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City of Prince Albert

Crescent Acres Neighbourhood Plan 2021 Update

Prepared by:

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Project #: 60637578

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Revision History

Rev #	Date	Revised By:	Revision Description
A	April 5, 2021	Bia de Freitas, P.Eng.	Draft Report
B	June 22, 2021	Bia de Freitas, P.Eng.	Draft Report
C	July 26, 2021	Bia de Freitas, P.Eng.	Draft Report
D	September 3, 2021	Bia de Freitas, P.Eng.	Draft Report
1	September 14, 2021	Bia de Freitas, P.Eng.	Final Report

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Craig Guidinger
Director
Planning and Development Services
City Hall
1084 Central Avenue
Prince Albert, SK S6V 7P3

September 14, 2021

Project #
60637578 (402.29)

Dear Craig:

Subject: Crescent Acres Neighbourhood Plan 2021 Update

We are pleased to submit two copies of the Crescent Acres Neighborhood Plan 2021 Update. The document has been updated to incorporate pertinent information from the following documents completed by the City since the issuance of the original Crescent Acres Neighborhood Land Development Study in 2013.

- Water Distribution Master Plan (AECOM)
- Sanitary Sewer Master Plan (AECOM)
- Stormwater Master Plan (AECOM)
- Transportation Master Plan (AllNorth)
- OCP, Zoning Bylaw, Housing Plan and HPAS (City of Prince Albert)
- OCP (Prince Albert Planning District)

This assignment has been a very rewarding and enjoyable project for us. We look forward to further collaboration with the City in preparing for and managing future growth for many years to come.

Sincerely,
AECOM Canada Ltd.

Chris Cunningham, P.Eng.
Project Engineer
chris.cunningham@aecom.com

\BdF

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AECOM: 2015-04-13

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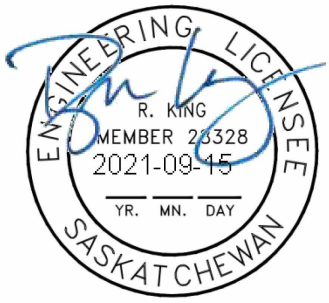

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ASSOCIATION OF PROFESSIONAL ENGINEERS
& GEOSCIENTISTS OF SASKATCHEWAN

CERTIFICATE OF AUTHORIZATION

AECOM Canada Ltd.

NUMBER C1667

PERMISSION TO CONSULT HELD BY:

DISCIPLINE	SASK. REG. No.	SIGNATURE
Civil	28328	2021-09-15
Civil	11013	

Executive Summary

In 2013, AECOM was commissioned by the City of Prince Albert to complete the Crescent Acres Neighborhood Land Study – Stage V, VI, and VII. The purpose of the study was to guide the development in the future Crescent Acres neighborhood in terms of optimal urban planning, traffic impact and upgrades, municipal servicing, site grading, and development staging. Unfortunately, the plan did not proceed beyond the draft stage to public consultation and was not formally adopted by City Council.

Since the 2013 land study, the City's land development needs and demands have changed. In addition, the City has adopted (and updated) multiple planning and engineering related legislation and plans. These factors, combined with the majority of residential development occurring over the next 20 years in the Crescent Acres neighborhood, an update to the 2013 Land Study is required.

The purpose of the Crescent Acres Neighborhood Plan – Stage 5 through 7 (CANP) is to guide the development of the remainder of the Crescent Acres neighbourhood in an appropriate, orderly and economical matter.

The Crescent Acres neighborhood is located in the southeast quadrant of the City of Prince Albert and encompasses approximately 67.8 ha within the present City Limits. In addition, details of the City's development intentions for the Crescent Acres Future Growth Area (CAFGA) is included. The CAFGA encompasses 75.7 ha and is located immediately east of the present City Limits, in the R.M. of Prince Albert. The Crescent Acres neighborhood will contain a blend of single-family, multi-family, and apartment residential and commercial land-uses. It is expected to contain a population of 2,276 people, and an additional population of 2,567 people would be housed within the CAFGA.

A desktop Environmental and Heritage Screening was completed. There are several known and expected species of conservation concern that may be present within 1,000 m of the project area. Further consultation with a Ministry of Environment Ecological Management Specialist is recommended to determine what, if any, species detection surveys are required and to discuss appropriate mitigation plans. The Heritage Resource Branch does not have concerns with the project proceeding as planned. Prior to conducting clearing activities, AECOM recommends submitting applications for permits and approvals to various regulatory agencies including the Ministry of Environment, Water Security Agency, and the Department of Fisheries and Oceans. While it is unlikely that there is a Duty to Consult with Indigenous communities there is an opportunity to include Indigenous people in the social and economic planning and benefit of the new neighbourhood.

A traffic impact study was completed for the Crescent Acres neighborhood (submitted as a separate report). The study reviewed the capacity of the existing transportation system with Crescent Acres at full build-out and with the future growth area. Recommendations for improvements to intersections that would be over-capacity at full build-out are provided.

The performance of the existing downstream sanitary sewer system was assessed, with particular consideration given for servicing the future Crescent Acres area. It is proposed to service the future area with a 450 mm diameter trunk that will connect to the existing 525 mm diameter trunk at 22nd Street East and 15th Avenue East. The new trunk would involve construction through the park area between Olive Diefenbaker Drive and 15th Avenue East. The on-site sanitary sewer system was also designed.

A design for the future Crescent Acres water distribution system was completed, and the sizing of the future water distribution system was assessed to satisfy peak demand and fire flow scenarios.

The performance of the existing downstream stormwater drainage system was completed. The drainage system consists of a large drainage ditch that is intercepted in a large-diameter trunk near Muzzy Drive. The trunk conveys stormwater flow down the river valley and then drains to an outlet channel that empties into the North

Saskatchewan River. It was determined that the storm sewer piping had little excess capacity available to accept flow from the future Crescent Acres neighbourhood. It is proposed to route stormwater from the future area to a retention pond, which will drain to the existing storm sewer system at a minimal flow and store the excess volume. A design for the storm sewer system within the future Crescent Acres neighbourhood was also completed.

A neighbourhood staging plan was completed to provide an orderly sequence of development, considering transportation, neighbourhood access, municipal servicing, and site grading. Development of the neighbourhood is planned to be completed in 9 phases; however, site grading for the entire area is planned to be completed in a single contract. A rough grading design was completed for the entire neighbourhood and is ready for tender call when directed by the City.

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1. INTRODUCTION

1.1 PURPOSE

The purpose of the Crescent Acres Neighbourhood Plan – Stage 5 through 7 (CANP) is to guide the development of the remainder of the Crescent Acres neighbourhood in an appropriate, orderly and economical manner. Additionally, the CANP details the City of Prince Albert's development intentions for the future growth of the neighbourhood into the Crescent Acres Future Growth Area (CAFGA), which is located in the Rural Municipality of Prince Albert (R.M. of P.A.).

1.2 LOCATION

As seen in Figure 1 (Appendix A), the CANP study area is located in the southeast corner of Prince Albert, consisting of 67.8 hectares in area and is defined by the following boundaries:

- To the north and west, the study area is bound by existing residential and institutional development, which follows Olive Diefenbaker Drive, Bradbury Drive, Barton Drive and Marquis Road East; and
- To the south and east, the study area is bound by the future extension of Marquis Road East (eastbound) and 21st Avenue East (northbound), which will connect to Highway 302 East.

As seen in Figure 1, the CAFGA, which is located in the R.M. of P.A., is 75.7 ha in size and is defined by the following boundaries:

- To the north, Highway 302 East;
- To the west, (future) 21st Avenue East;
- To the south, (future) Marquis Road East; and
- To the east, Sunshine Road.

1.3 BACKGROUND

In 2013, the City engaged AECOM to prepare the Crescent Acres Neighborhood Land Study – Stage V, VI and VII, the precursor to the CANP. Though the work had been completed, the plan did not proceed beyond the draft stage to public consultation, and it was not formally adopted by City Council.

Since 2015, the City has adopted the following planning and engineering related legislation and plans:

- The Prince Albert Planning District Official Community Plan (District OCP)
- The City of Prince Albert Official Community Plan (OCP)
- The City of Prince Albert Zoning Bylaw (Zoning Bylaw)
- The City of Prince Albert Housing Plan and Housing Plan Action Strategy (Housing Plan and HPAS)
- The City of Prince Albert Water Distribution Master Plan
- The City of Prince Albert Sanitary Sewer Master Plan

- The City of Prince Albert Stormwater Master Plan
- The City of Prince Albert Transportation Master Plan

With these documents being adopted after the initial preparation of the CANP and because the majority of the residential development expected to occur over the next 20 years will take place in Crescent Acres, the decision was made to update and adopt the CANP.

The original land study identified the following objectives, many of which have since been achieved:

- Conduct a desktop review and investigation into the environmental, geotechnical, and heritage conditions that may exist;
- Prepare a land use concept plan;
- Prepare a shadow plan (now referred to as the CAFGA) for the land located to the east, in the R.M. of P.A.;
- Prepare a traffic impact analysis study for the study area;
- Prepare a preliminary utility servicing design for water, sanitary, storm and roadways for the CANP area;
- Conduct a downstream capacity analysis upon the completion of the utility servicing design, identifying any capacity constraints; and
- Prepare a grading and staging plan for CANP area.

1.4 STUDY OBJECTIVE

As the City's land development needs and demands have changed since 2013, and the majority of the City's planning legislation and engineering design standards have been updated, the objective of the CANP is:

1. To provide a neighbourhood development framework that details:

    a) the municipal servicing, grading and development phasing for the neighbourhood that reflects current City standards;

    b) the future land uses for the study area, as well as proposed changes to these land uses for future consideration; and

2. To provide a high level annexation plan for the land located within the CAFGA.

1.5 STUDY PROCESS

Because the CANP was prepared in 2013, the study process undertaken for the update and adoption unfolded as follows:

1. Document Review and Update

    - City Administration reviewed and updated Sections 1 through 4;
    - City Administration reviewed the land use concept plan, making minor amendments (see Figure 4 – Appendix A) and prepared an additional land use concept plan intended to indicate future land use plan amendments (see Figure 4A – Appendix A); and
    - AECOM reviewed and updated sections 5 through 11, as well as all of the related figures and maps.

2. Public Engagement – Future Land Use Concept Plan Amendments

   In 2021, due to the COVID-19 pandemic, many of the typical methods of public engagement were not considered practical or safe; therefore, alternatives were sought. Because the City was looking for the public's opinion on the land use changes proposed in Figure 4A (Appendix A), the decision was made to employ a simple, digital public engagement platform in the form of an online survey. The survey consisted of 5 questions developed for the purpose of gauging the level of public satisfaction with the amendments proposed for the land use concept plan.

   Based on the results of the survey, the City hoped to learn:

   - whether or not the proposed changes align with the lessons learned over time; and
   - if or when any of the proposed changes should be made to the land use concept plan.

   In order to ensure that as many people as possible were aware of the survey, notice was provided in the following ways:

   - Information directing people to the online survey was posted on the City website, as well as on the City's digital billboard;
   - Letters were hand delivered to all properties located east and south of 15th Avenue and 15th Street East, notifying them of the opportunity to take the survey; and
   - A media release was prepared regarding the survey.

   Recognizing that not everyone is able to complete an online survey, a paper version was made available by request.

   The survey results are located in Appendix F.

3. Council Consideration

   Once the CANP was prepared and the results of the survey were tabulated, it was presented to City Council for consideration.

2. PRESENT CONTEXT

2.1 LAND OWNERSHIP

As of 2021, all of the land located within the study area, as well as three of the five parcels located in the CAFGA, is owned by the City of Prince Albert (the City). Two parcels, centrally located within the CAFGA, are privately owned.

2.2 EXISTING LAND USE AND ZONING

2.2.1 Study Area

As of 2021, and in accordance with the OCP, the land located within the study area is designated as Parks and Open Spaces, Low, Medium and High Density Residential. All of the land located within the CAFGA was designated as Future Growth.

As of 2021, the land located within the study area was zoned FUD – Future Urban Development. The purpose of the FUD Zoning District is, "to protect or hold undeveloped land for future development in accordance with a related area or secondary master plan". The zoning of the existing development located to the north and west of the study area is as follows:

- The majority of the existing residential land is zoned R1 – Large Lot Residential. There is a small pocket of R4 – High Density Residential located on the corner of Olive Diefenbaker Drive and Muzzy Drive;
- École Vickers Public School and St. Francis School are both zoned I1 – Institutional General;
- There is a small commercial node located on the intersection of 28th Street East and 15th Avenue East, zoned CMU – Commercial Mixed Use; and
- There are a number of local parks located throughout the developed portion of Crescent Acres, which are zoned P – Park.

2.2.2 CAFGA

As of 2021, and in accordance with *The Prince Albert Planning District Official Community Plan* (District OCP), the land use designation for the CAFGA, is "Urban Future Growth Area" and more specifically, "Future Residential" and "City of Prince Albert Potential Long Term Growth".

As of 2021, the land located within the CAFGA is zoned "Agriculture".

2.3 PLANNING CONTEXT

The CANP has been developed in accordance with Section 44 of The Planning and Development Act, 2007; The City of Prince Albert Official Community Plan, Bylaw No. 21 of 2015; and The City of Prince Albert Zoning Bylaw, Bylaw No. 1 of 2019.

2.4 SITE ANALYSIS AND CHARACTERISTICS

In 2013, AECOM completed a site analysis that discussed the topography, natural drainage and vegetation of the study area, as well as the CAFGA, which remains largely unchanged:

- The land located within the study area and the CAFGA is considered typical “knob and kettle” type topography, with scattered stands of aspen and spruce and many permanent and semi-permanent wetlands;
- The land located within the study area and the CAFGA is considered part of the “Prince Albert Plains”, which forms part of the Mixed Wood-Parkland Transition Ecodistrict;
- The land located within the study area and the CAFGA falls between 464.0 and 452.0 metres above-sea-level;
- There are three natural stormwater catchment areas located within the study area and the CAFGA, which have been identified as north, central and south (Figure 3 – Appendix A). The northern catchment area is located in the northeast corner study area. The central catchment area drains stormwater towards the large, permanent storm retention pond. The southern catchment area is located along the southern portion of the study area; and
- The land located within the study area is kept in a naturalized state and is maintained throughout the year by the City in order to keep noxious weeds and pests at a minimum. The land located within the CAFGA is active farmland.

As seen in Figure 1 (Appendix A), the following rights-of-way are planned to be extended and connected to either Marquis Road East or the future right-of-way, 21st Avenue East:

- Byars Street,
- Olive Diefenbaker Drive,
- Bradbury Drive,
- Barton Drive, and
- Marquis Road East.

Additionally, and in accordance with the Transportation Master Plan, each of the rights-of-way noted above are planned to be extended east past 21st Avenue East and connect to Sunshine Road.

As this road network is established, the timing of which will be based on development or existing traffic demands, it will provide access to and throughout the entire Crescent Acres neighbourhood.

3. DEVELOPMENT RATIONALE

3.1 HISTORICAL POPULATION GROWTH

In 2008, Watson & Associates Economists Ltd. (W&A) was retained by the City to prepare the City of Prince Albert Population, Household and Employment Forecast Study (W&A Study). Having a long-term, comprehensive, municipal growth study was considered imperative because it provided the City with historical population data as well as population forecasts, both of which were considered necessary in order to inform and prepare long-term development plans.

The original Crescent Acres Neighbourhood - Stage V, VI and VII Land Development Study included historical population growth information taken from the W&A Study, which described the City's population growth from the early 1980s through to the mid-2010s. In the 1980s, the City's population was growing at an average annual rate of up to 1.4%, but in the decades following, population growth dropped considerably, down to an annual average rate of 0.4%.

In 2015, when the City updated the OCP, the following information was included regarding growth projections and trends:

> ***" 2.2 Growth Projections and Trends***
>
> *... According to The Prince Albert Economic and Demographic Profile (2006) prepared by Sask Trends Monitor, in the 1980s the population of the city grew strongly – census records suggest annual growth rates of 1% per year. In the mid-1990s, population growth in the city slowed to near zero as population in the surrounding area grew. According to the Covered Health population from 1990 to 2005, the average annual increase in population for Prince Albert was 0.7% per year. However, most of the increase occurred in the mid-1990s."*

3.2 FUTURE GROWTH – POPULATION PROJECTIONS AND HOUSING FORECASTS

3.2.1 Population Projections

Though Prince Albert's population and housing growth continues to be slow and steady, with an average growth rate of 0.45% per year between 2011 and 2016 (0.32% for the Province over the same time period), there are a number of factors that W&A state will result in an increase in the long-term population growth rate, predicting a rate of 0.6% (medium growth scenario) up to 0.8% or higher. The growth drivers that lead to this conclusion are:

- A continually diversifying local economy, based on the following economic factors:
  - Continued growth in key commodity sectors;
  - Growing importance as a regional retail and service center for northern Saskatchewan;
  - Growth of the forestry sector;
  - Growth of the Tourism/Recreation industry; and
  - A developing Agri-Business industry.

- Continued in-migration from northern Saskatchewan and immigration from outside Saskatchewan.

Supporting these growth factors, specifically in-migration and immigration, Statistics Canada reports that between 2011 and 2016, 1,460 people immigrated to Canada and reside in Prince Albert.

The OCP echoes this predicted population growth rate increase in Section 2.2:

> *"There is indication that the rate of population growth in Prince Albert will change in response to many other factors. A study conducted by Crosby Hanna & Associates on the Prince Albert South Highway Corridor Concept Plans and Commercial/Industrial Feasibility Study noted key development opportunities that could trigger growth for the city including: future growth of the northern economy of Saskatchewan (e.g. uranium), potential regional developments including diamond and ethanol, a young and skilled labour supply to meet the demand of local and outside markets as well as the continuing strong role of Prince Albert as a centre of health/education and retail/service activities for a large trading area."*

3.3 HOUSING FORECASTS

Household occupancy has a significant correlation to future population growth and housing requirements. According to W&A, it is predicted that over the forecast period (2019 – 2034), the average occupancy of existing households or people per housing unit (PPU) is expected to drop, and the new housing units constructed over the forecast period are expected to have the following PPU:

- Low density residential = 3.19 PPU;
- Medium density residential = 2.01 PPU; and
- High density residential = 1.52 PPU.

Taking into consideration the anticipated medium growth scenario of 0.6% per year and the changing housing dynamics indicated above, W&A predicted that:

- A total of 3,510 housing units are forecast to be built between 2009 and 2034, which is an average of about 140 units per year. Of these units, 67% are anticipated to be low density and 24% are high density; and
- A moderate shift towards medium and high density in the medium and longer term is expected. This would be the result of an aging population and increased need for more affordable housing units.

According to 2016 census statistics that were updated in 2017, the census results generally support the W&A prediction that average household occupancy would drop between 2019 and 2034 as follows:

- 29.01% of homes are occupied by one person;
- 32.47% of homes are occupied by two people;
- 15.01% of homes are occupied by three people;
- 12.74% of homes are occupied by four people; and
- 10.75% of homes are occupied by five or more people.

Therefore, based on the information contained in the W&A Study; information provided by Statistics Canada; and the information the City collected through the review and update processes undertaken for the OCP, Zoning Bylaw, Housing Plan and HPAS, we can anticipate and should plan for a greater variety of housing densities and styles in the future.

4. CONCEPT PLAN

4.1 PLANNING GOALS

In 2013, AECOM prepared the Crescent Acres Neighbourhood – Stage V, VI and VII Land Study based on the information contained in the W&A Study, as well as on urban planning and engineering best practices. The overall goal is the same now as it was then, "to guide the development of the balance of the Crescent Acres neighbourhood in an appropriate, orderly and economical manner".

With this goal in mind, and with the lessons learned through the rewrite of the OCP, Zoning Bylaw, Subdivision Bylaw, Housing Plan and HPAS, this plan has been built to provide both predictability and adaptability:

- Predictably: Through this plan, and any future amendments, current and future citizens will be provided the opportunity to learn and see what the future has in store for this neighbourhood; and
- Adaptability: This plan has been designed in such a way that as community grows and needs change, the plan can also grow and adapt in meaningful and purposeful ways.

4.2 CANP CONCEPT PLAN

Unlike other, similar master plans, the CANP contains two land use concept plans, Figure 4 and Figure 4A (Appendix A). The first, Figure 4, is very similar to the original concept plan contained in the Crescent Acres Neighbourhood – Stage V, VI and VII Land Study, and it is based on current, gravity fed, servicing plans and capacity. The second, Figure 4A is a future concept plan that proposes a number of changes to the proposed land use and neighbourhood amenities, which are based on the language contained in the OCP, Zoning Bylaw, Subdivision Bylaw, Housing Plan, and HPAS, as well as community input. Figure 4A is a hypothetical map that shows what Crescent Acres could look like, and in order to implement it, further investigation and amendments to this plan are required.

4.2.1 Concept Plan Core Components

Because gravity fed servicing limitations will largely dictate the layout of the neighbourhood, both land use concept plans share the following core components:

- Buffering: existing residential and institutional development (École Vickers Public School and St. Francis School) will be buffered from new development through the use of green space and similar or complementary development;
- Neighbourhood layout, which includes:
  - the major road network;
  - the location of the central stormwater pond; and
  - the location of the parks and open spaces;
- Right-of-way extension and annexation timing, discussed in Section 4.3; and
- Land Use language.

4.2.2 Land Use Concept Plans

Although the foundation of both land use concept plans is the same, it is the difference in proposed land use that makes them quite different, which is described below:

- Land Use Concept Plan (Figure 4 – Appendix A),
  - Provides, primarily, low density residential development opportunities with a limited variety of lot sizes (single family homes and duplexes);
  - Provides a pocket of medium and high density residential development opportunity south of Olive Diefenbaker Drive (from single family homes to apartments); and
  - Provides three defined park spaces, two that are smaller, more local parks, and a large park space that contains the stormwater pond.
- Land Use Concept Plan (Alternate) (Figure 4A – Appendix A):
  - Provides, primarily, low density residential development opportunities, but with the intention to also provide a greater variety of lot sizes;
  - Provides multiple opportunities for medium and high density residential development;
  - Expands on the amount of park space provided by:
    - Eliminating a parcel of medium density development, a small cul-de-sac and portion of a crescent in order to increase the size of the large park space, creating a city scale (community core), programmable park;
    - Increasing the size of an existing (pocket) park, located between Barton Drive and Coombe Drive;
    - Including a linear park system that runs east to west through the southern portion of the study area to facilitate pedestrian movement; and
  - Includes a Commercial Mixed Use node, located in the southeast corner of the neighbourhood, at the southern end of the CAFGA.

While the allotment of land for the development of future schools is not shown on either concept plan, as development unfolds and through ongoing consultation with both the Saskatchewan Rivers Public School Division and the Prince Albert Catholic School Division, this plan may be consulted and amended as needed in order to anticipate and accommodate new school sites.

