsurface conditions across the investigated site. Transitions of the soil stratigraphy, either classified or graphically shown, are gradual, rather than the distinct unit boundaries presented.

SOIL DESCRIPTION AND CLASSIFICATION

Soils are described according to their appearance, lithological composition and probable mode of deposition (genetic type). Expected engineering properties and behaviour of the materials are interpreted relative to the soil type and laboratory test results.

I) DEFINITION OF SOIL TYPES

Material	Grain Size
Boulders	Larger than 300mm
Cobbles	75mm - 300mm
Gravel - Coarse	19mm - 75mm
- Fine	5mm - 19mm
Sand - Coarse	2mm - 5mm
- Medium	425um - 2mm
- Fine	75um - 425um
Silt and Clay	Smaller than 75um

II) COMPOSITION OF SOIL

2.1 Principal Component - Major soil type representing at least 50% by weight of material.

2.2 Minor Component - Minor soil types identified by the following terms with respect to their percentages by weight of material:

"Trace"	:	1% - 10%	"Some"	:	10% - 20%
Modifier "Y"	:	20% - 30%	Connector "and"	:	30% - 50%

III) CONSISTENCY OR STRENGTH OF SOIL

3.1 Coarse Grained Soils - (Principal Component larger than 75um). The following terms are used relative to the Standard Penetration Test (SPT), ASTM D1586:

Description	No. of Blows per Foot
Very Loose	Less than 4
Loose	4 - 10
Compact	10 - 30
Dense	30 - 50
Very Dense	Over 50

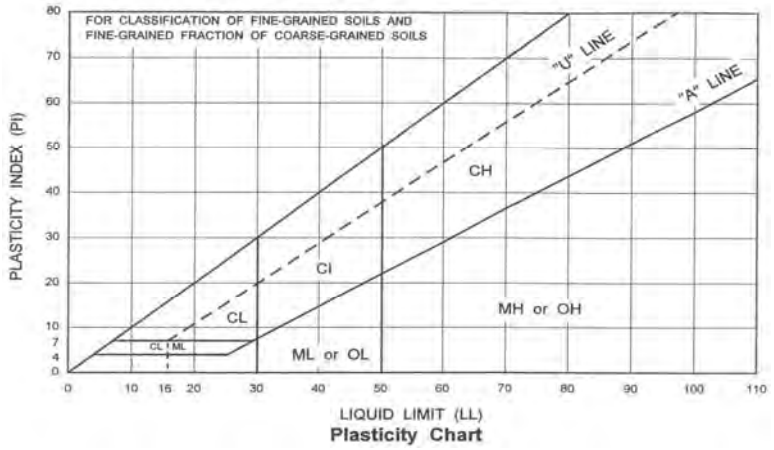
3.2 Fine Grained Soils - (Principal Component smaller than 75um). The following terms are used relative to the unconfined strength and Standard Penetration Test (SPT), ASTM D1586:

	Unconfined Compressive	
Description	Strength kPa (tsf)	No. Blows per Foot
Very Soft	Less than - 24 (0.25)	Less than 2
Soft	24 - 48 (0.25 - 0.5)	2 - 4
Firm	48 - 96 (0.5 - 1.0)	4 - 8
Stiff	96 - 190 (1.0 - 2.0)	8 - 15
Very Stiff	190 - 380 (2.0 - 4.0)	15 - 30
Hard	> 380 (4.0)	Over 30

SOIL CLASSIFICATION SYSTEM (MODIFIED U.S.C.)

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA	
HIGHLY ORGANIC SOILS			**PT**	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOR OR ODOR AND OFTEN FIBROUS TEXTURE	
COARSE-GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN NO. 200 SIEVE SIZE)	GRAVELS (MORE THAN HALF COARSE FRACTION LARGER THAN NO. 4 SIEVE)	CLEAN GRAVELS	**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES. <5% FINES	$C_u = \frac{D_{60}}{D_{10}} > 4$; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$	
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES. <5% FINES	NOT MEETING ALL ABOVE REQUIREMENTS	
		DIRTY GRAVELS	**GM**	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES. >12% FINES	ATTERBERG LIMITS BELOW "A" LINE OR $I_p < 4$	
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES. >12% FINES	ATTERBERG LIMITS ABOVE "A" LINE OR $I_p > 7$	
	SANDS (MORE THAN HALF COARSE FRACTION LARGER THAN NO. 4 SIEVE SIZE)	CLEAN SANDS	**SW**	WELL-GRADED SANDS, GRAVELLY SANDS. <5% FINES	$C_u = \frac{D_{60}}{D_{10}} > 6$; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$	
			SP	POORLY-GRADED SANDS, OR GRAVELLY SANDS. <5% FINES	NOT MEETING ALL ABOVE REQUIREMENTS	
		DIRTY SANDS	**SM**	SILTY SANDS, SAND-SILT MIXTURES. >12% FINES	ATTERBERG LIMITS BELOW "A" LINE OR Ip < 4	
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES. >12% FINES	ATTERBERG LIMITS ABOVE '"A" LINE OR Ip > 7	
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT PASSES NO. 200 SIEVE SIZE)	SILTS BELOW "A" LINE ON PLASTICITY CHART; NEGLIGIBLE ORGANIC CONTENT		**ML**	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	$W_L < 50$	SEE PLASTICITY CHART BELOW
			MH	INORGANIC SILTS, MICACEOUS OR DIATO-MACEOUS, FINE SANDY OR SILTY SOILS	$W_L > 50$	
	CLAYS ABOVE "A" LINE ON PLASTICITY CHART; NEGLIGIBLE ORGANIC CONTENT		**CL**	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS	$W_L < 30$	
			CI	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	$W_L > 30, < 50$	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	$W_L > 50$	
	ORGANIC SILTS AND CLAYS BELOW "A" LINE ON PLASTICITY CHART		**OL**	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	$W_L < 50$	
			OH	ORGANIC CLAYS OF HIGH PLASTICITY	$W_L > 50$	

1. All sieve sizes mentioned on this chart are U.S. Standard, ASTM E11.
2. Boundary classifications possessing characteristics of two groups are given combined group symbols, eg. GW-GC is a well graded gravel sand mixture with clay binder between 5% and 12%.
3. Soil fractions and limiting textural boundaries are in accordance with the United Soil Classification System, except that an inorganic clay of medium plasticity (C) is recognized.



Plasticity Chart

ALMOR TESTING SERVICES LTD.

ROCK CLASSIFICATION AND DESCRIPTION

The following factors are usually incorporated in a test hole log for adequate engineering geotechnical description:

Rock Name. Established names for igneous, metamorphic and sedimentary rocks are used. This could include established local names rather than the actual rock name. It is believed that for engineering purposes classification by mechanical properties is more significant than classified by mineralogy and texture.

Alteration and Weathering State. The following grades are used: fresh, slightly weathered, moderately weathered, highly weathered and decomposed. In some cases of decomposed rocks the material may exhibit plasticity and soil mechanics classification could be used.

Structure and Discontinuities. This includes comments on discontinuities (bedding planes or separation along foliation planes and fissures in igneous or sedimentary rocks) and veins in relation to their type, orientation, frequency, infilling and surface structures. RQD percentage of core fractions that are 100mm (4 in.) or greater in length, relative to length of solid core recovered (defined by Deere et al. as the Rock Quality Designation) is indicative of the fractured state.

Assessment of Strength. The field assessment of rock strength can be aided by simple tests such as the use of a hammer or penknife and supplemented by laboratory testing. Any rock with a strength significantly less than 1 MPa (145 psi) could be described with reference to soil mechanics practice.

Ancillary Geological Information. This might include dip, identification of infill, etc.

TEST DATA AND SAMPLE TYPES

Data obtained from laboratory and field testing are shown in appropriate columns on the test hole logs and at the corresponding depth interval. Abbreviations and graphic symbols are as follows:

w	moisture content	*pp*	pocket penetrometer test
W_P or PL	plastic limit (ASTM D 424)	*Y*	unit weight of soil or rock
W_L or LL	liquid limit (ASTM D 423)	*Y*d	dry unit weight
Ip or PI	Plastic index (LL-PL)	q_u	unconfined compressive strength
☐	undisturbed shelby tube sample or rock core	RQD	rock quality designation
☐	disturbed SPT sample		
B	disturbed bag sample		

APPENDIX C

7505 - 40 Street SE
Calgary, Alberta T2C 2H5
Telephone: (403) 236-8880

Grain Size Distribution

ASTM D-422

Project West Highlands Subdivision (NW-8-30-1-W5M)
Client Lee Maher Engineering Associates Ltd.
Almor Job # 062-01-21
Date Recieved June 23/21
Date Tested July 5/21

Test Hole # TH1
Depth 1.0m
Technician KC

	Overall	< 2mm
Gravel	0.0%	
Sand	39.1%	39.1%
Silt	28.7%	28.7%
Clay	32.2%	32.2%

Sieve Size (mm)	% Passing
100	
50	
40	
20	
10	
5	
2	100.0
1	69.4
0.5	95.8
0.25	85.7
0.10	69.4
0.05	60.9
0.002	32.2

