AREA STRUCTURE PLAN
BRIDGE CROSSING SUBDIVISION

LOT 1; BLOCK 26; PLAN 2023GL
BLOCK 50; PLAN 2039I
Lots 22-26; Block 27; Plan 7810356
OT; PLAN 2039I
UI; Block 50; Plan 7810356

HASEGAWA
CONSULTING PROFESSIONAL ENGINEERS

Town of Raymond
Bylaw 1017-15
July 7, 2015

TOWN of RAYMOND

TOWN OF RAYMOND
BYLAW NO. 1017-15
Bridge Crossing Area Structure Plan

BEING a bylaw of the Town of Raymond, in the Province of Alberta, to adopt the *Bridge Crossing Subdivision Area Structure Plan*.

WHEREAS section 633(1) of the Municipal Government Act, Revised Statutes of Alberta 2000, Chapter M-26, as amended, enables a municipal council to adopt by bylaw an area structure plan for the purpose of providing a framework for subsequent subdivision and development of an area of land.

AND WHEREAS the Council of the Town of Raymond wishes to adopt an area structure plan encompassing lands described as:

1. Lots 22 through 26, Block 27, Plan 7810356;
2. Lot 1, Block 26, Plan 2023GL, excepting the east 110 feet of the north 519.4 feet;
3. That portion of the unnamed street adjoining Block 49 on the north east which is designated as Parcel 14, Plan 2039I, excepting the subdivision on Plan 2023GL (Closed Road);
4. That portion of the unnamed street which lies between Block 50 and Block "A", Plan 2039I and that portion of Church Aenue which lies between Block 49 and Block 50, Plan 2039I (Closed Road);
5. Block 50, Plan 2039I;
6. Lot U1 (Public Utility Lot), Block 50, Plan 7810356;
7. 300 West south of 100 North

and illustrated in the attached Schedule A;

AND WHEREAS the purpose of the *Bridge Crossing Subdivision Area Structure Plan* is to establish a comprehensive land use plan and thereby provide for the subsequent orderly subdivision and development of land within the described area;

THEREFORE under the authority and subject to the provisions of the Municipal Government Act, Revised Statutes of Alberta 2000, Chapter M-26, as amended, the Council of the Town of Raymond duly assembled does hereby enact the following:

1. Bylaw No.1017-15 being the *Bridge Crossing Subdivision Area Structure Plan (*attached hereto) is hereby adopted.
2. This bylaw comes into effect upon third and final reading hereof.

READ a **first** time this 17th day of March, 2015.

READ a **second** time this 7th day of July, 2015.

READ a **third** time and finally passed this 7th day of July, 2015.

***Mayor** – George Bohne*

***Chief Administrative Officer** – J. Scott Barton*

Schedule A
Bridge Crossing Subdivision Area Structure Plan

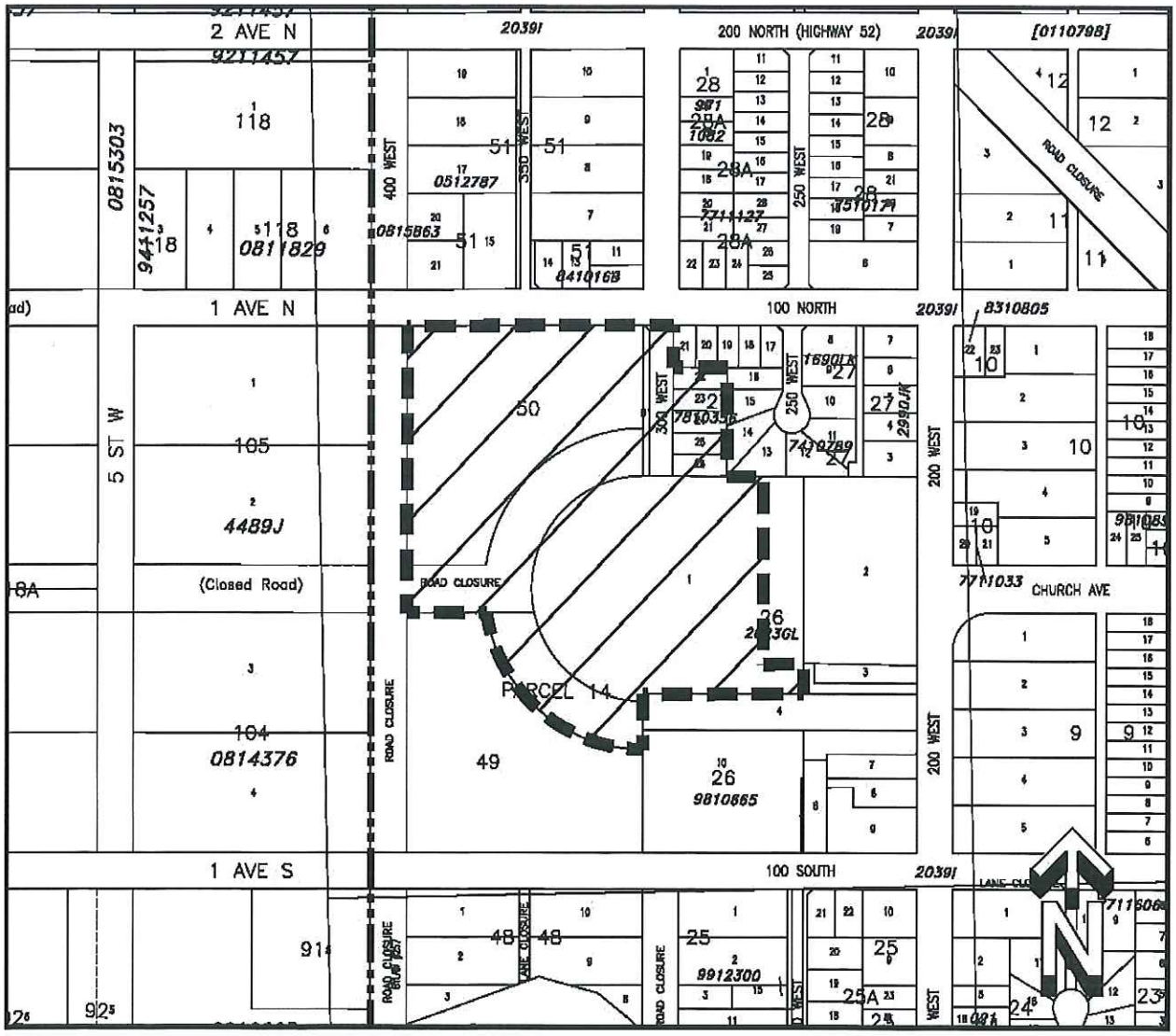


TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this Area Structure Plan is to describe the development and the municipal servicing strategy for the proposed development.

This document outlines a conceptual plan for a proposed subdivision located at:

1. Lot 1; Block 26; Plan 2023GL – R-1 (General Residential)
2. Block 50; Plan 2039I – R-1 (General Residential)
3. Lots 22-26, Block 27, Plan 7810356 – R-1 (General Residential)
4. OT; Plan 2039I – DC-1 (Direct Control)
5. U1, Block 50, Plan 7810356 – DC-1 (Direct Control)

All of the above parcels are located within the municipality of Raymond, AB (refer to Figure 1.1 for location plan). The parcels under consideration are located south of 100 North, between 300 and 400 West, in Raymond, AB. (refer to Figures 1.2 & 2.1). There is one existing house located on Block 50; Plan 2039I, within the proposed development which will remain as a newly titled lot. The proposed subdivision is bordered by existing residential properties in all directions as well as an LDS church along the southeast side. The development includes five undeveloped parcels with three of those owned by the municipality of Raymond (road closure plan and parcel 14, both with legal description Plan 2039I).

The proposed land use is General Residential (R-1). The client proposes to develop approximately 8.69ha. (21.47ac.) of mostly undeveloped grassland property from five parcels. An overview of the site and the proposed lot layout is provided in Figures 1.1 and 2.1. Proposed lot sizes are from 1/5 acre up to a maximum of 1/2 acre with the existing house lot sized at approximately .94ha.(2.32ac.).

The developer proposes to dedicate .59ha. (1.46ac.) as municipal reserve for a Storm Water Management and multi-recreational use facility. This facility will be completed as a grass field and also landscaped. As such, it will be used as a park area by residents. This is intended to match the Town of Raymond land use bylaw requirements.

The client is proposing to develop the property into a residential subdivision that meets Town of Raymond planning goals and objectives.

2.0 PLANS AND DRAWINGS

In order to illustrate the location of the property, site drainage, and the proposed subdivision layout, seven figures have been prepared. The figures are provided in Appendix A and are as follows:

1.1 Location Plan
1.2 Existing Legal & Zoning Site Plan
2.1 Site Plan, Land Use Plan & Phasing Plan
2.2 Traffic Integration Concept
3.1 Water, Storm, & Sanitary Servicing Plan
4.1 Existing Ground Contours
5.1 Existing Ground Section A-A Plan & Profile
5.2 Existing Ground Section B-B Plan & Profile
5.3 Standard Details
5.4 Standard Details

These maps are conceptual in nature and are to be used for planning purposes only. Upon ASP and re-zoning approval, design drawing and plans will be prepared and submitted for review.

3.0 LAND USE CONCEPT

3.1 Development Objectives

The overall goal of the subdivision is to establish a framework for merging new residential use properties with existing residential and public use areas. The proposed development has been designed to optimize land use within an existing parcel & integrate with the pre-developed areas. This land use also conforms to the Town of Raymond land use bylaw.

3.2 Land Use & Zoning

The existing zoning for the properties included in this development are shown in Figure 1.2. The entire development is proposed to be General Residential (R-1). Although the initial plan is to provide single family lots, there is the future potential to allow for affordable housing. Many of the lots are sized adequately to allow for duplex sites. Based on current need we estimate that up to 10 lots could be used for duplex purposes. This would be approved at the discretion of the development authority in accordance with the land use bylaw. Road widths and other infrastructure will be designed to accommodate up to 62 new units. Accessory dwelling units will be considered in accordance with the land use bylaw. This ASP allows for 53 residential lots (including the existing house) and further subdivision thereof will require an ASP amendment. Tentative lot line locations have been shown but these are approximations only. Final lot

lines will meet the standard set forth in the land use bylaw and will be finalized at the subdivision phase.

3.3 Proposed Land Use & Population Predictions

The distribution of land use within the proposed ASP is shown in Table 1 below. Population projections for the ASP area are provided in Table 2. The projected number of new dwelling units is 62 as shown on the Site Plan. The developable residential area is approximately 8.1 hectares giving an overall residential density of 7.65 units/hectares and a projected total population of 248.

Table 1: Land Use Statistics

	Hectares (Ac.)	Percent
Developable Area	**8.10 (20.01)**	**93.2%**
Road Allowance	1.14 (2.82)	14.1%
R-1 Single Detached Residential Lots	6.80 (16.80)	84.0%
Public Utility Lots	0.16 (0.39)	1.9%
Municipal Reserve	**0.59 (1.46)**	**6.8%**
Gross Area	**8.69 (21.47)**	**100%**

Table 2: Population Projections

	Units	Persons per Unit	Total Population
Developable Area +/- 11.34 ha	62	4	248

4.0 SERVICING

In order to determine the viability of this development, preliminary evaluations have been performed with respect to servicing. Key service items include water, sanitary sewer, storm water drainage collection, natural gas, telephone, television, and electric. Additional information on key services is included in this section.

As shown in the document, the storm pond and connection to the Town storm system is to be added as part of Phase 1. Phase 1 will not require any deep utilities but will be serviced from 100 North. The phasing has been specifically designed so that it connects in series so that the remainder of the shallow, and deep utilities and streets will correspond to the respective phase as shown on the map. Paving will be delayed to the end of each phase to minimize construction wear.

4.1 Sanitary Sewer System

This development will be serviced using Town of Raymond sewage infrastructure. Design criteria and predicted sanitary sewage flows are shown in Table 3 below.

Table 3: Sanitary Sewer Design Criteria

POP	DWF (L/d/cap)	PF	PEAK FLOW (L/d/cap)	WWF (L/d/cap)	IA (L/d/cap)	TOTAL (L/d/cap)	TOTAL FLOW (L/m)
248	400	4.12	1648	500	150	2298	396

POP - Population
DWF - Dry Weather Flows
PF - Peaking Factor
WWF - Wet Water Flow
IA - Infiltration Allowance
L/d/cap - Liters per day per Capita
L/m - Liters per minute

Each lot will be serviced by a 100mm (4") diameter pipe at a min. slope of 2% from the property line to the sanitary main. Each new sanitary main to be a 200mm (8") diameter pipe with a minimum slope of 0.6% (refer to Figure 3.1). This pipe size will easily contain the predicted Peak Flow rates. All sanitary piping will be gravity fed back into the existing Town of Raymond sanitary manhole located in the intersection of 100 North and 300 West.

A temporary manhole, cleanout, or other structure will be provided where "dead ends" occur due to construction phasing.

This design will also evaluate alternatives for sump pump drainage so as to not overload the sanitary system.

4.2 Water System

These lots will be serviced using Town of Raymond water supply. Predicted domestic Peak Flow rates are shown in Table 4 below.

Table 4: Water System Design Criteria

POP	MHD (L/m)	MDD (L/m)	2 HYD (L/m)	3 HYD (L/m)	TOTAL (L/m)
248	1.74	-	-	-	**432**
248	-	0.69	-		**172**
248	-	0.69	4,000	-	**4,172**
248	-	0.69	-	5,000	**5,172**

POP - Population
MHD - Maximum Hourly Demand
MDD- Maximum Daily Demand
2 HYD - 2 Hydrant Fire Flow of 4,000 L/m
3 HYD - 3 Hydrant Fire Flow of 5,000 L/m
L/m - Liters per minute

Since water lines servicing the area are only 150mm (6”) in diameter, the system will meet Maximum Hourly Demand (MHD) but not meet fire-flow requirements currently. Fire flow will be improved as the Town upgrades existing water lines as part of their long term improvement plan.

The water distribution system shows (refer to Figure 3.1) a PUL for future looping of the proposed water system to meet the requirements of the Town of Raymond Engineering Standards.

Each lot will be serviced by a 20mm (3/4”) diameter line complete with curb stop. Water mains located beneath each new road will be a min. of 200mm (8”) diameter, running parallel to the new storm and sanitary piping located under the new roads as well. The new water mains will tie into the existing water main running east/west under 100 North at the 300 West intersection.

4.3 Fire Protection

A 200mm diameter water main will be provided throughout the development and connected to hydrants to provide a supply of water for firefighting purposes. Hydrants will be spaced at a maximum of 200 meters in residential areas. The fire protection piping network system for the development will be designed to conform to the Town of Raymond engineering standards including NFPA 1142 where possible.

4.4 Storm Sewer System

A storm drainage analysis was conducted for this site (refer to Section 6.0 & Appendix B). This section describes the Minor (underground) and Major (overland) drainage infrastructure.

Minor System

The Minor system is composed of underground sewers which will convey the storm water by gravity to the SWMF (refer to Figure 3.1). The storm sewer network will consist of catch basins, manholes, and piping which meeting the Town of Raymond engineering standards.

Major System

The Major system is composed of surface features such as gutters, swales, roads, roof systems, and lot grading which is all designed to drain storm water to the SWMF. For additional details on the storm drainage design, refer to Section 6.0.

4.5 Gas

Natural gas distribution infrastructure in the area surrounding the site is operated by ATCO Gas. ATCO will distribute natural gas within the development. Each home owner is responsible for the cost of the service from the main line to their lot.

4.6 Electrical Power

Fortis will provide services to the proposed subdivision and underground services to each property line.

4.7 Telephone

Telus will provide services to the lots, but each individual owner must apply for the service when building.

4.8 Shaw Cable

Shaw Cable will provide services to the lots, but each individual owner must apply for the service when building.