Because the alternate land use concept plan requires further investigation prior to implementation, AECOM has provided high level comments regarding what would need to occur in order to consider or make these changes. (Refer to Sections 7 through 11)

4.2.3 Public Engagement Results

As previously noted, the City employed an online survey to introduce the CANP to Prince Albert and to get feedback. Over 350 surveys were completed and from those surveys the following themes emerged:

- Additional information is required:
  - What is the purpose of long-range plans and what do they consider?
  - What does the CANP represent to the City of Prince Albert?
  - When will development start and how long will it take to complete?

- Is there any flexibility in this plan?

- Differing land uses (low, medium and high density residential) need to be located appropriately and scaled to match the City's housing needs.
- Differing lot sizes to be grouped appropriately and developed to match the City's housing needs.
- Residents would prefer to have a large (City scale), open, naturalized and programmable park.
- If a small commercial node is to be developed, it should allow for appropriate uses, restaurants, coffee shops, offices, small scale retail and emergency services.

4.2.4 Implementation Strategy

As the City moves ahead with the CANP there are a number of important questions that will need to be considered over the course of time, the most impactful of which are:

- Which proposed land use changes are going to be implemented?
- When will development happen/how long will it take?

With this plan, the intention is that prior to initiating development, which will generally adhere to the original Land Use Concept Plan, Administration will review the changes proposed on the Alternate Land Use Concept Plan, the comments submitted through the public consultation process, evaluate current housing market conditions and needs, and present the findings to City Council. If this analysis reveals that a change is required, further research and consultation will be undertaken.

Including the Alternate Land Use Concept Plan provides a level of flexibility, as well as predictability that will allow this plan to grow and adapt over time to the changing needs of the City. Long range plans, or area master plans like the CANP, have both a short and long term function. In the short term, the CANP advises City Administration on what needs to take place next and how. This helps to ensure that the proper steps are taken before development occurs and it helps to build municipal budgets. In the long term, it advises the City and future residents on what they can expect for the entire area.

The one answer that may not be clear in these types of planning documents is "when?". When will development start? How long will it take? In answer to this:

- The CANP will take effect (meaning City Administration will formally follow the plan) once it is adopted by City Council;
- Development will start when there is a need for new residential land. However, some elements, like right-of-way, may be built prior to development of residential lots; and
- Based on the size of the undeveloped area, this is a neighborhood plan that could take decades to complete.

4.3 RIGHTS-OF-WAY DEVELOPMENT AND ANNEXATION

4.3.1 Rights-of-Way Development

The CANP shows two distinct development areas, the study area, which is located within the current city limits, and the CAFGA, which is located within the R.M. of P.A. In accordance with the Transportation Master Plan and the CANP, there are a number of existing rights-of-way that are planned to be extended into the CAFGA in order to serve the entire neighbourhood:

- Byars Street,
- Olive Diefenbaker Drive,
- Bradbury Drive, and
- Marquis Road East.

In addition to the existing rights-of-way, a new right-of-way will be built that connects Barton Drive to Marquis Road East and a new collector street, 21st Avenue East, will be built to connect Marquis Road East to Highway 302 East. See Figure 1 (Appendix A).

The timing of the extension of these rights-of-way will be drawn from the Transportation Master Plan. In the short term, for example, Byars Street is proposed to be extended and connect to Highway 302 East in order to alleviate existing traffic congestion in the northern half of Crescent Acres. This right-of-way extension also represents the first of the four right-of-way extensions proposed and will form a critical part of the total future road network. Over the long term, the remaining rights-of-way are proposed to be developed as the corresponding portions of the study area are developed, or if existing traffic demands required their development.

4.3.2 Annexation

As noted above, because these rights-of-way are planned to extend into the CAFGA, annexation will also need to take place. The intention with annexation is to time it with the development of the proposed rights-of-way, bringing the necessary parcels of land into the city as needed.

Ultimately, moving forward with the implementation of the CANP and any necessary annexations is intended to be done openly, transparently and in partnership with the R.M. of Prince Albert.

5. ENVIRONMENTAL REVIEW

5.1 INTRODUCTION

Crescent Acres and the Crescent Acres Future Growth Area (CAFGA) are in the southeast corner of the City of Prince Albert within the broad valley of the North Saskatchewan River in the NW and NE quarter sections of 12-48-26-W2M and in the SE and SW quarter sections of 13-48-26-W2M. As identified in Section 2.2.1, the Crescent Acres study area and the CAFGA areas are zoned in their respective jurisdictions as Parks and Open Spaces, Low, Medium and High Density Residential, and Future Growth. The plans for the existing large wetland located within the center of the Crescent Acres development will be retained as a wet stormwater pond.

Figures and tables of information obtained by searching the Saskatchewan Conservation Data Centre (SKCDC) data and the HabiSask online mapping tool for managed areas, Crown Land, First Nation lands, fisheries, wetlands and biodiversity which includes species of conservation concern (SOCC) and species predictive models are contained within Appendix D. A 1,000 m buffer has been applied to the search in order to capture the potential spatial restrictions of reported species in HabiSask since that is the search radius required to apply for a species detection survey permit from the Saskatchewan Ministry of Environment (SKMoE). Additionally, the desktop method assesses the project area using satellite imagery, topographical maps, legislation, approvals and permits that may be applicable to the development of the subject land.

5.2 DUTY TO CONSULT

When government regulatory agencies contemplate work that may adversely impact Indigenous people, a Duty to Consult (DTC) process is triggered. Early and frequent engagement with representatives of the Métis Nation Saskatchewan (MNS) or First Nations to determine if they have an interest in the Project is the first step in the DTC process. The purpose of the DTC is to make connections, share information, assess level of interest, gather information and identify adverse impacts to legislated Aboriginal Rights to hunt, fish, trap, gather, access and use cultural or spiritual lands and protect water and access to water routes. Following the engagement stage and depending on the level of interest, the DTC is assessed by the Agency tasked with the procedural review after which the Agency may declare that the DTC is mandatory.

The City of Prince Albert is in Treaty No. 6 territory established in 1876. Based on data from HabiSask and the Mining and Petroleum GeoAtlas (Government of Saskatchewan, 2020) within a 20 km radius of the Project, there are eight (8) Indian Reserves three (3) of which are urban reserves and the site is in MNS Western Region 2 and Treaty Land Claim selections as shown in Table 5.1.

Table 5.1: First Nation Reserves and MNS Contacts Within 20 km of Crescent Acres

Name of First Nation	Reserve Name or MNS Governance District	Contact Information
Peter Ballantyne Cree Nation, PADC Management Company Ltd. (Tribal Council)	Chief Joseph Custer Reserve, Kistapinânihk I.R. 231, Chief Philip Morin Indian Reserve No. 232, Kistapinan I.R. 211, and Northern Lights I.R. 220.	Chief Peter Beatty General Delivery Pelican Narrows, Sask. S0P 0E0 Phone: 306.632.2125
Muskoday First Nation, Saskatoon Tribal Council	Muskoday First Nation I.R. 99	Chief Herman Crain PO Box 99, Muskoday, SK S0J 3H0 Phone: 306. 764.1282
Wahpeton Dakota Nation, PADC Management Company Ltd. (Tribal Council)	Wahpeton I.R. 94a and Wahpeton I.R. 94b.	Chief John Waditaka P.O. Box 128 Prince Albert, Sask. S6V 5R4 Phone: 306.764.6649
Métis Nation Saskatchewan	Western Region 2	Sherry McLennan sherrymclennan@mns.work Phone: 306-930-0899

None of the above noted First Nation reserves are adjacent to the development lands. The existing land use conditions make it an unlikely location for hunting, fishing, trapping, collection of traditional use plants or for cultural or spiritual practices to take place. The proposed development plans are unlikely to impact Aboriginal Treaty Rights that would trigger a DTC. However, in the neighbourhood planning process there is an opportunity to consider local Indigenous communities in the plan for this neighbourhood to achieve mutual economic and social goals as identified in the Statements of Provincial Interest Regulations.

5.3 EXISTING ENVIRONMENT

The Crescent Acres Neighborhood Plan is located within the Boreal Plain eco-zone. The Boreal Plain eco-zone climate is described as humid continental at lower elevations and subarctic at higher elevations with short, warm, and moist summers; long, cold, and snowy winters; and low levels of precipitation. The project area lies within the Boreal Transition ecoregion and Prince Albert Plain landscape area consisting mainly of cropland, and is described as a moderately-sloping, hummocky glaciolacustrine area (Acton et al, 1998). According to the Atlas of Saskatchewan (1999), most of the underlying bedrock in the region is of the Lea Park and Milk River formation of the Montana Group from the Upper Cretaceous Period of the Phanerozoic Basin Eon.

The soil in the area is black chernozemic. The agricultural soil capability includes a Class 3 and 6. Class 3 represents soils with moderately severe limitations which restrict the range of crops or require special conservation practices. Class 6 represents soils with extremely severe limitations which are capable of only producing native perennial forage crops. The soil also has a subclass limitation of moisture retention (M) due to insufficient water-holding capacity and (T) of excess slope or other topographic limitation. (University of Saskatchewan, 1999)

Google Earth satellite imagery in 2020 shows that Crescent Acres land use appears to be comprised of human activity disturbance (~40%), water (~30%), a agriculture (~25%), and closed/open canopy hardwoods (~5%). The Crescent Acres Future Growth Area land use appears to be agriculture (~85%), water (~10%) and open/closed canopy hardwoods (~5%).

Surface runoff drains to and is retained by a number of locally isolated wetlands where in high precipitation years the wetlands may become connected or overflow and drain through storm water management systems into the

North Saskatchewan River that flows in a generally northeastwards direction discharging ultimately into the Hudson Bay. According to a Stantec report prepared in 2019, the Project site is located outside the 1:500-year flood zone.

An updated search for groundwater wells was performed on the Saskatchewan Water Security Agency (WSA) data portal in 2020. There are no groundwater wells in the immediate project area. However, there are 24 domestic water use wells drilled as water test hole or withdrawal wells located within 1.6 km of Crescent Acres and the CAFGA. A table summarizing the details of these wells and the complete driller record is available in Appendix C. These wells are located in soils composed primarily of clay and sand with the average well depth of 45' (14m), excluding the four (4) deep test holes. Three (3) static water levels were recorded; the average depth being 25' (8 m). If unregistered wells are encountered during land development, they would need to be decommissioned in accordance with the WSA Well Abandonment procedures.

5.4 PROTECTED SPECIES AND HABITAT SCREENING

On December 3, 2020 a Project Screening Report was obtained from HabiSask for a search conducted within 1,000 m of the site boundaries. The search identified eight (8) known species of conservation concern (SOCC), listed in Table 5.1 and in Appendix D. All but one (1) of the eight known SOCC are plants with a sub national rank of S2 or S3. The Little Brown Myotis bat is a known species within the 1,000 m buffer of the site. It has a designation under *The Species at Risk Act (SARA)* and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as Endangered and has a sub national rank of S4B and S4N. Under *SARA* and/or COSEWIC if the species is classified as Extirpated, Endangered, Threatened, or Special Concern then they are federally classified species at risk and are SOCC. *SARA* is federal legislation that provides legal protection for designated species as recommended by COSEWIC. Other SOCC are rare or vulnerable species with the subnational ranks of S1, S2, SH or SX, those listed provincially in The Wild Species at Risk Regulations and protected by *The Wildlife Act, 1998* or those listed in the Saskatchewan Activity Restriction Guidelines for Sensitive Species (ARGs).

Species detection surveys following the protocols established for the target species are to be conducted under permit from the SKMoE Fish Wildlife and Lands Branch, prior to construction as stated in the Conservation Standards Terms and Conditions for Research Permits on the wild species research permitting webpage. Habitat type and project timing are important elements to consider when deciding what species detection surveys to include as they are required where suitable habitat exists as identified by the NatureServe Explorer website. As well, surveys should consider the spatial and temporal restrictions as identified in the ARGs for SOCC that have the potential to be disturbed by the development activities.

Based on the ARGs, for plant species that are on the SKCDC tracking list with a rank of S1 to S3 but are not listed in *SARA* or the *Wildlife Act, 1998* there is a year-round 30 m restriction from each plant occurrence. Considering the current land use and the historical occurrence of the plants listed in Table 5.2, it is unlikely that they will be present, however, AECOM recommends discussing with the SKMoE Ecological Management Specialist (EMS) if a rare plant survey will be required.

The Crescent Acres Future Growth Area is owned by the City of Prince Albert therefore *SARA* does not apply to these lands except where it concerns migratory bird SOCC and aquatic species at risk. However, the SKCDC tracks the Little Brown Myotis and the ARG for high impact activities applies within 500 m of roosting and foraging sites. AECOM recommends that a discussion with the SKMoE EMS take place to discuss if species detection surveys are required or if timing the clearing and grubbing activities to coincide with the migratory bird periods will suffice to mitigate for potential harm to this species.

The site is within the expected range of Northern Leopard Frog (NLF) and Common Nighthawk, both species listed on Schedule 1 of *SARA* with a designation of Special Concern and Threatened respectively. Although the site is owned by the City and is therefore not on federal or provincial lands and there is no critical habitat or an Order on

the lands, the NLF is a tracked species by the SKCDC and there is a 500 m year round ARG for high impact activities. Similarly, the ARG is 200 m for high impact activities from a breeding Common Nighthawk during the period May 1 to August 31.

For work on or near the wetlands, AECOM recommends having a qualified biologist working under a permit issued by the SKMoE pursuant to *The Wildlife Act, 1998* to assess the site for NLF breeding and overwintering habitat by conducting an amphibian auditory and visual survey from the period approximately late April to early June. If present, then mitigation measures should be proposed that will exclude amphibians, provide for their salvage and relocation through a permit issued from the SKMoE.

Migratory bird species, their nests, eggs and fledglings are protected by the *Migratory Birds Convention Act, 1994*. Typically, the peak nesting period is mid April to mid September for open habitat though forest dwelling birds start as early as mid to late March. Construction clearing and grubbing should occur outside of this period to avoid harming migratory birds and triggering enforcement. AECOM recommends conducting a breeding bird survey to determine the species at the site prior to clearing activities during the breeding season.

Small bodied fish such as Sticklebacks may be present in the wetlands within the site despite there being no direct connection to streams or creeks leading into the North Saskatchewan River. Fish and fish habitat are protected throughout the year under the federal *Fisheries Act*. Draining wetlands or work within 100 m of the wetlands that could cause negative impacts to fish would require approval from the Department of Fisheries and Oceans Canada (DFO). At minimum, a Request for Review (RfR) application should be submitted and the Measures to Protect Fish and Fish Habitat should be applied. A search on the DFO aquatic species at risk mapping application does not show any aquatic species at risk. During construction, if wetlands are drained or reconfigured, a Special Collection Permit may be required to salvage fish.

The HabiSask screening report states that there are none of the following managed areas within the Project buffer area:

- Critical Habitat;
- Emergency Protection Order Lands;
- Conservation Easements;
- Fish and Wildlife Development Fund Land;
- Game Preserves;
- National Wildlife Area;
- Provincial Pasture;
- Recreation Site;
- Reservoir Development Area;
- Wildlife Refuge.
- Important Natural Areas;
- Crown Conservation Easement;
- Ecological Reserves;
- Former Federal Pastures;
- Migratory Bird Sanctuary;
- Provincial Park;
- Ramsar Wetland;
- Representative Area Ecological Reserve;
- Wildlife Habitat Protection Act Land; and

Although not an aspect of this Project, the site is within the Wind Turbine Avoidance Zone due to the proximity of the land to the North and South Saskatchewan Rivers.

The Project is located within the EMS 11 district. AECOM recommends contacting the EMS to determine which, if any, species detection surveys will be required and to discuss proposed mitigation measures to apply before, during and after construction. Otherwise, AECOM recommends having a qualified biologist conduct the surveys as permitted by the SKMoE for rare plants, Little Brown Myotis, amphibian auditory and visual surveys, and breeding birds following the SKMoE protocols and ARGs.

Table 5.2: SARA and SKCDC Species Identified During the Desktop Review

Scientific Name	Common Name	Provincial Rank	COSEWIC Status	*SARA* Status	Saskatchewan Activity Restriction Guideline (ARG) for High Impact Projects	Habitat Preference
Known Species						
Corispermum americanum var. americanum	American Bugseed	S3	Not listed	Not listed	Year-round 30 m from occurrence	Sandy soils along shore, roads and in fields[1]
Ribes oxyacanthoides var. setosum	Bristly Gooseberry	S3	Not listed	Not listed	Year-round 30 m from occurrence	Riparian areas[2]
Erigeron hyssopifolius	Hyssop-leaved Fleabane	S3	Not listed	Not listed	Year-round 30 m from occurrence	Bogs and muskeg with Black Spruce and Tamarack[1]
Leucophysalis grandiflora	Large White-flowered Ground cherry	S3	Not listed	Not listed	Year-round 30 m from occurrence	Sandy soils or disturbed areas in open woodlands[3]
Sisyrinchium mucronatum	Mucronate Blue-eyed-grass	S3	Not listed	Not listed	Year-round 30 m from occurrence	Moist sandy fields, roadsides, meadows[4]
Corispermum pallasii	Pallas' Bugseed	S2	Not listed	Not listed	Year-round 30 m from occurrence	Sand dunes, and sandy/gravelly shores[5]
Cirsium drummondii	Short-stemmed Thistle	S3	Not listed	Not listed	Year-round 30 m from occurrence	Meadows, roadsides and open woods[3]
Myotis lucifugus	Little Brown Myotis	S4B, S4N	Endangered	Endangered	Year-round 500 m from roost/foraging site	Wide ranging habitat from Shrub, forest, grasslands, buildings[5]

1 USask Virtual Herbarium, 2 FEIS, 3 Sask Wildflowers, 4 Minnesota Wildflowers, 5 NatureServe Explorer

Notes: S1 – S3 are rare and more vulnerable to extirpation, S4-S5 are more common and less vulnerable. Modifiers: for migratory species B refers to breeding population, M refers to transient population and N refers to non-breeding population and X refers to extinction of the breeding population. COSEWIC means Committee on Status of Endangered Wildlife Species in Canada, SARA means Species at Risk Act. Pre-construction surveys for species ranked as S1 and S2 are required during seasonally appropriate time periods and within spatial setbacks for the species as identified in the provincial Activity Restriction Guidelines (ARGs). Breeding birds are those that show territorial behaviour, breeding and nesting behaviour, the presence of nest.

5.5 HERITAGE RESOURCES

A heritage resource review determines if there is a need for, and the scope of, a Heritage Resource Impact Assessment (HRIA) pursuant to Section 63 of *The Heritage Property Act* administered by the Ministry of Parks, Culture and Sport (PCS) through the Heritage Conservation Branch (HCB). Heritage Resource Impact Assessments are conducted by a qualified archaeologist working under an approved investigation permit issued by the Department. Completing the requirements of a HRIA is the proponent's responsibility.

For any proposed land use or development project, the primary factors for determining whether a HRIA is required are:

- The presence of previously recorded heritage sites.
- The heritage resource potential (or sensitivity) of the development area.

Important secondary factors include:

- The nature and extent of previous land disturbances (including cultivation).
- The nature and scope of new land alteration.

All criteria for identifying archaeologically sensitive lands are observable on 1:50,000 scale NTS series maps. Archaeologically sensitive lands include those located:

- Within the same quarter-section (or within 500 m of) a Site of a Special Nature, or other previously recorded site.
- Within 1 km of permanent rivers/streams.
- Within 1 km of well-formed valleys (defined by three or more contour intervals) containing permanent and/or seasonal watercourses.
- Within 1 km of permanent/seasonal water bodies greater than 2 km in length/width.
- Within 1 km of smaller water bodies that are located in well-defined drainage basins.
- On hummocky terrain (defined by three (3) or more contour intervals and four (4) or more wetlands per quarter-section)
- Within (or on the periphery of) sand dune complexes
- On escarpments (defined by two (2) or more contour intervals within 200 m), prominent uplands, and hills/ridges (including eskers). This often translates to looking for rolling to hilly native prairie.

The Crescent Acres Neighborhood Plan was screened using the Ministry of Tourism, Parks, Culture and Sport (TPCS) Heritage Resources Branch (HRB) developers on-line screening tool in 2011 where it was determined that further assessment by the HRB was required. After submitting a letter requesting a Heritage Resource Review to the HRB on August 22, 2011, a reply was received on September 6, 2011 (Appendix E). The Heritage Resource Review revealed that there are no recorded heritage sites located in conflict with the proposed project. The project is mostly located in areas that have been disturbed previously by cultivation or development, so the potential for heritage sites to be adversely affected by this project is low. Their office has no concerns with the project proceeding as planned, however, if during construction heritage property or human remains are discovered then the work should be halted until further direction from the HCB.

5.6 REGULATORY REQUIREMENTS

5.6.1 The Planning and Development Act, 2007 and The Statements of Provincial Interest Regulations

The Planning and Development Act, 2007 (the *Act*) and Regulations identify interests that guide provincial and municipal planning decisions for land use and development following planning principles that are comprehensive and sustainable, responsive, sensitive, respectful, balanced, efficient and effective to meet the objectives that consider culture, social well being, the economy and the environment. The Statements of Provincial Interest Regulations relevant to the planning and development of the Crescent Acres neighbourhood are Biodiversity and

Natural Ecosystems, First Nations and Métis Engagement, Heritage and Culture, Shore Lands and Water Bodies, Public Safety, Public Works, Residential Development, Sand and Gravel, and Transportation. Supporting the *Act* and Regulations is The City of Prince Albert Official Community Plan Bylaw No. 21 of 2015 with a policy framework that City departments will consider when planning for the future of the new neighbourhood.

5.6.2 *The Environmental Management and Protection Act, 2010 (EMPA)*

The Environmental Management and Protection Act, 2010 (*EMPA*) is legislation enacted to protect the environment, air, water, land, organic and inorganic material and beings, and the interactions of natural and ecological systems. As it applies to this Project, *EMPA* sets out prohibitions on discharges, duties for reporting environmental impacts, remediation or corrective action, water protection, water and waste management.

Under *EMPA*, an Aquatic Habitat Protection Permit is required prior to construction to authorize the work at or within 5 m from the top of bank (boundary of riparian area) of a shared waterbody or wetland, one that is not entirely contained within the land ownership parcel. In order to receive approval, the permit application should be submitted to the Water Security Agency at least three (3) months before clearing and grubbing is anticipated to begin.

5.6.2.1 The Wildlife Act, 1998 / The Wild Species At Risk Regulations and Wildlife Regulations 1981

The Wildlife Act (the *Act*) administered by the SKMoE serves to provide for the management, conservation and protection of all Saskatchewan wildlife resources including Species at Risk and to establish ARGs for SOCC. Under Section 21 of *The Wildlife Act* a license (permit) is required to conduct species detection surveys for baseline data and habitat assessments by a SKMoE approved qualified person.