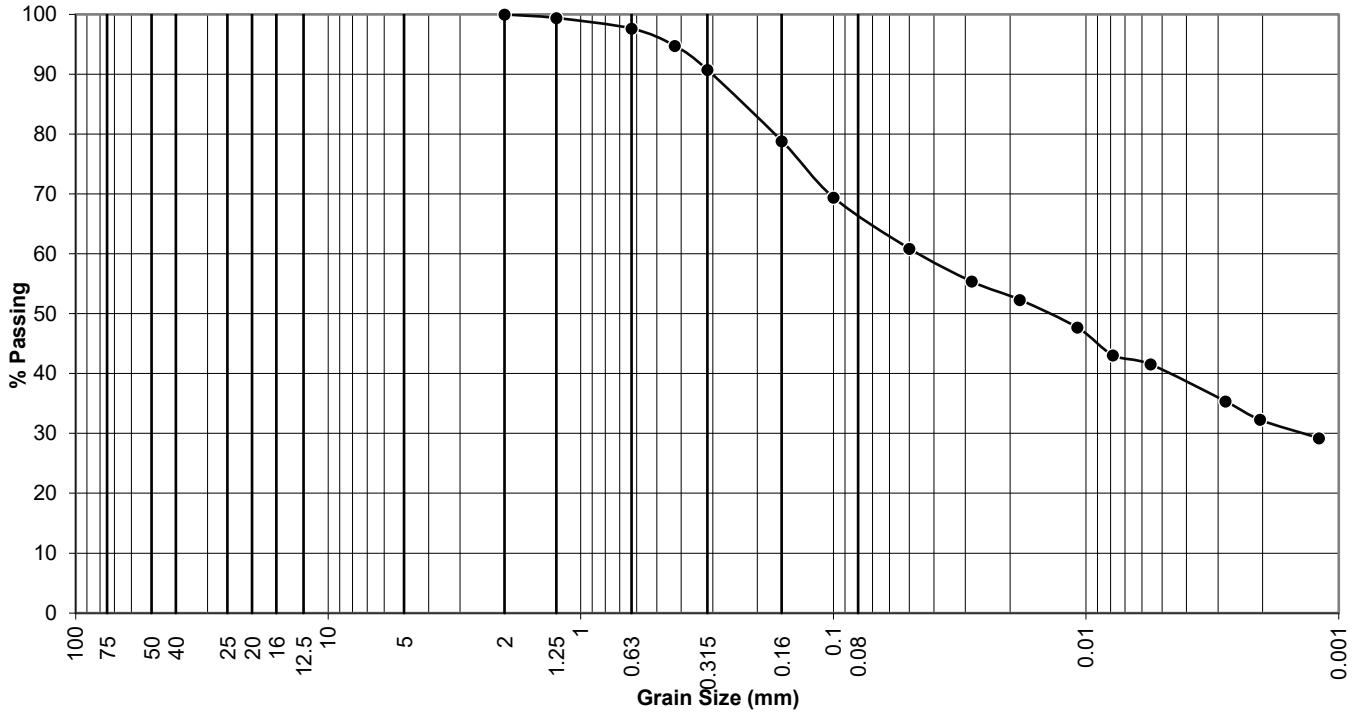
Soil Description Silty SAND and CLAY (Clay Loam)

Soil Properties

Natural Moisture Content	16.6	%
Liquid Limit		%
Plastic Limit		%
Plasticity Index		%
Specific Gravity	2.65	
Organic Content	1.51	%
K	0.036	

Comments *** FOR EROSION CONTROL ***

Gravel	Sand	Silt	Clay



APPENDIX D

Phase 1 Environmental Site Assessment

Phase I Environmental Site Assessment

Block A, Plan 9212174
NW¼-08-030-01 W5M, Carstairs, Alberta
Agricultural Property

July 8, 2021
Trace Project No. 100-1931

Prepared for:
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DOCUMENT CONTROL

Revision	Description	Project Manager	File Location	Date Issued
0	Issued for client use	Nick Swanlund	P: Drive (Secretary)	July 8, 2020

EXECUTIVE SUMMARY

Lee Maher Engineering Associates Ltd. (Lee Maher) retained Trace Associates Inc. (Trace) to conduct a Phase I environmental site assessment (ESA) for an agricultural property located within Block A, Plan 9212174, Carstairs, Alberta (NW¼-08-030-01 W5M), hereinafter referred to as "the Site." The objective of conducting the Phase I ESA was to identify actual and potential sources of soil and/or groundwater contamination that may be present at the Site.

Discussion and Conclusions

The Site is currently an agricultural homestead and has been used as such since prior to 1949. Based on the results of this assessment, Trace did not identify actual or potential sources of contamination from on-site or off-site sources which would warrant further investigation at the Site.

Recommendations

Based on the assessment findings and conclusions, further investigation or assessment (i.e., a Phase II ESA) is not recommended; however, Trace recommends consideration of the following actions:

- Due to the buildings' dates of construction (prior to 1949 to 1975), consider the presence of hazardous building materials prior to any major renovations or demolition of any buildings on the Site.
- Decommission the water well, septic tank, and septic field in accordance with applicable acts, regulations, and guidelines when no longer in use.
- If buried debris, stained soils, or soils of unknown quality are encountered during redevelopment, contract a qualified environmental professional.

This Executive Summary is subject to the same general limitations as contained in the report and must be read in conjunction with the entire report.

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1.0 INTRODUCTION

1.1 Purpose and Authorization

Lee Maher Engineering Associates Ltd. (Lee Maher) retained Trace Associates Inc. (Trace) to conduct a Phase I environmental site assessment (ESA) for an agricultural property located within Block A, Plan 9212174, Carstairs, Alberta (NW¼-08-030-01 W5M), hereinafter referred to as "the Site." Lee Maher provided written authorization to proceed with the project on June 11, 2021. The objective of conducting the Phase I ESA was to identify actual and potential sources of soil and/or groundwater contamination that may be present at the Site. Lee Maher requested that the Phase I ESA be conducted in support of their redevelopment application with the municipality.

1.2 Standards and Methods

Trace conducted the project in general accordance with the following documents:

- The Canadian Standards Association Group's (CSA) *Phase I Environmental Site Assessment* standard Z768-01 (CSA, 2001)
- Trace's Professional Report Conditions (Appendix A)

As per CSA standards, there were no enhancements (e.g., risk evaluations, recommendations regarding remedial measures) to the Phase I ESA. Trace personnel did not request or gain access to the residence on the north portion of the Site.

1.3 Scope of Work

The scope of work for this project included the following specific tasks:

- Review historical environmental reports (as provided by the client) related to the Site.
- Review available historical information for the Site and the immediate surrounding areas, including aerial photographs, fire insurance plans (FIPs), and property listing directories (i.e., Henderson Business Directories and/or Telus Numerical Directories) for previous land use of the Site and the immediate surrounding areas.
- Investigate and collect relevant environmental information pertaining to the Site from the Town of Carstairs, the Alberta Safety Codes Authority (ASCA) (formerly the Petroleum Tank Management Association of Alberta), the Alberta Environment and Parks (AEP) Online Water Well Database, the AEP Approval Viewer, and the Alberta Energy Regulator (AER).
- Obtain and review available environmental reporting for the surrounding area from the Alberta Environmental Site Assessment Repository (ESAR) database.
- Conduct a site visit and personnel interview.
- Review current land title information for the Site.
- Prepare a Phase I ESA report.

1.4 Qualifications of the Personnel

Kirk Elliott, R.T. (Ag.), conducted the site visit. Kirk is an Environmental Scientist and Partner out of Trace's Didsbury office, and has over 12 years of experience. Kirk's primary area of technical expertise is in reclamation, with a focus on native prairie and cultivated land in Central and Southern Alberta. Kirk's experience and interests lie in site reclamation; ESAs for contaminated sites; soil remediation; and spill response projects in the upstream and midstream oil and gas market sectors.

Sarah Burris, B.Sc., prepared the report. Sarah is an Environmental Scientist with Trace, and has experience assisting with Phase I and Phase II ESAs, groundwater monitoring and sampling, data evaluation, and technical report preparation related to land development and upstream oil and gas activities.

Nick Swanlund, B.Sc., is the Project Manager and conducted an intermediate review of the report. At Trace, Nick is the Team Lead, Real Estate and Development and an Associate, and is responsible for technical advisory, mentorship, client liaison, and successful project execution in this market sector. Nick's primary areas of experience include: ESAs, contaminated sites management, hazardous building materials surveys, regulatory and municipal liaising, wetland assessments, and hydrogeological investigations related to land development, mining, and oil and gas activities. Nick's project experience extends throughout the Western Prairies for both private sector and government clientele.

Jason Hampson, B.Sc., P.Ag., conducted a technical review of the report. Jason is a Principal Scientist and a Partner with Trace, and has over 21 years of experience in conducting ESAs, remediation, environmental liability assessments, and groundwater monitoring related to upstream oil and gas activities and land development. Jason specializes in developing cost-effective assessment and remediation solutions for complex contaminated sites. Through use of innovative guideline adjustment, remedial techniques, and risk management options, liability is effectively managed, and sites are quickly progressed towards regulatory closure.

2.0 SITE CHARACTERIZATION

Trace personnel conducted a site visit on June 23, 2021. Photographs of the Site are included in Appendix B.