5.0 TRANSPORTATION

In developing this plan the existing street network and the inter-municipal development plan were studied and considered.

In 2008, the Town of Raymond completed a Master Transportation Plan document. The purpose of this plan was to evaluate the existing and future transportation issues. The plan projects traffic to the year 2028 and allows for 262 new homes and a new senior facility to be built in Raymond over that time period. As part of that analysis, 100 North is classified as a collection road with a potential capacity of up to 8000 cars/ day. 300 West and 250 West are both classified as local roads with a capacity of up to 1000 vehicles per day. This development could add up to 62 dwelling units to the Town, well below the predicted 262 homes to be added.

The study evaluates current and future peak traffic flow in the Town including on 100 North. In 2008, the measured traffic flow at the intersection of 100 North and 200 West was less than 100 total vehicles (both directions). The performance of that intersection is classified as Level of Service A, which means very short waiting periods. It is currently, and predicted in the future to work well within its designed capacity.

On June 3, 2015 a traffic count was performed at the intersection of 300 West and 100 North to evaluate existing traffic flow through that intersection. The count occurred from 7:30 a.m. until 8:30 a.m. to monitor the a.m. peak flow. During that period there were 11 vehicles straight through and 7 vehicles coming from 300 West onto 100 North and 1 vehicle turning into 300 West. No waiting or queuing was observed during that time period. This indicates the intersection is currently at a Level of Service A and is functioning well below its design capacity.

Adding this development will increase peak hour traffic on 100 North and 300 West by approximately 1.1 vehicles per unit. This could increase total peak hour traffic by approximately 80 vehicles. Adding this traffic to the total existing flow still results in total

traffic numbers well below the design capacity of both 100 North (collector) and 300 West (a local road).

A layout of the existing road network and future planning within the County and Town are shown in Figure 2.2. Key points in developing this road network included:

1. 100 North and 100 South are major east west collectors
2. Due to the location of the LDS church to the east, Church Avenue will not be an east-west connector
3. 400 West is proposed to be a future arterial.
4. Currently the Town does not own the 400 West right of way between 100 North and 100 South.
5. 300 West is currently classified as a local road.

The overall transportation concept was developed to maximize the effectiveness of the road work within the development while integrating into the existing and proposed transportation network. Currently 300 West connects to Highway 52 and although it is currently a local road, has the potential to act as a minor collector to serving the south side of town. As such, 300 West is designed to be a through road and will be sized as a collector. A connection to 400 West has also been provided (refer to Figure 2.1). In addition, the cul de sac has been oversized to allow for better access to buses and other municipal services. This will minimize congestion and allow room for snow removal and other services to be provided.

The primary access to the subdivision will be from 300 West which will be extended approximately 320 meters to the south of 100 North where it will “dead end”. The 300 West extension will be a 20 meter wide minor collector roadway. There are two proposed roads which will “T” off to the west from the 300 West extension. These two roadways will be 18 meter wide local roads (see Figure 2.1 for new road layouts).

Sidewalks have been limited to one side of each proposed road within the development (refer to Figure 5.3 for road cross sections). The new roads within the subdivision will be paved in asphalt complete with curb and gutter systems which comply with Town of Raymond engineering standards.

The proposed bike path will be dedicated in the form of Municipal Reserve or public utility lots on the final plan of the subdivision to provide for pedestrian and bicycle circulation through the development. However, the land east of the development is not owned by the developer.

6.0 SITE DRAINAGE AND GRADING

All drainage onsite must conform to Town of Raymond and Alberta Environmental requirements. Documents referred to when completing this analysis included Alberta Environment Storm Water Management Guidelines (1999). This document also includes descriptions of Best Management Practices (BMPs) which are used to mitigate peak runoff values. These practices combined with the dry pond, will provide control and containment of storm runoff over the entire development. As can be seen in Figures 4.1,

5.1, & 5.2 of the ASP, drainage on the existing ground generally flows towards the northeast.

6.1 Site Drainage

Existing Conditions

The existing development site is mostly open grass land with no structures or landscaping, with the exception of the existing house.

The existing topography of the subject land shows that the ground generally slopes away from the south development boundary to the northeast and northwest downward toward to a low spot near the center of the development. There is a ditch and culvert at this low spot, under the existing gravel access road, to divert overland drainage to the northwest towards 100 North.

There are two high elevation points, one is the existing house and the other is a high mound located northwest of the house.

Pre-development storm drainage patterns are described in greater detail in the Hydrogeological and Site Drainage Analysis completed for the site by Hasegawa Engineering and attached to this document as Appendix B.

Drainage from the properties to the south and LDS church parking lot to the east both comes through the existing land. As such, provisions have been made to continue to accommodate these flows. They will be part of the overland flow in the road right of way.

Post-development

A detailed drainage analysis was performed for the site to compare pre and post-development storm drainage patterns. The results of this analysis are included in Appendix B. A summary of the findings of this report appear below.

The curb and gutter systems of the internal roadways will provide the primary channels for storm drainage within the proposed development. Rear lot swales will be utilized to direct storm water east into catch basins or directly into the storm water management facility. Rear yards and the existing residential lot adjacent to the storm pond will be sloped to direct overland drainage into the storm water management facility.

Storm water runoff will be detained in the SWMF and released into existing Town of Raymond storm sewer system through an outlet structure. The outlet control structure will be designed to limit peak release rate to the peak pre-development runoff rate for a 1:5 year 4 hour design storm.

To determine the required active storage volume of the dry pond, a hydrologic model of the site was prepared using the PC SWMM hydrologic modeling software package. The hydrologic model was used to estimate the pre-development release rate for a 1:5 year, 4 hour storm event. The hydrologic model of the site post-development was then analyzed using a 1:100 year 24 hour design storm event. The SWMF was sized to

detain runoff and reduce the post-development peak flow rate to no more than the pre-development release rate. Detailed methods and results of surface runoff analysis are provided in Appendix B.

The results of the hydrologic modeling indicate a peak post development runoff rate of approximately 3.52 m^3/s from the development to the SWMF and a required storage volume of 5,676 cubic meters to attenuate the peak runoff from the site. Refer to Appendix B for complete SWMM figures and models. Figure 2.1 shows the proposed dry pond footprint. As noted above, the outlet control structure and dry pond will attenuate the peak runoff from the site. A drain pipe from outlet structure will be required to drain the pond to the existing storm sewer located in 100 North. The hydrologic model will be reviewed during the detailed design stage to confirm the required capacity of the overland drainage system and culverts.

A diagram showing the proposed pond design as related to the site groundwater and storm drain is shown in Figure 5.5. As can be seen by this figure the bottom of the pond is situated above the observed water table. Also, it will be graded to drain to the storm sewer.

7.0 SITE GEOTECHNICAL SCREENING

Preliminary site investigation activities for the subject property included subsurface investigations to determine existing soil properties and suitability for development. These investigation activities involved the digging of two test holes, one at the north side of the property, and one on the south side of the property (refer to Figure 1.2 for test hole locations).

Each test hole was advanced to a depth of 1.8m (6') below grade. The upper water bearing zone (water table) was encountered at a depth of 1.7m (5.5') in TH-1, and 1.5m (5') in TH-2.

Soil characteristics of each test hole showed topsoil from 0 – 0.2m (8") below grade and light brown silty-clay for the remaining depth to the bottom of the test hole. One soil sample was collected from each test hole and submitted for laboratory for Atterberg limits and moisture content analysis. The Atterberg Limits test classified both soil samples CI, which is a medium plastic clay (refer to Appendix C for complete analytical results).

The depth of water has been taken into consideration in preparing a grading plan for the site. The lots will be designed so that final basement elevations are above the groundwater table (refer to Figure 5.3 for detail).

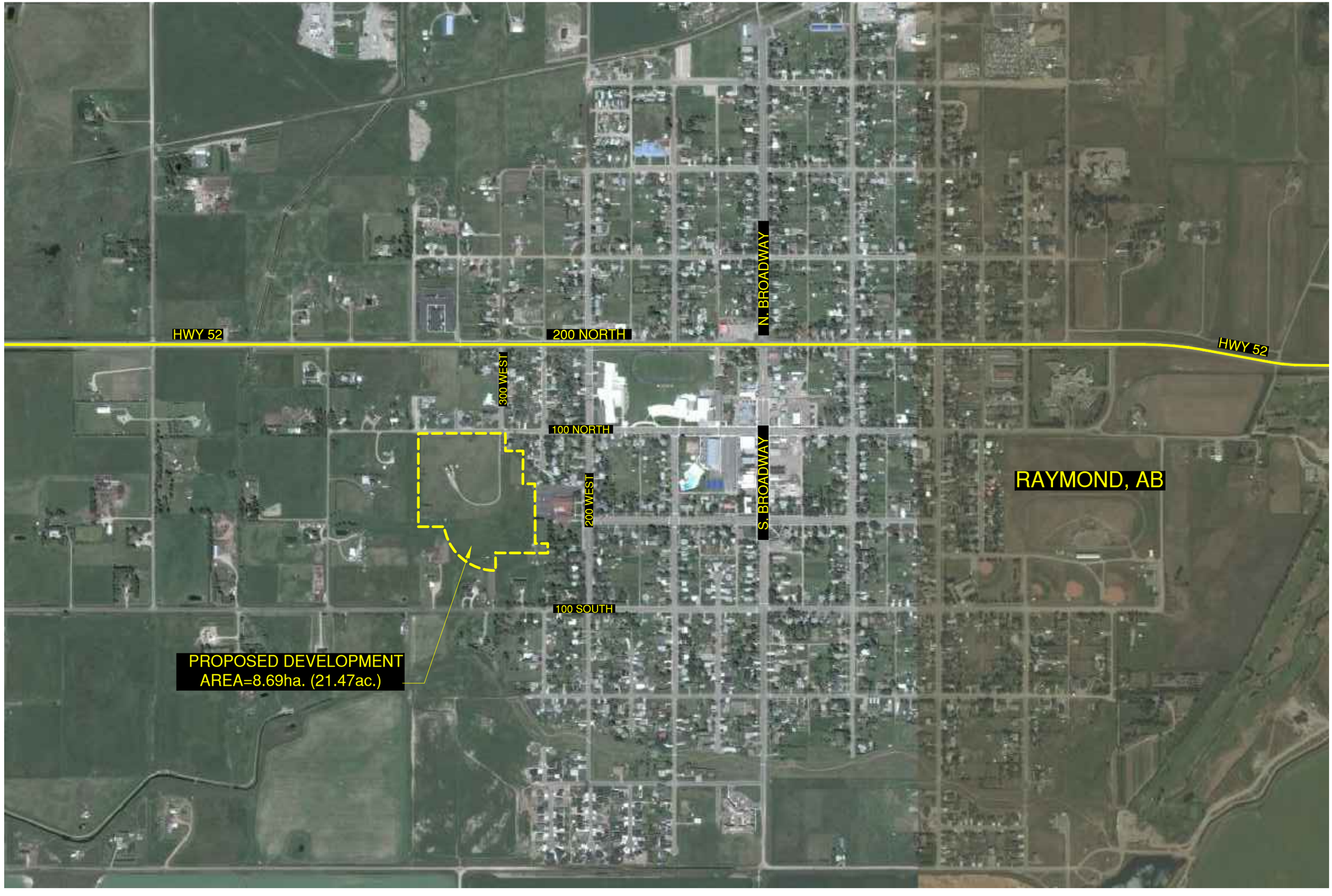
8.0 ARCHITECTURAL CONTROLS

Architectural controls will be prepared prior to subdivision. Key items addressed in these controls will include:

- Building size
- Building timelines for exterior completion
- Fencing guidelines for interior and boundary fences.
- Acceptable building and exterior finishing materials.

APPENDIX A

Figures



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HASEGAWA
CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

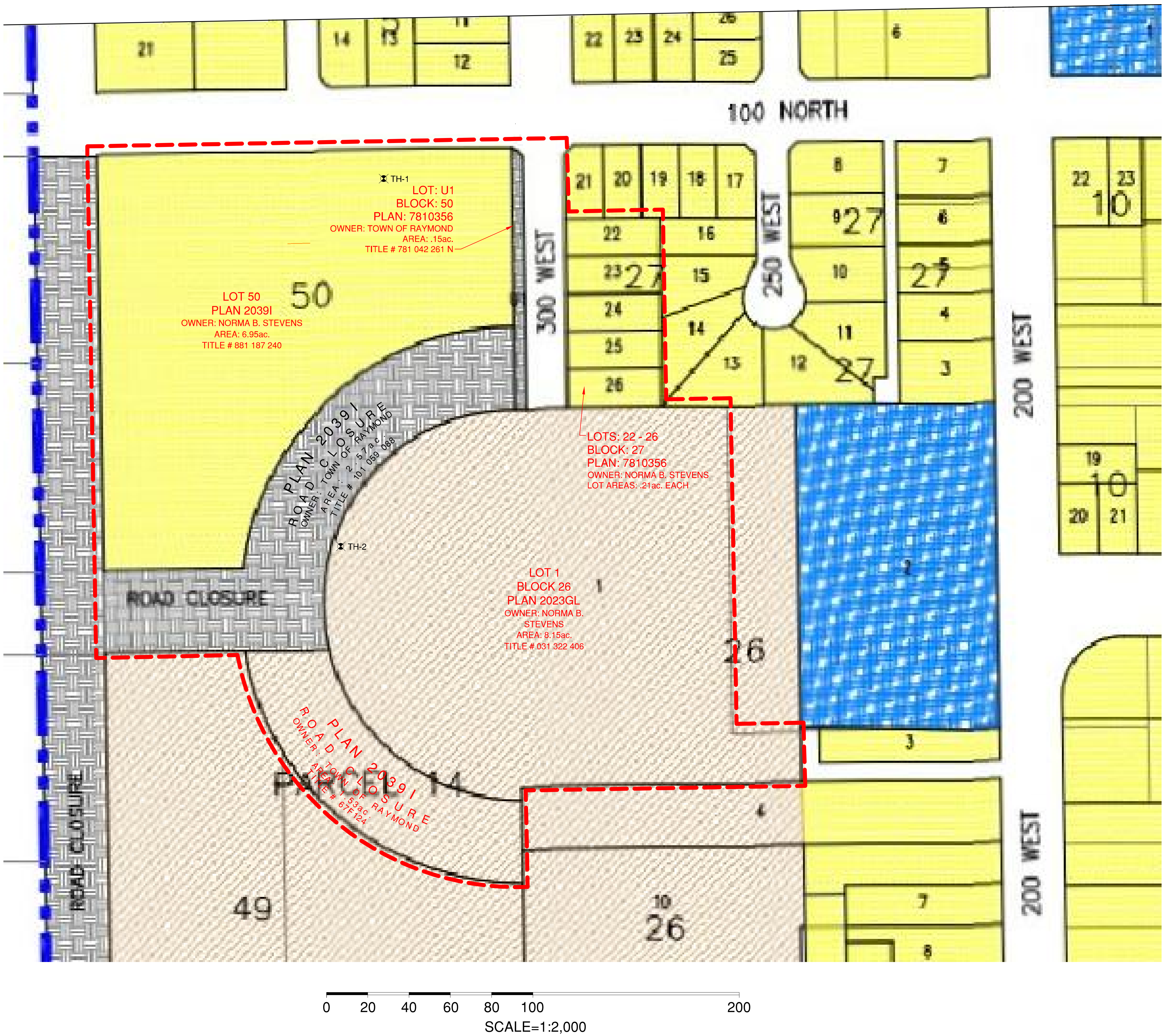
CLIENT
BRIDGE CROSSING

PROJECT TITLE
BRIDGE CROSSING
AREA STRUCTURE
PLAN

DRAWING TITLE
LOCATION PLAN

PROJECT NUMBER
14-072

SHEET NUMBER
1.1



TOWN OF RAYMOND

Town Boundary

LAND USE DISTRICTS MAP
Bylaw No. 987-11
June 7, 2011

- General Residential - 'R-1'
- Manufactured Home Park - 'R-2'
- General Commercial - 'C-1'
- Neighbourhood Commercial - 'NC-1'
- Industrial - 'I-1'
- Parks & Open Space - 'POS-1'
- Public & Institutional - 'PI-1'
- Urban Reserve - 'UR-1'
- Direct Control - 'DC-1'