There is an anticipated 4-week review timeline once the application to conduct species detection surveys has been submitted, however, the survey work can begin right away. To prepare for an amphibian and/or fish salvage, there is an approximate one (1) week review period before a permit is issued and work is only allowed to begin once the permit has been issued.

5.6.2.2 Environmental Assessment Act

The E*nvironmental Assessment Act (EAA)* administered by the EA&S is legislation designed to ensure that development, if approved, proceeds with environmental protection and is accepted by the public through their participation in the process if the Project is deemed a “development”. The *EAA* has the potential to be triggered by six (6) criteria listed under Section 2.d summarized below as:

- Have an effect on a unique, rare or endangered feature of the environment;
- Substantial use of a provincial resource;
- Emit unregulated pollutants, by-products, residual or other wastes;
- Cause widespread public concern about potential environmental changes;
- Involve new technology that uses resources and may create significant environmental change; and
- Have a significant impact on the environment or requires further development that is likely to have a significant impact on the environment.

A quick review was conducted to determine if there is a match with any of the criteria listed in Section 2.d to decide if the Project needs to be submitted for review by the SKMoE EA&S as a potential “development”. There may be a trigger to the *Act* by SOCC such as NLF, migratory birds that are designated in *SARA* or species that are listed in the ARGs and reported in HabiSask (Table 5.2). Although it appears from satellite imagery that a significant portion

of the site has been previously disturbed by human activity, there may still be suitable habitat present for SOCC. As recommended in Section 5.4, the SKMoE EMS should be contacted at least one (1) year prior to construction to determine which, if any, surveys should be conducted. When surveys are undertaken, and if SOCC are present, then a Technical Proposal should be prepared and submitted to the EA&S for their determination whether the Project is a development that would require additional study or whether the City can proceed to obtain other permits and approvals.

The provincial and federal governments have agreed to meet the objective of "one project, one assessment" for a streamlined, cooperative review of environmental impact assessments. AECOM recommends that discussions occur first with the EMS, then the EA&S Branch before developing an Initial Project Description for submission to the IAAC should *SARA* designated SOCC or migratory birds be impacted.

5.6.3 *Species at Risk (SARA)*

The *Species at Risk Act (SARA*) administered by Environment and Climate Change Canada (EC) was discussed briefly in Section 5.4 as it relates to managing species of concern to prevent them from becoming endangered or threatened and to manage those species of special concern. The *Act* supports the protection and stewardship of at-risk species and their critical habitat on federal lands as well as listed migratory birds and aquatic species, or where an Order has been placed on non-federal lands. Permits are required for activities that affect species listed in Schedule 1 as extirpated, endangered or threatened and for contraventions to the general and critical habitat prohibitions.

5.6.4 *Migratory Birds Convention Act, 1994*

Migratory bird species, their nests and eggs are protected by the *Migratory Birds Convention Act*, 1994 administered by EC applies throughout Canada on Crown and non-Crown lands. Typically, the peak nesting period is mid-April to mid-September and construction activities should occur outside of this period.

5.6.5 *Fisheries Act*

For projects near water, The *Fisheries Act,* administered by DFO, updated in 2019 to restore protection to all fish and fish habitat, in addition to other revisions, will apply. Measures to protect fish and fish habitat, standards and codes of practice may apply to the Project work. If the Measures, standards and codes cannot be fully implemented, then the Project should be submitted to DFO for their review through the RfR application process to receive a Letter of Advice (LoA). If upon review of the RfR DFO determines that the Project will cause the death of fish and / or the harmful alteration, disruption or destruction of fish habitat, then an Application for Authorization must be submitted before work proceeds. The anticipated RfR timelines once the application is submitted is approximately 3-6 months.

5.7 CONCLUSION AND RECOMMENDATIONS

The following is a summary of the findings and recommendations prior to and during development of the Crescent Acres Neighborhood Plan as it pertains to Duty to Consult, existing environmental conditions, heritage, community planning and environmental legislation.

It is unlikely that a DTC is triggered by the development of Crescent Acres or the Crescent Acres Future Growth Area. There is, however, an opportunity to consider local Indigenous communities in the development of new neighbourhoods so that mutual economic and social goals as stated in the Statements of Provincial Interest Regulations can be achieved.

There are 24 registered domestic use water wells or water test holes within 1.6 km of the Project but no registered water wells on the site. If unregistered wells are encountered during land development, they would need to be decommissioned in accordance with the WSA Well Abandonment procedures.

Within 1,000 m of the Project boundaries there are known and expected SOCC comprised of plant, amphibian, mammal, and bird species. AECOM recommends contacting the EMS to determine which, if any, species detection surveys will be required and to discuss mitigation measures to apply before, during and after construction. Otherwise, AECOM recommends having a qualified biologist conduct the surveys under permit by the SKMoE for rare plants, Little Brown Myotis, amphibian auditory and visual surveys, and breeding birds following the SKMoE protocols and ARGs. An Amphibian Salvage Checklist application should be submitted if amphibians are present and after having conducted amphibian surveys.

Clearing and grubbing should take place outside of the migratory bird nesting period which is generally mid-April to mid-September for this location.

Fish and fish habitat are protected throughout the year. If the wetlands will be drained or impacted by work within a 100 m of the riparian zone, then a RfR should be submitted to DFO. There are no identified aquatic species at risk in the Project area. A Special Collection Permit to salvage fish may be required if the wetlands are altered.

The Heritage Conservation Branch (HCB) formerly the Heritage Resource Branch (HRB) conducted a Heritage Potential Screening on the proposed project location in 2011 and had no concerns with the Project proceeding as planned and does not require any further screening. However, if during construction heritage property or human remains are discovered then the work should be halted until further direction from the HCB.

An Aquatic Habitat Protection Permit is required prior to construction to authorize the work at or within 5 m from the top of bank (boundary of riparian area) of a shared waterbody or wetland, one that is not entirely contained within the land ownership parcel.

When species detection surveys are undertaken and SOCC are present, then a Technical Proposal should be prepared and submitted to the EA&S for their determination whether the Project is a development that would require additional study or whether the City can proceed to obtain other permits and approvals.

6. TRANSPORTATION PLANNING

6.1 CITY WIDE TRANSPORTATION NETWORK

The City of Prince Albert's transportation network contains 10.5 km of collector roads, 30.5 km of arterial roads and 54.3 km of highways. The neighbourhoods on the north side of the North Saskatchewan River are separated by the Diefenbaker Bridge, which also connects the City to the province's northern communities. The bridge has annual average daily traffic of approximately 26,000 vehicles per day (2017 traffic counts). The City's residents have access to many modes of urban transportation. The Statistics Canada reports that 83.3% of all commuters use a private automobile, 6% use a private automobile as a passenger, and only 1.8% of commuters within Prince Albert use public transit to get to work. It also reported that the average commuting time to work in Prince Albert was 16.0 minutes, compared to the provincial average of 18.5 minutes.

The 2017 issue of the Transportation Master Plan (AllNorth) analysed the impact the development of Crescent Acres will have on the City's existing transportation network. This was done by completing traffic volume forecasting, trip distribution generation and traffic analysis. The analysis examined the 5-year planning horizon (2021), the 10-year planning horizon (2026) and the 20-year planning horizon (2036). It was carried out with the assumption of a medium growth rate scenario (0.8% average annual growth) and that the West Hill and Crescent Acres development phases will occur concurrently. As a result, the traffic impact assessment of the future transportation network did not examine beyond the development of Crescent Acres Neighborhood Plan area (Crescent Acres Future Growth Area).

6.2 CRESCENT ACRES TRANSPORTATION NETWORK

The long-term network is compatible with the designations of the 2017 issue of the City of Prince Albert's Transportation Master Plan.

The roadways within the CANP are currently classified as local roadways. However, the report has recommended that the following classification changes within the Crescent Acres neighborhood:

Table 6.1: Roadway Classification Changes

Location	Current	Proposed Classification
Olive Diefenbaker Dr (15th Ave E to 21st Ave E)	Local	Collector
Muzzy Dr (15th Ave E to Olive Diefenbaker Dr)	Local	Collector
21st Ave E (Bradbury Dr E to Hwy 302)	n/a	Collector

The Crescent Acres Future Growth Area (CAFGA) is located beyond the study period, however the report has indicated that Olive Diefenbaker Drive (21st Ave E to Sunshine Rd) be classified "collector". The Marquis Road Extension/Sunshine Road is to be classified "arterial".

6.3 RECOMMENDED IMPROVEMENTS

As identified in the Transportation Master Plan, in order to accommodate the additional traffic from the development of Crescent Acres, a list of improvements have been recommended. The improvements have been prioritized based on the short-term, medium-term, and long-term needs. See below:

Table 6.2: Transportation Network Improvements

Location	Planning Horizon	Improvement
15th Ave E (b/w Muzzy Dr & 15th St E) Roadway currently at LoS D	5 year 10 year 20 year	No changes required No changes required Upgrade roadway to 4 lanes due to reduced capacity
15th Ave E & 15th St E (intersection) Signal light currently at LoS C	5 year 10 year 20 year	Change signal cycle to 110 sec from 120 sec No changes required No changes required
15th Ave E & Muzzy Dr (signal light) Signal light currently at LoS F	5 year 10 year 20 year	Change signal cycle to 70 sec. Split 47 sec N-S, 23 sec E-W No changes required Upgrade intersection to include turning lanes
15th Ave E & 22nd St E (EB/WB Stop) Intersection currently at LoS D	5 year 10 year 20 year	Change 2-way stop control to signal light No changes required No changes required
15th Ave E & 28th St E/Olive Diefenbaker Dr (intersection) Intersection currently at Los B	5 year 10 year 20 year	No changes required No changes required Upgrade intersection to include turning lanes
21st Ave E & Hwy 302 (intersection)	5 year	Construct 4 legged intersection
21st Ave E (b/w Hwy 302 & Byars St)	5 year	Construct 2 lane roadway for additional access into CANP
21st Ave E (b/w Hwy 302 & Marquis Rd ext)		Extension required prior to Marquis Road extension construction
Marquis Road Extension (Sunshine Road)	20+ year	Beyond study period

The report indicated that If all immediate 5 year recommendations are implemented, this would result in a decade where no major upgrades are required.

7. SANITARY SEWER COLLECTION

The original concept plan has been updated in 2020 to reflect the changing needs of the City. Since the conceptual layout has not changed significantly from the 2013 plan, the changes required for the sanitary sewer collection system will have minimal impact on the current sanitary demands. However, because the land use densities have been modified, further investigation is required to ascertain pipe sizes and grades in the study area, and capacity in the existing downstream infrastructure.

Sanitary sewer modelling information has been completed for the original concept plan, and is presented below:

The development of the sanitary collection system for the future Crescent Acres Neighbourhood was completed in three steps. First, the existing downstream sanitary collection system was investigated to identify any system restrictions. Second, the sanitary collection system in the future Crescent Acres neighbourhood was designed to determine pipe sizes and inverts. Lastly, the future sanitary collection system was connected to the existing sanitary system. The impact of conveying this additional flow to the existing sanitary system was assessed and required upgrades to the existing system are proposed.

7.1 EXISTING SANITARY COLLECTION SYSTEM

7.1.1 System Overview

The existing downstream system encompasses approximately 290 ha and covers Districts 30, 43, 44, 47, 48, 49, 54, 55, 56, 57 and 61. The existing system benefits from a gradual drop in elevation to the northeast, and the entire system is drained by gravity. The collection area, with exception of District 30, is predominately single-family residential, with multi-family residential, commercial, schools, and churches interspersed throughout. District 30 is composed entirely of commercial and industrial land-uses.

The main sanitary trunk begins as 375 mm diameter at the intersection of 40th Street East and 4th Avenue East. Through the industrial area south of Marquis Road, the trunk runs east along 40th Street East, north along 5th Avenue East, and east along Marquis Road. Approximately 330 m east of 6th Avenue East, the trunk heads north and east through Prime Minister's Park and the north leg of Grey Owl Crescent. At Dunn Drive, the trunk increases in size to 450 mm diameter and follows northeast along the drainage ditch easement. At the intersection of Olive Diefenbaker Drive and 15th Avenue East, the trunk increases to 525 mm diameter and heads north along 15th Avenue East and connects to the 1200 mm diameter interceptor sewer approximately 150 m south of 7th Street East. The interceptor sewer collects sewage from the entire city and conveys it directly to the wastewater treatment plant. The existing sanitary sewer system was modeled to the point where it connects to the interceptor sewer.

The existing sanitary sewer contains approximately 34.8 km of piping and 450 manholes. The pipes within the system are comprised of the following sizes (diameter): 200 mm (27,329 m), 250 mm (1426 m), 300 mm (207 m), 375 mm (3007 m), 450 mm (1012 m), and 525 mm (1780 m). The pipe and manhole data were gathered from record drawings supplied by the City. For clay tile, concrete, and asbestos cement pipe, a mannings roughness of 0.013 was assumed. For PVC pipe, a mannings roughness of 0.011 was used.

Refer to Figure Drawing 6 (Appendix A) for a graphical illustration of the area of the existing sanitary sewer system that was investigated for this study.

7.1.2 Dry Weather Model Setup (XPSWMM)

The existing and new sanitary collection systems were modeled in XPSWMM. A sanitary sewer model consists of two components: the Dry Weather Flow (DWF) and the Wet Weather Flow (WWF). The DWF is made up of groundwater infiltration and domestic sewage flows. The groundwater infiltration is a relatively constant flow, varying on a seasonal basis. The domestic sewage flow follows a regular and repetitive pattern throughout a 24 hour period, with a maximum peak occurring at 7:30 am, a second smaller peak at 5:30 pm, and a minimum flow at 3:30 am.

The sanitary collection areas draining to each section of pipe were delineated and transferred to the upstream manhole. The composition of the individual collection areas, which included single family homes, multi-family units, commercial and industrial businesses, schools, and other contributors were determined from aerial imagery and Google Street View. The Average DWF was calculated for each individual collection area based on City of Saskatoon and City of Edmonton design standards for different land-uses. The design Average DWF was then calibrated based on actual flow monitoring data collected by AECOM at other nearby municipalities. The Average DWF draining from the existing system in the 525 mm diameter trunk at its connection to the 1200 mm diameter interceptor sewer is approximately 19.2 L/s.

The Average DWF was then multiplied by a diurnal pattern to provide the regular variation in flows throughout the day. The diurnal pattern (shown below in Table 7.1) was developed from past modeling work and takes into account the overall timing of flows from different contributors that would individually have a wide disparity in timing of peak flows (for instance, single family homes, schools, and industrial contributors).

The peak DWF draining from the existing system is 65 L/s.

Table 7.1: Sanitary Flow - Diurnal Pattern

Time	Relative Flow	Time	Relative Flow
12 am	0.54	12 pm	1.26
1 am	0.50	1 pm	1.20
2 am	0.36	2 pm	1.18
3 am	0.34	3 pm	1.15
4 am	0.40	4 pm	1.20
5 am	0.55	5 pm	1.40
6 am	1.00	6 pm	1.22
7 am	1.60	7 pm	1.19
8 am	1.32	8 pm	1.16
9 am	1.30	9 pm	1.06
10 am	1.29	10 pm	0.80
11 am	1.28	11 pm	0.70

7.1.3 Wet Weather Model Setup (XPSWMM)

Once the DWF component was loaded into the model, the WWF parameters were developed. The WWF is inflow and infiltration to the sanitary sewer during a rainfall event, and is nearly always the cause for the sanitary sewer being overwhelmed and basement flooding. The WWF parameters were developed based on AECOM's past experience (using actual flow monitoring data collected in existing sanitary sewer collection systems) in other nearby municipalities.

The WWF component was added to the XPSWMM model using the unit hydrograph method. The rainfall-derived inflow to the sanitary sewer system is illustrated with three unit hydrographs, each representing the fast, medium, and slow response of the inflow to the system. The fast response may indicate direct inflows to the system through low-lying manhole lids and direct drainage connections. The medium response may be composed of slower flows to the system, such as weeping tile flows. Finally, the slow response may be representative of longer-lasting inflows such as increased infiltration (above the relatively constant groundwater inflow) into the system through the pipe and manhole joints. The slow-response hydrograph is not typically a critical flow for the sanitary collection system and was not used in the model.

The unit hydrographs are drawn based on the parameters R, T, and K. The R value represents the proportion of rainfall that enters the sanitary sewer, T is the time of the peak in the hydrograph, and K describes the recession limb of the hydrograph. The R value is converted into a flow rate by multiplying the proportion of the rainfall intensity by the collection area of the given node. The sum of the three hydrographs then produces the total inflow and infiltration (I/I) hydrograph to the sanitary sewer. The R, T, K parameters used in the model are shown in Table 7.2. Note that the model estimates 4% of the total rainfall volume enters the sanitary collection system.

Table 7.2: Wet Weather Flow: RTK Parameters

Parameter	Fast	Medium	Slow
R	2%	2%	0%
T	0.5 hr	2.0 hr	0.0 hr
K	3	2	0

The 10 year storm is generally accepted as being a reasonable level of service that should be achieved for a sanitary system. A shorter-duration storm tends to be critical when assessing conveyance, while a longer-duration storm may be more critical for assessing storage (such as for pump stations). The existing system consists of only conveyance (gravity sewer only), so the 10 year 1 hour design storm was selected for the model simulations. As a conservative approach, the model simulation was set up so that the peak WWF during the design storm occurred at the same time as the peak DWF at 7:00 am.

A sanitary collection system is typically considered to be overwhelmed when basement flooding occurs, which happens when the Hydraulic Grade Line (HGL) rises to less than 2.4 m below the ground surface (assuming basement depths are 2.4 m).

The model showed that there were only localized areas where basement flooding may occur, mostly located east of 15th Avenue and between 22nd Street East and 28th Street East (see Appendix A – Figure 6). The model shows that basement flooding may occur in some of the upstream manholes of the system, where the sewer is at its shallowest depth. The sewers in these locations are less than 2.4 m deep. Considering that the basements would be above this level in order for the service connections to drain to the sewer, the basements in these areas should not experience flooding. The performance of the existing system is considered to be acceptable and meets the 10 year level of service.

The theoretical peak WWF from the existing system is 396 L/s. The WWF input parameters, which include both the RTK values and design storms, are theoretical in nature. In order to accurately assess the WWF component, flow monitoring data, coupled with tipping bucket rain gauge data that captures a number of wet weather events is required. With this information, the model may be calibrated specifically for the local sanitary collection system.

7.2 CRESCENT ACRES NEIGHBOURHOOD – SANITARY SEWER SERVICING

The sanitary collection system for the future Crescent Acres neighbourhood was designed after preliminary surface grading design elevations had been established. Sanitary flow from the neighbourhood will be split to possibly connect to the existing system at two locations: (1) at the east end of Bradbury Drive (at Barton Drive), and (2) at the intersection of Olive Diefenbaker Drive and Lamb's Lane. The future Crescent Acres sanitary system will also connect to the existing system at the east end of Coombe Drive and at the intersection of Olive Diefenbaker Drive and Muzzy Drive. There will be a high point in the sewer at these two locations. There should not be flow across these connections under normal conditions but will provide an overflow if the existing sewer in these locations happen to become overwhelmed.

The Average Dry Weather Flow for the future neighbourhood was determined using City of Edmonton Design standards. For single family and multi-family residential land uses, a population density of 98 p/ha and 488 p/ha was assumed. The average per capita flow was 300 lpcd. The commercial flow was assumed to be 68 m^3/ha/day. The diurnal pattern presented in the previous section was used for the future neighbourhood model. The WWF parameters used in the existing collection system simulations were applied to the new collection system model.

The sanitary sewer piping within the Crescent Acres neighbourhood will be 200 mm diameter, increasing to 250 mm diameter as required because of capacity and/or available pipe slope. There will be two main 300 mm diameter trunks; one along the extension of Bradbury Drive and servicing the north portion of the neighbourhood. All new piping was assumed to be PVC and was assigned a Mannings roughness of 0.011. A summary of the flow at each of the four connection points is provided below.

Refer to Figure Drawing 7 (Appendix A) for the proposed Sanitary Sewer Servicing Design.

Table 7.3: Sanitary Sewer Design Summary

	East End of Bradbury Drive	Olive Diefenbaker Drive/ Lamb's Lane
Pipe Size	300 mm	300 mm
Collection Area	31.13 ha	22.39 ha
Average DWF	8.50 L/s	10.74 L/s
Peak DWF	13.49 L/s	16.95 L/s
Peak WWF	55.02 L/s	48.10 L/s

7.3 EXISTING DOWNSTREAM SYSTEM – PROPOSED UPGRADES

The loading from the future Crescent Acres neighbourhood was brought into the existing system model. With the additional loading at the connection point at the east end of Bradbury Drive, the downstream 375 mm pipe is surcharged from the intersection of Bradbury Drive and Gisi Road to the intersection of 15th Avenue East and Olive Diefenbaker Drive. There would be possible basement flooding along Bradbury Drive between Olive Diefenbaker Drive and Gisi Road, and along Gisi Road between Bradbury Drive and Eagle Crescent. In this location, the minimum depth of the HGL is 2.27 m.

The additional loading at the connection point at the intersection of Olive Diefenbaker Drive and Lamb's Lane causes widespread basement flooding in the downstream sewer, which extends into a portion of its upstream reaches.

There is a small amount of surcharge in the 525 mm diameter trunk sewer along 15th Avenue. The minimum depth of the HGL along this stretch is 2.71 m, which occurs at a local low point at the intersection of 15th Avenue East and

22nd Street East. At the manholes immediately north and south of this location, the depth of the HGL is 3.71 m and 3.41 m, respectively. The trunk sewer through this area is deep, and the surcharge should be of no consequence. The HGL in the 525 mm diameter trunk sewer for the present flow and with the full Crescent Acres flow is shown in Figure 7.1.

It would not be acceptable to introduce the additional loading at the east end of Bradbury Drive or the intersection of Olive Diefenbaker Drive and Lambs Lane without upgrading the downstream sewer. An initial concept for upgrading the downstream sewer included replacing the existing sanitary sewer along Olive Diefenbaker Drive between Lambs Lane and Barton Drive with a new 375 mm diameter sewer (approximately 300 m). It is noted that construction would occur along an extensive stretch of a main roadway, adjacent to two schools.

Following further consideration and discussion with the City, an alternative route for the new sanitary sewer was developed. Rather than connecting the 300 mm diameter sewer to the existing sewer at the east end of Barton Drive, the sewer will be constructed through the park behind the residential lots. It will join with the new 300 mm diameter sewer from the north and continue west as a 450 mm diameter sewer where it would cross Olive Diefenbaker Drive. This option adds an extra length of 220 m, but the length of sewer replacement along Olive Diefenbaker Drive is reduced to 30 m.