2.1 Site Description

The Site is located within Block A, Plan 9212174, Carstairs, Alberta, within NW¼-08-030-01 W5M. The Site is rectangular in shape, with an area of approximately 38,800 square metres (m^2) or 3.88 hectares. The Site and surrounding areas to the north and west are zoned as Urban Reserve, the surrounding areas to the east and south are zoned as Residential, and the surrounding area to the northeast is zoned as Public Facility and Recreation District. The Site is bordered to the north by Gough Road (Township Road 302). A site plan, including surrounding land use, is presented as Figure 1.

2.1.1 Topography, Physiography, and Surface Water

The Site topography is nearly level, with surface drainage directed off site to surrounding properties. A suspected wetland is situated 160 metres (m) southwest of the Site. There is an unnamed creek situated approximately 1 kilometre south-southwest of the Site.

2.2 Infrastructure and Site Feature Details

The following sections outline the infrastructure and site feature details identified during the site visit, records review, and file information/reporting review:

- A two-storey residence, two shops, one carport, one barn, one outhouse, and nine sheds are located on the north portion of the Site.
- The north portion of the Site is occupied by residential tenants.
- Based on information collected during this study, the residence and some sheds were constructed prior to 1949, and the shops were constructed between 1963 and 1975.

2.2.1 Sewage Disposal and Wastewater

The Site is serviced by a septic tank and septic field, reportedly located northwest of the residence, and is pumped out annually.

2.2.2 Pits and Lagoons

There were no pits or lagoons observed at or surrounding the Site.

2.2.3 Sumps and Drains

No sumps or drains (e.g., stormwater sewer or collection basins) of environmental interest were observed during the site visit.

2.2.4 Watercourses, Ditches, or Standing Water

There are no surface water features identified at the Site. Surface drainage is directed off site.

2.2.5 Potable Water Supply

Potable water is reportedly supplied to the Site by a domestic water well located south of the residence.

2.2.6 Wells

Oil, gas, or disposal wells were not observed or reported to be present at the Site.

2.2.7 Special Attention Items

Special attention items include building materials such as: polychlorinated biphenyls (PCBs); asbestos-containing materials; lead; ozone-depleting materials; and urea foam formaldehyde insulation (UFFI). Based on the buildings' dates of construction (prior to 1949 to 1975), the following Sections 2.2.8.1 to 2.2.8.3 outline special attention building items identified that require further discussion or investigation at the Site.

2.2.8 Polychlorinated Biphenyls

The Canadian Environmental Protection Act (CEPA) (http://laws-lois.justice.gc.ca/eng/acts/C-15.31/index.html) has restricted the use of, and controlled the phasing out of, PCBs in Canada. Additionally, the storage and disposal of PCBs is regulated. The CEPA 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 other various types of electrical equipment (e.g., rectifiers) dating back to the early 1980s or earlier.

Based on the buildings' dates of construction (prior to 1949 to 1975), the presence of PCB-containing light ballasts and/or electrical equipment is possible.

2.2.8.1 Asbestos-Containing Materials

Construction materials (i.e., ceiling or floor tiles, drywall, wall insulation, and other insulation for boiler/piping and/or ducts) used prior to the early 1980s were known to potentially contain asbestos. Asbestos is considered a health hazard if it is friable, airborne, and humans are exposed to it.

There was no obvious asbestos observed at the time of the site reconnaissance. Based on the building's date of construction (prior to 1949 to 1975), the presence of friable asbestos-containing materials is possible, and therefore should be taken into consideration. Intrusive investigation and sampling of possible construction materials was not within the scope of this Phase I ESA. No reporting relating to asbestos abatements was provided to Trace personnel for review.

2.2.8.2 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 production in the Canadian market in the late 1970s but remained in circulation into the early 1980s. If present, lead-based paint is likely concealed beneath multiple layers of paint applied over years of renovations. Lead-based paint and plumbing equipment are not a direct health risk when concealed (sealed behind layers of non-lead-based paint) and/or in good condition.

There are no x-ray rooms with lead shielding at the Site. Based on the building's date of construction (prior to 1949 to 1975), the presence of lead-based paint and plumbing equipment is possible.

2.2.8.3 Urea Formaldehyde Foam Insulation

Insulation materials used during the 1970s and 1980s were known to possibly contain UFFI. UFFI was banned in 1980 under the Federal Hazardous Products Act (http://laws-lois.justice.gc.ca/eng/acts/H-3/).

Based on the building's date of construction (prior to 1949 to 1975), the presence of UFFI is possible. Intrusive investigation of wall cavities and associated sampling was not within the scope of this Phase I ESA.

2.2.9 Other Special Attention Items

Other special attention items include: methane generation; mould; noise; electric and magnetic fields; vibration; and radon. There were no other special attention items identified that require further discussion.

2.2.10 Hazardous Materials, Storage Tanks, and Chemical Containers

The following above-ground storage tanks (ASTs), underground storage tanks (USTs), and/or chemical-container storage areas were observed or reportedly present at the Site:

- AST No. 1: Located on a trailer north of one of the shops. One ~250 litre (L) steel slip tank, unknown contents. No obvious leaks or stains were observed.
- AST No. 2: Located in the shed east of the residence. One ~200 L reportedly empty herbicide tank, plastic construction, stored on a small trailer. One 20 L jerry can was also observed in this shed. No obvious leaks or stains were observed on or near the tank.
- Chemical Storage Area No. 1: Several jerry cans and five 10 L plastic containers of motor oil were observed in the shop, largely stored on wooden pallets. No obvious leaks or stains were observed on or near the storage area.

2.2.11 Staining and Stained Materials

Minor surficial stains typically less than 1 m^2 were located in one of the shops and one of the sheds, and both were reportedly related to vehicle/equipment storage. Based on the size of these stains, they are considered a minor housekeeping issue.

2.2.12 Odours

There were no obvious strong, pungent, or noxious odours identified during the site visit.

2.2.13 Stressed Vegetation

There were no indications of obviously-stressed vegetation at the Site.

2.2.14 Fill Areas

If present, the main concern with fill material is the unknown origin and therefore, unknown physical and chemical quality. Best management practices for fill material management include sampling and testing fill material prior to use on a new site. With developed sites, the potential for fill material placement with an unknown chemical and physical quality exists.

This study did not identify obvious indications of uncontrolled fill material placement on the Site.

2.2.15 Hydraulic Elevators/Hoists

There are no hydraulic elevators or hoists at the Site.

2.3 Off-site Observations

Trace personnel observed the grounds of neighbouring properties and associated structures (from the Site and publicly-accessible areas) for signs of actual or potential sources of contamination. There were no adjacent properties (within 100 m) identified that were interpreted by Trace to present an actual or potential source of contamination to the Site which would warrant further investigation.

3.0 INTERVIEW

Trace personnel interviewed a site representative familiar with the history of the Site. The interview was conducted to obtain information regarding current and past activities and events that may have affected the environmental conditions at the Site.

Cory Brekelmans, the current landowner, was the site representative. Cory has been familiar with the property for less than one year. Trace conducted the interview during the site visit on June 23, 2021. The findings of the personnel interview, which have been incorporated into this report, are in general agreement with the records reviewed and site observations.

4.0 RECORDS REVIEW

The following sections include a review of the land title records and historical aerial photographs.

4.1 Land Title Records

Trace personnel reviewed the current land title for the property. Two utility rights-of-way and one caveat were associated with the land title; however, there were no instruments of potential environmental interest warranting further investigation at the Site. A copy of the current land title is included in Appendix C.

4.2 Aerial Photographs

Aerial photographs provide visual evidence of site occupancy, operational activities, and general Site details. As well, aerial photographs capture a view of the Site and the surrounding areas at a given time. Trace personnel reviewed aerial photographs of the Site for the years: 1949, 1963, 1975, 1993, 2004, 2015, and 2020 obtained from the AEP Aerial Photo Record System (https://securexnet.env.gov.ab.ca/aprs/inquiry.jsp) and Google Earth™ (www.google.com/earth). The aerial photograph review and discussion are limited to developments of environmental interest.

1949 and 1963

- The Site is developed as a homestead located on agricultural land; the current residence, one of the two current shops, and associated sheds are visible.
- A road borders the north portion of the Site.
- Structures are visible on the adjacent property to the northeast; the remaining surrounding areas within 100 m are undeveloped agricultural land.

1975, 1993, and 2004

- Fewer buildings/structures are visible on the Site and a potential barn is visible on the west portion.

2015 and 2020

- The adjacent properties to the east and south are developed (residential).

5.0 REGULATORY INQUIRIES

Trace personnel contacted the Town of Carstairs, the ASCA, and the AER; and searched the AEP Online Water Well Database, AEP Approval Viewer, and Alberta ESAR database to obtain environmental information with respect to the Site and surrounding area. Responses from the regulatory agencies are presented in Appendix D.

5.1 Town of Carstairs

Trace personnel contacted the Town of Carstairs to inquire about historical information on file pertaining to the Site. The Town of Carstairs indicated that there are no current or historical landfills, environmental reports, current or historical ASTs or UST, or bylaw infractions listed for the Site.

5.2 Alberta Safety Codes Authority

The ASCA (formerly the Petroleum Tank Management Association of Alberta) requires that all USTs be registered; however, only ASTs with a capacity greater than 2,500 L are required to be registered. The database is based on a limited survey conducted in 1992 and voluntary information submitted and is therefore, not considered a comprehensive inventory of storage tanks in Alberta. Trace personnel contacted the ASCA regarding registered petroleum storage tanks (PSTs) at the Site. The ASCA response indicated that no PSTs are listed for the Site.