LEGEND

- EXISTING PROPERTY LINES
- PROPOSED DEVELOPMENT BOUNDARY
- TEST HOLE LOCATION - REFER TO APPENDIX C

NOTES

#	DATE (YY/MM/DD)	DRAWING STATUS	DSN	DRW	CHK	APP
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HASEGAWA
CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

CLIENT
BRIDGE CROSSING

PROJECT TITLE
BRIDGE CROSSING AREA STRUCTURE PLAN

DRAWING TITLE
EXISTING LEGAL & ZONING SITE PLAN

PROJECT NUMBER
14-072

SHEET NUMBER
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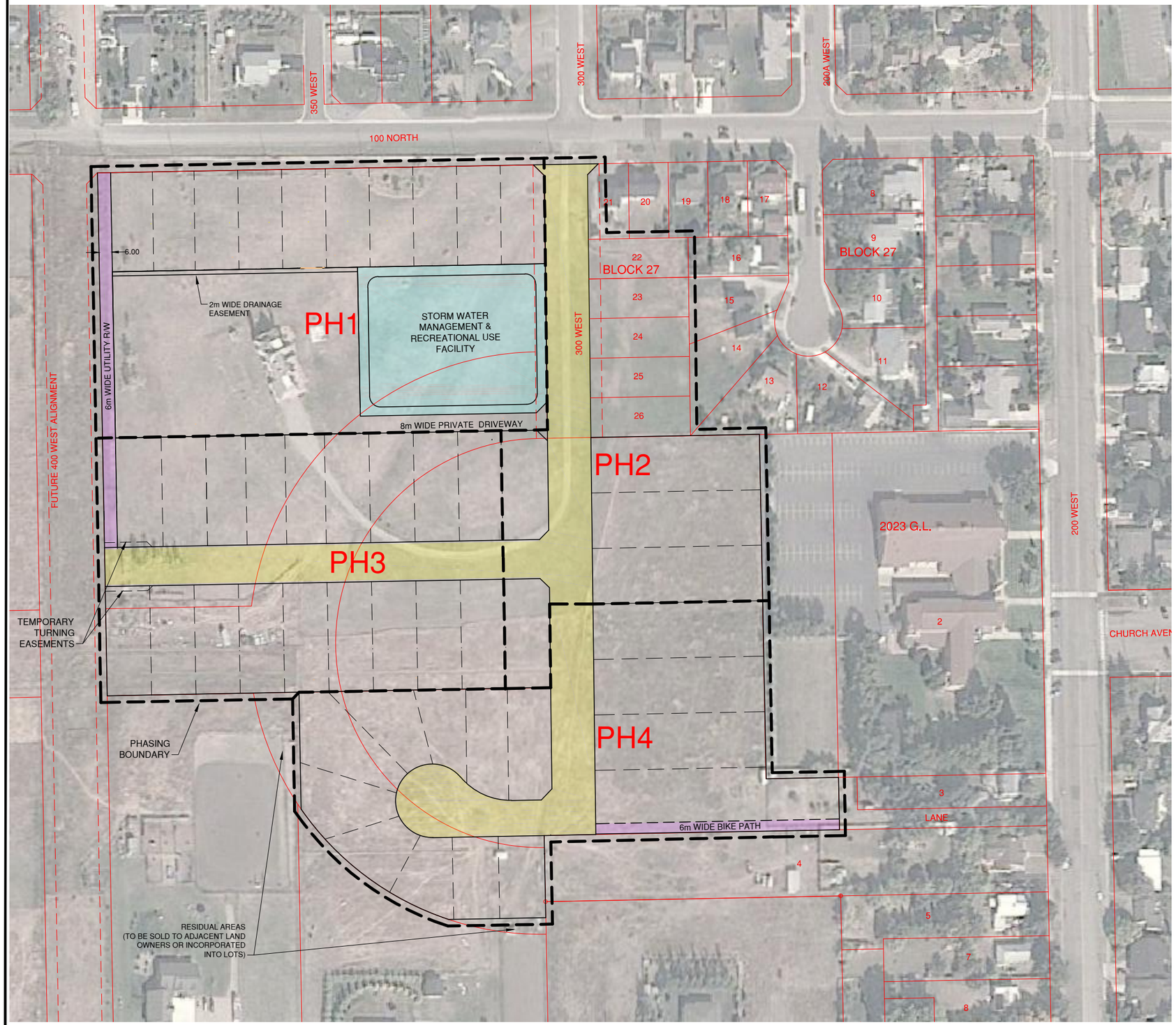

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LEGEND

- EXISTING LOTS
- PROPOSED DEVELOPMENT
- TENATIVE LOT LINES (FINAL DIMENSIONS TO BE INCLUDED IN SUBDIVISION PLAN)
- R-1 SINGLE DETACHED RESIDENTIAL LOTS = 6.80ha. (16.80ac.) (SEE SECTION 3.2 FOR RESIDENTAIL USES)
- PUL (PUBLIC UTILITY LOTS) = .16ha. (.39ac.)
- ROAD ALLOWANCE = 1.14ha. (2.82ac.)
- MUNICIPAL RESERVE (MR) = .59ha. (1.46ac.)

NOTES

#	DATE (YY/MM/DD)	DRAWING STATUS	DSN	DRW	CHK	APP
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HASEGAWA
CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

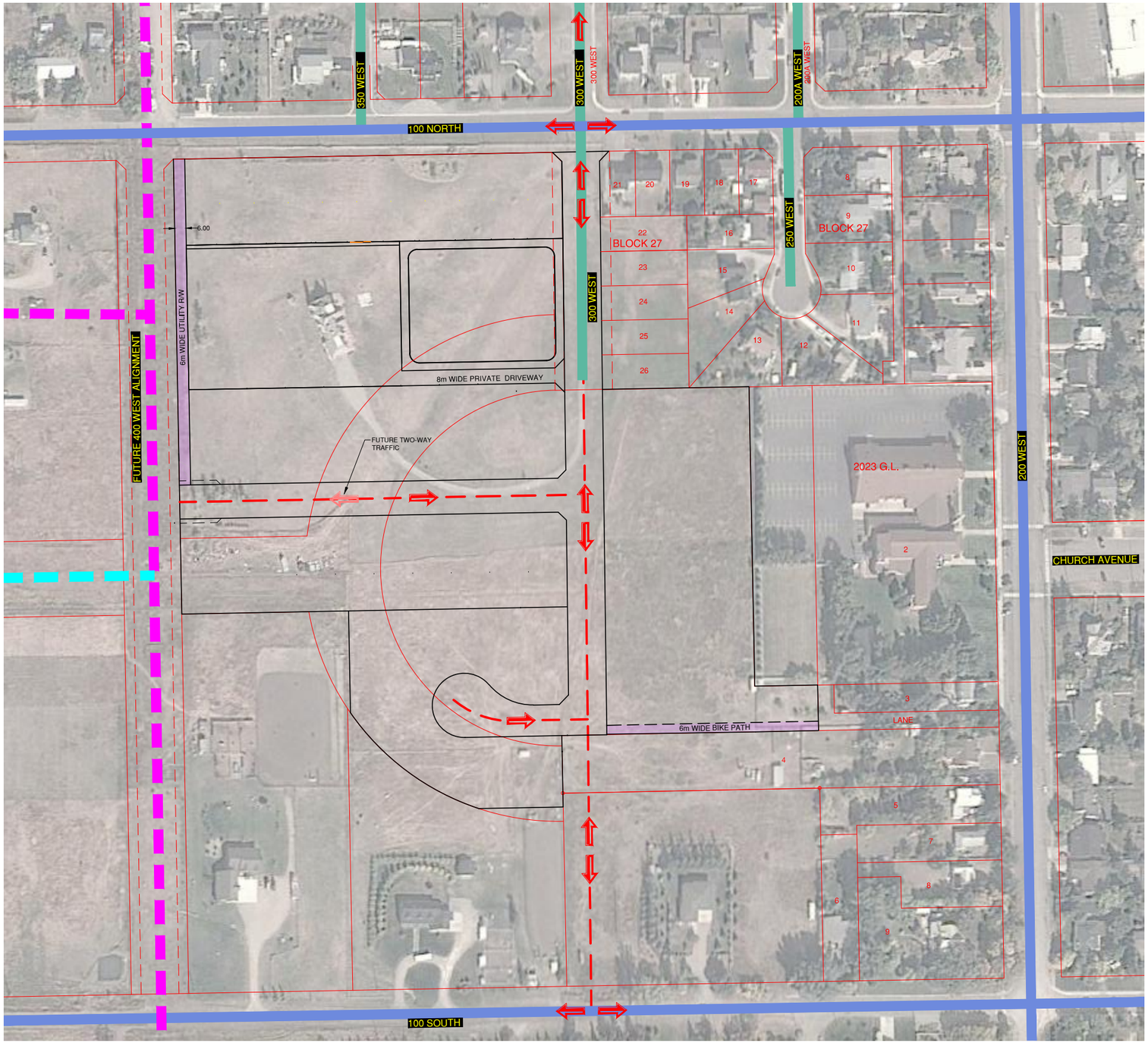
CLIENT: BRIDGE CROSSING

PROJECT TITLE: LANDUSE & PHASING PLAN

DRAWING TITLE: SITE PLAN

PROJECT NUMBER: 14-072

SHEET NUMBER: 2.1



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LEGEND - TRANSPORTATION CONCEPT

EXISTING PROPERTY LINES

PROPOSED DEVELOPMENT

EXISTING ROAD NETWORK

ARTERIAL

COLLECTOR

LOCAL

IMDP PROPOSED

POTENTIAL HIGHER CAPACITY ROAD

POTENTIAL LOWER CAPACITY ROAD

PROPOSED FUTURE TRAFFIC FLOW

NOTES

#	DATE (YY/MM/DD)	DRAWING STATUS	DSN	DRW	CHK	APP
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HASEGAWA
CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

CLIENT

BRIDGE CROSSING

PROJECT TITLE

BRIDGE CROSSING AREA STRUCTURE PLAN

DRAWING TITLE

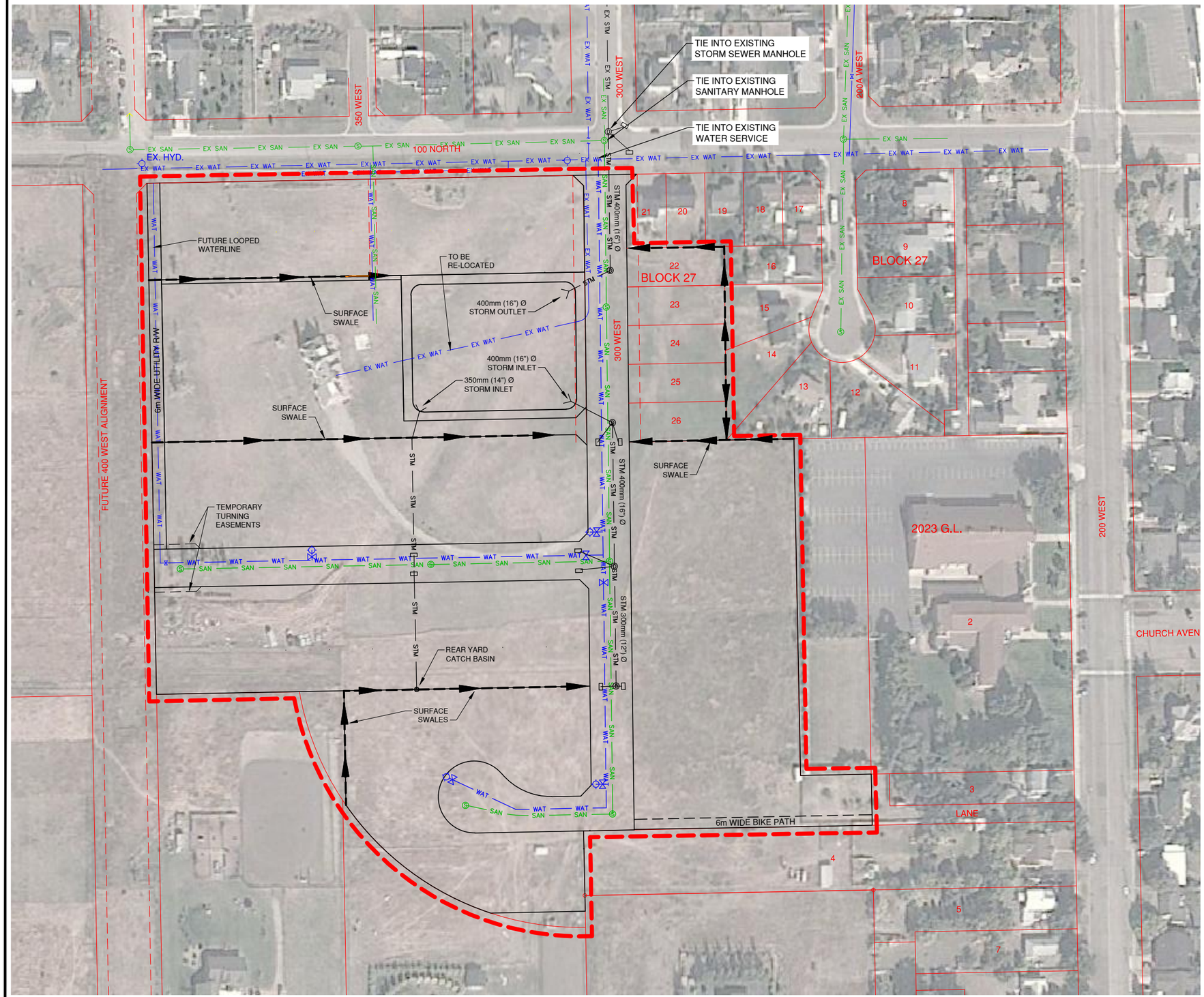
TRAFFIC INTEGRATION CONCEPT

PROJECT NUMBER

14-072

SHEET NUMBER

2.2



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LEGEND

PROPOSED	EXISTING	
		PROPERTY LINE
		EASEMENT
WAT	EX WAT	WATERMAIN
BLOCK 1	BLOCK 1	BLOCK NUMBER
1	1	LOT NUMBER
		OVERLAND DRAINAGE
		HYDRANT
		CULVERT
GAS	EX GAS	GAS LINE
		FENCE
SAN	EX SAN	SANITARY
STM	EX STM	STORM
		SANITARY MANHOLE
		STORM MANHOLE
		CATCH BASIN - CURB
		CATCH BASIN - ROUND
		LIGHT STANDARD
PP	PP	POWER POLE
TS	TS	TRAFFIC SIGNAL
		GW WELL
		VALVE
CS	CS	CURB STOP

NOTES:
- SANITARY SEWER MAINS TO BE 200mm (8") DIAMETER.
- WATER MAINS TO BE 200mm (8") DIAMTER.
- CATCH BASIN LEADS TO BE MIN. 150mm (6") DIAMETER.
- STORM SEWER MAINS SIZED AS SHOWN (SIZES ARE ESTIMATED AND WILL BE CONFIRMED AT OUTLINE PLAN PHASE.