From Olive Diefenbaker Drive, the new 450 mm diameter sewer would continue northwest in the open space between Pereveroff Place and Lambs Lane, through the park area, along Attree Bay, and connect to the existing 525 mm diameter sewer at 15th Avenue East (a length of approximately 754 m). The new sewer will replace the existing 200 mm diameter sewer within the park and along Attree Bay between Pereveroff Place and 15th Avenue East. Figure 7.2 shows the HGL in the existing 200 mm diameter sanitary sewer and proposed 450 mm diameter sanitary sewer replacement between Olive Diefenbaker Drive and 15th Avenue East.

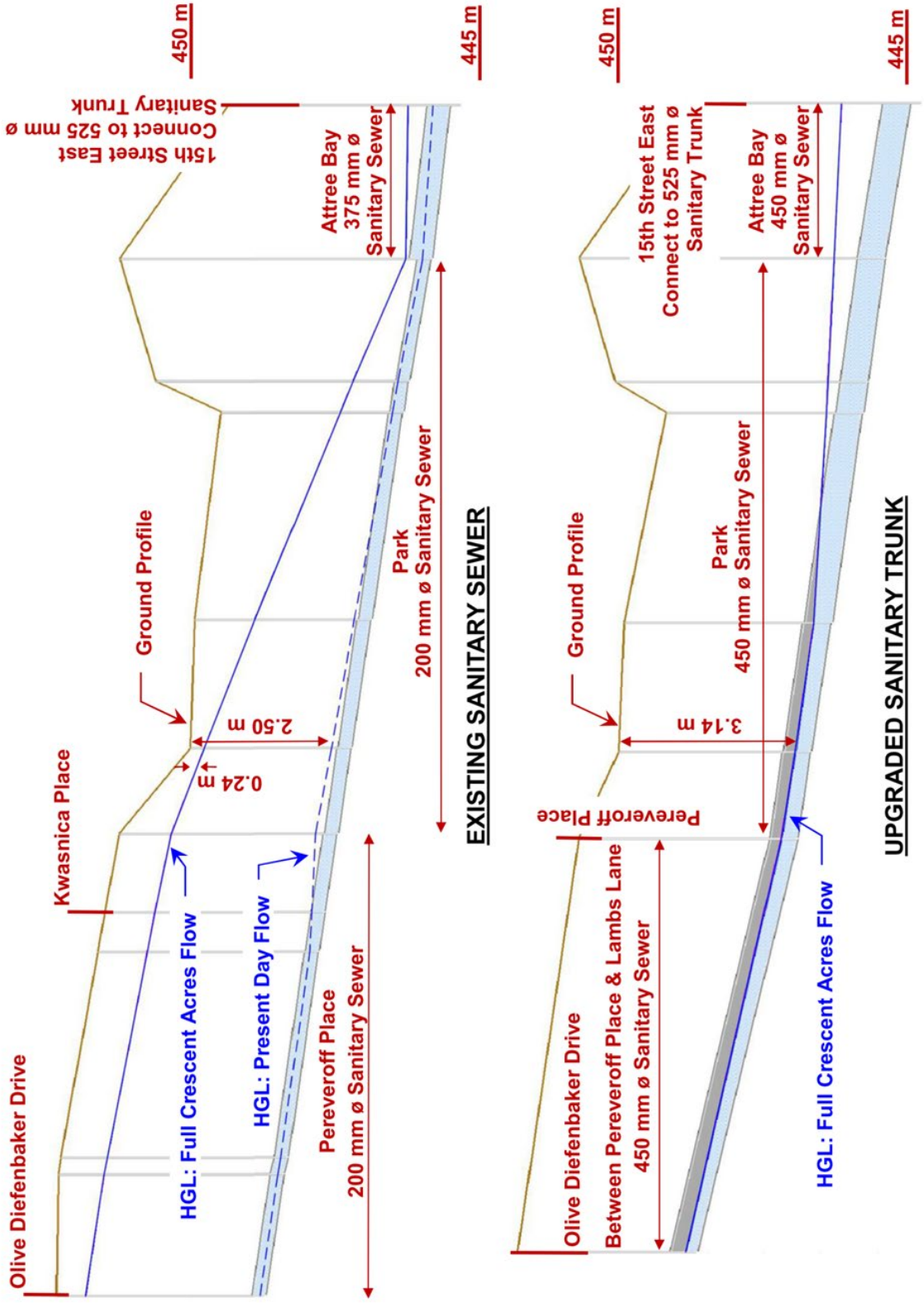

Figure 7.1: 15th Avenue East Sanitary Trunk (525 mm ø) from 28th Street East to 7th Street East Present Flow, Full Crescent Acres Flow, and South Marquis Industrial Stage 1 Flow 10 Year 1 Hour Storm HGL

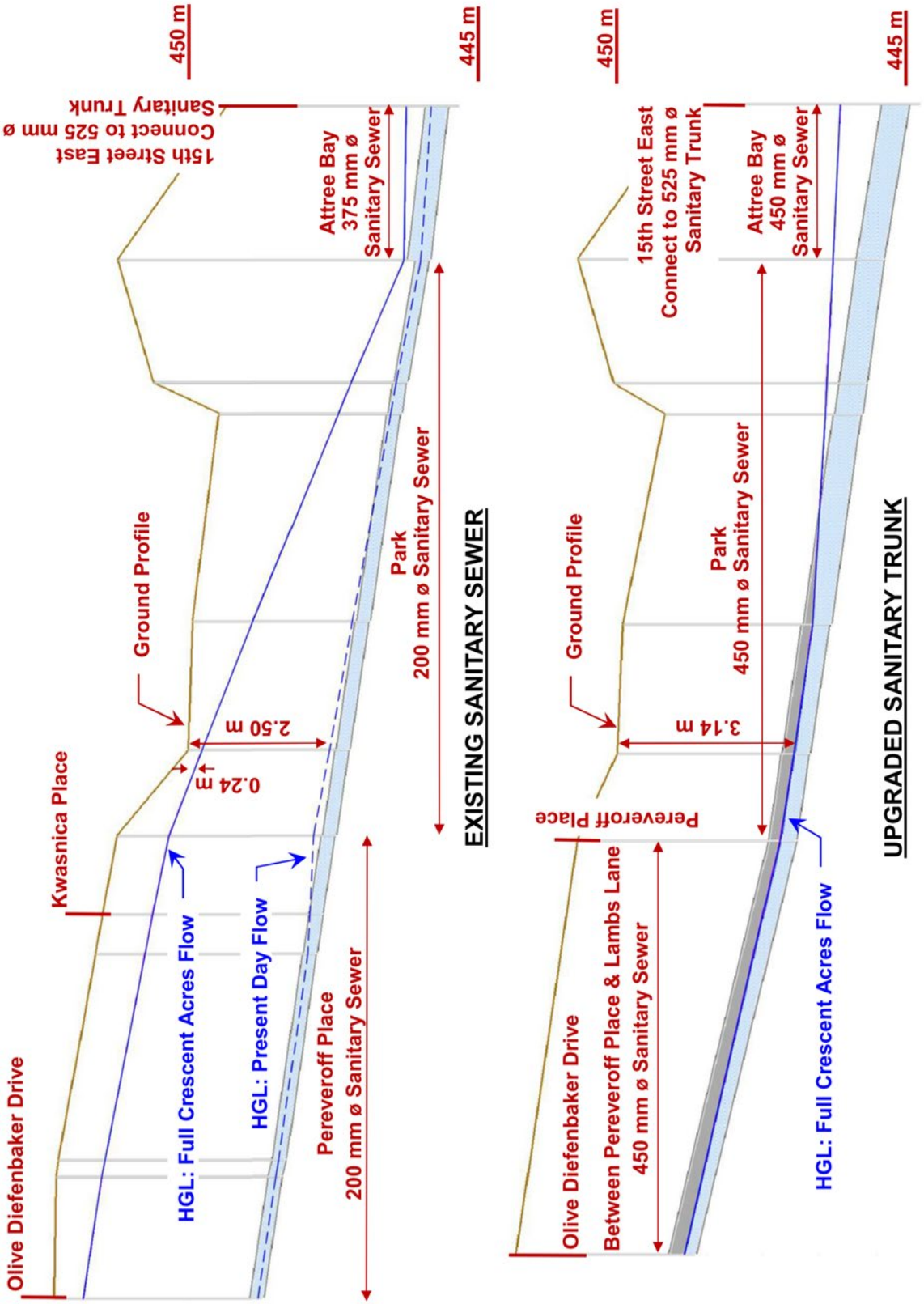

Figure 7.2: Sanitary Sewer from Olive Diefenbaker Drive to 15th Street East
10 Year 1 Hour Storm HGL

8. WATER DISTRIBUTION

The original concept plan has been updated in 2020 to reflect the changing needs of the City. Since the conceptual layout has not changed significantly from the 2013 plan, the changes required for the water distribution system will have minimal impact on the current water demands. However, because the land use densities have been modified, further investigation is required to ascertain capacities and fire flow in the study area. Impact on the City's water storage has not been assessed.

Water distribution modelling information has been completed for the original concept plan, and is presented below:

The Crescent Acres Neighbourhood water distribution system will consist of a primary water main loop and local water distribution system. The primary water main will connect to the existing City system, supply the overall neighbourhood, and will be looped to provide redundancy. The local water distribution system provides water service to the minor streets within the neighbourhood and will also be looped to provide redundancy.

The Crescent Acres water distribution system was modeled in WaterCAD to determine pipe sizes to meet the water demands and fireflow requirements. There are five locations where the Crescent Acres water distribution system would connect to the existing City system:

1. A 300 mm water main at the east end of Coombe Drive
2. A 250 mm water main at 1652 Barton Drive
3. A 300 mm water main at the intersection of Barton Drive and Bradbury Drive
4. A 250 mm water main at the intersection of Olive Diefenbaker Drive and Muzzy Drive
5. A 250 mm water main at Olive Diefenbaker Drive and the Pedersen multi-site
6. A 250 mm water main at Byars Street

The City provided hydrant test data (pressure and flow) at four locations where the new piping will connect to the existing system. The four connection points were configured in the WaterCAD model as a pump that operated based on the test data provided (shown below). Hydrant test data was not provided for the connection at the Pedersen multi-site. This is deemed to not have a significant effect on the analysis.

Table 8.1: Hydrant Test Data

91 Coombe Drive		1652 Barton Drive		Barton Drive/ Bradbury Drive		Olive Diefenbaker Drive/Muzzy Drive	
300 mm Water Main		250 mm Water Main		300 mm Water Main		250 mm Water Main	
Flow (L/s)	Pressure (psi)	Flow (L/s)	Pressure (psi)	Flow (L/s)	Pressure (psi)	Flow (L/s)	Pressure (psi)
0	60	0	67	0	71	0	71
53	50	23	65	38	64	53	62
83	40	38	62	53	58	68	56
99	33	53	57	68	53	83	50
114	24	68	53	83	45	99	43
129	14	83	46	99	35	114	34
136	10	99	37	114	23	129	24
		114	28	129	10	136	17
		129	18	136	4		
		136	13				

The existing 300 mm diameter primary water main loop was extended through the Crescent Acres neighbourhood with connections at Coombe Drive, the east end of Bradbury Drive, and the south end of Muzzy Drive. The local water distribution system was designed as 150 mm diameter pipe through single-family residential areas and 200 mm diameter pipe through multi-family residential and commercial areas. The Hazen-Williams friction factor of 140 was assumed for all piping. The Crescent Acres water distribution system is shown in Figure Drawing 8 (Appendix A).

There are two demand scenarios which the water infrastructure should be capable of sustaining:

- Scenario 1 – Peak Hour Demand (PHD) while maintaining a residual pressure of 40 psi in the system; and
- Scenario 2 – Maximum Day Demand (MDD) plus Fire Flow (FF) while maintaining a residual pressure of 20 psi in the system.

The MDD and PHD for the water distribution were determined based on net area for the different land-uses, as shown below. The total MDD and PHD for the Crescent Acres neighbourhood is 40 L/s and 69 L/s, respectively.

Table 8.2: Water System Design Criteria

	MDD	PHD	FF
Single Family	0.695 L/s/ha	1.215 L/s/ha	90 L/s
Multi-Family	1.736 L/s/ha	3.038 L/s/ha	150 L/s
Commercial	2.500 L/s/ha	4.375 L/s/ha	220 L/s
Park	0.300 L/s/ha	0.480 L/s/ha	

The proposed water distribution system satisfies the minimum pressure constraints for the two demand scenarios. For the PHD scenario, the residual pressure through the system is within a range of 60 – 70 psi. In the MDD+FF scenario, the system is able to supply the required fireflows, and the minimum pressure within the system is 39 psi. A pressure contour map showing the minimum residual pressures at the required fireflow is shown on Figure 8 (Appendix A).

9. STORMWATER MANAGEMENT

The original concept plan has been updated in 2020 to reflect the changing needs of the City. Since the conceptual layout has not changed significantly from the 2013 plan, the changes required for the stormwater management system will have minimal impact on the current stormwater flows. However, because the land use densities have been modified, further investigation is required to ascertain the run-off volume within the study area, and subsequently the storage requirements for the stormwater pond.

Stormwater system modelling information has been completed for the original concept plan, and is presented below:

The development of the stormwater management system was similar to the design process for the sanitary collection system in that it was approached in three steps. First, the existing downstream stormwater management system was investigated to identify any system restrictions. In addition, the analysis of the downstream stormwater infrastructure would determine what (if any) flow could be added to this infrastructure without causing surcharge within the system beyond allowable levels. Second, the stormwater management system in the future Crescent Acres neighbourhood was designed to determine pipe sizes and inverts and required storage. Lastly, the future stormwater management design was connected to the existing system. The impact of conveying this additional flow through the existing storm sewer system was assessed, and required upgrades to the existing system, if necessary, are identified.

9.1 SYSTEM OVERVIEW

The existing downstream system encompasses approximately 374 ha and includes Storm Districts 17, 23, 26, 27, 28, 30, 33 and 35. The existing system benefits from a gradual drop in elevation to the northeast, and the entire system is drained by gravity. The catchment area is predominately single-family residential, with multi-family residential, commercial, schools, and churches interspersed throughout.

The existing area is serviced by a large drainage ditch which begins at approximately 3rd Avenue E. (south of Southwood Drive). The drainage ditch drains from the west to the east, crossing 6th Avenue and weaving through the residential area where it collects stormwater from storm sewers periodically connected to the ditch as the channel extends east. The drainage channel generally has a flat bottom width of 3.65 m, 4:1 side slopes and an effective conveyance depth of 1.52m (as taken from the record drawings). The channel has a 0.10% gradient from the west to east, with several small vertical drops along its length. A manning's roughness of 0.035 was used in modelling the conveyance capacity of the channel. It has been AECOM's experience that a mannings roughness of 0.035 on similar channels is typical during normal spring and summer conditions due to weed growth. Although maintenance will increase the conveyance capacity and lower the mannings roughness of the channel, previous work on long canal systems in Saskatchewan and Alberta (which included calibrating those canal systems based on actual flow and depth/headloss results) has generally equated to a defendable and realistic mannings roughness value of 0.035.

The drainage channel is 3410 m in length and transitions to a buried large diameter storm sewer trunk at Muzzy Drive. The 1500 mm diameter storm trunk conveys stormwater from the drainage ditch and Crescent Acres Neighbourhood down the river valley slope into the East Flat neighbourhood. At 7th Street East (near Mcintosh Drive), the trunk increases to a 2100 mm diameter pipe. The 2100 mm storm trunk is aligned eastward and extends east of the existing neighbourhoods towards the North Saskatchewan River. The storm trunk empties into a 1000 m long drainage ditch (3.65 m flat bottom width and 3:1 side slopes) and then ultimately discharges into the North Saskatchewan River.

The existing storm sewer contains approximately 37.8 km of piping and 472 manholes. The summary of pipes within the system is shown in Table 9.1.

The pipe and manhole data was gathered from record drawings supplied by the City. For clay tile, concrete, and asbestos cement pipe, a mannings roughness of 0.013 was assumed. For PVC pipe, a mannings roughness of 0.011 was used. For corrugated steel pipe (CSP), a manning value of 0.024 was used.

Refer to Figure Drawing 9 (Appendix A) for an overview of the existing storm sewer system that was analyzed for this study.

Table 9.1: Existing Storm Piping Summary

Pipe Size (Diameter)	Length
200 mm	432 m
250 mm	1,478 m
300 mm	6,186 m
375 mm	6,275 m
450 mm	4,115 m
525 mm	2,422 m
600 mm	4,767 m
675 mm	1,473 m
750 mm	1,025 m
900 mm	2,367 m
1050 mm	894 m
1200 mm	234 m
1350 mm	1,028 m
1500 mm	4,076 m
1800 mm	390 m
2100 mm	699 m
Storm Sewer Piping Total	**37,875 m**
Drainage Channel	**3,410 m**

9.2 STORM SYSTEM MODEL SETUP (XPSWMM)

The soil in the area of the Crescent Acres Neighbourhood and surrounding developed City is described as a silt-loam with moderately sloping land (RM of Prince Albert Soil Survey, 1988). An infiltration database was set up in XPSWMM for a silt-loam soil with the parameters shown in Table 9.2.

Table 9.2: Infiltration Database

Infiltration Parameters	
Pervious depression storage	2.5 mm
Impervious depression storage	0.55 mm
Pervious mannings n	0.3
Impervious mannings n	0.013
Zero detention	30%
Maximum infiltration rate	75 mm/h
Minimum infiltration rate	4 mm/h
Decay rate of infiltration	0.00115 /sec
Maximum infiltration volume	0 mm

The imperviousness for the existing neighbourhoods was measured using aerial photographs. For catchments composed of only single-family residential lots, typical impervious values were determined and applied throughout the study area (Table 9.3). For catchments that contained a mixture of land-uses (e.g. multi-family residential, commercial, schools, parks), the imperviousness was calculated manually. Standard impervious values were used for the future development areas, as shown in Table 9.4.

Table 9.3: Imperviousness Values for Single Family Residential Lots

Land Use	Percent Impervious	Runoff Coefficient
Grassed	0%	0.10
Full Lot	30%	0.34
Front Half of Lot	40%	0.42
Back Half of Lot	20%	0.26
Streets	100%	0.90

Table 9.4: Land-Use Runoff Coefficients

Landuse	Runoff Coefficient
Residential	0.60
Multi-Residential	0.80
Commercial	0.80
Park	0.30
Farmland	0.20
Wet pond	1.00
School	0.30
Light Industrial	0.65
Heavy Industrial	0.75

The effective Runoff Coefficient (C_{eff}) used in the Rational Method is related to the percent impervious value (*%Imp*). It may be calculated as a weighted average using the Runoff Coefficients for an impervious area (e.g. pavement) and a pervious area (e.g. grassed):

$$C_{eff} = \frac{\%Imp(C_{imp}) + (100 - \%Imp)(C_{perv})}{100}$$

- C_{imp} is the Runoff Coefficient for an impervious area (0.90)
- C_{perv} is the Runoff Coefficient for a pervious area (0.10)

Subcatchment width was calculated based on the area and shape of the catchment. Subcatchment slope was set as the slope of the dominant flow path (2% for residential lots).

Design storms were derived from Intensity-Duration-Frequency (IDF) data collected by Environment Canada at the Prince Albert Airport for the period of 1960 to 2001. Equations to fit the IDF curves were developed and were of the form:

$$i = \frac{a}{(t+b)^c}$$

- i is the average intensity (mm/h)
- t is time (minutes)
- a, b, c are coefficients to fit the equation to the IDF data

The coefficients for the 2, 5, 25, 50, and 100 year design storms are shown below in Table 9.5. From the IDF equations, rainfall hyetographs were generated for the following design storms: 2 year 1 hour, 100 year 1 hour (Chicago distribution) and 100 year 12 hour and 100 year 24 hour (Huff II distribution). The rainfall data was imported into XPSWMM as a tipping bucket gauge with the interval of the bucket tip set to the time step of the design storm.

Table 9.5: IDF Coefficients

	a	b	c
2 year	416.79	3.2	0.766
5 year	577.06	2.7	0.769
25 year	785.39	2.1	0.762
50 year	881.85	2.0	0.763
100 year	986.97	2.0	0.766

The hydraulic system was modelled in XPSWMM as a node and link system where the nodes represent manholes or ponds and the links represent pipes (or the drainage channel).

9.3 MODEL RESULTS (XPSWMM)

The existing storm infrastructure model was simulated to assess the performance of the existing infrastructure and to identify available capacity within the system for flows from the future Crescent Acres neighbourhood. The storms that were simulated in the model were the 2 year 1 hour, 5 year 1 hour and 100 year 12 hour.

Most urban municipalities typically endeavour to provide a level of service for the storm system that conveys flow from a 2 year 1 hour design storm with no surcharge. Storm trunks are typically identified to provide a higher level of service, such as a 1 in 5 year design storm with some surcharge allowed (although not to surface). Stormwater

retention storage is typically designed using a longer duration, higher volume rainfall such as the 100 year 12 hour or 24 hour storm.

The performance of the existing storm infrastructure in a 2 year rainfall event is shown in Figure 9 (Appendix A). There is widespread surcharge throughout the system, and isolated locations of flooding in the upstream pipe sections.

There is an existing 600 mm diameter storm sewer along Muzzy Drive and Guy Drive/Hadley Road that was recently installed and is intended to provide stormwater servicing for Crescent Acres Stage IV. Although Stage IV is outside the scope of the present study, it is important to acknowledge the performance of these storm sewers. The storm sewer along Muzzy Drive is presently surcharged in the 2 year storm and should not accept any additional flow. The 600 mm storm sewer along the north leg of Guy Drive and Hadley Road currently has approximately 300 L/s of available capacity in the 2 year storm.

The existing storm sewers in the vicinity of the future Crescent Acres neighbourhood are in surcharge, so that there is no opportunity to directly connect the future storm sewer to the existing storm sewer without providing storage. The logical connection point for the future Crescent Acres neighbourhood is the 600 mm diameter storm sewer in the school grounds, southeast of Olive Diefenbaker Drive. The model simulations show that, in the 2 year storm, there are sections of storm sewer under surcharge, which suggests there is limited capacity available to accept additional flow. The profile of the storm sewer (Figure 9.1) shows that, although the storm sewer is surcharged, the HGL is contained below the ground level and no surface flooding occurs. There is opportunity to connect the Crescent Acres stormwater system to the existing storm sewer system and add flow only after the rainfall and flow has subsided within the downstream system. In order to manage stormwater within the future Stage V – VII area, storage of the full runoff volume with minimal release would be required.

The drainage channel and large-diameter storm trunk in the East Flats neighbourhood performs reasonably well for a 2 year rainfall. In the 100 year 12 hour rainfall, there is a large volume of flooding at the CNR crossing near 15th Street East. The 2 year 1 hour and 100 year 12 hour HGL's in the drainage ditch and storm trunk are shown in Figure 9.2.