5.3 Alberta Environment and Parks – Online Water Well Database

The AEP Online Water Well Database (http://groundwater.alberta.ca/WaterWells/d/) has six records of water wells within 400 m of the Site. The water wells were drilled to depths of between 26 m and 46 m for domestic use. Drilling completion dates were not available for any of the wells. Trace personnel observed one water well on site during the site visit.

5.4 Alberta Environment and Parks – Online Approval Viewer

The AEP Online Approval Viewer (https://avw.alberta.ca/ApprovalViewer.aspx) allows the public to view approvals, licences, registrations, and permits issued under the Water Act and under the Environmental Protection and Enhancement Act. There were no approvals (active or inactive) listed for Block A, Plan 9212174. There were 33 approvals issued for NW¼-08-030-01 W5M. Two approvals pertain to a municipal landfill located greater than 100 m from the Site, one approval pertains to construction in a wetland located greater than 100 m from the Site, and the remaining approvals pertain to municipal activities (i.e., wastewater management, subdivision construction, etc.) and are not interpreted to be of medium or high risk to soil and/or groundwater quality at the Site.

5.5 Alberta Environmental Site Assessment Repository Database

The Alberta ESAR database (http://www.esar.alberta.ca/) allows the public to perform an online search for ESAs relating to sites throughout Alberta. There were no records for review within 100 m of the Site.

5.6 Alberta Government – Spatial Information System Website

The Alberta Government Spatial Information System (SPIN) website (https://alta.registries.gov.ab.ca/spinii/logon.aspx) is an internet data delivery system that provides online delivery of land titles, registered plans, and survey control monuments. The SPIN website indicates historical and/or current land use for some areas of Alberta.

One water pipeline right-of-way was identified bordering the north portion of the Site, utility rights-of-way were identified bordering the east and west boundaries of the Site, and several utility rights-of-way were identified within 100 m of the east and south portions of the Site. Trace did not identify any other information that indicates the presence of potential or actual contamination relative to the Site.

5.7 Alberta Energy Regulator – Oil and Gas-Related Facilities, Spills, and Complaints

The AER maintains information on oil and gas wells, registered pipelines, and oil and gas facilities. The AER information was accessed through the Abacus Datagraphics Ltd. database (www.abacusdatagraphics.com), which is a web-based oilfield mapping program that uses current information to graphically display the location of oilfield and related facilities, and/or spills and complaints within Alberta. The following oil and gas-related wells, pipelines, facilities, spills, or complaints occurred within 400 m of the Site:

5.7.1 Pipelines

Two natural gas pipelines are situated approximately 120 m east and 245 m northeast of the Site, respectively. Based on the contents of the pipelines (natural gas) and distance to the Site, no further environmental investigation is warranted.

5.7.2 Wellsites

The downhole of the 100/03-17-030-01 W5M/0 reclamation certified wellsite is located approximately 325 m north of the Site. The well was spud in 1997 and reclamation certified in 2001. Based on distance to the Site, the potential for soil and/or groundwater contamination relative to the Site is considered low.

5.8 Business Directories

Based on the rural location of the Site, there were no Henderson Business Directories and/or Telus Numerical Directories for the Site and surrounding area available for review.

5.9 Fire Insurance Plans

Based on the rural location of the Site, there were no FIPs for the Site and surrounding area available for review.

6.0 PREVIOUS ENVIRONMENTAL REPORTING AND DOCUMENTS

There were no previous environmental reports provided to Trace from the client.

7.0 DISCUSSION AND CONCLUSIONS

Based on the results of this assessment, Trace did not identify actual or potential sources of contamination from on-site or off-site sources which would warrant further investigation at the Site.

It is important to note that Trace personnel did not request to or gain access to the residence on site.

8.0 RECOMMENDATIONS

Based on the assessment findings and conclusions, further investigation or assessment (i.e., a Phase II ESA) is not recommended; however, Trace recommends consideration of the following actions:

- Due to the buildings' dates of construction (prior to 1949 to 1975), consider the presence of hazardous building materials prior to any major renovations or demolition of any building on the Site.
- Decommission the water well, septic tank, and septic field in accordance with applicable acts, regulations, and guidelines when no longer in use.
- If buried debris, stained soils, or soils of unknown quality are encountered during redevelopment, contract a qualified environmental professional.

9.0 LIMITATIONS OF LIABILITY

This report is based solely on the conditions which existed on site at the time of Trace's investigation. The client, and any other parties using this report with the express written consent of the client and Trace, acknowledges that conditions affecting the environmental assessment of the Site can vary with time, and that the conclusions and any recommendations set out in this report are time sensitive.

The client, and any other party using this report with the express written consent of the client and Trace, also acknowledges that the conclusions and recommendations set out in this report are based on limited observations and testing on the Site, and that conditions may vary across the Site which, in turn, could affect the conclusions and recommendations made.

The client acknowledges that Trace is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment, or development of the Site, the decisions on which are the sole responsibility of the client.

10.0 CLOSURE AND QUALITY MANAGEMENT

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

Respectfully submitted,
Trace Associates Inc.

09-Jul-2021

09-Jul-2021

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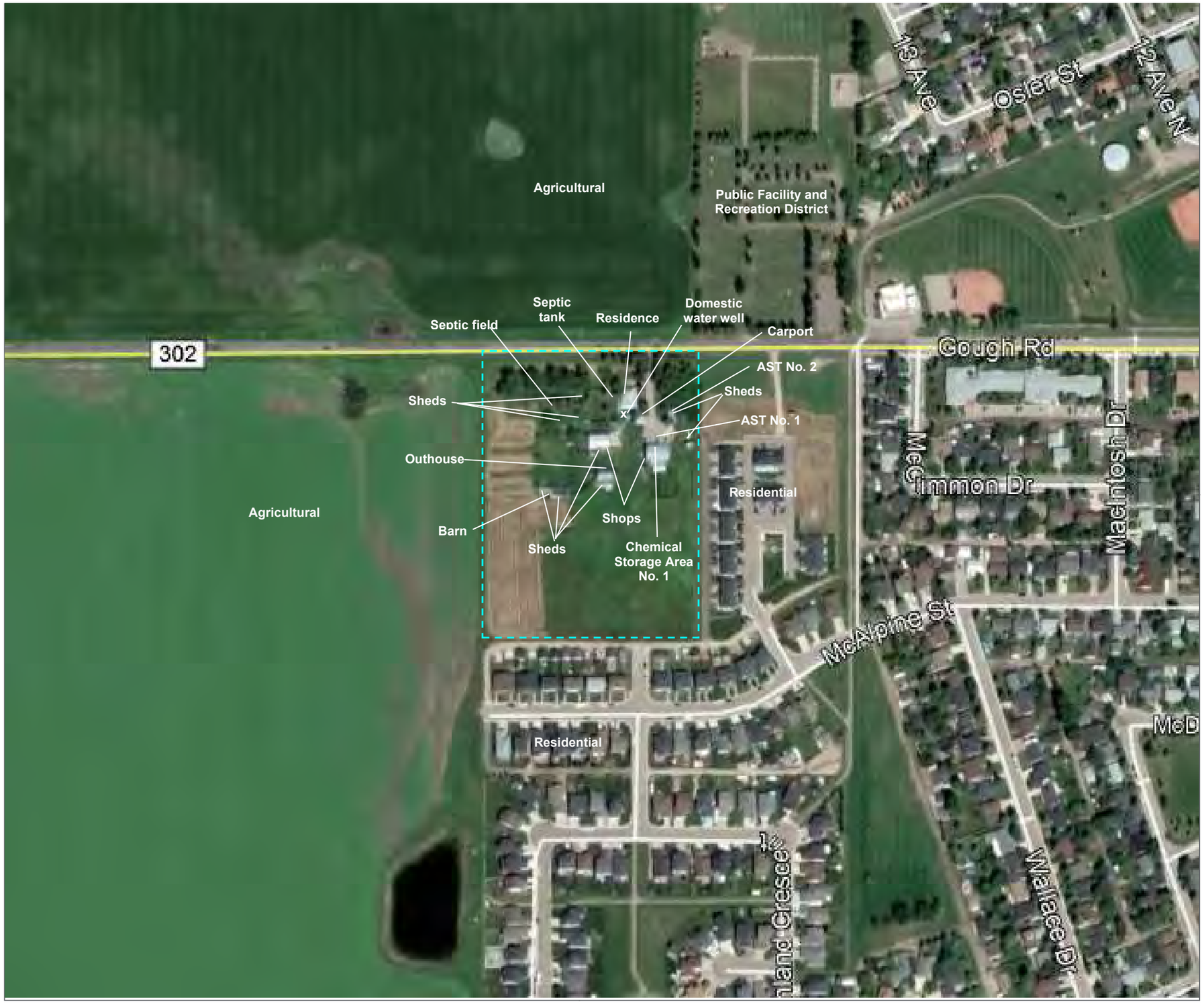
11.0 REFERENCES

CSA (Canadian Standards Association Group). (2001). *Phase I environmental site assessment, reaffirmed 2016 (Update No. 1, CAN/CSA-Z768-01, April 2003)*. Canadian Standards Association Group. https://www.csagroup.org/store/product/Z768-01/

Figures

Site Plan Showing Surrounding Area

Lee Maher Engineering Associates Ltd.
Phase I Environmental Site Assessment
Block A, Plan 9212174, NW¼-08-030-01 W5M
Carstairs, Alberta, Agricultural Property
Trace Project No. 100-1931



Legend

Approximate Site Boundary

~1:3,100 (At original plot size of 11x17)

Notes

1. Base Image: Google Earth™ (Image Date: 2020)
2. Base Features: Trace Site Visit on June 23, 2021
3. Inset Image: Creative Commons
4. Drawn by: NK (June 14, 2021)
5. Reviewed by: NS (July 8, 2021)
6. File Name: Phase I ESA NW¼-08-030-01 W5M (100-1931 R01 Fig 1).docx
7. Revision 0

TRACE™ ASSOCIATES

Figure No. 1

Appendix A

Trace Associates Inc.
Professional Report
Conditions

1.0 USE OF REPORT

This report pertains to a specific site, development, organization, or business and a specific scope of work, all as specifically identified in the within report (the "Report") (such site, development, organization or business and scope of work is hereinafter referred to as the "Subject"). It is not applicable to any other Subject. An assessment or evaluation of a Subject other than the one specifically identified in the within Report would necessitate a supplementary evaluation.