NOTES

#	DATE (YY/MM/DD)	DRAWING STATUS	DSN	DRW	CHK	APP
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1	15/06/05	FOR APPROVAL	MH	MO	MH	MH
0	15/04/06	FOR APPROVAL	MH	MO	MH	MH

HASEGAWA HE CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

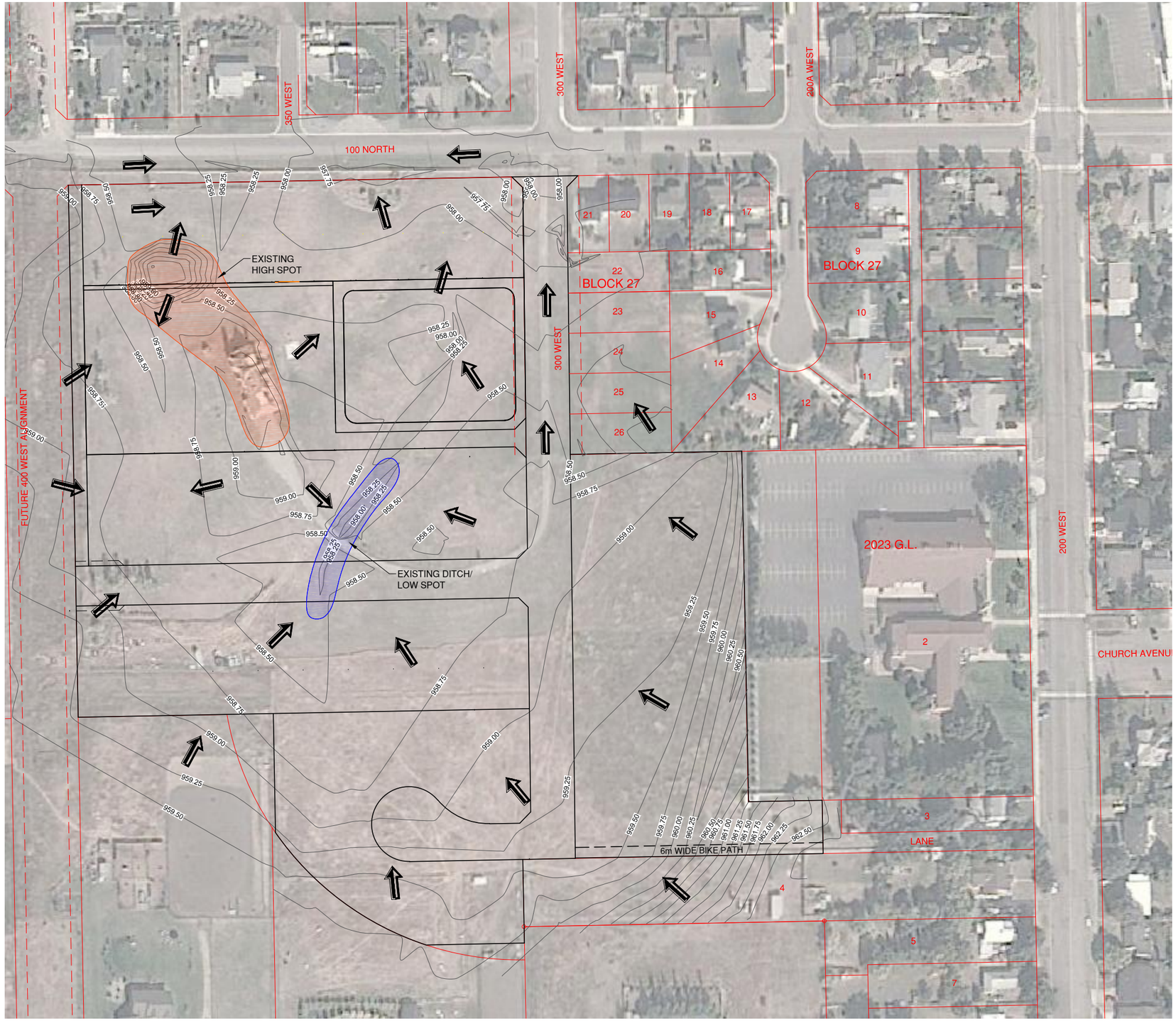
CLIENT
BRIDGE CROSSING

PROJECT TITLE
BRIDGE CROSSING AREA STRUCTURE PLAN

DRAWING TITLE
WATER, STORM, & SANITARY SERVICING PLAN

PROJECT NUMBER
14-072

SHEET NUMBER
3.1



LEGEND

- EXISTING LOTS
- EXISTING GROUND CONTOURS (0.25m INTERVALS)
- PROPOSED DEVELOPMENT
- EXISTING GROUND DRAINAGE DIRECTION

0 20 40 60 80 100 200

SCALE=1:2,000

NOTES

#	DATE (YY/MM/DD)	DRAWING STATUS	DSN	DRW	CHK	APP
2	15/07/07	FOR APPROVAL	MH	MO	MH	MH
1	15/06/05	FOR APPROVAL	MH	MO	MH	MH
0	15/04/06	FOR APPROVAL	MH	MO	MH	MH

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330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

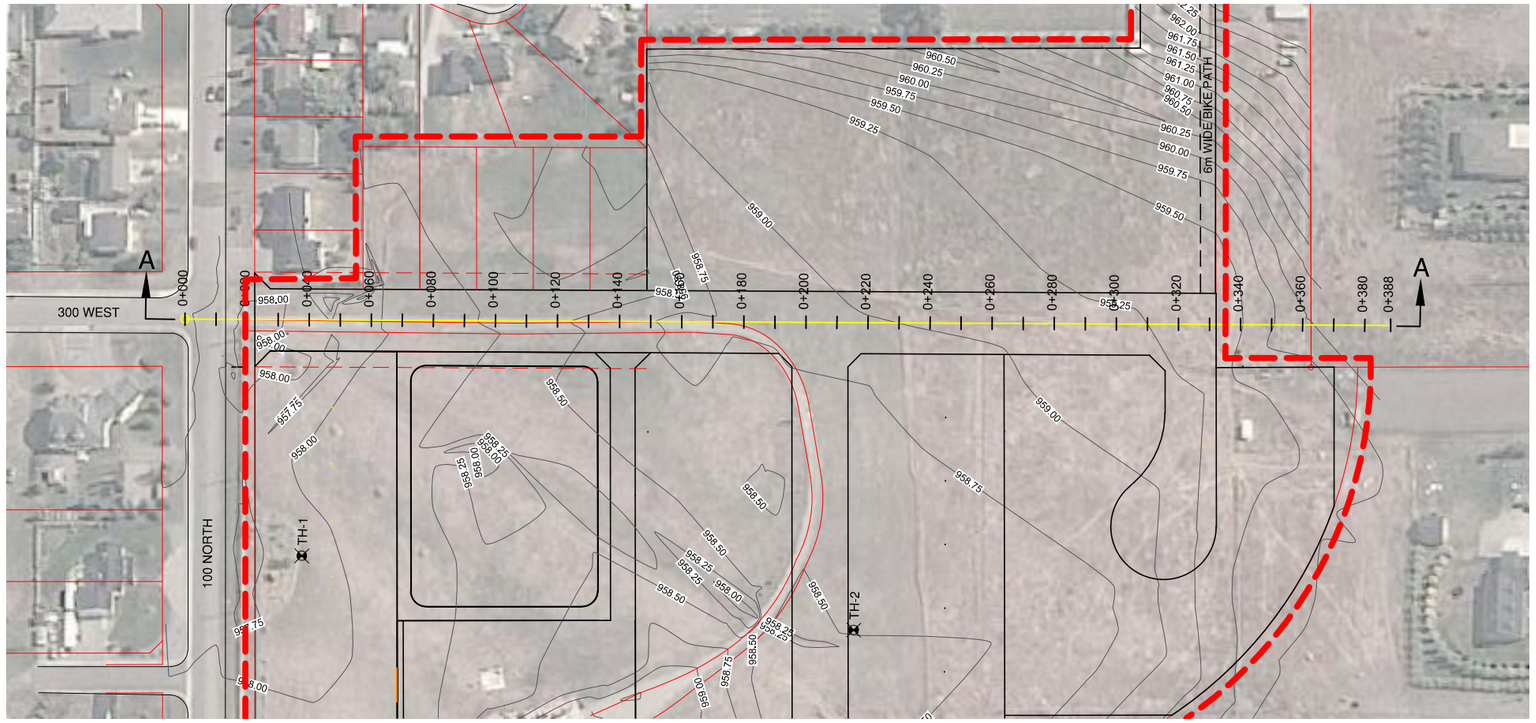
CLIENT
BRIDGE CROSSING

PROJECT TITLE
BRIDGE CROSSING AREA STRUCTURE PLAN

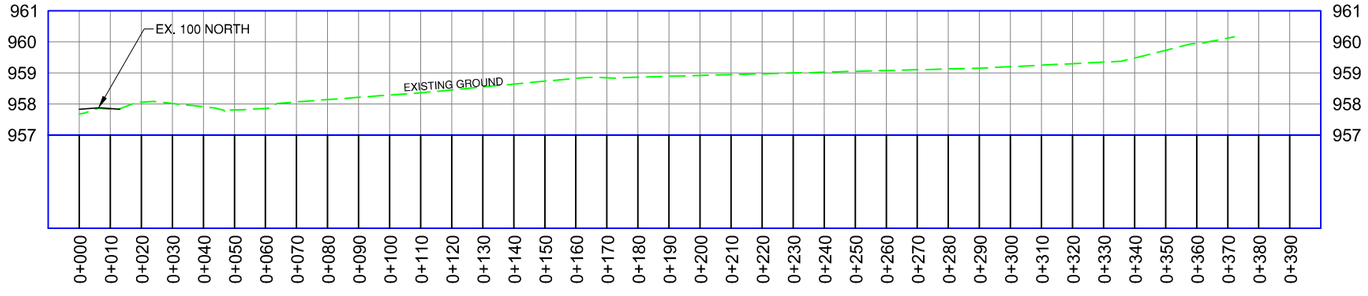
DRAWING TITLE
EXISTING GROUND CONTOURS

PROJECT NUMBER
14-072

SHEET NUMBER
4.1



SECTION A-A EXISTING GROUND - PLAN VIEW
SCALE: 1:2,000



SECTION A-A EXISTING GROUND - PROFILE VIEW
SCALE: 1:2,000

0 20 40 60 80 100 200
SCALE=1:2,000

LEGEND
- EXISTING LOTS
- EXISTING GROUND CONTOURS (0.25m INTERVALS)
- PROPOSED DEVELOPMENT

NOTES

#	DATE (YY/MM/DD)	DRAWING STATUS	DSN	DRW	CHK	APP
2	15/07/07	FOR APPROVAL	MH	MO	MH	MH
1	15/06/05	FOR APPROVAL	MH	MO	MH	MH
0	15/04/06	FOR APPROVAL	MH	MO	MH	MH

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CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

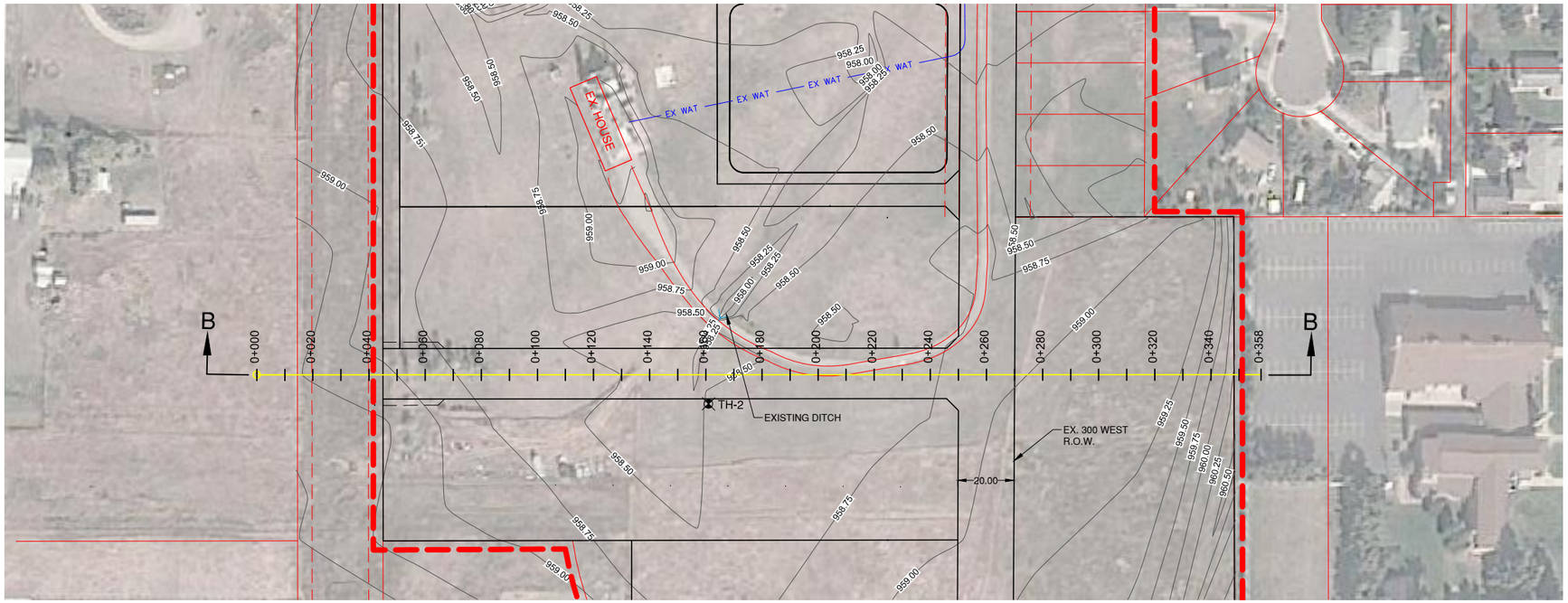
CLIENT
BRIDGE CROSSING

PROJECT TITLE
BRIDGE CROSSING
AREA STRUCTURE
PLAN

DRAWING TITLE
EXISTING GROUND
SECTION A-A
PLAN & PROFILE

PROJECT NUMBER
14-072

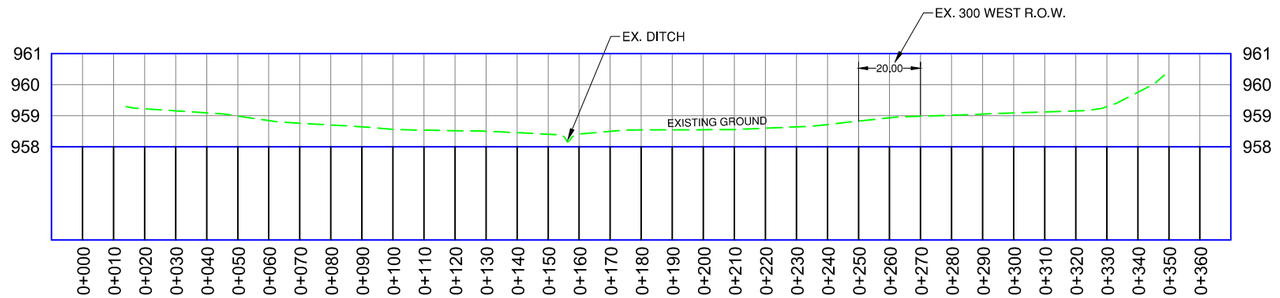
SHEET NUMBER
5.1



LEGEND

- EXISTING LOTS
- EXISTING GROUND CONTOURS (0.25m INTERVALS)
- PROPOSED DEVELOPMENT

SECTION B-B EXISTING GROUND - PLAN VIEW
SCALE: 1:2,000



SECTION B-B EXISTING GROUND - PROFILE VIEW
SCALE: 1:2,000

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SCALE=1:2,000

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1	15/06/05	FOR APPROVAL	MH	MO	MH	MH
0	15/04/06	FOR APPROVAL	MH	MO	MH	MH

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CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