9.4 CRESCENT ACRES NEIGHBOURHOOD STORMWATER MANAGEMENT DESIGN

The hydraulic design for the stormwater system in the Stage V – VII development area was completed using the modeling software XPSWMM and included both the proposed stormwater retention pond and storm sewer system.

The proposed stormwater retention pond was assumed to have an active storage depth of 1.75 m. The active storage depth is described as the volume between the Normal Water Level (NWL) and High Water Level (HWL). The permanent pool of water maintained below NWL is identified as inactive storage and was not considered in this design. Above the HWL, a 1.0 m freeboard depth was allowed. The sideslopes of the ponds were assumed to be 6H:1V on average.

The pond was modeled with the 100 year 1 hour, 12 hour, and 24 hour design storms. It was found that the 12 hour duration generated the greatest storage volume for the pond. The NWL and HWL areas were sized to contain the storage volume within the allowable active storage depth. The dimensions of the pond are shown in Table 9.6.

Table 9.6: Stormwater Pond Design Details

Elevation		Surface Area		Inflow	Outflow	Storage Volume
NWL	HWL	NWL	HWL			
450.50 m	452.25 m	1.37 ha	1.87 ha	2.98 cms	0.10 cms	28,500 m³

As described previously, the pond will drain at a minimal rate to the existing 600 mm diameter storm sewer in the school grounds, southeast of Olive Diefenbaker Drive because storm sewer is surcharged in the 2 year storm. The maximum outflow from the pond was limited to 100 L/s.

If the downstream storm sewer happens to be overwhelmed during a storm, a check valve may be installed on the pond outlet to close the outlet pipe so that the pond only drains when downstream water levels have subsided. Also, additional modelling may be done to consider the potential use of the pond to provide surcharge storage for the existing downstream storm sewer system (ie flow backs up into the pond). The above may be further investigated during detailed design.

One important component of the detailed design of the storm retention pond and flow control chamber will be the design of a weir or orifice which will limit the outflow during the rainfall to the minimal amount of 100 L/s. However, it would take almost 5 days to drain back to NWL. Typically, the time for a storm retention pond to return to NWL is 48 hours, so that storage is available if a subsequent severe storm happens to occur. The time for the pond to drain may be reduced by installing a gate on the pond outlet that is manually opened. This would allow the pond to quickly drain once the downstream storm sewer capacity returns following the storm. This can be further reviewed during detailed design.

The proposed stormwater management design and surface grading plan for Stages V – VII are shown in Figures 10 and 11 (Appendix A).

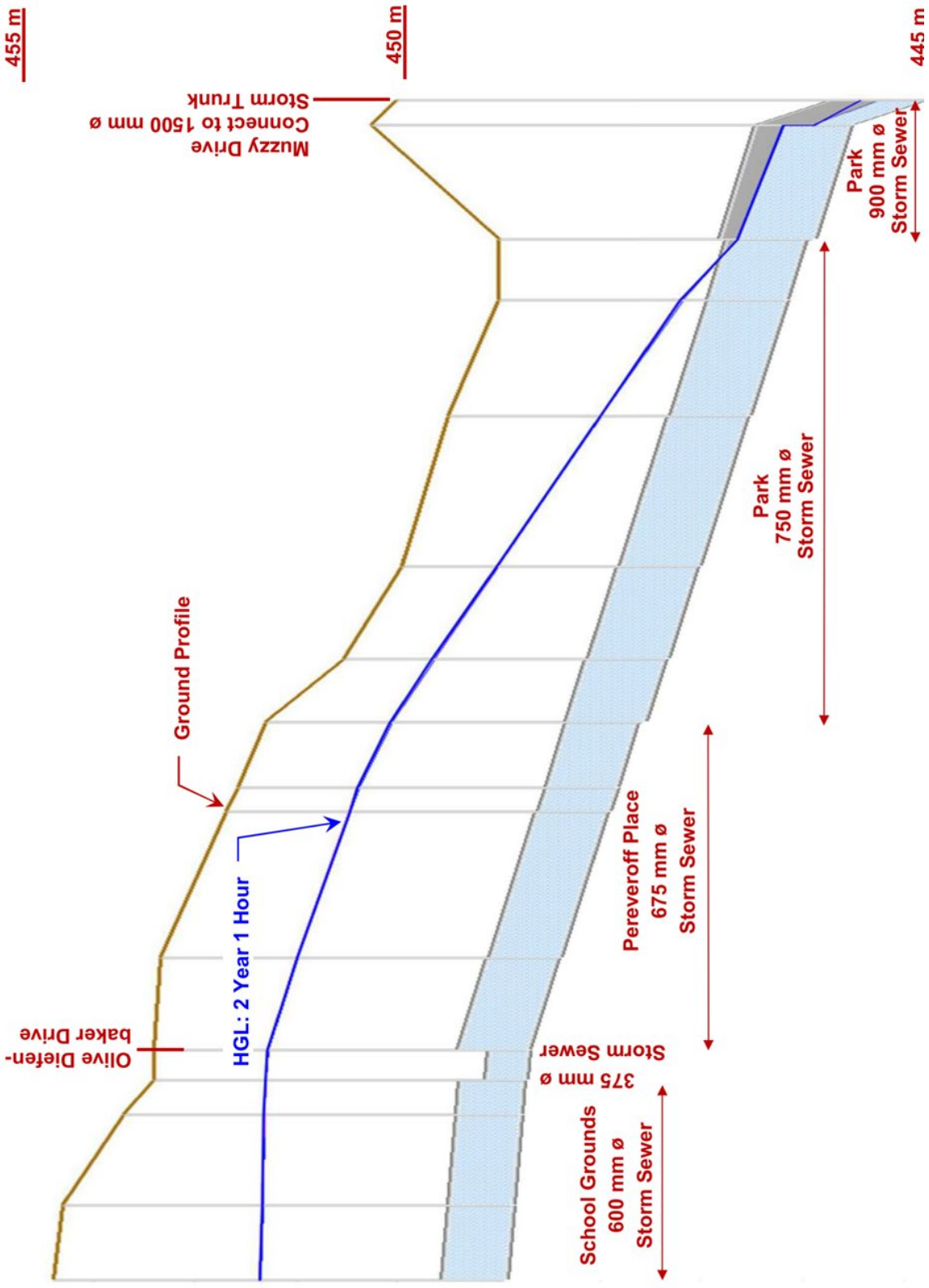

Figure 9.1: Existing Storm Sewer from School Grounds to Muzzy Drive
2 Year 1 Hour Storm HGL

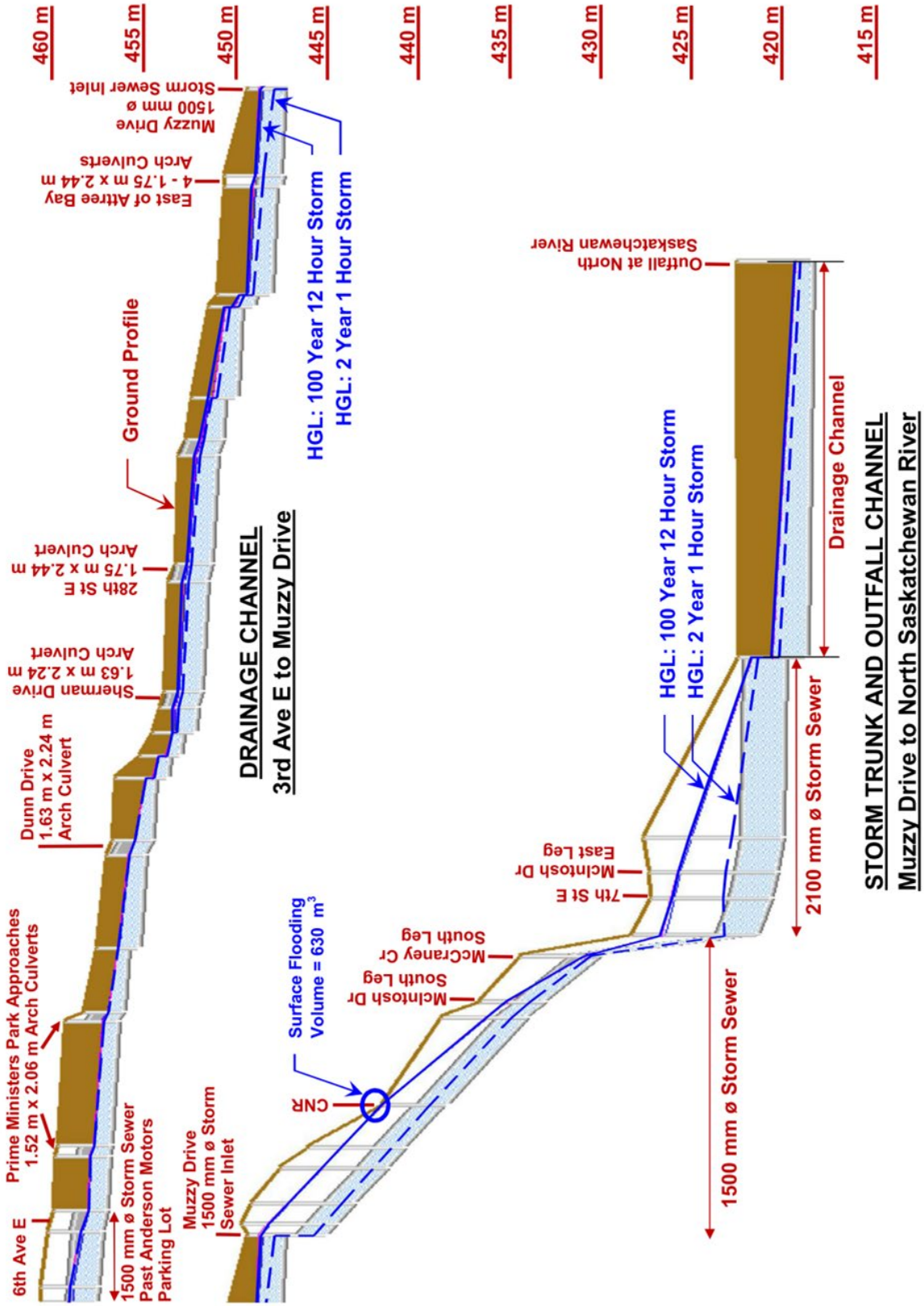

Figure 9.2: Drainage Ditch and Storm Trunk - 3rd Avenue East to Outfall at North Saskatchewan River 2 Year 1 Hour and 100 Year 12 Hour Storm HGL's

10. NEIGHBOURHOOD STAGING

The future Crescent Acres Neighbourhood will take a number of years to build out in its entirety. To provide an orderly sequence to all aspects of development (including transportation, neighbourhood access, municipal services, and site grading), a phasing plan was completed. An earthworks cut/fill plan for the study area is shown in Figure 12 (Appendix A). The contract for site grading has been prepared and final design completed by AECOM within the scope of this project. The package is ready for a tender call as directed by the City.

The future Crescent Acres Neighbourhood is proposed to be constructed in 9 phases, as shown in Figure 13 (Appendix A). The first 6 phases are located south of the retention pond, and Phases 7-9 are located north of the pond. As each phase is constructed, the municipal services (water, sanitary, stormwater) will be extended from the preceding phase.

The new 300 mm / 450 mm diameter sanitary trunk and upgrades to the existing downstream sanitary collection system are significant capital works projects. By constructing an interim connection to the existing 375 mm diameter sanitary sewer at the intersection of Bradbury Drive and Barton Drive, the neighbourhood development may proceed for a period of time before the new trunk and upgrades are required. This connection is able to service construction of Phases 1 – 4. From Phase 5 and on, the flow to the existing sanitary system exceeds its available capacity and the new 300 mm/450 mm trunk and downstream upgrades would be required. Once the new trunk is completed, the connection at the intersection of Bradbury Drive and Barton Drive would need to be decommissioned.

An area extending outside the City limits (east of Phase IV and V) has been designed by AECOM in this study. This area has not been included in the staging as it is presently outside the City boundary and annexation would be required.

11. ROUGH GRADING AND EARTHWORKS DESIGN

Since the conceptual layout has not changed significantly, there will be minimal changes to the existing grading and earthworks as the general layout has not been modified. However, further investigation is required to determine earthworks volumes related to the stormwater pond.

Updates have not been made to reflect the updated concept plan. Rough grading and Earthworks design has already been completed for the original concept plan and is described below:

As part of the project scope, AECOM completed rough grading and earthworks design for the study area. The design is ready for tender call when directed by the City. It is anticipated that the rough grading for the entire study area would be completed in a single contract.

A topsoil depth of 300 mm was assumed for the study area, which yields a volume of 395,000 m^3 of topsoil material.

The rough grading design also includes the primary and secondary retention ponds and their connecting drainage ditch. The ponds were assumed to have a slope of 3.5H:1V (horizontal to vertical) from the floor to 0.5 m below NWL, a 7H:1V shelf (7 m wide) from 0.5 m below NWL to 0.5 m above NWL, and a slope of 5H:1V above this.

The minimum and maximum road grades were set to 0.50% and 2.00%, respectively, and the minimum and maximum easement grades were set to 0.65% and 2.25%, respectively. The roadways are to be graded to 100 mm above subgrade elevation to allow for removal of potentially unsuitable material immediately before final construction. Prior to construction of the storm sewer system, temporary drainage swales would be constructed to drain roadway low points to the retention ponds. Once the drainage system is installed, the temporary swales would be filled.

A shrinkage factor of 22% was assumed. The rough grading design yielded a cut volume of 495,000 m^3 and a fill volume of 405,000 m^3.

12. REFERENCES

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Indigenous and Northern Affairs Canada website at First Nation Profiles (aadnc-aandc.gc.ca)

Minnesota Wildflowers website at https://www.minnesotawildflowers.info/

NatureServe Explorer website at https://explorer.natureserve.org/Search#q

Rural Municipality of Prince Albert No. 461, 2020, RM461 (rmprincealbert.ca)

Saskatchewan Water Security Agency websites https://www.wsask.ca/ and Data Portal at WSA Wells Site (wsask.ca)

Saskatchewan Wildflowers website https://www.saskwildflower.ca/

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13. ACKNOWLEDGMENT

The Saskatchewan Conservation Data Centre (SKCDC) is acknowledged for the use of their database. The database is sensitive and to be used for conservation purposes only. Although the SKCDC makes every attempt to verify the information, they make no guarantee with respect to the accuracy of the data, and accept no responsibility for decisions made based on the information supplied.

AECOM Imagine it. Delivered.

Appendix

A

Figure Drawings

CITY LIMIT

BYARS STREET

MUZZY DRIVE

CITY LIMITS

OLIVE DIEFENBAKER DRIVE

CRESCENT ACRES

BRADBURY DRIVE

21st AVENUE EAST

(SUNSHINE ROAD)

15th AVENUE EAST

MARQUIS ROAD

CITY LIMIT

N

LEGEND

STUDY AREA

CRESCENT ACRES FUTURE GROWTH AREA

CITY LIMITS

0 125 250 m

1:5000

City of Prince Albert
Crescent Acres Neighborhood Study

Location

Figure 1

AECOM

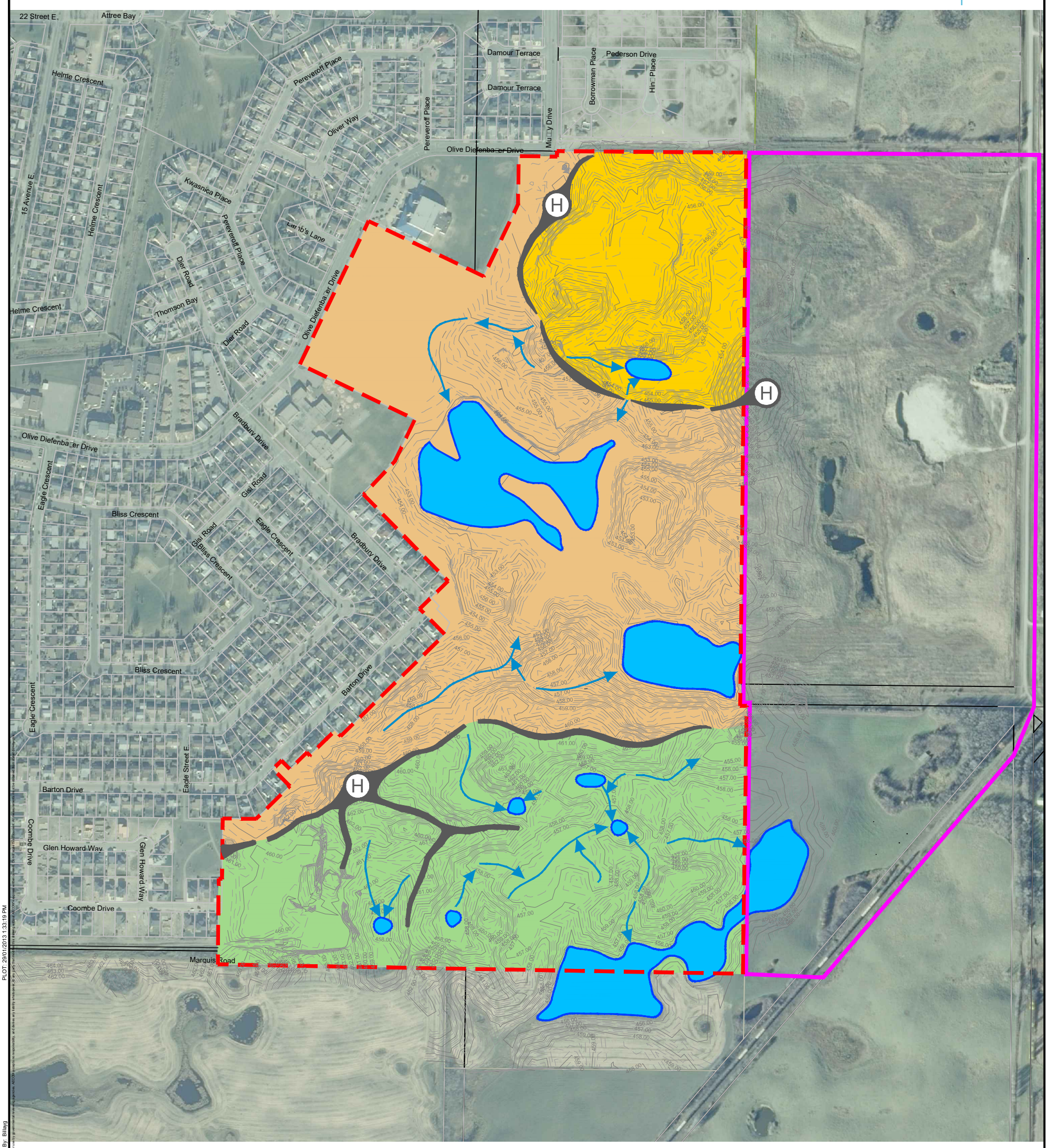
LEGEND

- STUDY BOUNDARY
- SHADOW PLAN BOUNDARY
- 462 EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS

City of Prince Albert
Crescent Acres Neighborhood Study

Existing Site Features

Figure 2



0 75 150 m
1:3000

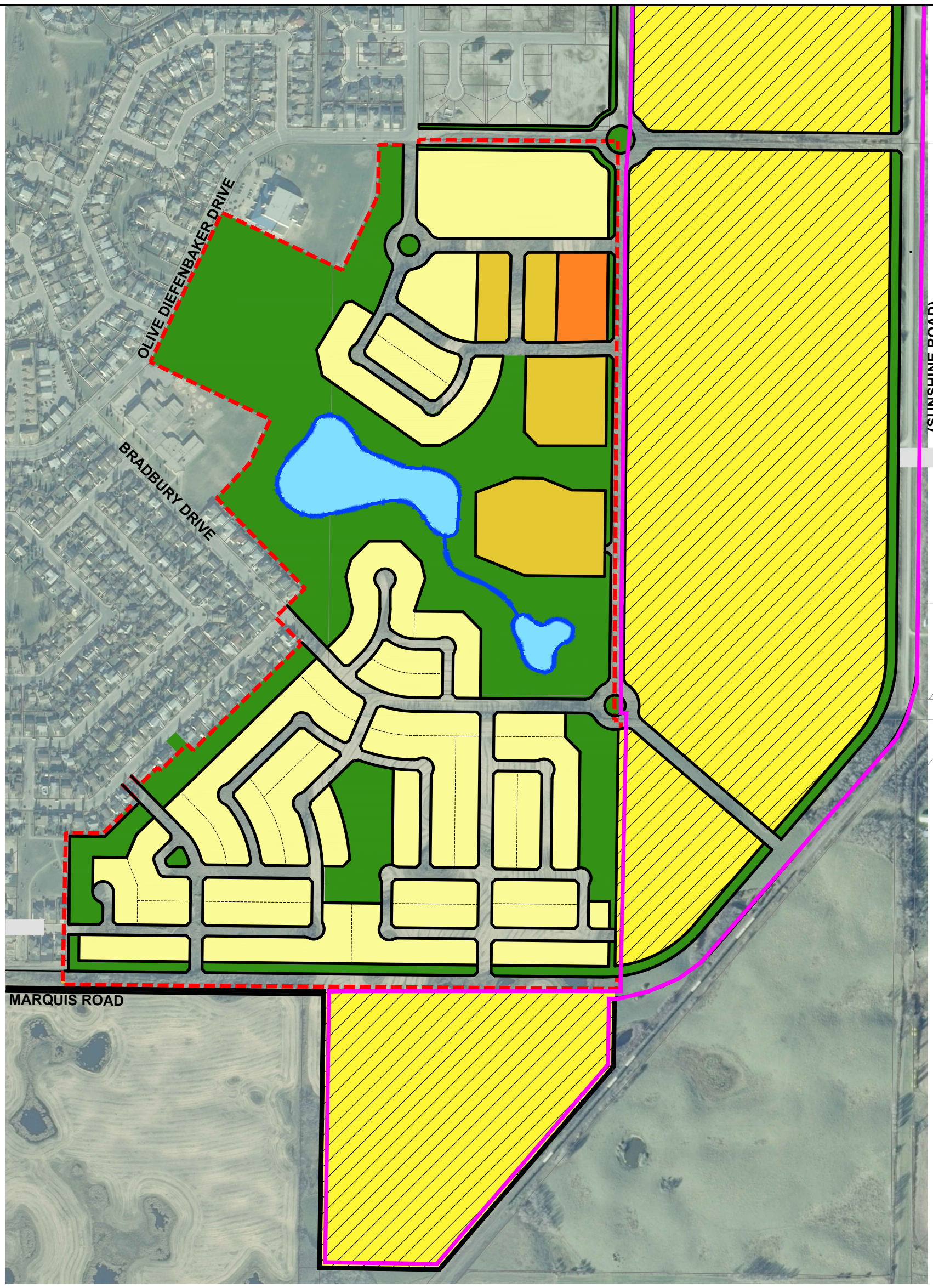
LEGEND

- 457.85 — EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- STUDY BOUNDARY
- SHADOW PLAN BOUNDARY
- H — HIGH POINT
- LOW AREA
- NORTH CATCHMENT AREA
- CENTRAL CATCHMENT AREA
- SOUTH CATCHMENT AREA
- RIDGE
- DRAINAGE ROUTE