This Report and the assessments, evaluations, and recommendations contained in it are intended for the sole use of Trace Associates Inc.'s (Trace's) client, as specifically identified in the Report (the "Client"). If this Report is being read by any other person (other than from a regulatory body or government agency), such person is hereby advised that Trace is not making any observations, evaluations, or recommendations for such person's benefit and such person is unable to rely on the contents of this Report. Any such person would use this Report at their own risk, and liability is expressly declined to any person other than the Client. Accordingly, no responsibility is accepted by Trace for any damages suffered by any reader of this Report other than the Client. Diligence by all readers is assumed. Any use of or reliance on the Report by any person other than the Client is at the sole risk of the user.

This Report is subject to copyright and may not be reproduced either wholly or in part without the prior, written permission of Trace. The Client agrees that it shall use the Report for its own internal purposes, and it shall not provide the Report to another party (other than a regulatory body or government agency). The report provided is suitable for use by the client for the intended purpose only after accounts are settled for the work conducted.

2.0 LIMITATION OF REPORT

This Report is based solely on the information and conditions that existed and were presented to Trace at the time of Trace's evaluation. The Client acknowledges conditions affecting the contents of this Report can vary with time and that the conclusions and recommendations set out in this Report are time sensitive.

The Client also acknowledges that the conclusions and recommendations set out in this Report are based on limited observations and upon circumstances, assumptions and information presented or made available to Trace by the Client and, where applicable testing on the Subject site. Further, the Client acknowledges that conditions may vary across a site and with time which, in turn, could affect the conclusions and recommendations made.

The Client acknowledges that Trace is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the site, the decisions on which are the sole responsibility of the Client.

3.0 INFORMATION PROVIDED TO TRACE BY OTHERS

During the performance of the work and the preparation of this Report, Trace may have relied on information provided by persons (third parties) other than the Client if instructed to do so by the Client. Trace did not verify this information and accepts no responsibility for the accuracy or the reliability of such information and disclaims all liability with respect thereto.

4.0 LIMITATION OF LIABILITY

In consideration of Trace providing the services requested by the Client to complete the Report, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the Client, the Client agrees that Trace's liability shall be limited as follows:

1. With respect to any claims brought against Trace by the Client for damages of any kind whatsoever, including without limitation, incidental, consequential, exemplary, or punitive damages, for any reason whatsoever arising out of the observations, conclusions, or recommendations contained in the Report, the amount of such claim and the extent of Trace's liability shall be limited to the amount of fees paid by the Client to Trace under this Agreement.

2. With respect to claims brought by any third parties arising out of the contents of this Report, the Client agrees to indemnify, defend, and hold harmless Trace from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs, and expenses of every nature and kind whatsoever, including solicitor-client costs, arising or alleged to arise either in whole or part out of services provided by Trace or the Report completed by Trace.

5.0 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that in conducting the scope of work (the “Scope”) and preparing the Report, Trace has relied on information provided by the Client. Trace, in conducting the Scope and preparing the Report, has assumed the accuracy, and has not attempted to verify the completeness of all such information. The Client acknowledges that Trace cannot be held liable for any damages to the Client resulting from any inaccuracies or incompleteness in the information provided by the Client to Trace.

6.0 STANDARD OF CARE

Services performed by Trace for this Report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the professional associations of which Trace's employees who worked on this Scope and this Report are members. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Report (or under separate cover). No further warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this Report.

7.0 NOTIFICATION OF AUTHORITIES

The Client acknowledges that in certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed. The Client acknowledges and agrees that the notification of such bodies or persons remains wholly the responsibility of the Client; however, agrees that notification to such bodies or persons, as required, may be done by Trace in Trace’s reasonably exercised discretion.

8.0 OWNERSHIP OF INSTRUMENTS OF SERVICE

The Client acknowledges that all reports, plans, and data generated by Trace during the performance of the work and preparation of the Report and other documents prepared by Trace in the course of performing the scope are considered its professional work product and shall remain the copyright property of Trace. Any patents, methods, ideas, concepts, know-how, copyrights, trademarks, trade secrets, or other intellectual property rights developed by Trace prior to, during, and in the course of performing the Services

("IP") will be the exclusive property of Trace. The only exception to this is where Trace has prepared an Emergency Response Plan and associated training materials for a Client; in these cases, the Client owns these documents and is solely responsible for their implementation in an emergency.

9.0 ALTERNATE REPORT FORMAT

Where Trace submits both electronic file and hard copy versions of the Report, drawings, and other documents and deliverables (collectively termed "Trace's instruments of professional service"), the Client agrees that only the signed and stamped versions shall be considered final and legally binding. Trace shall keep the original electronic documents for record and working purposes, and, in the event of a dispute or discrepancies, Trace's electronic copy shall govern.

The Client agrees that both electronic file and hard copy versions of Trace's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party, except Trace. The Client warrants that Trace's instruments of professional service will be used only and exactly as submitted by Trace and for the purpose for which such instruments of professional service were intended.

The Client recognizes and agrees that electronic files submitted by Trace have been prepared and submitted using specific software and hardware systems. Trace makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

10.0 RECORDS RETENTION

Trace will, at its own cost and effort, retain project related Client data, including billing records, project files, documents, and final reports, for 12 years from the date of written authorization to proceed with the Scope. After 12 years, all data and information will be destroyed without notice to the Client. The Client may request in writing, within the 12-year period, copies of such information, and Trace will provide the information to the Client at the Client's cost.

11.0 GOVERNING LAW

The validity, construction, and performance of these General Conditions, which the Client shall be deemed to have accepted upon its acceptance of this Report, shall be governed by the laws in effect in the Province where the Subject site is located.

Appendix B

Site Photographs

Photo 1: North view of the house and domestic water well (June 23, 2021).

Photo 2: South view of the shop and equipment (June 23, 2021).

Photo 3: View of AST No. 1 (slip tank) inside a trailer (June 23, 2021).

Photo 4: Interior view of the shed east of the residence with AST No. 2 (plastic herbicide tank) and minor staining visible (June 23, 2021).

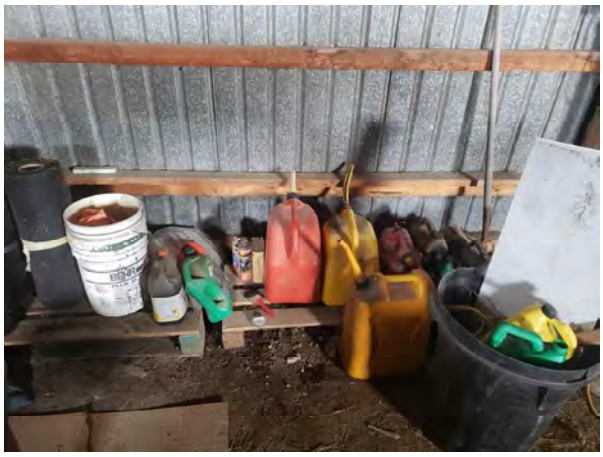


Photo 5: View of Chemical Storage Area No. 1 along the north wall inside one of the shops (June 23, 2021).

Photo 6: View of the covered septic tank on the west side of the residence (June 23, 2021).

Photo 7: View of the septic field (June 23, 2021).

Photo 8: Interior view of one of the shops with minor staining visible (June 23, 2021).

Appendix C

Current Land
Title Records

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0023 919 707	9212174;A	141 074 760

LEGAL DESCRIPTION

DESCRIPTIVE PLAN 9212174
BLOCK A
EXCEPTING THEREOUT ALL MINES AND MINERALS
AREA: 3.88 HECTARES (9.59 ACRES) MORE OR LESS

ATS REFERENCE: 5;1;30;8;NW
ESTATE: FEE SIMPLE

MUNICIPALITY: TOWN OF CARSTAIRS

REFERENCE NUMBER: 971 074 272

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
141 074 760	26/03/2014	TRANSFER OF LAND	$590,000	$590,000

OWNERS

WILLIAM G PACARYNUK

AND
SHAREN K BUTLER
BOTH OF:
BOX 940
CARSTAIRS
ALBERTA T0M 0N0
AS JOINT TENANTS

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
761 053 226	30/04/1976	UTILITY RIGHT OF WAY GRANTEE - THE MOUNTAIN VIEW REGIONAL WATER SERVICES COMMISSION.