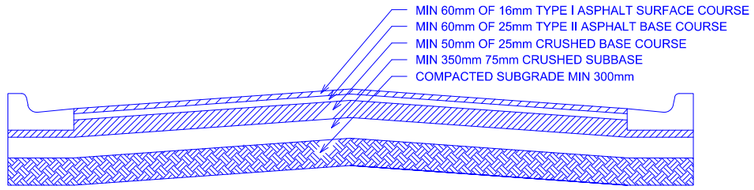
CLIENT
BRIDGE CROSSING

PROJECT TITLE
BRIDGE CROSSING
AREA STRUCTURE
PLAN

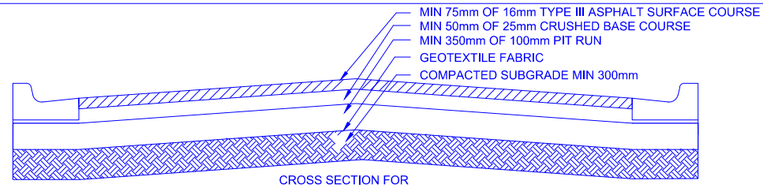
DRAWING TITLE
EXISTING GROUND
SECTION B-B
PLAN & PROFILE

PROJECT NUMBER
14-072

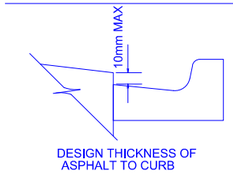
SHEET NUMBER
5.2



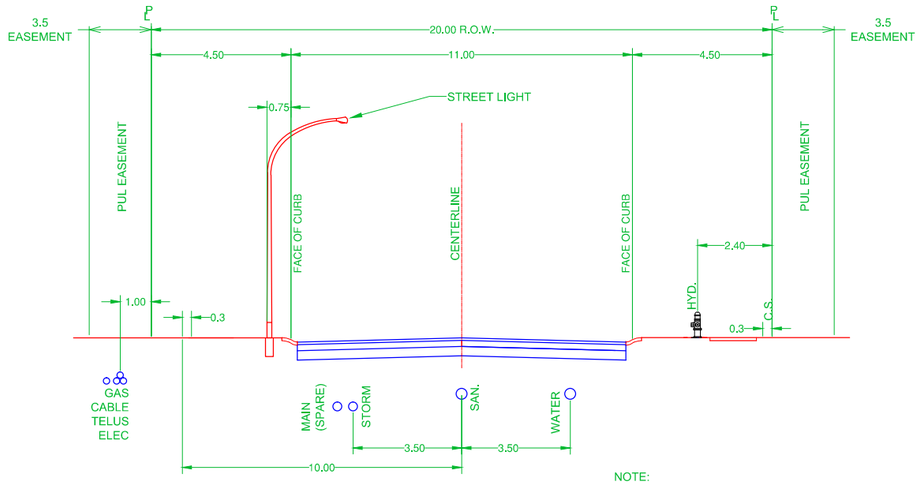
CROSS SECTION FOR
COLLECTOR



CROSS SECTION FOR
LOCAL

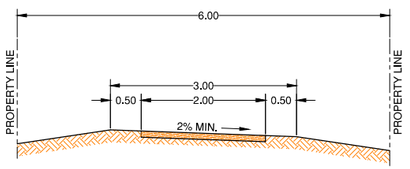


DESIGN THICKNESS OF
ASPHALT TO CURB

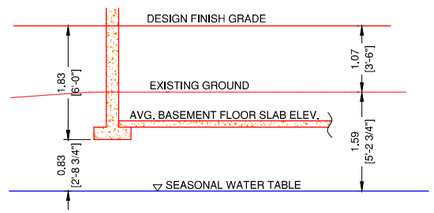


NOTE:
NOT FOR CONSTRUCTION
FOR CONCEPTUAL APPROVAL ONLY

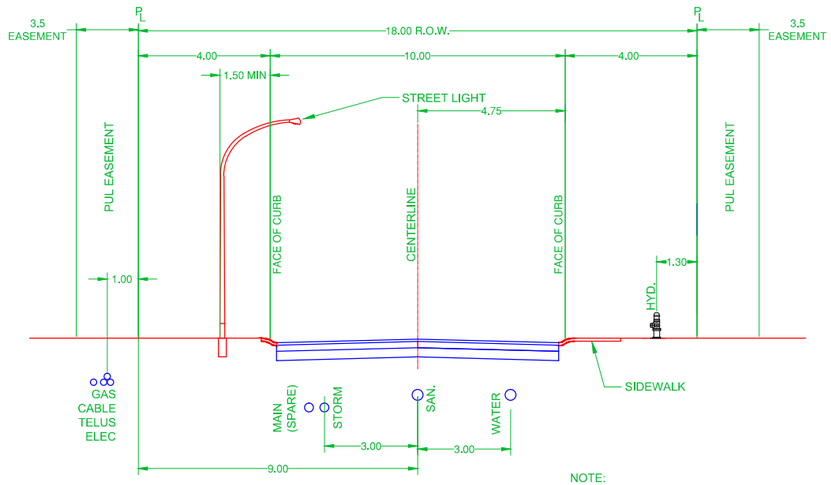
20 METER MONO-WALK ROAD CROSS SECTION
SCALE: NTS



6m WIDE SHALE BIKE PATH - CROSS SECTION
SCALE: 1:100



TYP. BASEMENT FLOOR SLAB ELEVATION
SCALE: 1:100



NOTE:
NOT FOR CONSTRUCTION
FOR CONCEPTUAL APPROVAL ONLY

18 METER MONO-WALK ROAD CROSS SECTION
SCALE: NTS

SECTION B-B EXISTING GROUND - PROFILE VIEW
SCALE: 1:2,000

0 20 40 60 80 100 200
SCALE=1:2,000

NOTES

#	DATE (YYMMDD)	DRAWING STATUS	DSN	DRW	CHK	APP
2	15/07/07	FOR APPROVAL	MH	MO	MH	MH
1	15/06/05	FOR APPROVAL	MH	MO	MH	MH
0	15/04/06	FOR APPROVAL	MH	MO	MH	MH

HASEGAWA
CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

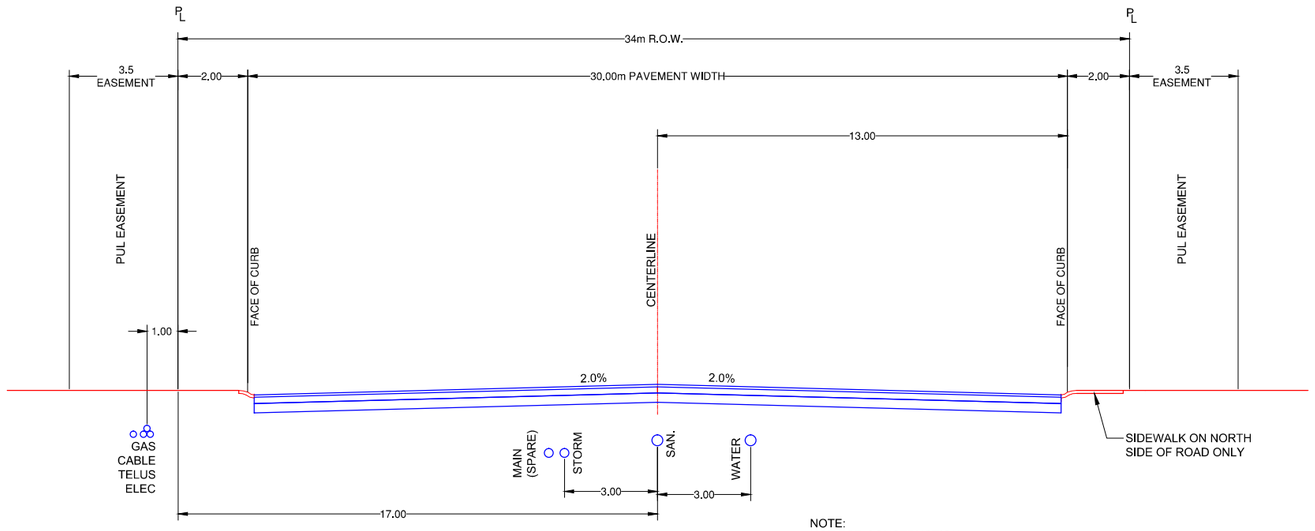
CLIENT
BRIDGE CROSSING

PROJECT TITLE
BRIDGE CROSSING
AREA STRUCTURE
PLAN

DRAWING TITLE
STANDARD DETAILS

PROJECT NUMBER
14-072

SHEET NUMBER
5.3



NOTE:
NOT FOR CONSTRUCTION
FOR CONCEPTUAL APPROVAL ONLY

34 METER CUL DE SAC CROSS SECTION
SCALE: NTS

NOTES

#	DATE (YY/MM/DD)	DRAWING STATUS	DSN	DRW	CHK	APP
2	15/07/07	FOR APPROVAL	MH	MO	MH	MH
1	15/06/05	FOR APPROVAL	MH	MO	MH	MH
0	15/04/06	FOR APPROVAL	MH	MO	MH	MH

HASEGAWA
CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

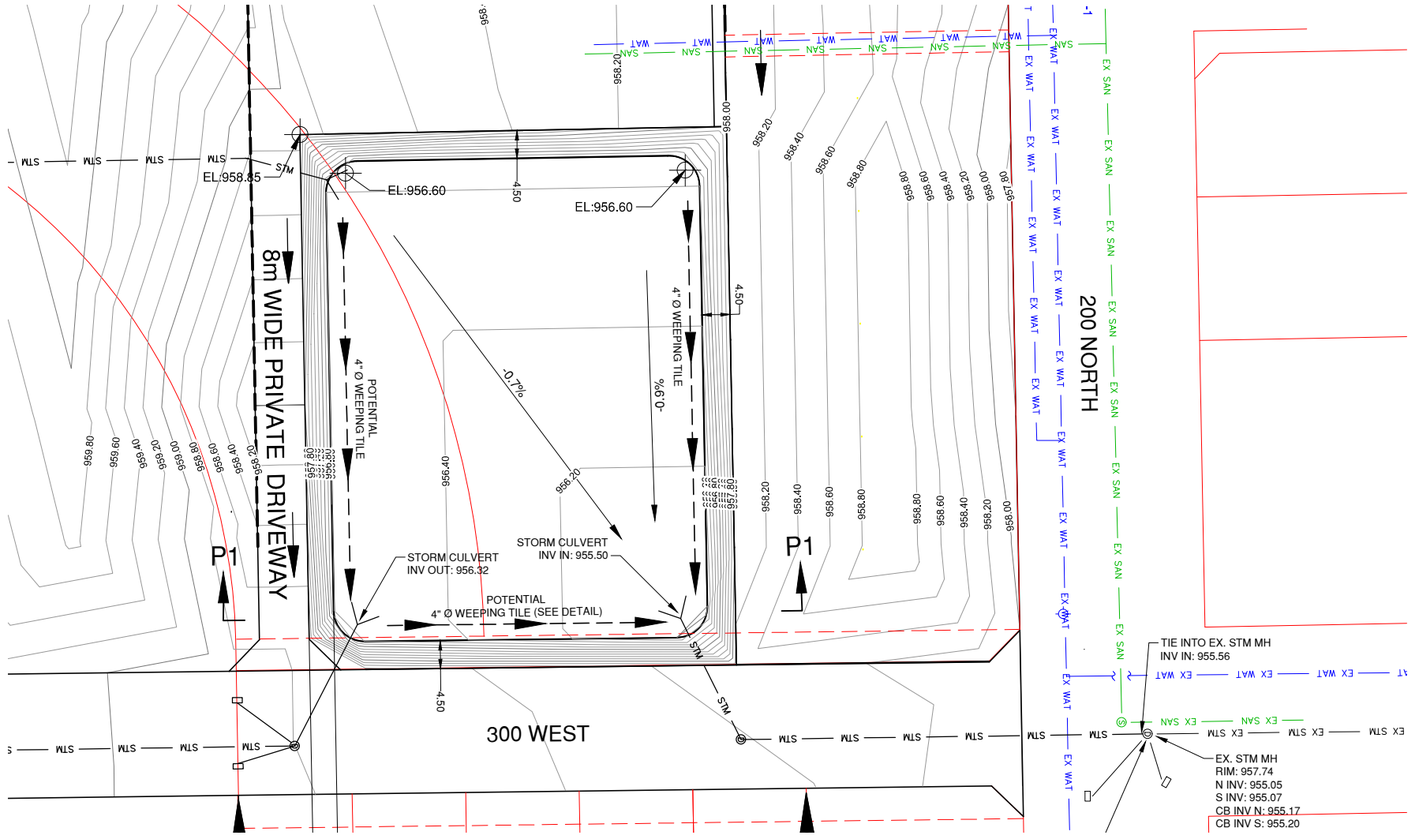
CLIENT
BRIDGE CROSSING

PROJECT TITLE
BRIDGE CROSSING
AREA STRUCTURE
PLAN

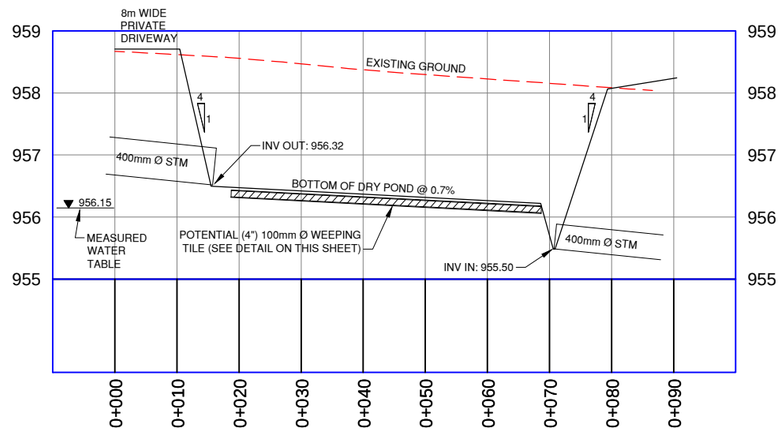
DRAWING TITLE
STANDARD DETAILS

PROJECT NUMBER
14-072

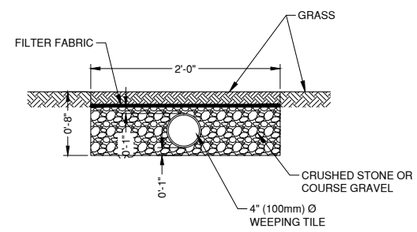
SHEET NUMBER
5.4



STORMWATER RETENTION POND - PLAN VIEW
SCALE: 1:1,000



SECTION P1
SCALE: 1:1,000



WEEPING TILE DETAIL
SCALE: 1:20

0 10 20 30 40 50 100
SCALE=1:1,000

NOTES
- STORM POND DESIGN ELEVATION WILL CHANGE DURING THE FINAL DESIGN.
- IF NEEDED A WEEPING TILE SYSTEM AS SHOWN IN THIS DRAWING WILL BE USED TO AID THE FUNCTIONALITY OF THE DRY POND.

NOTES

#	DATE (YY/MM/DD)	DRAWING STATUS	DSN	DRW	CHK	APP
2	15/07/07	FOR APPROVAL	MH	MH	MH	MH
1	15/06/05	FOR APPROVAL	MH	MO	MH	MH
0	15/04/06	FOR APPROVAL	MH	MO	MH	MH

HASEGAWA
CONSULTING PROFESSIONAL ENGINEERS
330, 3120 - 32nd Street South
Lethbridge, Alberta T1K 7B4
Ph: 403-328-2686
Fax: 403-328-2728
Email: office@hasegawa.ca

CLIENT
BRIDGE CROSSING

PROJECT TITLE
BRIDGE CROSSING AREA STRUCTURE PLAN

DRAWING TITLE
PRELIMINARY DRY POND DESIGN

PROJECT NUMBER
14-072

SHEET NUMBER
5.5

APPENDIX B

Hydrological & Site Drainage Analysis

HYDROLOGICAL &
SITE DRAINAGE ANALYSIS

STEVENS SUBDIVISION
RAYMOND, AB

PREPARED FOR:
Troy Leavitt
526 – 5th Street South
Lethbridge AB T1J 2B8

PREPARED BY:
Hasegawa Engineering
Consulting Professional Engineers
Suite 330, 3120 – 32nd St. S.
Lethbridge, AB
T1K 7B4

TABLE OF CONTENTS

1.0 Introduction

On behalf of Troy Leavitt, Hasegawa Engineering (HE) has completed this preliminary hydrological analysis of the subject site. The hydrological analysis includes the following major aspects:

1. On site layout, topography and conditions
2. Offsite topography
3. Precipitation and runoff analysis
4. Retention Pond storage size calculations

The site is located in the Town of Raymond, Alberta as shown in Figure 1 (Appendix A.)