City of Prince Albert
Crescent Acres Neighborhood Study

Topography & Drainage

Figure 3



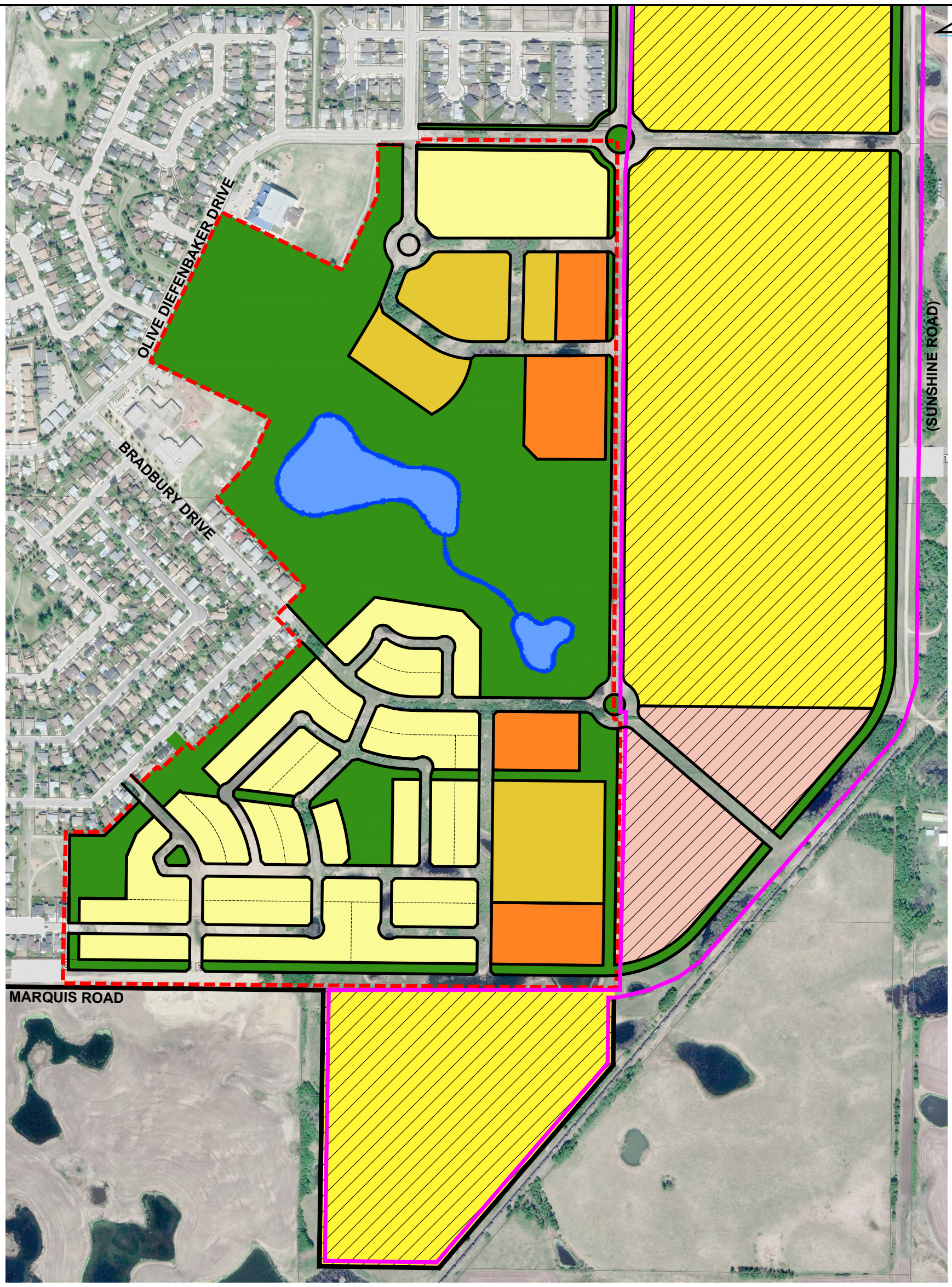
LEGEND

- LOW DENSITY
- MEDIUM DENSITY
- HIGH DENSITY
- CITY LIMITS
- CRESCENT ACRES FUTURE GROWTH AREA BOUNDARY
- PARKS AND OPEN SPACES
- PUBLIC UTILITIES (STORM POND)
- CRESCENT ACRES FUTURE GROWTH AREA (URBAN EXPANSION RESIDENTIAL)
- STUDY BOUNDARY

City of Prince Albert
Crescent Acres Neighborhood Study

Land Use Concept Plan

Figure 4



0 75 150 m
1:3000

LEGEND

- LOW DENSITY
- MEDIUM DENSITY
- HIGH DENSITY
- CITY LIMITS
- CRESCENT ACRES FUTURE GROWTH AREA BOUNDARY
- PARKS AND OPEN SPACES
- PUBLIC UTILITIES (STORM POND)
- CRESCENT ACRES FUTURE RESIDENTIAL GROWTH AREA
- CRESCENT ACRES FUTURE MIXED USE COMMERCIAL GROWTH AREA
- STUDY BOUNDARY

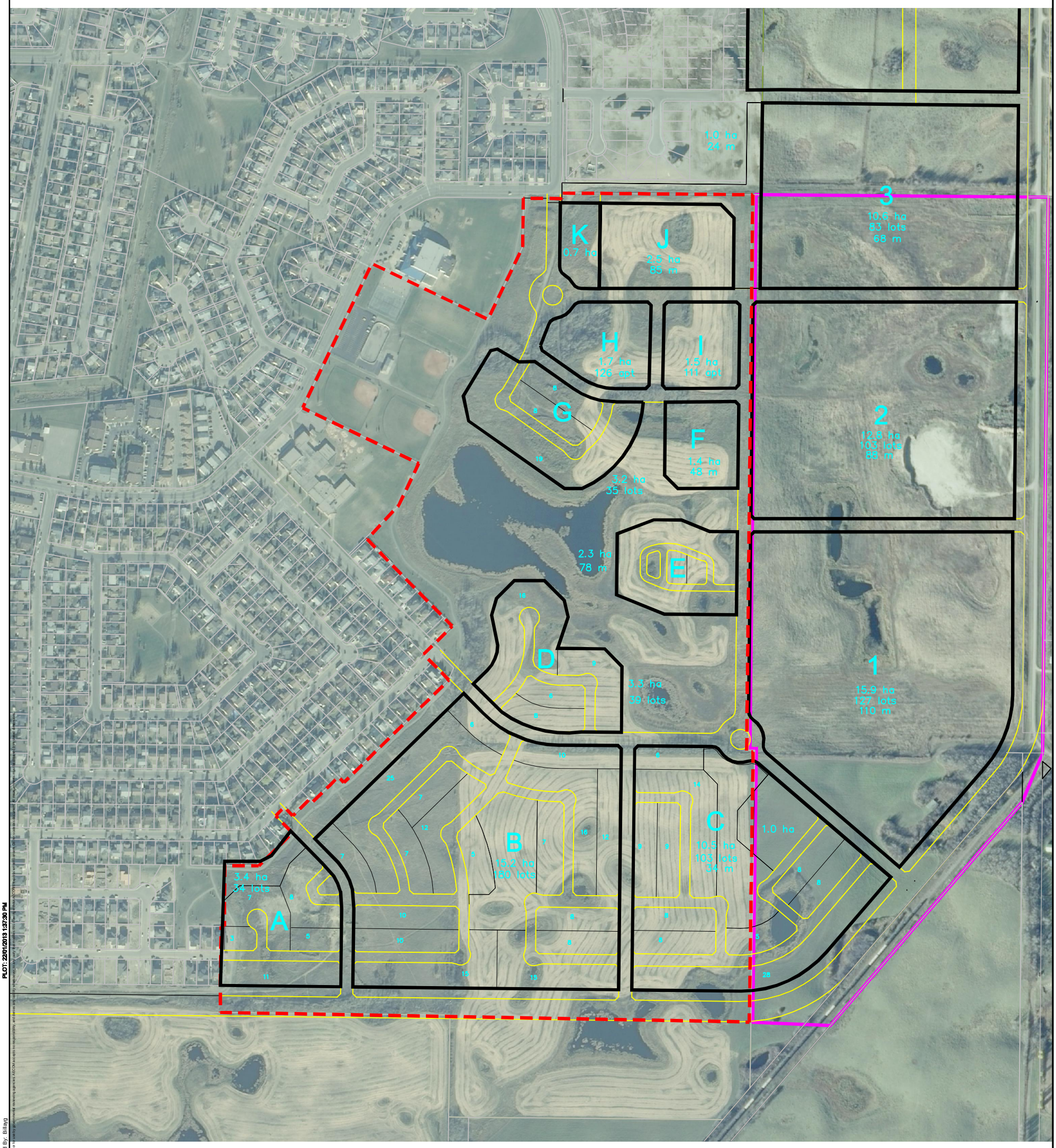
THIS MAP IS A PROPOSED ALTERNATIVE TO FIG 4, WHICH REQUIRES FURTHER STUDY PRIOR TO IMPLEMENTATION

City of Prince Albert
Crescent Acres Neighborhood Study

Land Use Concept Plan (Alternate)

AECOM

Figure 4A



LEGEND

STUDY BOUNDARY

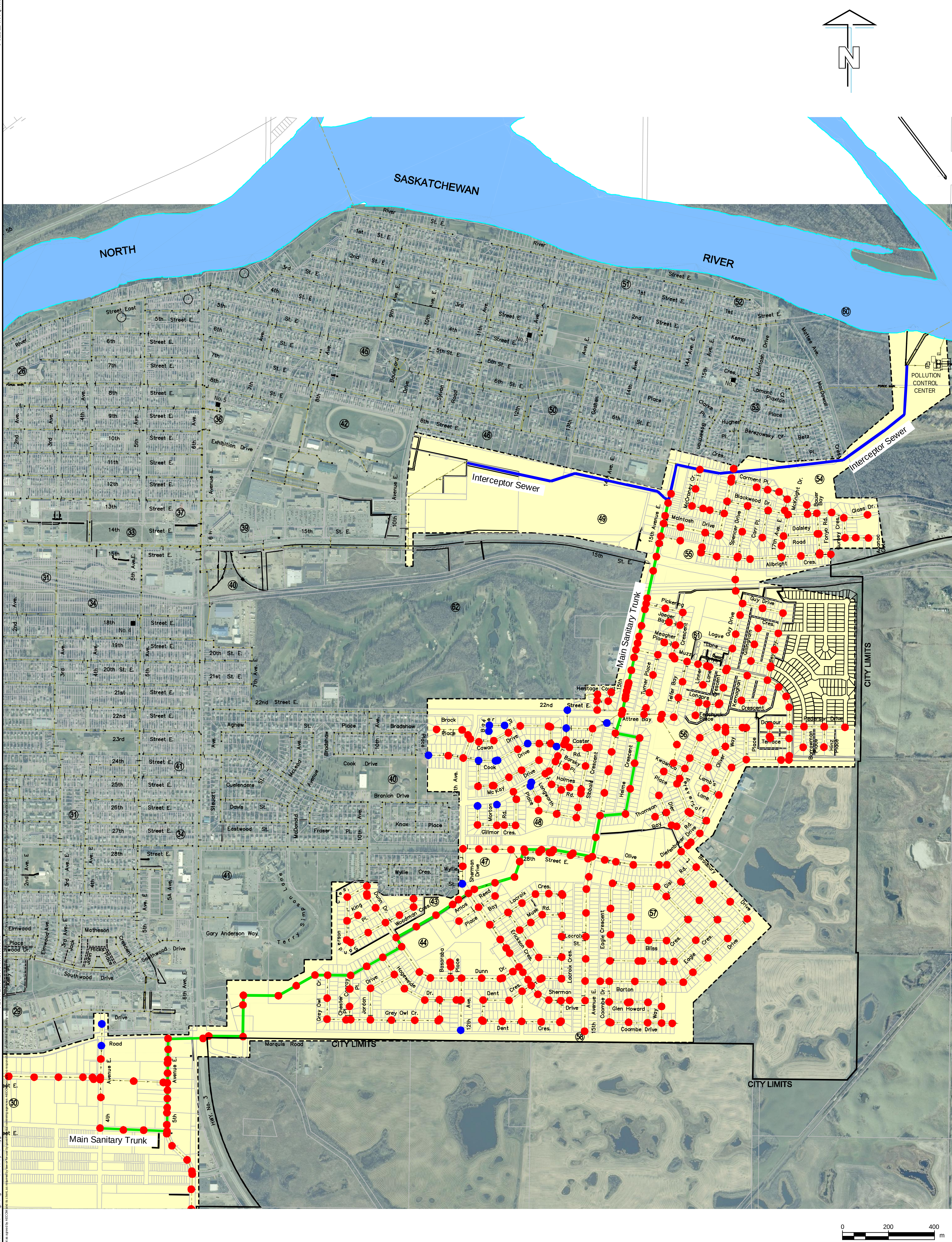
SHADOW PLAN BOUNDARY

City of Prince Albert
Crescent Acres Neighborhood Study

Neighborhood Plan Details

Figure 5

D SIZE 22" x 34" (558.8mm x 863.6mm)



LEGEND

EXISTING SANITARY SEWER

62 CofPA SANITARY SEWER DISTRICT IDENTIFIER

SANITARY SEWER SYSTEM ANALYSIS AREA

CITY LIMITS

SANITARY TRUNK/DRAINAGE CHANNEL

Model Results (10 Year 1 Hour Storm)

HYDRAULIC GRADE LINE > 2.4m BELOW GROUND SURFACE

HYDRAULIC GRADE LINE < 2.4m BELOW GROUND SURFACE (POSSIBLE BASEMENT FLOODING)

City of Prince Albert
Crescent Acres Neighborhood Study

Existing Sanitary Sewer System

Figure 6

AECOM

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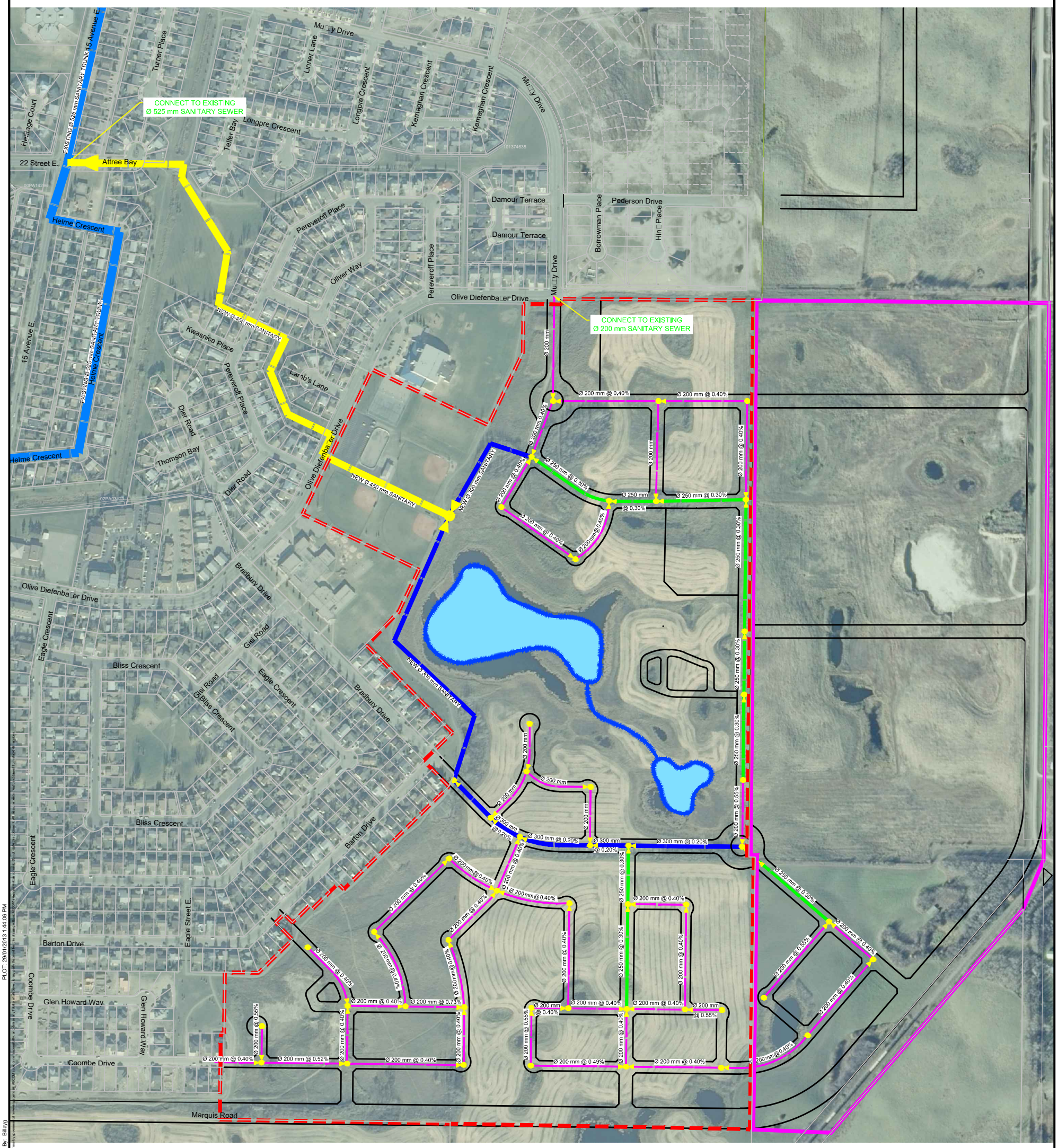


LEGEND

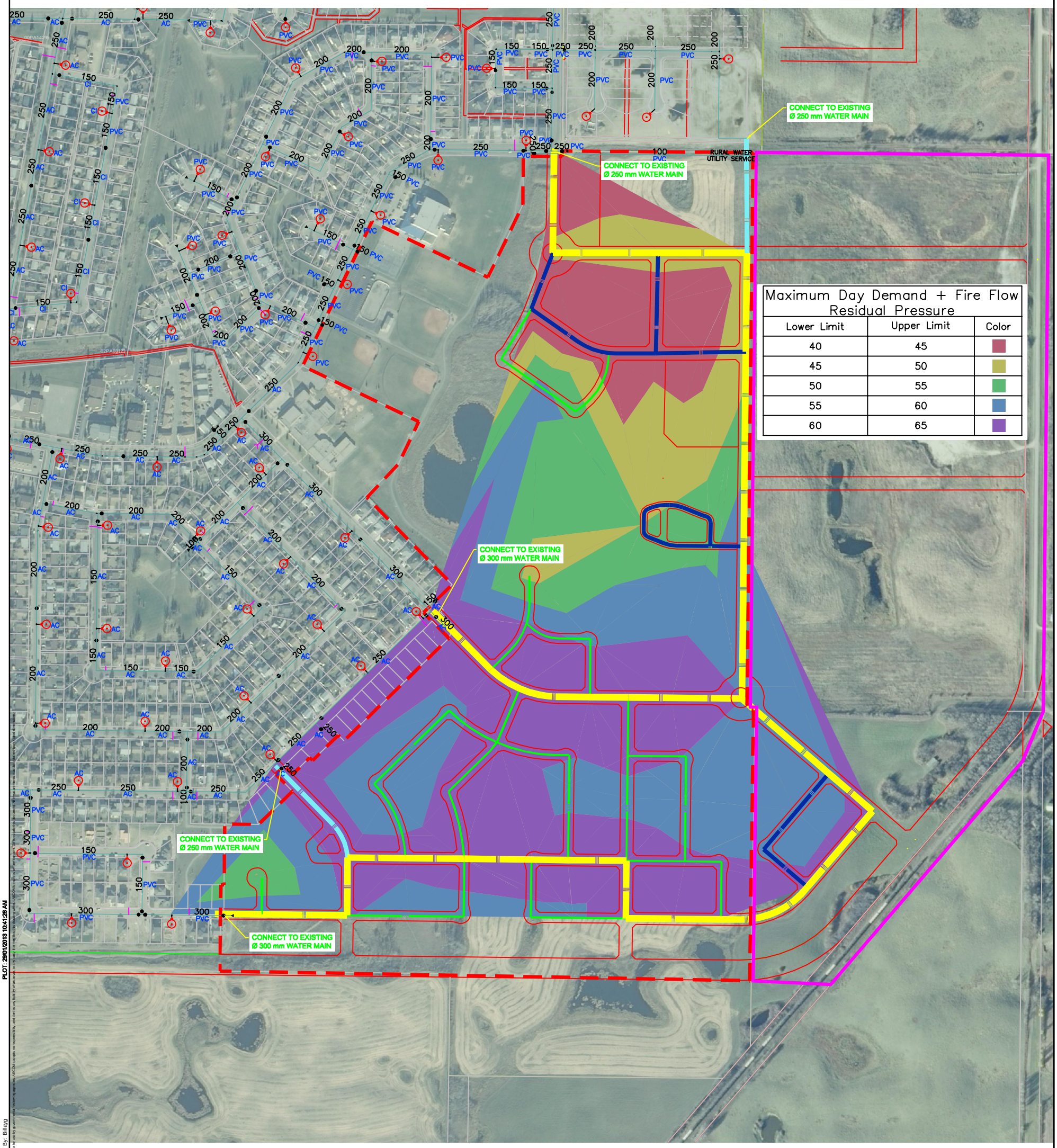
- STUDY BOUNDARY
- SHADOW PLAN BOUNDARY
- Ø 200 mm SANITARY SEWER
- Ø 375 mm SANITARY SEWER UPGRADE
- Ø 250 mm SANITARY SEWER
- Ø 450 mm SANITARY SEWER UPGRADE
- Ø 300 mm SANITARY SEWER
- EXISTING SANITARY SEWER
- STORM POND
- Ø 525 mm EXISTING SANITARY TRUNK

City of Prince Albert
Crescent Acres Neighborhood Study

Proposed Sanitary Sewer System and Upgrades

AECOM

Figure 7



Maximum Day Demand + Fire Flow Residual Pressure

Lower Limit	Upper Limit	Color
40	45	
45	50	
50	55	
55	60	
60	65	

LEGEND

- STUDY BOUNDARY
- SHADOW PLAN BOUNDARY
- Ø 150 mm WATER MAIN
- Ø 200 mm WATER MAIN
- Ø 250 mm WATER MAIN
- Ø 300 mm WATER MAIN
- EXISTING WATER MAIN