(CONTINUED)

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
		35566 RGE RD 10 RED DEER COUNTY ALBERTA T4G0H5 (DATA UPDATED BY: TRANSFER OF UTILITY RIGHT OF WAY 961186724) (DATA UPDATED BY: CHANGE OF ADDRESS 141266605)
921 273 304	02/11/1992	CAVEAT RE : ACQUISITION OF LAND CAVEATOR - THE COUNTY OF MOUNTAIN VIEW NO. 17. BAG 100, DIDSBURY ALBERTA T0M0W0
101 055 038	24/02/2010	UTILITY RIGHT OF WAY GRANTEE - ATCO GAS AND PIPELINES LTD.

TOTAL INSTRUMENTS: 003

PENDING REGISTRATION QUEUE

DRR NUMBER	RECEIVED DATE (D/M/Y)	CORPORATE LLP TRADENAME	LAND ID
C0023G4	01/06/2021	MILLER THOMSON LLP 403-206-6391 CUSTOMER FILE NUMBER: 254888.2/JIS-CL	
001		TRANSFER OF LAND	9212174;A

TOTAL PENDING REGISTRATIONS: 001

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 14 DAY OF JUNE, 2021 AT 03:25 P.M.

ORDER NUMBER: 41921990

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

(CONTINUED)

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).

IF MORE INFORMATION IS REQUIRED ON A PENDING REGISTRATION WHERE THE CONTACT INFORMATION DISPLAYS N/A PLEASE EMAIL LTO@GOV.AB.CA.

Appendix D

Regulatory Inquiry Information

Nicole Koloff

From: Rob McKay <robm@carstairs.ca>
Sent: June 17, 2021 8:42 AM
To: Nicole Koloff
Cc: Cathy Lensen
Subject: RE: Environmental file search request

Hi Nicole,

After reviewing the property file the property has no noted concerns or items from your list.

Thanks

Rob Mckay
Development Officer
Fire Safety Codes Officer
Director of Emergency Management
Town of Carstairs
403.337.3341

From: Nicole Koloff <nkoloff@traceassociates.ca>
Sent: Wednesday, June 16, 2021 3:00 PM
To: Rob McKay <robm@carstairs.ca>
Subject: Environmental file search request

Good afternoon,

Trace Associates Inc. (Trace) is conducting an environmental site assessment for the property located at Block A, Plan 9212174, within NW¼-08-030-01 W5M, Carstairs, Alberta (map attached for reference). I would like to request an information search for this property that includes:

- Presence of current or historical landfills
- Environmental reports
- Presence of current or historical above-ground or underground storage tanks
- Bylaw infractions

Trace has obtained permission from the landowner to release the information (attached as the file search release letter). Please note that there was a delay with updating the land title at the registry office, but the landowner listed on the release letter (2339043 Alberta Limited) is current and correct.

I can pay any required search fees via credit card over the phone, or via formal invoice to our accounting department. Any assistance you can provide would be greatly appreciated.

Thank you kindly,

NICOLE J. KOLOFF, B.A., B.Ed. (She/Her/Hers)

Project Consultant, Trace Associates Inc.
Lincoln Park Centre, Suite 300, 37 Richard Way SW, Calgary, Alberta, T3E 7M8
587.779.2898 | nkoloff@traceassociates.ca
www.traceassociates.ca

Alberta Safety Codes Authority

A Division of the Safety Codes Council

June 4, 2021

Ms. Nicole Koloff Neufeld
Trace Associates Inc.
300 37 Richard Way SW
Calgary AB T3E 7M8

EMAIL: nkoloff@traceassociates.ca

Re: ASCA Storage Tank Search - Your File No. 100-1931

Dear Ms. Koloff Neufeld,

As per your search request dated June 14, 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 address:

1. Block A, Plan 9212174, NW-08-30-01-5, Carstairs AB

The search of the storage tank database determined no records were available for the address 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

Alberta Water Well Information Database Map

Projection
Web Mercator (Auxillary Sphere)

Datum
WGS 84

Date
6/14/2021, 3:30:33 PM

Legend
- Groundwater Drilling Report
- Baseline Water Well Report

http://groundwater.alberta.ca/WaterWells/d/

Reconnaissance Report

View in Imperial

Export to Excel

Groundwater Wells

Please click the water Well ID to generate the Water Well Drilling Report.

GIC Well ID	LSD	SEC	TWP	RGE	M	DRILLING COMPANY	DATE COMPLETED	DEPTH (m)	TYPE OF WORK	USE	CHM	LT	PT	WELL OWNER	STATIC LEVEL (m)	TEST RATE (L/min)	SC_DIA (cm)
406856	NW	8	30	1	5	UNKNOWN DRILLER		25.91	Chemistry	Domestic	1			FARRELL, J.E.	6.71		0.00
406857	NW	8	30	1	5	UNKNOWN DRILLER		45.11	Chemistry	Domestic	1			FARRELL, J.	20.73		0.00
406858	NW	8	30	1	5	UNKNOWN DRILLER		45.72	Chemistry	Domestic	1			STOESSER, DALE			0.00
406859	NW	8	30	1	5	UNKNOWN DRILLER		38.10	Chemistry	Domestic	3			STOESSER, MIKE	28.96		0.00
406859	NW	8	30	1	5	UNKNOWN DRILLER		38.10	Chemistry	Domestic	3			STOESSER, MIKE	30.48		0.00
406861	NW	8	30	1	5	UNKNOWN DRILLER		30.48	Chemistry	Domestic	1			STOESSER, MIKE			0.00

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- Contact Government |
- Government of Alberta Home |

Authorization Viewer **Traditional Agriculture Registration Viewer** **Public Notices Viewer** **Help**

Authorization Viewer - Search Results

The Search Used the Following Values:	
Area Parcel:	Plan: 9212174 Block: A
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.

0 Result(s)

Clear & Return

Comments regarding the Authorization Viewer page may be directed to the Regulatory Approvals Centre RAC.Environment@gov.ab.ca.

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- Government of Alberta Home |

Authorization Viewer **Traditional Agriculture Registration Viewer** **Public Notices Viewer** **Help**

Authorization Viewer - Search Results

The Search Used the Following Values:	
Legal Land Location:	NW 08-030-01-W5
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

33 Result(s)

	This consolidation document for TOWN OF CARSTAIRS has been provided for your convenience only. It's intended purpose is to summarize all Amendments that have been applied to the master Approval. Anyone making use of a consolidation is reminded that it has no legal standing and that you must refer to the original Approval and Amendments for purposes of interpretation and application.
	Document 00000500-00-00 CARSTAIRS WASTEWATER SYSTEN is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Approval is currently renewed.
	Document 00000500-01-00 CARSTAIRS WASTEWATER SYSTEM is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Approval is currently renewed.
	Document 00000500-01-01 CARSTAIRS WASTEWATER SYSTEM -MILLENNIUM ARENA DRAINAGE PLAN is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Approval is currently renewed.
	Document 00000500-01-02 CARSTAIRS WASTEWATER SYSTEM - MILLENIUM AREA DRAINAGE PLANT, UPGRADE OUTFALL DUE TO INCREASED CATCHMENT AREA is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Approval is currently renewed.
	Document 00000500-01-03 CARSTAIRS WASTEWATER SYSTEM - STONEBRIDGE SUBDIVISION is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Approval is currently renewed.
	Document 00000500-01-04 CARSTAIRS WASTEWATER SYSTEM - CARRIAGE LANES SUBDIVISION, STORM is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Approval is currently renewed.
	Document 00000500-01-05 CARSTAIRS WASTEWATER SYSTEM - LINKS STAGE 1 DRY STORM POND AND OUTFALL IN NE 17-30-1-W5M is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Approval is currently renewed.
	Document 00000500-01-06 CARSTAIRS WASTEWATER SYSTEM - LEGISLATIVE CHANGES is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Registration is currently renewed.
	Document 00000500-01-07 CARSTAIRS WASTEWATER SYSTEM - WEST HIGHLANDS PHASE 1 STORM POND AND OUTFALL is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Registration is currently renewed.
	Document 00000500-02-00 CARSTAIRS WASTEWATER SYSTEM is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Registration is currently issued as of Apr. 18, 2005 and does not expire.