2.0 Site Conditions

Currently, the site consists of approximately 8.09ha. (20ac.) of relatively flat pasture land with a large residence located in the center area. Existing drainage is generally to the northeast. Land to the south and southwest of the site may contribute offsite runoff. The site is proposed to be divided into residential lots with the existing residence retaining 2.3 acres. The remaining lots will be single residential lots – these will be about ¼ acre lots except along the east boundary where ½ acre lots are proposed.

3.0 Runoff Design Criteria

3.1 Predevelopment

Modeling used SWMM, a storm runoff software program developed by the United States Environmental Protection Agency and widely accepted for runoff analysis. The existing ground was first modeled to determine predevelopment flows during a 5 year/4 hour storm and a 100 year/24 hour storm event. These storm events are Modified Chicago method synthetic storms accepted by the City of Lethbridge for modeling runoff and use rainfall intensity data obtained from the Atmospheric Environment Service of Environment Canada for the City of Lethbridge. The rainfall data produces a peak intensity and total rainfall depth as summarized in Table 1 in section 4.

Predevelopment modeling includes the impervious surfaces of the existing residence and assumes the remaining site surfaces are 100% pervious. Each area was analyzed using the slope of existing ground and general drainage patterns. Offsite runoff from the south was not included in modeling. The SWMM software estimates the rate of predevelopment storm runoff which then determines allowable post development release.

3.2 Post Development

The post development drainage model is shown in Figure 2 (Appendix A). The development is divided into catchments according to flow paths dictated by design elevations at the present time. The minor storm system running underground is not yet designed, modeling at this stage used only the major storm system. Drainage from the front of lots is directed onto the street and to the dry pond; drainage from the rear of the lot in catchment 3 is intercepted by swales and taken to retention. The streets are assumed to be paved, 13 meters wide and 0.15 meters high at the curb with 2% cross slope. Swales are 3 meters wide at the top with sides sloped at 4h:1v to a depth of 0.3 meters.

The existing residence is modeled as is, new lots are assumed to have a residence with 2000 ft.^{2} impervious surface area and 1000 ft.^{2} of impervious landscaping. The landscaping and half of the house is assumed to be in the front half of the lot. There are 5 lots from a neighboring subdivision bordering on the northeast – it is assumed that runoff from these lots will flow toward the property and they have been included in the drainage analysis. As in the predevelopment model, offsite runoff from the south is not included and detailed design may need to route this runoff around the development.

Storm runoff is directed to a dry pond to attenuate storm flow. Alberta Environment recommends that dry ponds have interior side slopes with a horizontal/vertical ratio of 4:1, 0.6 meters of freeboard and a maximum active water depth of 1.5 meters. This pond has 1.5 meters of active storage depth and is modeled with 0.6 meters of freeboard above and side slopes of 5h:1v. The dry pond releases runoff into the existing storm system at the northeast corner of the property through a 375mm storm pipe - it should be noted that this model does not account for storm flow in the existing system. Required retention volume is based on a 24 hour/100 year storm event. The pond area as shown in Figure 1 is based on an allowable storm pond release rate limited to the peak flow obtained in the pre-development model during a 5 year/4 hour storm – several sizes of dry pond have been modeled to test system performance with changes in allowable release into the Town storm system.

4.0 Surface Runoff Results

Table 1 below summarizes computer modeling.

Storm Event	Maximum Intensity/ Total Rainfall*	Total/ Peak Runoff ($m^3/m^3/sec$)		Post Development Maximum Pond Depth and Release**
		Pre Dev.	Post Dev.	
5 yr/4hr	122mm/hr, 39mm	357/0.105	1611/0.972	0.46 m (25%)/0.051 m^3/sec
100 yr/24 hr	255mm/hr, 109mm	3449/1.02	5676/3.515	1.25 m (80%)/0.096 m^3/sec

***Based on a Modified Chicago Storm. This storm has a maximum rain intensity at time = 0.3 and is a synthetic event but uses Environment Canada rainfall data for Lethbridge to produce a storm profile.**
**** Based on release restricted to the 5 year predevelopment rate.**

As shown in the table, the predevelopment 5 year storm produced a runoff rate of 0.1 m^3/second. The post development model shown here has an outlet orifice that restricts flow into the Town storm system to no more than this rate in all events up to the 100 year storm. The post development column runoff shows the increase in runoff intensity and volume that is to be expected. The final column shows the pond performance in attenuating both storms to below 5 year storm predevelopment levels. These benefits are available in all lesser storm events which includes the majority of rainfall. Additional models were run with an allowable release based on the 100 year storm predevelopment runoff rate (1.02 m^3/second). These models have smaller dry ponds and shorter retention times.

Detailed results of runoff models are included in Appendix B - key points for the 100 year post development storm are as follows:

- Flow paths to the retention pond show minor flooding at junctions 2, 4 and 6 (2, 51 and 39 m^3 respectively) which can be resolved as the design becomes more detailed.
- Flows directed into the roads are acceptable with maximum velocities under 1.5 m/second. Flow in the swales accepting back-of-lot runoff is contained within the swale but velocities slightly exceed 2.6 m/second. This can be reduced during final design.
- With release held to 0.1 m^3/second, the retention pond fills to 79% full at a maximum depth of 1.25 meters. This does not include the 0.6 meter freeboard. Retention capability attenuates storm flows over 24 hours (see Figure 3 – Appendix A).

Key input parameters for SWMM analysis along with summaries of the computer simulations are attached in Appendix B.

5.0 Conclusion

Computer modeling of the proposed subdivision shows that the post development increase in storm runoff is attenuated over 24 hours through a dry pond. Release into the Town of Raymond storm system during the 100 year storm does not exceed that of the predevelopment 5 year storm. Similar benefits are provided for all storm events up to the 100 year design storm. Final design will refine the storm retention system as required.

APPENDICES

APPENDIX A-FIGURES

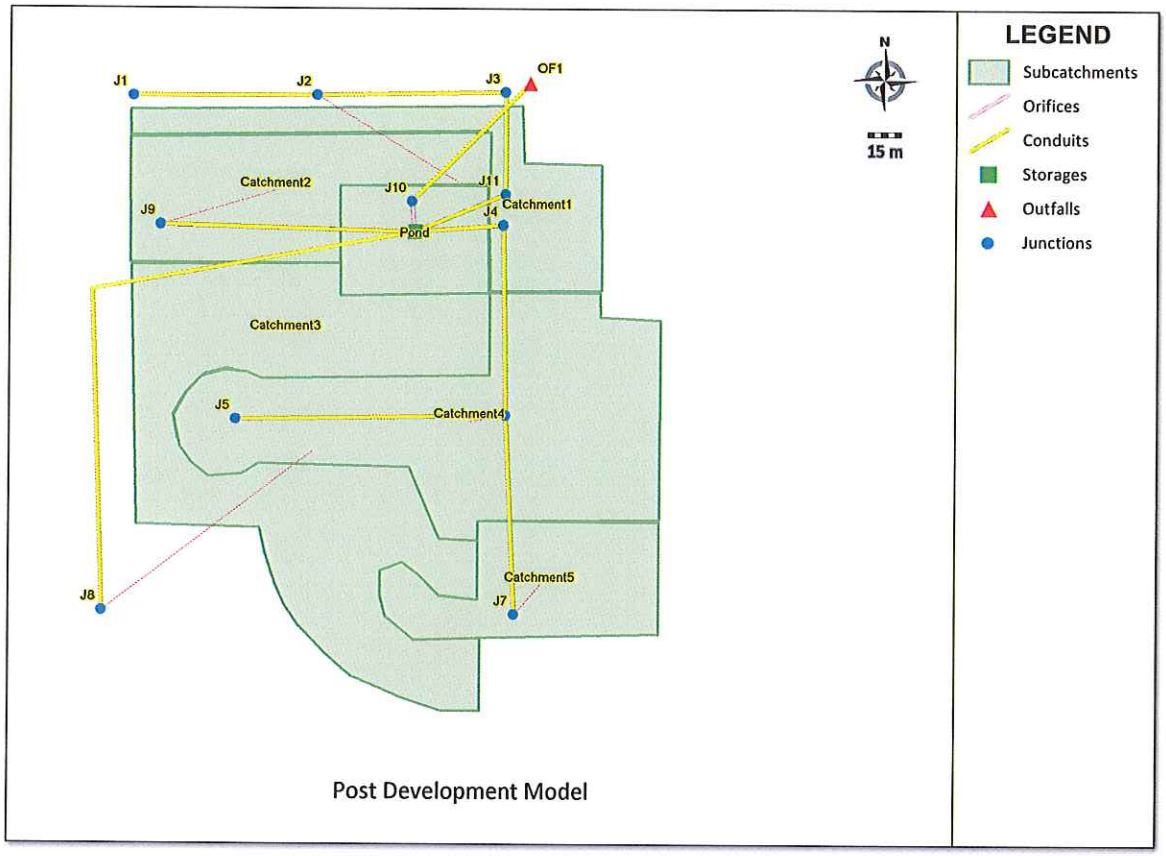


Figure 2 – Proposed Subdivision Post Development Runoff Model

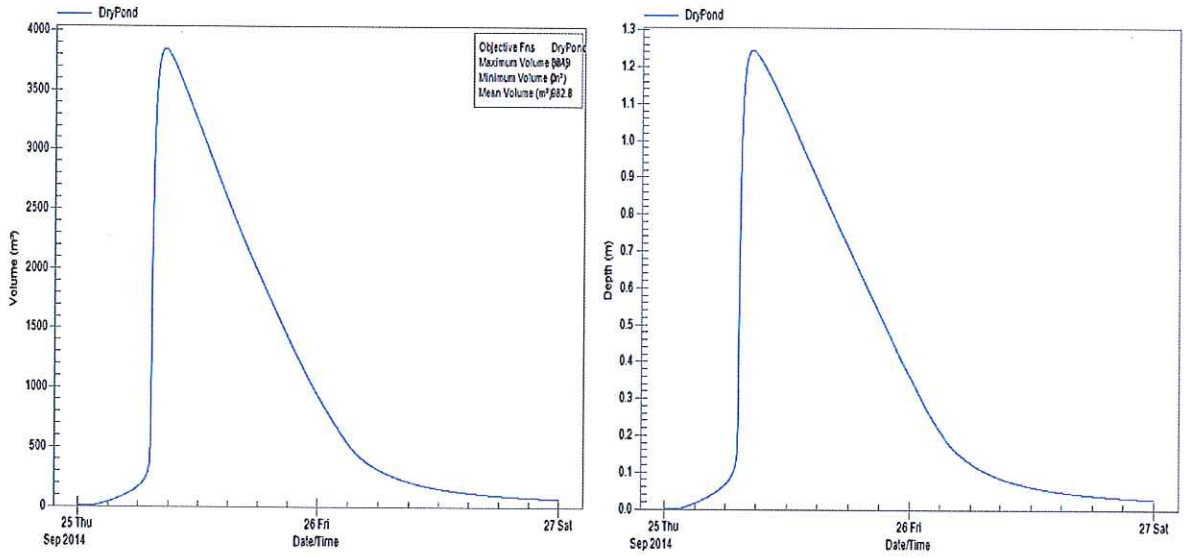


Figure 3 – Storm Pond Retention Time During 100 Year Storm

APPENDIX B-SWMM SUMMARIES

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.021)

Stevens Subdivision 5 Year/4 Hour Predevelopment

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... YES
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Starting Date SEP-25-2014 00:00:00
Ending Date SEP-27-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

********** Runoff Quantity Continuity **********	Volume hectare-m	Depth mm
Total Precipitation	0.324	39.167
Evaporation Loss	0.000	0.000
Infiltration Loss	0.290	35.016
Surface Runoff	0.036	4.310
Final Surface Storage	0.000	0.015
Continuity Error (%)	-0.445	

**********	Volume	Volume

Flow Routing Continuity	hectare-m	10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.036	0.357
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.036	0.357
Internal Outflow	0.000	0.000
Storage Losses	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.010	

****
Time-Step Critical Elements
****
Link C9 (2.17%)

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

****
Routing Time Step Summary
****

Minimum Time Step	:	1.12 sec
Average Time Step	:	4.92 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff

S1	39.17	23.88	0.00	40.52	22.64	0.36	0.10	0.359
S2	39.17	0.00	0.00	30.76	9.37	0.04	0.05	0.239
S3	39.17	0.52	0.00	34.09	5.68	0.33	0.15	0.143
S4	39.17	0.00	0.00	31.45	8.28	0.03	0.03	0.211

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min
J1	JUNCTION	0.01	0.10	957.80	0 01:40
OF1	OUTFALL	0.00	0.10	957.60	0 01:40

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr
J1	JUNCTION	0.105	0.105	0 01:40	0.357	0.357
OF1	OUTFALL	0.000	0.105	0 01:40	0.000	0.357

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CMS	Max. Flow CMS	Total Volume 10^6 ltr
OF1	9.90	0.038	0.105	0.357
System	9.90	0.038	0.105	0.357

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C9	CHANNEL	0.105	0 01:40	2.65	0.05	0.33

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Avg. Froude Number	Avg. Flow Change
C9	1.00	0.00	0.00	0.00	0.89	0.11	0.00	0.00	0.34	0.0000