0 75 150 m
1:3000

City of Prince Albert
Crescent Acres Neighborhood Study

Water Distribution System

Figure 8

SASKATCHEWAN

RIVER

NORTH

HWY No. 55

Ø 2100 mm STORM TRUNK

Ø 1500 mm STORM TRUNK

Drainage Ditch

Drainage Ditch

CITY LIMITS

CITY LIMITS

CITY LIMITS

101816939

AK2420

BY2431

LEGEND

- EXISTING STORM SEWER
- 25 — CofPA STORM SEWER DISTRICT IDENTIFIER
- STORM SEWER SYSTEM ANALYSIS
- CITY LIMITS
- 25 — LOCATION AND VOLUME OF FLOODING (m³) 2 YEAR 1 HOUR STORM

Model Results (2 Year 1 Hour Storm)

- NO SURCHARGE
- NODES SURCHARGED (PIPE OVERCAPACITY)

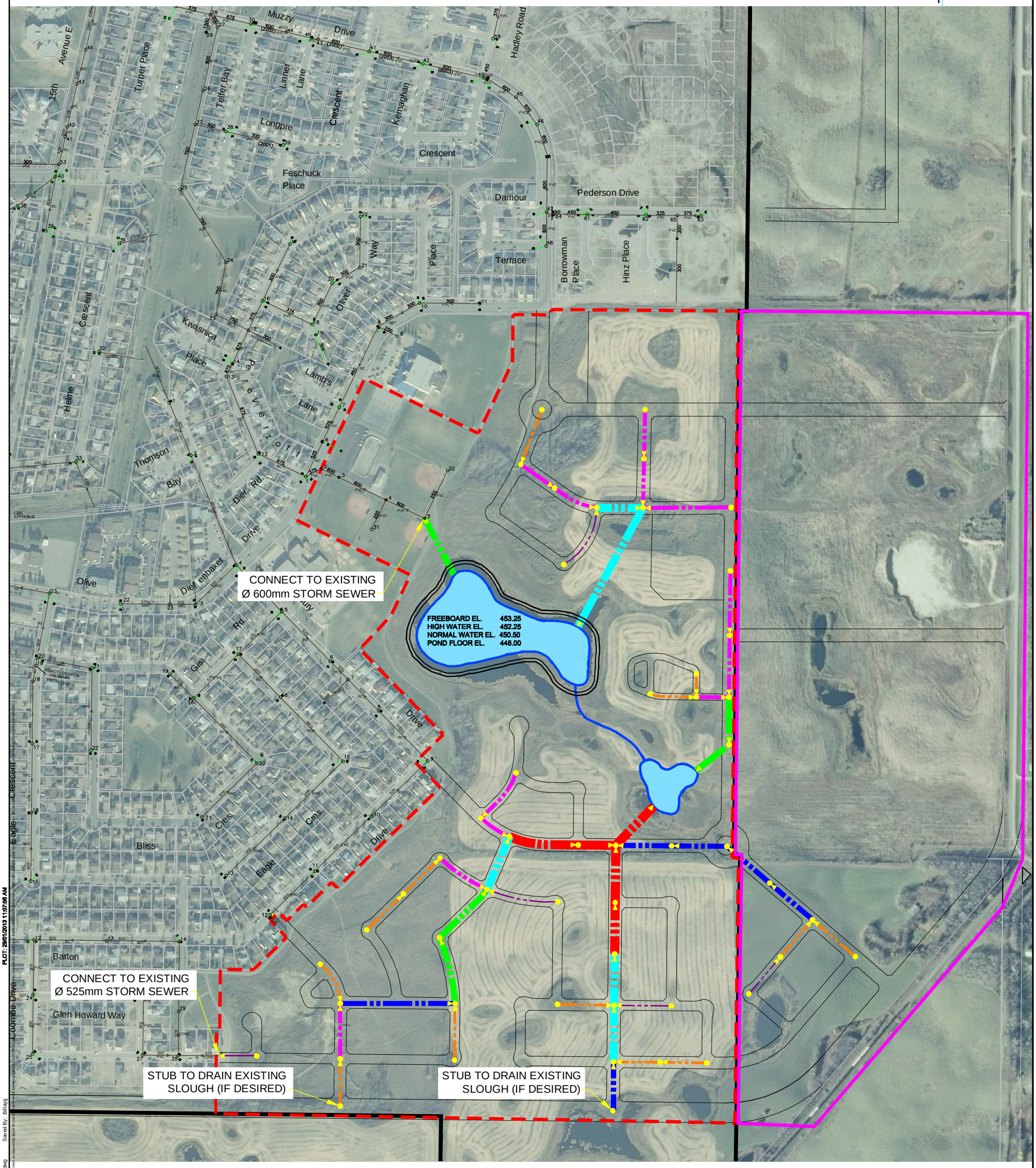
0 200 400 m

1:8000

City of Prince Albert
Crescent Acres Neighborhood Study

Existing Storm Sewer System

Figure 9



LEGEND

- Ø 300 mm STORM SEWER
- Ø 375 mm STORM SEWER
- Ø 450 mm STORM SEWER
- Ø 525 mm STORM SEWER
- STUDY BOUNDARY
- STORM POND
- Ø 600 mm STORM SEWER
- Ø 750 mm STORM SEWER
- Ø 900 mm STORM SEWER
- EXISTING STORM SEWER
- SHADOW PLAN BOUNDARY
- CITY LIMITS

0 75 150 m
1:3000

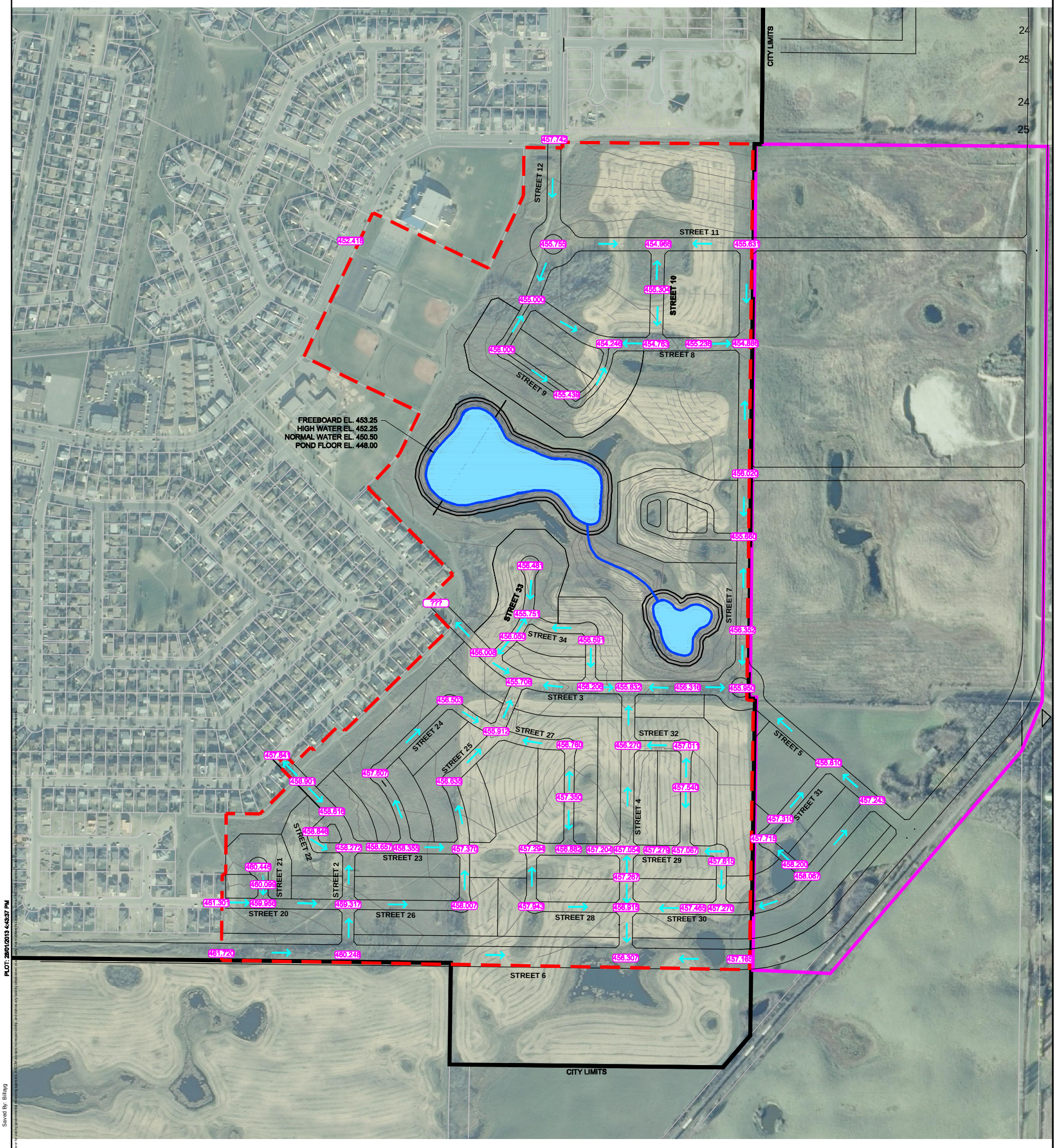
City of Prince Albert
Crescent Acres Neighborhood Study

Storm Sewer System

AECOM

Figure 10

D SIZE: 22" x 34" (559.8mm x 863.6mm)



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LEGEND

- 457.841 — SPOT ELEVATION
- 457.85 — MAJOR CONTOURS
- MINOR CONTOURS
- STUDY BOUNDARY
- SHADOW PLAN BOUNDARY
- CITY LIMITS
- DRAINAGE ARROW
- STORM POND

0 75 150 m

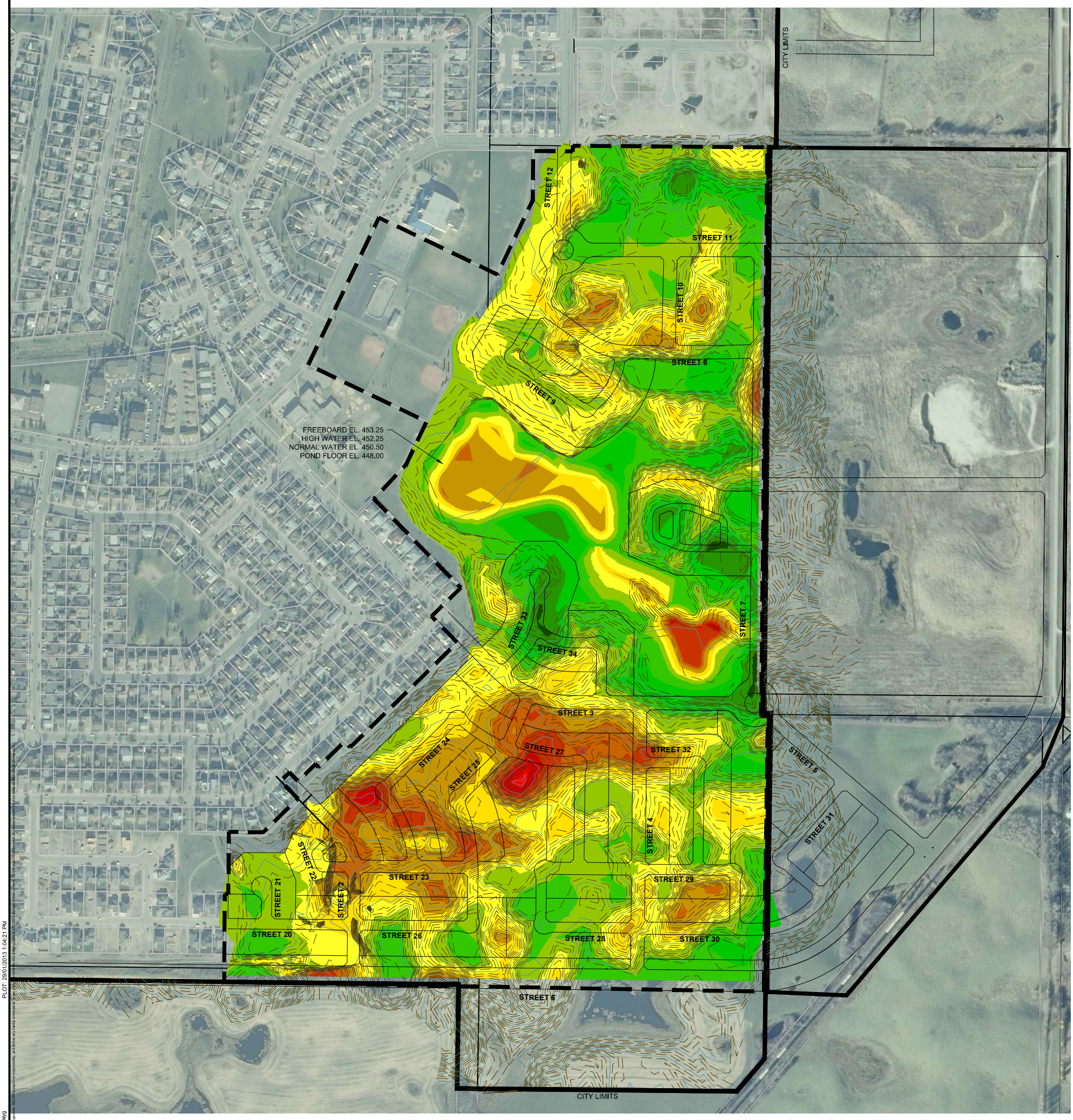
1:3000

City of Prince Albert
Crescent Acres Neighborhood Study

Surface Grading Plan

AECOM

Figure 11



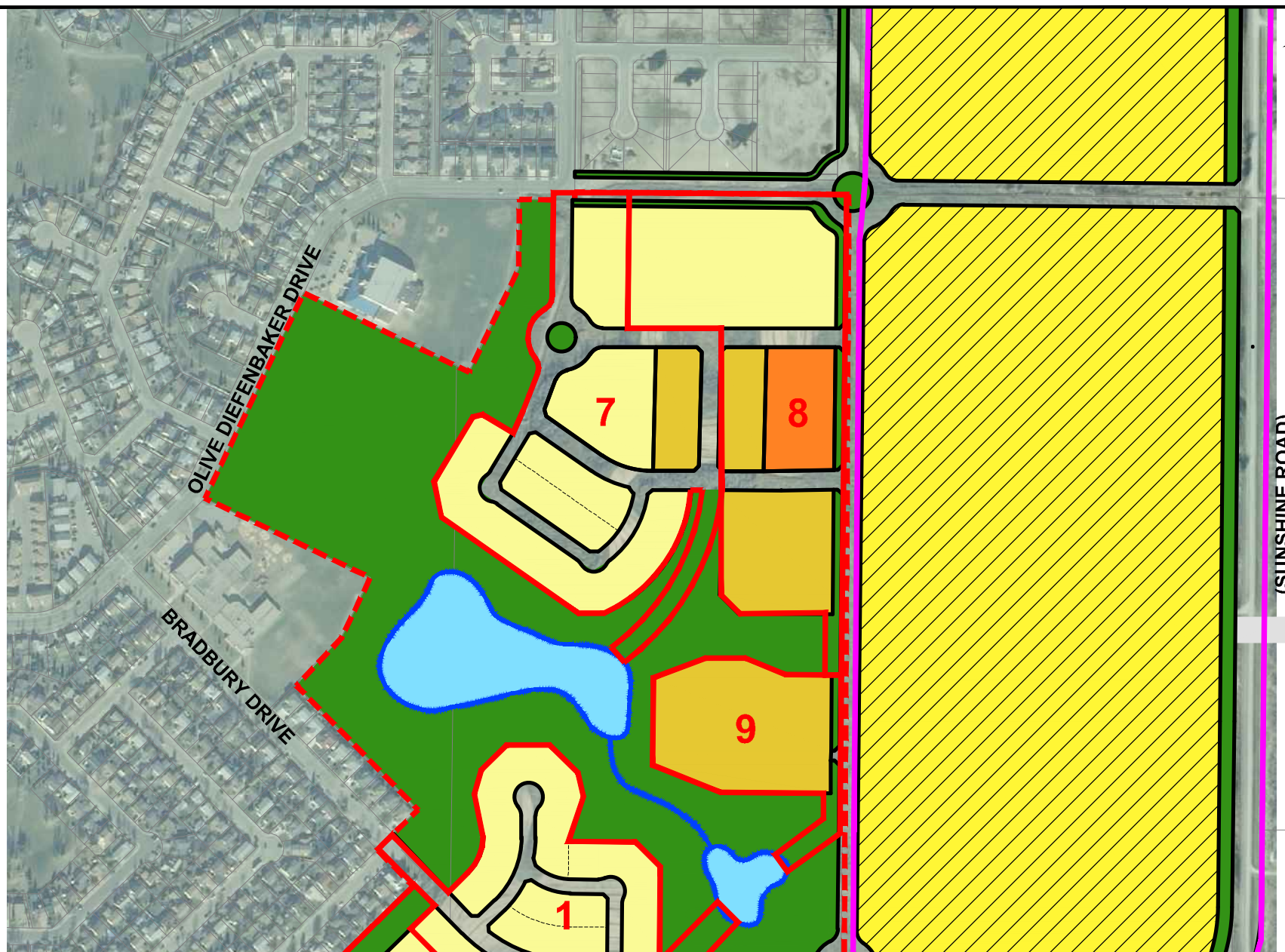
Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	-7.000	-6.000	
2	-6.000	-5.000	
3	-5.000	-4.000	
4	-4.000	-3.000	
5	-3.000	-2.000	
6	-2.000	-1.000	
7	-1.000	0.000	
8	0.000	1.000	
9	1.000	2.000	
10	2.000	3.000	
11	3.000	4.000	
12	4.000	5.000	

0 75 150 m
1:3000

City of Prince Albert
Crescent Acres Neighborhood Study

Cut/Fill Plan

Figure 12



LEGEND

- LOW DENSITY
- MEDIUM DENSITY
- HIGH DENSITY
- CITY LIMITS
- CRESCENT ACRES FUTURE GROWTH AREA BOUNDARY
- PARKS AND OPEN SPACES
- PUBLIC UTILITIES (STORM POND)
- CRESCENT ACRES FUTURE GROWTH AREA (URBAN EXPANSION RESIDENTIAL)
- DEVELOPMENT PHASES (1)
- STUDY BOUNDARY

City of Prince Albert
Crescent Acres Neighborhood Study

Development Phase Concept Plan

AECOM

Figure 13

AECOM Imagine it. Delivered.

Appendix

B

Photos

Appendix B – Photos

Photograph 1: Natural wetland located in SE 13-48-26-W2M and site of proposed storm water retention pond (August 2011)

Appendix B – Photos

Photograph 2: Pond east of storm water retention pond (August 2011)

Appendix B – Photos

Photograph 3: Southeast of storm water retention pond (August 2011)

Appendix B – Photos

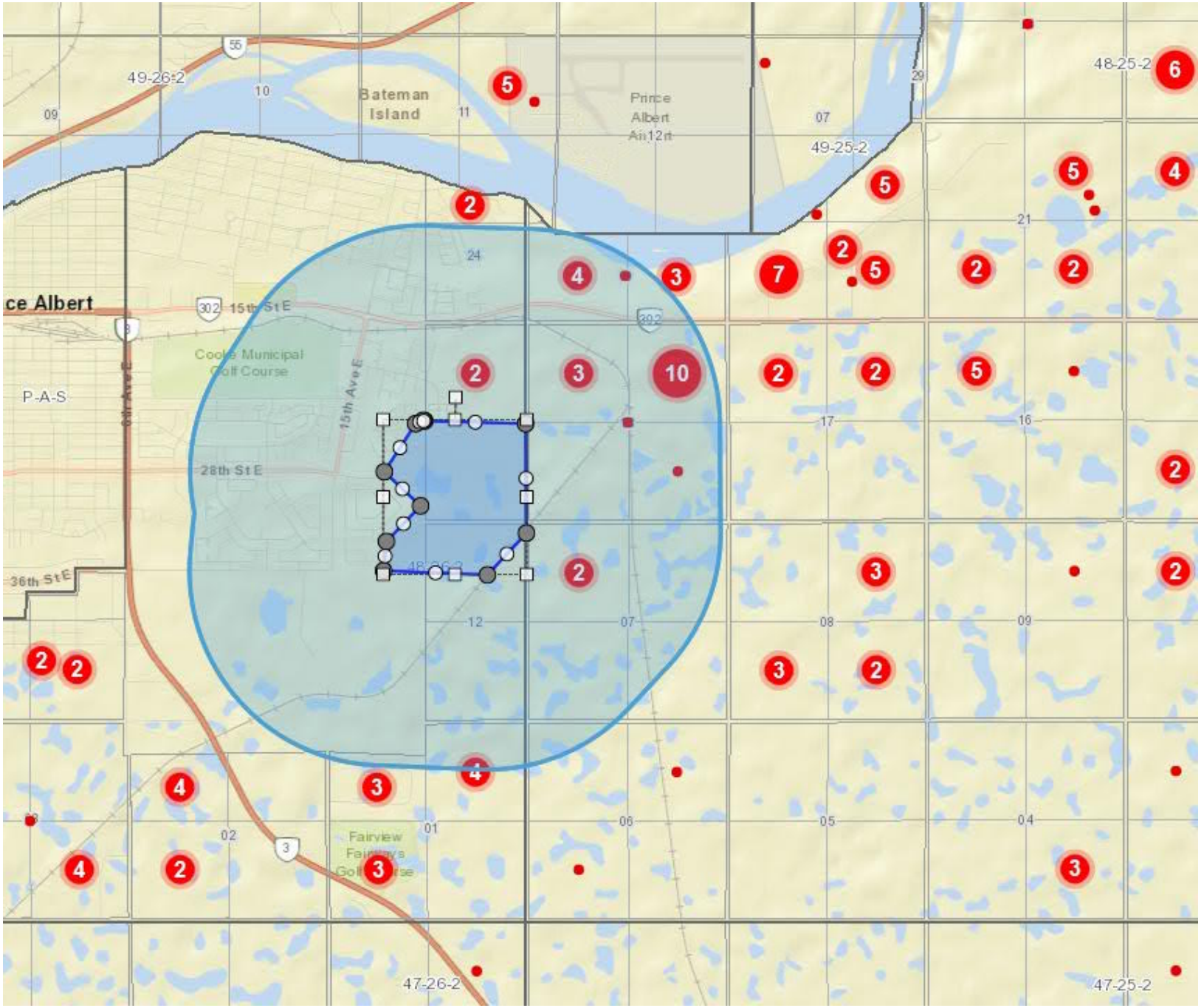
Photograph 4: Field east of park / storm water retention pond (August 2011)

AECOM Imagine it. Delivered.