	Document 00000500-02-01 CARSTAIRS WASTEWATER LAGOON - STORM DRAINAGE SYSTEM is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Registration is currently issued as of Apr. 21, 2005 and does not expire.
	Document 00000500-02-02 CARSTAIRS WASTEWATER LAGOON - THE HAVENFIELDS WET AND DRY STROM POND is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Registration is currently issued as of Dec. 18, 2006 and does not expire.
	Document 00000500-02-03 CARSTAIRS WASTEWATER SYSTEM - CARLINTON ESTATES STORM POND AND OUTFALL is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Registration is currently issued as of Jul. 20, 2010 and does not expire.
	Document 00067975-00-00 CARSTAIRS/MUNICIPAL - CARRIAGE LANE OF CARSTAIRS PH 1 is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Oct. 06, 1998 and does not expire.
	Document 00067975-00-01 CARSTAIRS/MUNICIPAL - CARRIAGE LANE OF CARSTAIRS PH 2 is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Apr. 30, 2001 and does not expire.
	Document 00067975-00-02 CARSTAIRS/MUNICIPAL - CARRIAGE LANE SUBDIVISION, PHASE 4 is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of May. 14, 2002 and does not expire.
	Document 00067975-00-03 CARSTAIRS/MUNICIPAL - CARRIAGE LANE OF CARSTAIRS PH 3 is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Jul. 15, 2003 and does not expire.
	Document 00068110-00-00 CARSTAIRS/MUNICIPAL - MOUNTAINVIEW GATE SUBDIV is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of May. 19, 1998 and does not expire.
	Document 00075474-00-00 CARSTAIRS/MUNICIPAL - OSTLER STR SANITARY MAIN REPLACE is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Jul. 27, 1999 and does not expire.
	Document 00082177-00-00 CARSTAIRS/MUNICIPAL -2000 EXT UPGRADE,NW LANE,N OF DOWNIE ST is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Apr. 11, 2000 and does not expire.
	Document 00082177-00-01 CARSTAIRS/MUNICIPAL -MILLENNIUM ARENA, INCLUDING A SANITARY LIFT STATION is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Jul. 11, 2000 and does not expire.
	Document 00082177-00-02 CARSTAIRS/MUNICIPAL - WATER LOOPING, HWY 2A TO 9 AVENUE is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Apr. 12, 2001 and does not expire.
	Document 00082177-00-03 CARSTAIRS/MUNICIPAL -2001 EXT,NORTH SANITARY TRUNK MAIN AND NORTH WATER MAIN LOOPING is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Apr. 20, 2001 and does not expire.
	Document 00082177-00-04 CARSTAIRS/MUNICIPAL -2001 EXT, STONEBRIDGE GLEN SUBDIVISION is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of May. 17, 2001 and does not expire.
	Document 00082177-00-05 CARSTAIRS/MUNICIPAL - LINKS STAGE 1 is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Jul. 27, 2001 and does not expire.
	Document 00082177-00-06 CARSTAIRS/MUNICIPAL - PARKVIEW ESTATES SUBDIV, PHASE 3 (MILTFORD CLOSE) is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Apr. 11, 2000 and does not expire.
	Document 00082177-00-07 CARSTAIRS/MUNICIPAL - MEADOW PARK SUBDIVISION is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Apr. 11, 2000 and does not expire.
	Document 00082177-00-08 CARSTAIRS/MUNICIPAL - WEST BAY PROPERTIES SUBDIVISION, PHASE 1 is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Authorization is currently issued as of Jun. 26, 2002 and does not expire.
	Document 00142463-00-00 CARSTAIRS/WMF/MUNICIPAL LANDFILL,NE 8 is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Approval is currently expired.
	File 00142873-00-00 CARSTAIRS/WMF/MUNICIPAL LANDFILL,SW 9 , HERITAGE FUNDED RECLAMATION operated/owned by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act.* This Heritage

	Funded Reclamation Project file is dated Nov. 17, 1983.
	Document 00153006-00-00 CARSTAIRS/MUNICIPAL - WASTEWATER EFFLUENT USE IN ROAD DUST CONTROL is held by Town of Carstairs, under the provisions of the *Environmental Protection & Enhancement Act*. This Authorization is currently issued as of Aug. 09, 2001 and does not expire.
	Document 00211393-00-00 MOUNTAINVIEW-CARSTAIRS/CONSTRUCTION IN A WETLAND/BSEI F-00211393 is held by Mountain View County, under the provisions of the *Water Act*. This Approval is currently expired.

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Alberta Environment and Parks

Alberta Environment and Parks

- Search Form
- Map Search

A designated location identifies a site where Alberta Environment and Parks has received scientific or technical information for that site and does not imply anything regarding the current state or condition of the site. Please refer to the studies and reports to determine the condition of the site.