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Jan 20 21:28:10 2015
Analysis ended on: Tue Jan 20 21:28:10 2015
Total elapsed time: < 1 sec

```
[TITLE]
Stevens Subdivision 5 Year/4 Hour Predevelopment

[OPTIONS]
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
START_DATE           09/25/2014
START_TIME           00:00:00
REPORT_START_DATE    09/25/2014
REPORT_START_TIME    00:00:00
END_DATE             09/27/2014
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          0:01:00
WET_STEP             0:05:00
DRY_STEP             0:05:00
ROUTING_STEP         5
ALLOW_PONDING        YES
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type           Parameters
;;-------------- ----------
CONSTANT     0.0
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time    Snow    Data
;;Name           Type      Intrvl  Catch   Source
;;-------------- --------- ------ ------ ----------
5yr4hr           INTENSITY 0:05   1.0    TIMESERIES 5yr4hr
100yr24hr        INTENSITY 0:05   1.0    TIMESERIES 100yr2hr

[SUBCATCHMENTS]
;;                                                 Total     Pcnt.             Pcnt.     Curb      Snow
```

```
;;Name           Raingage        Outlet          Area     Imperv   Width    Slope    Length   Pack
;;-------------- --------------- --------------- -------- -------- -------- -------- -------- --------
S1               5yr4hr          J1              1.5748   1.6      132.336  0.46     0
S2               5yr4hr          S1              0.4452   0        171.231  4.4      0
S3               5yr4hr          S1              5.8857   2.4      420.407  0.9      0
S4               5yr4hr          S3              0.3684   0        76.75    4.2      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
S1               0.01       0.1        1          3          25         OUTLET
S2               0.01       0.1        1          3          25         OUTLET
S3               0.01       0.1        1          3          25         OUTLET
S4               0.01       0.1        1          3          25         OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
S1               253        3.5        0.2
S2               253        3.5        0.2
S3               253        3.5        0.2
S4               253        3.5        0.2

[JUNCTIONS]
;;               Invert     Max.       Init.      Surcharge  Ponded
;;Name           Elev.      Depth      Depth      Depth      Area
;;-------------- ---------- ---------- ---------- ---------- ----------
J1               957.7      0.3        0          0          100

[OUTFALLS]
;;               Invert     Outfall    Stage/Table      Tide
;;Name           Elev.      Type       Time Series      Gate
;;-------------- ---------- ---------- ---------------- ----
OF1              957.5      FREE                        NO

[CONDUITS]
;;               Inlet           Outlet                      Manning    Inlet      Outlet     Init.      Max.
;;Name           Node            Node            Length      N          Offset     Offset     Flow       Flow
;;-------------- --------------- --------------- ----------  ---------- ---------- ---------- ---------- ----------
C9               J1              OF1             5           0.01       0          0          0          0

[XSECTIONS]
;;Link           Shape        Geom1           Geom2      Geom3      Geom4      Barrels
;;-------------- ------------ --------------- ---------- ---------- ---------- ----------
C9               IRREGULAR    swale           0          0          0          1
```

```
[TRANSECTS]

NC 0.01     0.01     0.01
X1 swale            3        0.0      0.0      0.0       0.0       0.0       0.0       0.0
GR 0        0        -0.3     1.2      0        2.4

[LOSSES]
;;Link           Inlet      Outlet     Average    Flap Gate
;;-------------- ---------- ---------- ---------- ----------

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
Pond             Storage    0          2407
Pond                         .5         2936
Pond                         1          3515
Pond                         1.5        4143

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
5yr4hr                      0:00       0
5yr4hr                      0:05       2.4
5yr4hr                      0:10       2.6
5yr4hr                      0:15       2.8
5yr4hr                      0:20       3
5yr4hr                      0:25       3.4
5yr4hr                      0:30       3.7
5yr4hr                      0:35       4.2
5yr4hr                      0:40       4.9
5yr4hr                      0:45       5.8
5yr4hr                      0:50       7.3
5yr4hr                      0:55       9.8
5yr4hr                      1:00       15.5
5yr4hr                      1:05       37.6
5yr4hr                      1:10       122.3
5yr4hr                      1:15       51
5yr4hr                      1:20       28
5yr4hr                      1:25       19
5yr4hr                      1:30       15
5yr4hr                      1:35       12
5yr4hr                      1:40       10
5yr4hr                      1:45       9
5yr4hr                      1:50       8
5yr4hr                      1:55       7
5yr4hr                      2:00       6
```

5yr4hr	2:05	5.5
5yr4hr	2:10	5.3
5yr4hr	2:15	5
5yr4hr	2:20	4.6
5yr4hr	2:25	4
5yr4hr	2:30	4
5yr4hr	2:35	3.9
5yr4hr	2:40	3.7
5yr4hr	2:45	3.5
5yr4hr	2:50	3.4
5yr4hr	2:55	3.3
5yr4hr	3:00	3.2
5yr4hr	3:05	3.1
5yr4hr	3:10	3
5yr4hr	3:15	2.8
5yr4hr	3:20	2.7
5yr4hr	3:25	2.6
5yr4hr	3:30	2.5
5yr4hr	3:35	2.4
5yr4hr	3:40	2.4
5yr4hr	3:45	2.3
5yr4hr	3:50	2.2
5yr4hr	3:55	2.2
5yr4hr	4:00	2.1
100yr2hr	0:00	0
100yr2hr	0:05	0.763
100yr2hr	0:10	0.771
100yr2hr	0:15	0.779
100yr2hr	0:20	0.787
100yr2hr	0:25	0.796
100yr2hr	0:30	0.804
100yr2hr	0:35	0.813
100yr2hr	0:40	0.822
100yr2hr	0:45	0.831
100yr2hr	0:50	0.841
100yr2hr	0:55	0.851
100yr2hr	1:00	0.861
100yr2hr	1:05	0.871
100yr2hr	1:10	0.881
100yr2hr	1:15	0.892
100yr2hr	1:20	0.903
100yr2hr	1:25	0.914
100yr2hr	1:30	0.926
100yr2hr	1:35	0.938
100yr2hr	1:40	0.95

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.021)

Stevens Subdivision 100 yr/24 Hr Post Development
Allowable release = 0.105 cu. m./sec

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

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... YES
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Starting Date SEP-25-2014 00:00:00
Ending Date SEP-27-2014 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:05:00
Dry Time Step 00:05:00
Routing Time Step ..... 5.00 sec

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.951	109.858
Evaporation Loss	0.000	0.000
Infiltration Loss	0.378	43.632
Surface Runoff	0.579	66.905
Final Surface Storage	0.002	0.244
Continuity Error (%)	-0.839	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.579	5.792
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.566	5.663
Internal Outflow	0.000	0.000
Storage Losses	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.008	0.083
Continuity Error (%)	0.806	

Highest Continuity Errors

Node J3 (2.36%)
Node DryPond (-1.31%)

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Routing Time Step Summary

Minimum Time Step	:	5.00 sec
Average Time Step	:	5.00 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.00

Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
Catchment1	109.86	0.00	0.00	29.78	80.32	0.68	0.59	0.731
Catchment2	109.86	0.00	0.00	58.18	52.77	0.63	0.61	0.480
Catchment3	109.86	0.00	0.00	52.91	57.95	1.55	1.53	0.527
Catchment4	109.86	0.00	0.00	36.32	74.02	1.69	1.42	0.674
Catchment5	109.86	0.00	0.00	47.20	63.37	0.70	0.60	0.577
Pond	109.86	0.00	0.00	11.91	97.57	0.54	0.39	0.888

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min
J1	JUNCTION	0.00	0.00	958.75	0 00:00
J2	JUNCTION	0.01	0.17	958.02	0 07:18
J3	JUNCTION	0.01	0.12	957.87	0 07:24
J4	JUNCTION	0.04	0.78	957.73	0 07:19
J5	JUNCTION	0.00	0.00	959.95	0 00:00
J6	JUNCTION	0.01	0.15	959.25	0 07:17
J7	JUNCTION	0.01	0.11	960.21	0 07:15
J8	JUNCTION	0.01	0.28	959.98	0 07:17
J9	JUNCTION	0.00	0.17	958.47	0 07:15
J10	JUNCTION	0.13	0.31	956.21	0 08:35
J11	JUNCTION	0.45	0.70	957.65	0 07:29
OF1	OUTFALL	0.11	0.23	955.30	0 08:35
DryPond	STORAGE	0.37	1.25	957.15	0 08:32

****
Node Inflow Summary
****

	Maximum	Maximum		Lateral	Total

Node	Type	Lateral Inflow CMS	Total Inflow CMS	Time of Max Occurrence days hr:min	Inflow Volume 10^6 ltr	Inflow Volume 10^6 ltr
J1	JUNCTION	0.000	0.000	0 00:00	0.000	0.000
J2	JUNCTION	0.586	0.586	0 07:15	0.684	0.684
J3	JUNCTION	0.000	0.369	0 07:20	0.000	0.690
J4	JUNCTION	0.000	1.638	0 07:17	0.000	2.378
J5	JUNCTION	0.000	0.000	0 00:00	0.000	0.000
J6	JUNCTION	1.418	1.943	0 07:15	1.687	2.393
J7	JUNCTION	0.600	0.600	0 07:15	0.705	0.705
J8	JUNCTION	1.526	1.526	0 07:15	1.549	1.549
J9	JUNCTION	0.612	0.612	0 07:15	0.626	0.626
J10	JUNCTION	0.000	0.096	0 08:31	0.000	5.663
J11	JUNCTION	0.000	0.346	0 07:24	0.000	0.673
OF1	OUTFALL	0.000	0.096	0 08:35	0.000	5.663
DryPond	STORAGE	0.389	3.515	0 07:16	0.541	5.670

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J4	JUNCTION	0.01	0.033	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J2	0.15	0.318	0 07:15	0.039	0.17
J4	0.12	0.276	0 07:16	0.051	0.78
J6	0.02	0.114	0 07:16	0.002	0.15

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
DryPond	1.045	21	0	3.868	80	0 08:32	0.096

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CMS	Max. Flow CMS	Total Volume 10^6 ltr
OF1	95.38	0.034	0.096	5.663
System	95.38	0.034	0.096	5.663

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CHANNEL	0.000	0 00:00	0.00	0.00	0.50
C2	CHANNEL	0.369	0 07:20	0.45	0.80	0.89
C3	CHANNEL	0.346	0 07:24	0.60	0.43	0.72
C4	CHANNEL	1.532	0 07:22	1.00	0.78	0.87
C5	CHANNEL	0.000	0 00:00	0.00	0.00	0.50
C6	CHANNEL	0.562	0 07:15	0.71	0.39	0.86
C7	CHANNEL	1.638	0 07:17	1.43	1.00	1.00
C8	CHANNEL	1.263	0 07:17	2.61	0.86	0.94
C9	CHANNEL	0.588	0 07:15	2.65	0.30	0.72

C10	CONDUIT	0.096	0	08:35	1.14	0.92	0.71
C11	CHANNEL	0.261	0	07:29	0.83	0.56	0.72
OR1	ORIFICE	0.096	0	08:31			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Avg. Froude Number	Avg. Flow Change
		--- Fraction of Time in Flow Class ---								
C1	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.26	0.0000
C3	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.64	0.0000
C4	1.00	0.09	0.00	0.00	0.42	0.00	0.00	0.50	0.11	0.0000
C5	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.33	0.0000
C7	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.04	0.0001
C8	1.00	0.00	0.00	0.00	0.33	0.00	0.00	0.66	0.48	0.0000
C9	1.00	0.04	0.00	0.00	0.33	0.00	0.00	0.63	0.34	0.0000
C10	1.00	0.01	0.00	0.00	0.98	0.01	0.00	0.00	0.80	0.0001
C11	1.00	0.04	0.00	0.00	0.02	0.00	0.00	0.94	0.35	0.0000

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C7	0.02	0.02	0.02	0.01	0.01

Analysis begun on: Wed Mar 11 09:31:02 2015
Analysis ended on: Wed Mar 11 09:31:04 2015
Total elapsed time: 00:00:02

```
[TITLE]
Stevens Subdivision 100 yr/24 Hr Post Development
Allowable release = 0.105 cu. m./sec

[OPTIONS]
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
START_DATE           09/25/2014
START_TIME           00:00:00
REPORT_START_DATE    09/25/2014
REPORT_START_TIME    00:00:00
END_DATE             09/27/2014
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          0:01:00
WET_STEP             0:05:00
DRY_STEP             0:05:00
ROUTING_STEP         5
ALLOW_PONDING        YES
INERTIAL_DAMPING     PARTIAL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         DEPTH
MIN_SLOPE            0

[EVAPORATION]
;;Type           Parameters
;;-------------- ----------
CONSTANT     0.0
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time    Snow    Data
;;Name           Type      Intrvl  Catch   Source
;;-------------- --------- ------ ------ ----------
5yr4hr           INTENSITY 0:05   1.0    TIMESERIES 5yr4hr
100yr24hr        INTENSITY 0:05   1.0    TIMESERIES 100yr2hr

[SUBCATCHMENTS]
```

;; ;;Name	Raingage	Outlet	Total Area	Pcnt. Imperv	Width	Pcnt. Slope	Curb Length	Snow Pack
Catchment1	100yr24hr	J2	0.851	53.6	567.333	3.33	0	
Catchment2	100yr24hr	J9	1.187	10.3	409.31	1.7	0	
Catchment3	100yr24hr	J8	2.6726	18.2	722.324	3.8	0	
Catchment4	100yr24hr	J6	2.2791	43.8	690.636	1.7	0	
Catchment5	100yr24hr	J7	1.1122	27.3	226.98	2.7	0	
Pond	100yr24hr	DryPond	0.555	81.4	1110	2	0	

[SUBAREAS]

;;Subcatchment	N-Imperv	N-Perv	S-Imperv	S-Perv	PctZero	RouteTo	PctRouted
Catchment1	0.01	0.1	1	3	25	OUTLET	
Catchment2	0.01	0.1	1	3	25	OUTLET	
Catchment3	0.01	0.1	1	3	25	OUTLET	
Catchment4	0.01	0.1	1	3	25	OUTLET	
Catchment5	0.01	0.1	1	3	25	OUTLET	
Pond	0.01	0.1	1	3	25	OUTLET	

[INFILTRATION]

;;Subcatchment	Suction	HydCon	IMDmax
Catchment1	253	3.5	0.2
Catchment2	253	3.5	0.2
Catchment3	253	3.5	0.2
Catchment4	253	3.5	0.2
Catchment5	253	3.5	0.2
Pond	253	3.5	0.2

[JUNCTIONS]

;; ;;Name	Invert Elev.	Max. Depth	Init. Depth	Surcharge Depth	Ponded Area
J1	958.75	0.15	0	0	100
J2	957.85	0.15	0	0	100
J3	957.75	0.15	0	0	100
J4	956.95	0.75	0	0	100
J5	959.95	0.15	0	0	100
J6	959.1	0.15	0	0	100
J7	960.1	0.15	0	0	100
J8	959.7	0.3	0	0	100
J9	958.3	0.3	0	0	100
J10	955.9	1.5	0	0	0
J11	956.95	0.75	0	0	0

[OUTFALLS]

;;Name	Invert Elev.	Outfall Type	Stage/Table Time Series	Tide Gate
OF1	955.07	FREE		NO

[STORAGE]

;;Name	Invert Elev.	Max. Depth	Init. Depth	Storage Curve	Curve Params			Ponded Area	Evap. Frac.	Infiltration Parameters
DryPond	955.9	1.5	0	TABULAR	LargePond			4143	0	

[CONDUITS]

;;Name	Inlet Node	Outlet Node	Length	Manning N	Inlet Offset	Outlet Offset	Init. Flow	Max. Flow
C1	J1	J2	108	0.01	0	0	0	0
C2	J2	J3	108	0.01	0	0	0	0
C3	J3	J11	70	0.01	0	0.6	0	0
C4	J4	DryPond	25	0.1	0	0.25	0	0
C5	J5	J6	160	0.01	0	0	0	0
C6	J7	J6	108	0.01	0	0	0	0
C7	J6	J4	130	0.01	0	0.6	0	0
C8	J8	DryPond	446	0.1	0	0.45	0	0
C9	J9	DryPond	146	0.1	0	0.45	0	0
C10	J10	OF1	400	0.01	0	0	0	0
C11	J11	DryPond	400	0.01	0.45	1.2	0	0

[ORIFICES]

;;Name	Inlet Node	Outlet Node	Orifice Type	Crest Height	Disch. Coeff.	Flap Gate	Open/Close Time
OR1	DryPond	J10	SIDE	0	0.65	NO	0

[XSECTIONS]

;;Link	Shape	Geom1	Geom2	Geom3	Geom4	Barrels
C1	IRREGULAR	Street1	0	0	0	1
C2	IRREGULAR	Street1	0	0	0	1
C3	IRREGULAR	Street1	0	0	0	1
C4	IRREGULAR	ditch	0	0	0	1
C5	IRREGULAR	Street1	0	0	0	1
C6	IRREGULAR	Street1	0	0	0	1
C7	IRREGULAR	Street1	0	0	0	1
C8	IRREGULAR	swale	0	0	0	1
C9	IRREGULAR	swale	0	0	0	1

```
C10              CIRCULAR     0.45             0          0          0          1
C11              IRREGULAR    swale            0          0          0          1
OR1              RECT_CLOSED  0.185            0.185      0          0

[TRANSECTS]

NC 0.01     0.01     0.01
X1 swale            4        0.0      0.0      0.0      0.0       0.0      0.0      0.0
GR 0        0        -0.3     1.2      -0.3     1.8      0         3

;Full street, width = 13m, curb = 0.15m , cross-slope = 0.02m/m, bank-slope = 0.02m/m, bank-height = 0.23m.
NC 0.02     0.02     0.014
X1 Street1          7        4        17       0.0      0.0       0.0      0.0      0.0
GR 0.15     0        0.14     4        0        4        0.13      10.5     0        17
GR 0.14     17       0.15     21

NC 0.1      0.1      0.1
X1 ditch            4        0.0      0.0      0.0      0.0       0.0      0.0      0.0
GR 0        0        -0.75    2.25     -0.75    2.75     0         5

[LOSSES]
;;Link           Inlet      Outlet     Average    Flap Gate
;;-------------- ---------- ---------- ---------- ----------

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
SmallPond        Storage    0          801
SmallPond                    .5         1125
SmallPond                    1          1500
SmallPond                    1.5        1923

LargePond        Storage    0          2407
LargePond                    .5         2935
LargePond                    1          3514
LargePond                    1.5        4143

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
5yr4hr                      0:00       0
5yr4hr                      0:05       2.4
5yr4hr                      0:10       2.6
5yr4hr                      0:15       2.8
5yr4hr                      0:20       3
5yr4hr                      0:25       3.4
```

APPENDIX C

Site Geotechnical Screening

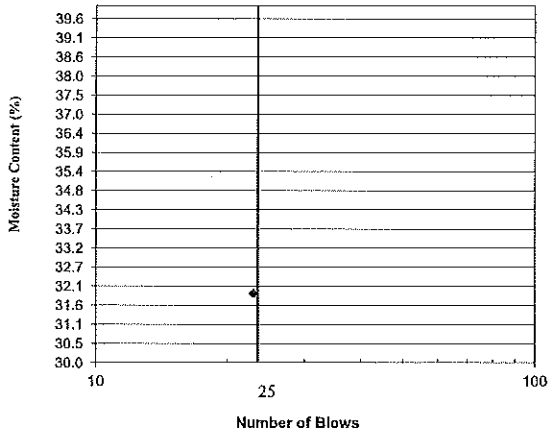
ATTERBERG LIMITS TEST

AMEC Environment & Infrastructure
a Division of AMEC Americas Limited
469, 40 St South
Lethbridge, Alberta
Canada, T1J 4M1
Tel: (403) 327-7474
Fax: (403) 327-7682

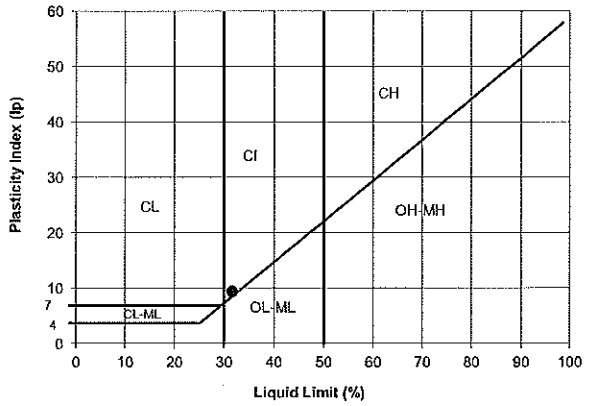
Project No: BX10990.800
Date: 30-Sep-14
Project: Stevens - Raymond
CC:

Liquid Limit Test				Plastic Limit Test		
# of Blows	23					
Tare #	18			Tare #	8	
Wet Wt + Tare	33.1967			Wet Wt + Tare	14.7615	
Dry Wt + Tare	28.3735			Dry Wt + Tare	14.4980	
Wt of Tare	13.2730			Wt of Tare	13.3104	
% Moisture	31.9			% Moisture	22.2	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 31.6 **Plastic Limit (%):** 22.2 **Plasticity Index:** 9.5

Classification : CI **Depth:** 5' **Sample ID:** BH 1 N

Technician: MS

= Input Data

Per: _____

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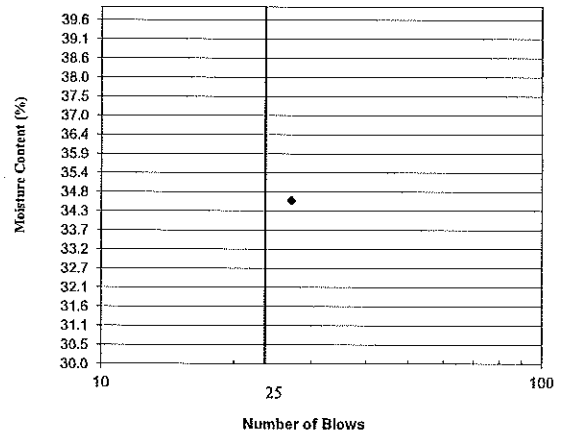
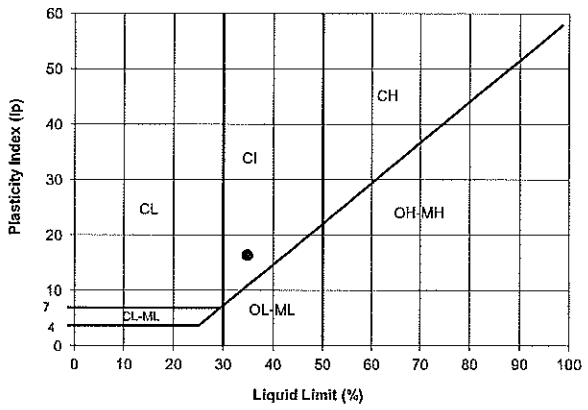
Project No: BX10990.800
Date: 30-Sep-14
Project: Stevens - Raymond
CC:

Liquid Limit Test				Plastic Limit Test		
# of Blows	27					
Tare #	20			Tare #	44	
Wet Wt + Tare	37.7730			Wet Wt + Tare	8.8624	
Dry Wt + Tare	31.5215			Dry Wt + Tare	8.6798	
Wt of Tare	13.4388			Wt of Tare	7.6895	
% Moisture	34.6			% Moisture	18.4	

Liquid Limit Test



Plasticity chart for soil passing 425 um sieve



Liquid Limit (%): 34.9 **Plastic Limit (%):** 18.4 **Plasticity Index:** 16.4

Classification : CI **Depth:** 5' **Sample ID:** BH 2 S

Technician: MS

= Input Data

Per: _____

MOISTURE CONTENT

Project: **Stevens - Raymond**
Project #: **BX10990.800**
Technician: **MS** Date: **30-Sep-2014**

Hole #	**BH1 N**					
Depth (m)	**5'**					
Sample						
Tare No.						
Wt. Sample Wet	282.1					
Wt. Sample Dry	235.6					
Wt. Water	46.5					
Tare Container	0.0					
Wt. Dry sample	235.6					
Moist. Content	***19.7%***					

Hole #	**BH2 S**					
Depth (m)	**5'**					
Sample						
Tare No.						
Wt. Sample Wet	291.8					
Wt. Sample Dry	236.9					
Wt. Water	54.9					
Tare Container	0.0					
Wt. Dry sample	236.9					
Moist. Content	***23.2%***					

Hole #						
Depth (m)						
Sample						
Tare No.						
Wt. Sample Wet						
Wt. Sample Dry						
Wt. Water						
Tare Container						
Wt. Dry sample						
Moist. Content						

Hole #						
Depth (m)						
Sample						
Tare No.						
Wt. Sample Wet						
Wt. Sample Dry						
Wt. Water						
Tare Container						
Wt. Dry sample						
Moist. Content						

Hole #						
Depth (m)						
Sample						
Tare No.						
Wt. Sample Wet						
Wt. Sample Dry						
Wt. Water						
Tare Container						
Wt. Dry sample						
Moist. Content						

Hole #						
Depth (m)						
Sample						
Tare No.						
Wt. Sample Wet						
Wt. Sample Dry						
Wt. Water						
Tare Container						
Wt. Dry sample						
Moist. Content						

APPENDIX D

LAND TITLES

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0020 212 916	2039I;OT	67F124 .

LEGAL DESCRIPTION

PLAN 2039I
THAT PORTION OF THE UNNAMED STREET ADJOINING
BLOCK 49 ON THE NORTH EAST WHICH IS
DESIGNATED AS PARCEL 14 AS SHOWN COLORED GREEN ON SAID PLAN
EXCEPTING THE SUBDIVISION ON PLAN 2023GL
EXCEPTING THEREOUT ALL MINES AND MINERALS

ATS REFERENCE: 4;20;6;7
ATS REFERENCE: 4;20;6;8
ATS REFERENCE: 4;20;6;9
ATS REFERENCE: 4;20;6;16
ATS REFERENCE: 4;20;6;17
ATS REFERENCE: 4;20;6;18
ESTATE: FEE SIMPLE

MUNICIPALITY: TOWN OF RAYMOND

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
67F124 .	20/10/1945			REF. 2744FL

OWNERS

THE TOWN OF RAYMOND.
OF RAYMOND
ALBERTA

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS

NO REGISTRATIONS

TOTAL INSTRUMENTS: 000

(CONTINUED)

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 13 DAY OF JUNE, 2014 AT 04:55 P.M.

ORDER NUMBER: 26202322

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0019 856 509	2023GL;26;1	031 322 406

LEGAL DESCRIPTION

PLAN 2023GL
BLOCK 26
LOT 1
EXCEPTING THE EAST 110 FEET OF THE NORTH 519.4 FEET
EXCEPTING THEREOUT ALL MINES AND MINERALS

ATS REFERENCE: 4;20;6;8
ESTATE: FEE SIMPLE

MUNICIPALITY: TOWN OF RAYMOND

REFERENCE NUMBER: 861 206 782

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
031 322 406	19/09/2003	TRANSFER OF LAND	$13,375	$13,375

OWNERS

NORMA B STEVENS
OF BOX 358
RAYMOND
ALBERTA T0K 2S0

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
3397HC .	24/07/1956	EASEMENT "(SUBJECT TO) IN FAVOUR OF LOT 2"
871 024 837	17/02/1987	CAVEAT RE : EASEMENT CAVEATOR - DAVID K ELTON 511-5 ST S

(CONTINUED)

REGISTRATION NUMBER | DATE (D/M/Y) | PARTICULARS

LETHBRIDGE
ALBERTA T1J2B9
AGENT - ROBERT W FLETCHER

TOTAL INSTRUMENTS: 002

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 13 DAY OF JUNE, 2014 AT 04:33 P.M.

ORDER NUMBER: 26202197

CUSTOMER FILE NUMBER:

END OF CERTIFICATE

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0034 252 502	2039I;OT	101 059 088

LEGAL DESCRIPTION

PLAN 2039I
THOSE PORTIONS OF STREETS AND AVENUES DESCRIBED AS FOLLOWS:
FIRST:
THAT PORTION OF RANGE AVENUE BETWEEN THE INTERSECTION OF FIRST STREET SOUTH AND FIRST STREET WEST AND THE CANAL RIGHT OF WAY ON PLAN IRR40
EXCEPTING THEREOUT:
(A) THAT PORTION OF RANGE AVENUE WHICH LIES SOUTH OF FIRST STREET SOUTH WEST OF FIRST STREET WEST, THE EAST OF LOT 4 IN BLOCK 24 AND NORTH OF A STRAIGHT LINE PARALLEL WITH THE SAID FIRST STREET SOUTH AND THROUGH THE NORTH CORNER OF LOT 3 IN BLOCK 23 IN PLAN 2039 I
(B) THE SUBDIVISION AS SHOWN ON PLAN 7510939
(C) THE SUBDIVISION AS SHOWN ON PLAN 7611058
(D) THE PORTION ON PLAN 7711606
(E) THE REPLOTING SCHEME ON PLAN 7810572
(F) THE SUBDIVISION AS SHOWN ON PLAN 9612141 CONTAINING 0.364 HECTARES
SECONDLY:
THAT PORTION OF CHURCH AVENUE WHICH LIES BETWEEN BLOCK 49 AND BLOCK 50
THIRDLY:
THAT PORTION OF FIRST STREET WEST WHICH LIES BETWEEN FIRST STREET NORTH AND SECOND STREET NORTH
FOURTHLY:
THAT PORTION OF THE UNNAMED STREET WHICH LIES BETWEEN BLOCK 50 AND BLOCK "A"
FIFTHLY:
THAT PORTION OF FOURTH STREET EAST WHICH LIES SOUTH OF CANAL RIGHT OF WAY ON PLAN IRR40 AND NORTH OF THE PRODUCTION EASTERLY OF THE SOUTH BOUNDARY OF LOT 5 IN BLOCK 67 ON PLAN 0010374
EXCEPTING THEREOUT:
(A) THAT PORTION WHICH LIES WITHIN CANAL RIGHT OF WAY ON PLAN IRR50
(B) THAT PORTION WHICH LIES WITHIN ROAD PLAN 1010291
SIXTHLY;
THAT PORTION OF COLUMBIA AVENUE WHICH LIES
BETWEEN BLOCKS 11 AND 12 ON SAID PLAN
EXCEPTING THEREOUT ALL MINES AND MINERALS

ATS REFERENCE: 4;20;6;7
ATS REFERENCE: 4;20;6;8
ATS REFERENCE: 4;20;6;9
ATS REFERENCE: 4;20;6;16
ATS REFERENCE: 4;20;6;17
ATS REFERENCE: 4;20;6;18

(CONTINUED)

ESTATE: FEE SIMPLE

MUNICIPALITY: TOWN OF RAYMOND

REFERENCE NUMBER: 101 058 988

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
101 059 088	26/02/2010	AMENDMENT-LEGAL DESCRIPTION		

OWNERS

THE TOWN OF RAYMOND.
OF RAYMOND
ALBERTA T0K 2S0

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
071 037 036	24/01/2007	CAVEAT RE : LEASE , ETC. CAVEATOR - VIDEON CABLESYSTEMS INC. SUITE 900, 630-3 AVE SW CALGARY ALBERTA T2P4L4 AGENT - PETER A JOHNSON

TOTAL INSTRUMENTS: 001

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 13 DAY OF JUNE, 2014 AT 04:33 P.M.

ORDER NUMBER: 26202197

CUSTOMER FILE NUMBER:

REGISTRAR OF LAND TITLES

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).

LAND TITLE CERTIFICATE

B

LINC	SHORT LEGAL	TITLE NUMBER
0020 216 560	2039I;50	881 187 240

LEGAL DESCRIPTION
PLAN 2039I
BLOCK 50

ESTATE: FEE SIMPLE
ATS REFERENCE: 4;20;6;7
ATS REFERENCE: 4;20;6;8

MUNICIPALITY: TOWN OF RAYMOND

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
881 187 240	18/10/1988			$3,500

OWNERS

NORMA B STEVENS
OF RAYMOND
ALBERTA

ENCUMBRANCES, LIENS & INTERESTS

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
811CA .		RESTRICTIVE COVENANT
131 303 747	27/11/2013	WRIT CREDITOR - HER MAJESTY THE QUEEN IN RIGHT OF CANADA AS REPRESENTED BY MINISTER OF NATIONAL REVENUE C/O ASSISTANT DIRECTOR, REVENUE COLLECTIONS LETHBRIDGE TAX SERVICES OFFICE 300, 704-4 AVE S POSTAL BAG 3009 LETHBRIDGE ALBERTA T1J4A9 DEBTOR - NORMA STEVENS BOX 358

(CONTINUED)

REGISTRATION
NUMBER DATE (D/M/Y) PARTICULARS

RAYMOND
ALBERTA T0K2S0
AMOUNT: $45,020 AND COSTS IF ANY
ACTION NUMBER: ETA-6477-13

TOTAL INSTRUMENTS: 002

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED HEREIN THIS 13 DAY OF JUNE, 2014 AT 04:33 P.M.

ORDER NUMBER: 26202197

CUSTOMER FILE NUMBER:

END OF CERTIFICATE