ATS

Meridian W -	5
Range	1
Township	30
Section	8
[Quarter]	NW

Search

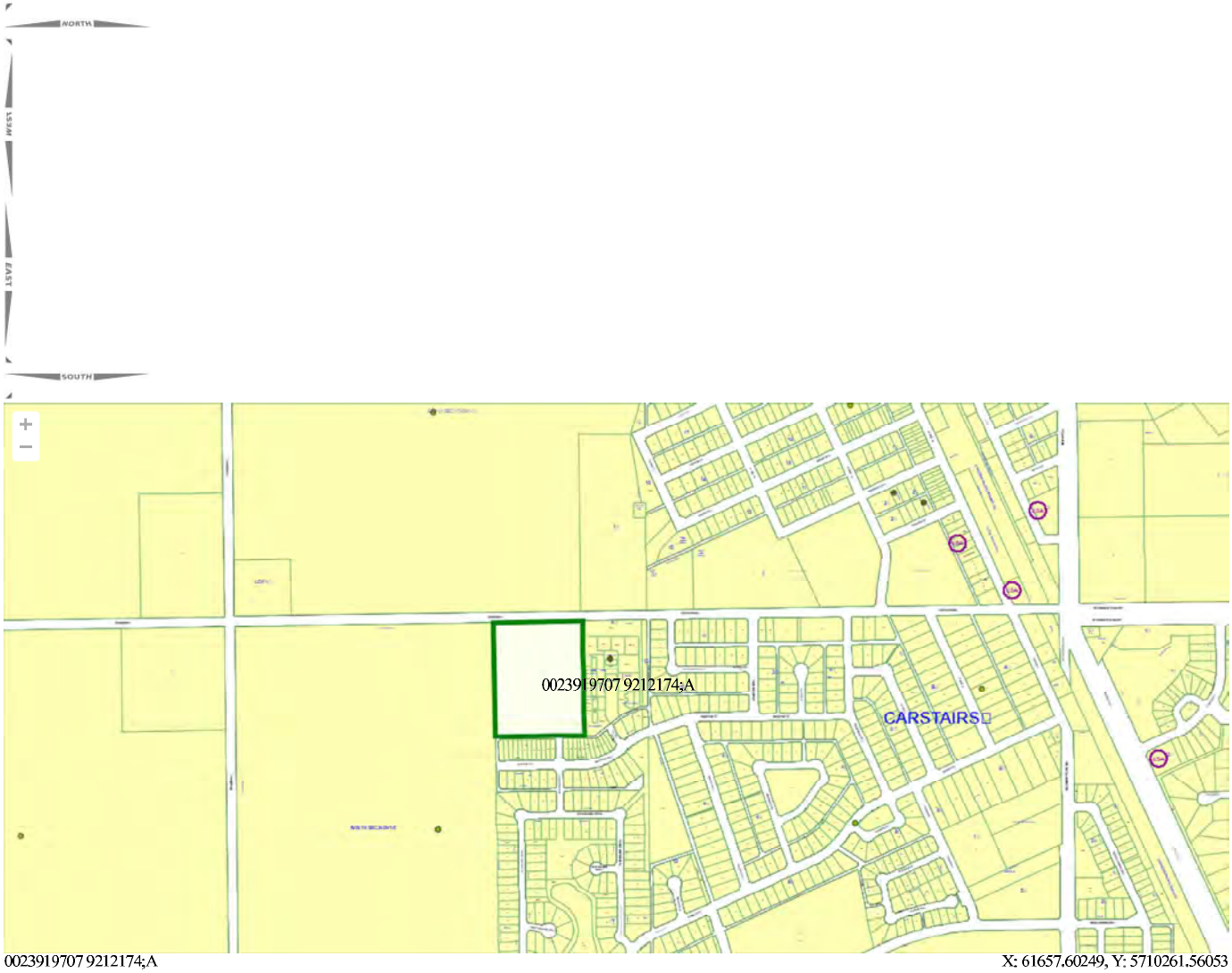
PBL

Address

Place Name

Coordinate

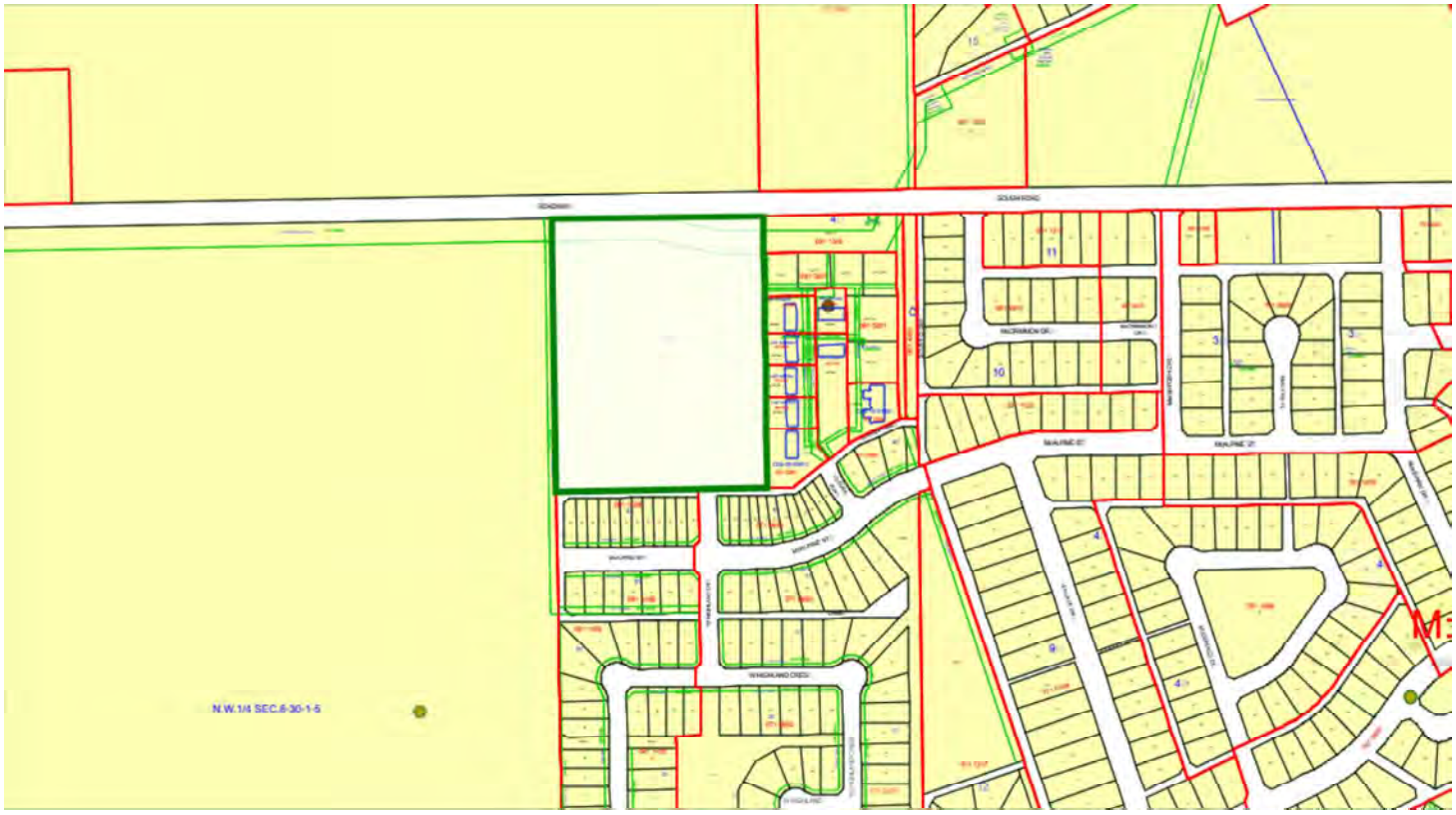
Help with Map



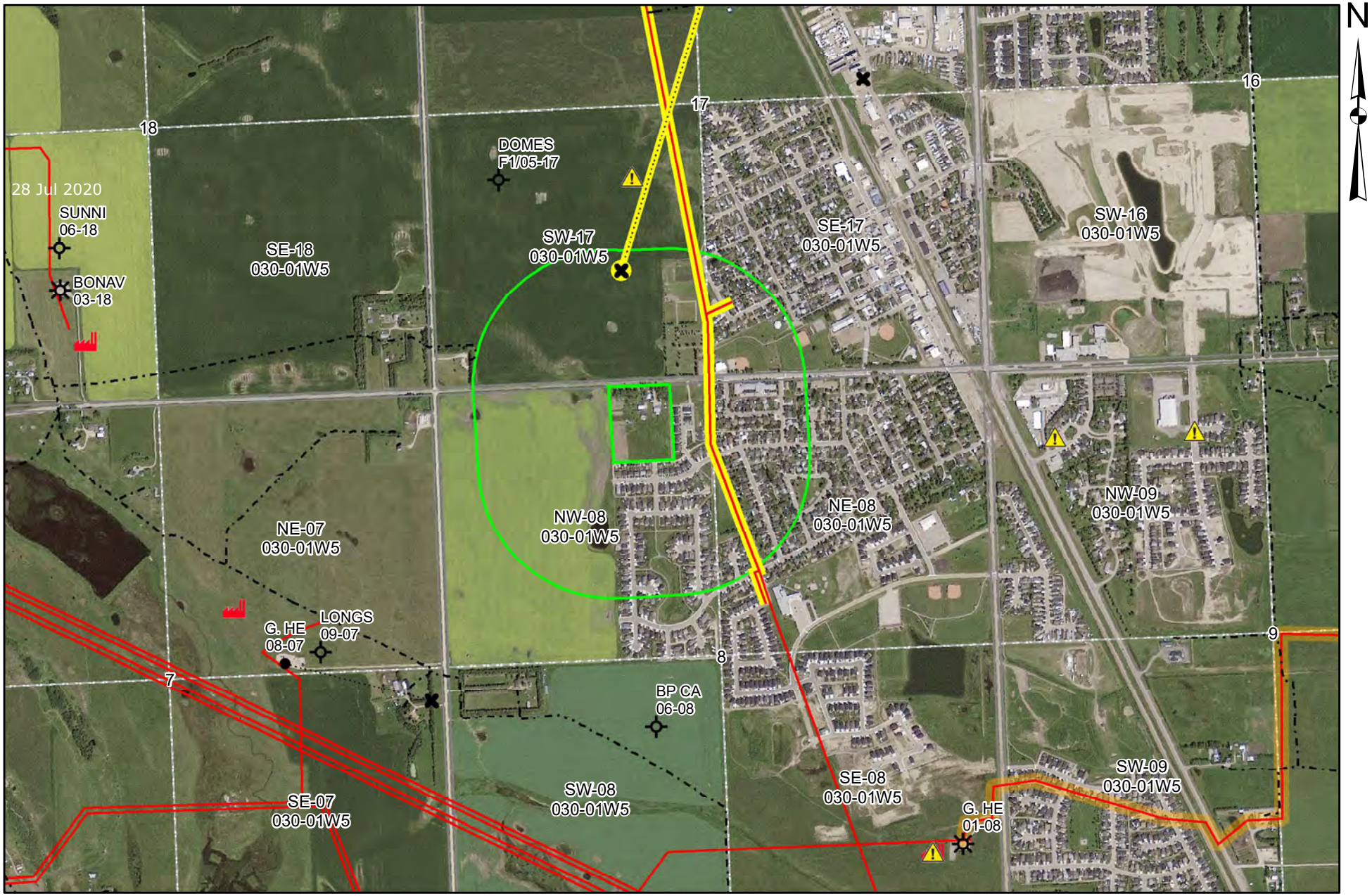
0023919707 9212174;A X: 61657.60249, Y: 5710261.56053

Map Views Map Information Map Navigation Map Tools

The ESA marker represents an approximate location of a site where the Government of Alberta has received scientific and/or technical information. The marker is an arbitrary, 40 meter diameter circle centered on the property for which this information is attached. For locations or other site information, see the document results table.
Spatial Search provided by the Alberta Land Titles SPIN 2 System


N.W.1/4 SEC.6-30-1-5

Oil and Gas-related Facilities, Spills, and Complaints within 400 metres



Wells

- Abandoned Wellhead
- Suspended Gas Wellhead
- Suspended Oil Wellhead
- Flowing Gas Wellhead
- Location Wellhead
- Flowing Oil Wellhead
- Miscellaneous Wellhead
- Water Wellhead
- Well Downhole Location
- Newly Licenced Well
- Newly Spudded Well
- AB Environment Water Well
- User Water Well
- Monitor Well

Pipelines

- Gas Pipeline
- Oil Pipeline
- Water Pipeline
- LVP/HVP Pipeline
- Foreign Pipeline (When Filtering by Company)
- Gas Co-op Pipeline (Low Pressure)

0 125 250 500 750 1,000 m

AbaData

Pipeline Report

LICENSE / LINE #	PROV	COMPANY NAME	LICENSE DATE	FROM LOCATION	TO LOCATION	LGTH (kms)	STS	SUB	H2S (mol/ kmol)	OD (mm)	WT (mm)	MAT	TYPE	GRD	MOP (kpa)	JNT	INTL COAT	STRESS LEVEL (%)	ENV	FIELD
2029 - 122	AB	ATCO GAS AND PIPELINES LTD.	APR 21 2003	3-17-30-1W5 BE	2-17-30-1W5 BE	0.07	A	NG	0	60.3	3.91	S	Z245.1	2411	0	W	U	0		CROSSFIELD EAST
2029 - 138	AB	ATCO GAS AND PIPELINES LTD.	APR 3 2003	2-5-32-1W5 PL	10-8-30-1W5 PL	17.04	O	NG	0	114.3	4.78	S	5L	B	4960	W	U	25		GARRINGTON

Government Pipeline Data Current to: May 11, 2021

Page: 1 of 1

AbaData AER Well Report

WELL ID	LICENSE #	LICENSE DATE	WELL NAME	LICENSEE	SURFACE LOCATION	LICENSE STATUS	SPUD DATE	FINAL DRILL DATE	WELL STATUS	ABANDON DATE	SURFACE LATITUDE	SURFACE LONGITUDE	DOWNHOLE LATITUDE	DOWNHOLE LONGITUDE	H2S (%)
100 / 03-17-030-01 W5 / 0	0204810	AUG 12 1997	MOBIL HZ CROSSE 3-17-30-1	EXXONMOBIL CANADA ENERGY	15-17-030-01W5M	RecCertified	AUG 20 1997	SEP 20 1997	ABD	APR 1 1999	51.575878	-114.104789	51.564964	-114.110789	0.000

Government Well Data Current to: May 05, 2021

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ASSOCIATES

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