Appendix

C

Water Well Driller Records



Water Wells

Notes

1.6 km radius

Projection:

WGS_1984_Web_Mercator_Auxiliary_Sphere

Scale:

1: 72,224

Date

8-Dec-20

Disclaimer:

WSA prepares maps with varying degrees of accuracy and completeness dependant on the circumstances and available data. WSA makes no representation that this map will be sufficient for all uses. The user is advised to confirm the information contained herein in the event that precision and currency of data are required.

Water Security Agency

Table 1 Saskatchewan Watershed Authority – Well Records

Location / WWDR #	Water Use / Well Use [1]	Date Constructed	Depth of Well/ Static Water Level (SWL)	Lithology List
SW-19-48-25-2 / 012742	Domestic, W	29/07/1974	68'(20.7 m) / SWL: Unknown	Topsoil, clay, sand, clay, clay
NE 13-48-26-2 / 081048	Domestic, W	27/05/1985	50' (15.2 m) / SWL 29' (8.8 m)	Sandy clay, clay, sand, sand, clay
SW 19-48-25-2 / 012743	Domestic, W	30/07/1974	32' (9.8 m) / SWL: Unknown	Clay, sand, clay, sand, clay
SW 19-48-25-2 / 012744	Domestic, WTH	30/07/1974	32' (9.8 m) / SWL: Unknown	Clay, clay, silt, clay
NW 18-48-25-2/ 067094	Domestic, W	11/06/1981	41' (12.5 m) / SWL Unknown	Topsoil, clay, sand, clay
NW 18-48-25-2 / 024009	Domestic, WTH	Not available	39' (11.9m) / SWL Unknown	Sand, clay, sand, clay
NW 18-48-25-2 / 024008	Domestic, W	30/08/1963	28'(8.5m) / SWL Unknown	Sand, clay, sand, clay
NW 07-18-25-2 / 023972	Domestic, W	06/06/1968	34' (10.4m)/ SWL Unknown	Sandy clay, silt, sand, silty clay
NW 07-48-25-2 / 074276	Domestic, W	30/03/1983	40' (12.2 m) / SWL 22' (6.7m)	Topsoil, sand, sand, till, sand, sandy clay, clay
18-48-25-2 / 023997	Domestic, WTH	04/05/1963	38' (11.6m) / SWL Unknown	Clay, sandy clay, clay
SW 19-48-25-2 / 024014	Domestic, WTH	14/04/1964	230' (70.1m) / SWL Unknown	Sandy clay, clay, clay
NE-13-48-26-2 / 024312	Domestic, W	24/08/1963	36' (11m) / SWL 20' (6m)	Topsoil, sand, clay, sand, clay.
NE-18-048-25-W2 / 023998	Domestic, W	17/11/1970	38' (12m) / SWL Unknown	Topsoil, sandy clay, sand, silt
NE-18-048-25-W2 / 023999	Domestic, W	15/06/1968	74' (23m) / SWL Unknown	Clay, clay, sand
NE-18-048-25-W2 / 024000	Domestic, W	28/07/1967	51' (15m) / SWL Unknown	Clay, till, silt, clay
NE-18-048-25-W2 / 024001	Domestic, WTH	27/07/1967	60' (18m) / SWL Unknown	Clay, till, till, silty clay
NE-18-048-25-W2 / 024002	Domestic, WTH	14/05/1966	235' (72m) / SWL Unknown	Sandy clay, clay, sandy clay, clay, sand, clay, clay, clay, clay, clay
NE-18-048-25-W2 / 024003	Domestic, WTH	19/05/1966	190'(58m) / SWL Unknown	Sandy clay, clay, clay, clay, clay, clay, clay
NE-18-048-25-W2 / 024004	Domestic, WTH	20/05/1966	152' (46m) / SWL Unknown	Topsoil, clay, clay, sand, clay

Location / WWDR #	Water Use / Well Use [1]	Date Constructed	Depth of Well/ Static Water Level (SWL)	Lithology List
NE-18-048-25-W2 / 024005	Domestic, WTH	12/05/1964	66’ (20m) / SWL Unknown	Sandy clay, sand, clay, sand, clay, clay, clay
NE-18-048-25-W2 / 024006	Domestic, W	12/05/1964	42’ (13m) / SWL 30’ (9m)	Sandy clay, clay, sandy clay
NE-18-048-25-W2 / 024007	Domestic, WTH	08/11/1962	50’ (15m) / SWL Unknown	Sand, clay, clay
SE-18-048-25-W2 / 024010	Domestic, WTH	08/11/1962	40’ (12m) / SWL Unknown	Sandy clay, clay, clay
-19-048-25-W2 / 098493	Domestic, W	28/09/1989	50’ (15m) / SWL Unknown	Topsoil, clay, sand, clay

Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **GRIMWOOD** WWDR #: **024008**

Well Location

Land Location	**NW-18-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**07**
Elevation (ft)	**1500**	SubBasin:	**29**
Aquifer			

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1963.08.30**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**28**
Bit Dia (in)	**33**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**28**	**33**	**Wood**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

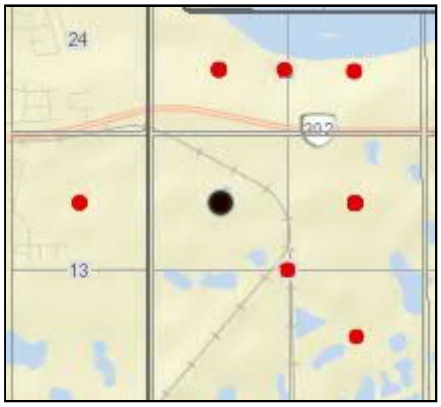
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**42**	deg. F
Rec. Pumping Rate	**30**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
10	Sand	Unknown	Unknown
14	Clay	Yellow	Unknown
21	Sand	Unknown	Unknown
28	Clay	Blue	Unknown



Water Security Agency

Water Well Driller's Report

8-Dec-2020

WSaskWWDR01

Well Name: **GRIMWOOD** WWDR #: **024009**

Well Location

Land Location	**NW-18-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**07**
Elevation (ft)	**1500**	SubBasin:	**29**
Aquifer			

Well Information

Driller	**J GOLA DRILLING**
Completion Date	
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**39**
Bit Dia (in)	**33**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

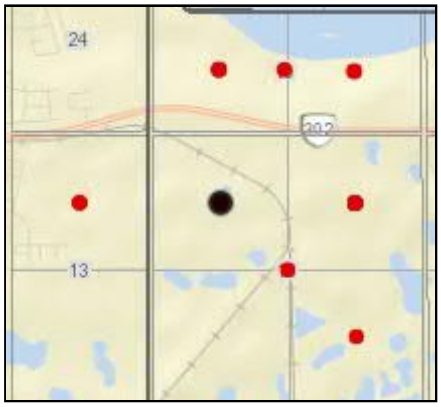
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
6	Sand	Unknown	Unknown
12	Clay	Yellow	Unknown
30	Sand	Unknown	Unknown
39	Clay	Blue	Unknown



Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **GRIMWOOD** WWDR #: **067094**

Well Location

Land Location	**NW-18-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**06**
Elevation (ft)	**1500**	SubBasin:	**30**
Aquifer			

Well Information

Driller	**PRAIRIE WATER LTD**
Completion Date	**1981.06.11**
Hole #	**001**
Install Method	**Bored**
Borehole Depth (ft)	**41**
Bit Dia (in)	**36**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
44	**41**	**36**	**Porous Concrete**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

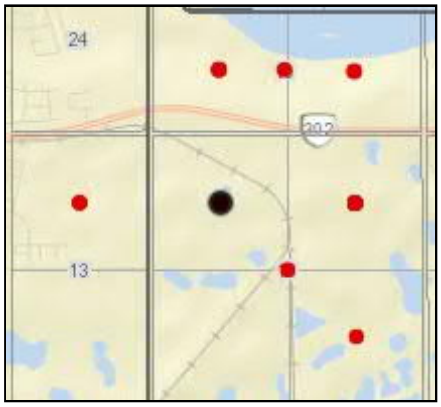
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
1	Topsoil	Unknown	Unknown
21	Clay	Brown	Unknown
34	Sand	Grey	Silty
41	Clay	Blue	Unknown



Water Security Agency

Water Well Driller's Report

8-Dec-2020

WSaskWWDR01

Well Name: **SIWAK** WWDR #: **023998**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**700**	ft from N/S Boundary	**N**
Reserve		**600**	ft from E/W Boundary	**E**
RM:				
NTS Map:	**73H00**	Major Basin:	**06**	
Elevation (ft)	**1500**	SubBasin:	**30**	
Aquifer				

Well Information

Driller	**PRAIRIE WATER LTD**
Completion Date	**1970.11.17**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**38**
Bit Dia (in)	**36**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**38**	**36**	**Porous Concrete**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

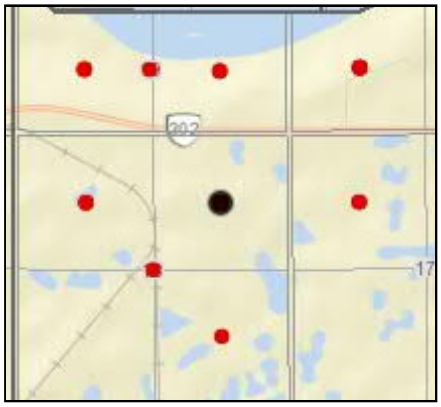
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**6**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
1	Topsoil	Unknown	Unknown
9	Sandy Clay	Brown	Unknown
31	Sand	Grey	Silty
38	Silt	Unknown	Unknown



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **HANSON** WWDR #: **023999**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**250**	ft from N/S Boundary	**N**
Reserve		**1000**	ft from E/W Boundary	**E**
RM:				
NTS Map:	**73H00**	Major Basin:	**06**	
Elevation (ft)	**1500**	SubBasin:	**30**	
Aquifer				

Well Information

Driller	**PRAIRIE WATER LTD**
Completion Date	**1968.06.15**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**74**
Bit Dia (in)	**36**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**74**	**36**	**Porous Concrete**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

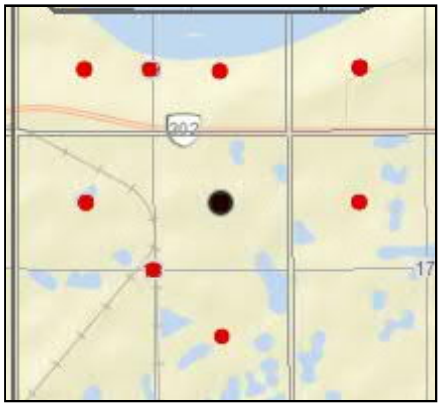
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**1**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
42	Clay	Brown	Unknown
56	Clay	Grey	Unknown
74	Sand	Grey	Silty



Water Security Agency — Water Well Driller's Report

Well Name: **WATTS** WWDR #: **024000**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**450**	ft from N/S Boundary	**N**
Reserve		**1000**	ft from E/W Boundary	**E**
RM:				
NTS Map:	**73H00**	Major Basin:	**06**	
Elevation (ft)	**1500**	SubBasin:	**30**	
Aquifer				

Well Information

Driller	**PRAIRIE WATER LTD**
Completion Date	**1967.07.28**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**51**
Bit Dia (in)	**36**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**51**	**36**	**Porous Concrete**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

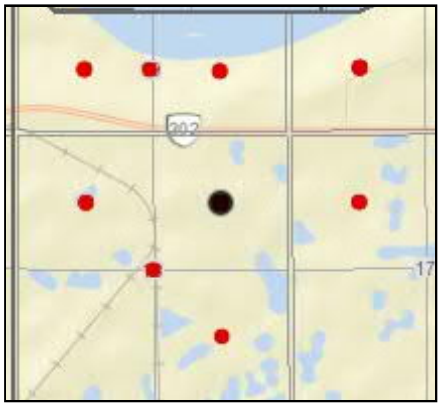
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
21	Clay	Brown	Unknown
31	Till	Grey	Unknown
37	Silt	Brown	Medium
51	Clay	Blue	Unknown



Water Well Driller's Report

Well Name: **WATTS** WWDR #: **024001**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**650**	ft from N/S Boundary	**N**
Reserve		**1000**	ft from E/W Boundary	**E**
RM:				
NTS Map:	**73H00**	Major Basin:	**06**	
Elevation (ft)	**1500**	SubBasin:	**30**	
Aquifer				

Well Information

Driller	**PRAIRIE WATER LTD**
Completion Date	**1967.07.27**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**60**
Bit Dia (in)	**36**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

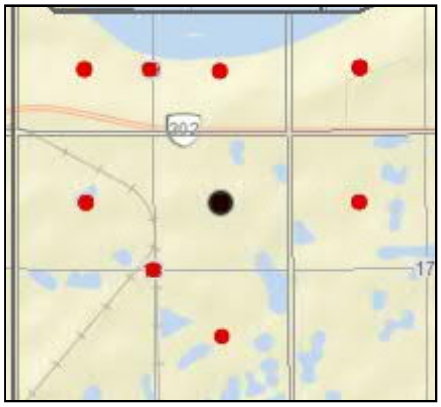
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
23	Clay	Brown	Unknown
35	Till	Grey	Unknown
48	Till	Grey	Silty
60	Silty Clay	Grey	Unknown



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **HANSON** WWDR #: **024002**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**60**	ft from N/S Boundary	**N**
Reserve		**177**	ft from E/W Boundary	**W**
RM:				
NTS Map:	**73H00**	Major Basin:	**07**	
Elevation (ft)	**1475**	SubBasin:	**29**	
Aquifer				

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1966.05.14**
Hole #	**001**
Install Method	**Drilled**
Borehole Depth (ft)	**235**
Bit Dia (in)	**4.8**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

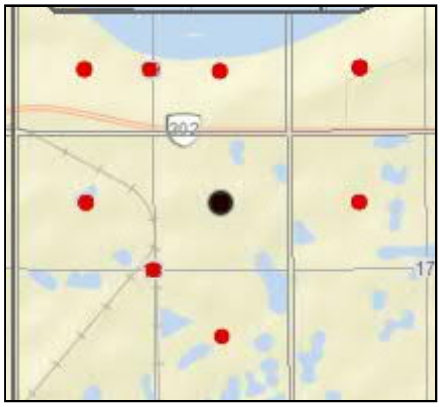
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
10	Sandy Clay	Unknown	Unknown
20	Clay	Yellow	Unknown
40	Sandy Clay	Yellow	Unknown
98	Clay	Blue	Soft
101	Sand	Grey	Fine
110	Clay	Blue	Soft
140	Clay	Blue	Hard
164	Clay	Blue	Hard
190	Clay	Blue	Boulders
235	Clay	Blue	Hard



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **HANSON** WWDR #: **024003**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**06**
Elevation (ft)	**1500**	SubBasin:	**30**
Aquifer			

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1966.05.19**
Hole #	**002**
Install Method	**Drilled**
Borehole Depth (ft)	**190**
Bit Dia (in)	**4.8**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

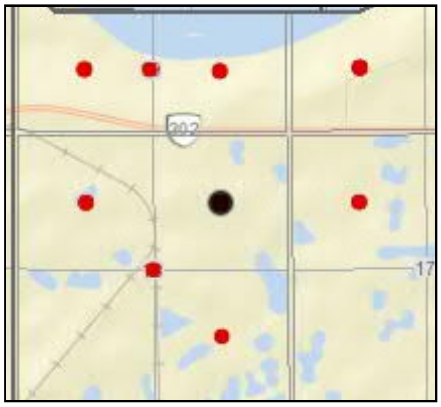
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
30	Sandy Clay	Yellow	Unknown
51	Clay	Blue	Unknown
70	Clay	Blue	Sand Streaks
80	Clay	Blue	Unknown
110	Clay	Blue	Sand Streaks
176	Clay	Blue	Hard
190	Clay	Blue	Boulders



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **HANSON** WWDR #: **024004**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**06**
Elevation (ft)	**1500**	SubBasin:	**30**
Aquifer			

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1966.05.20**
Hole #	**003**
Install Method	**Drilled**
Borehole Depth (ft)	**152**
Bit Dia (in)	**0**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

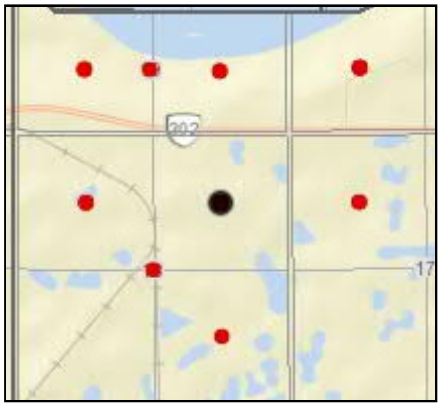
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
1	Topsoil	Unknown	Unknown
19	Clay	Yellow	Unknown
42	Clay	Blue	Unknown
43	Sand	Grey	Fine
152	Clay	Blue	Unknown



Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **CHRISTOPHERSON** WWDR #: **024005**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**06**
Elevation (ft)	**1500**	SubBasin:	**30**
Aquifer			

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1964.05.12**
Hole #	**001**
Install Method	**Bored**
Borehole Depth (ft)	**66**
Bit Dia (in)	**33**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**30**	**Unknown**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

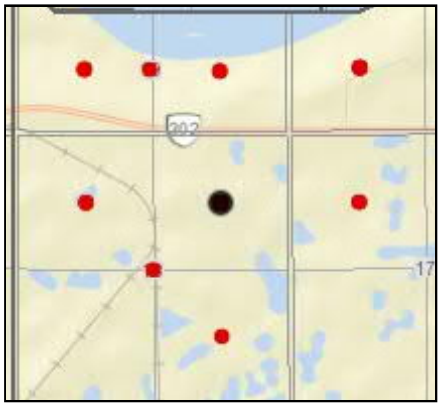
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
10	Sandy Clay	Unknown	Unknown
20	Sand	Unknown	Unknown
30	Clay	Yellow	Unknown
40	Sand	Grey	Unknown
50	Clay	Blue	Unknown
60	Clay	Blue	Sand Streaks
66	Clay	Blue	Unknown



Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **CHRISTOPHERSON** WWDR #: **024006**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**35**	ft from N/S Boundary	**N**
Reserve		**95**	ft from E/W Boundary	**W**
RM:				
NTS Map:	**73H00**	Major Basin:	**07**	
Elevation (ft)	**1500**	SubBasin:	**29**	
Aquifer				

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1964.05.13**
Hole #	**002**
Install Method	**Bored**
Borehole Depth (ft)	**42**
Bit Dia (in)	**33**
Water Level	**30**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**42**	**30**	**Wood**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

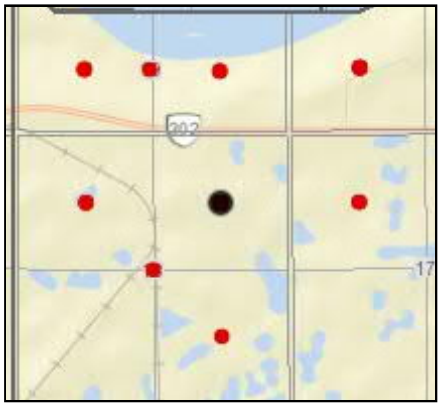
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**41**	deg. F
Rec. Pumping Rate	**30**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
20	Sandy Clay	Unknown	Unknown
29	Clay	Yellow	Unknown
42	Sandy Clay	Unknown	Unknown



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **CHRISTOPHERSON** WWDR #: **024007**

Well Location

Land Location	**NE-18-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**06**
Elevation (ft)	**1490**	SubBasin:	**30**
Aquifer			

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1962.11.08**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**50**
Bit Dia (in)	**33**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

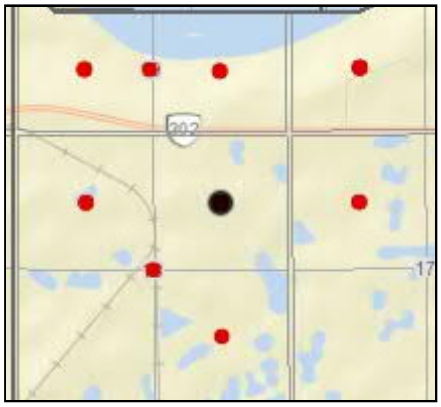
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
10	Sand	Unknown	Unknown
20	Clay	Yellow	Unknown
50	Clay	Blue	Unknown



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **OLESKO** WWDR #: **023972**

Well Location

Land Location	**NW-07-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**550**	ft from N/S Boundary	**N**
Reserve		**600**	ft from E/W Boundary	**W**
RM:				
NTS Map:	**73H00**	Major Basin:	**06**	
Elevation (ft)	**1475**	SubBasin:	**30**	
Aquifer				

Well Information

Driller	**PRAIRIE WATER LTD**
Completion Date	**1968.06.06**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**34**
Bit Dia (in)	**36**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**36**	**36**	**Porous Concrete**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

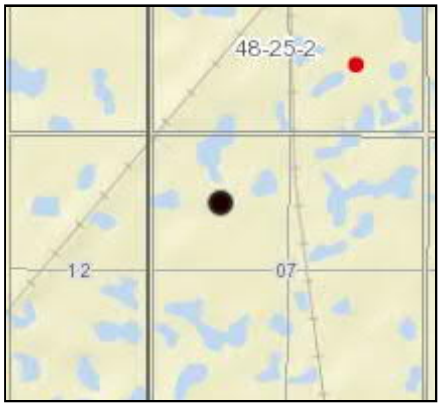
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
23	Sandy Clay	Brown	Unknown
25	Silt	Grey	Unknown
27	Sand	Grey	Silty
36	Silty Clay	Grey	Unknown



Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **OLESKO** WWDR #: **074276**

Well Location

Land Location	**NW-07-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**06**
Elevation (ft)	**1475**	SubBasin:	**30**
Aquifer			

Well Information

Driller	**ANDERSON DRILLING**
Completion Date	**1983.03.30**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**40**
Bit Dia (in)	**42**
Water Level	**22**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Perforated Casing**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
42	**40**	**30**	**Galvanized Iron**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

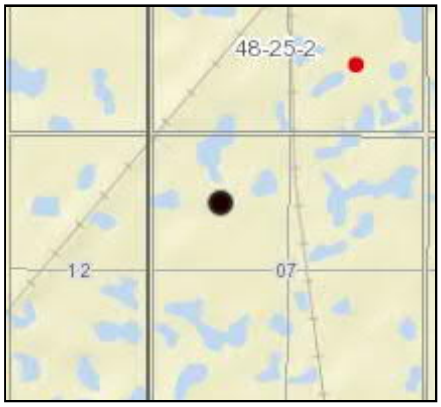
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
22	**36**	**30**	**125**	**Galvanized Iron**
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**1**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
1	Topsoil	Unknown	Unknown
11	Sand	Unknown	Dry
15	Sand	Unknown	Water
22	Till	Grey	Unknown
31	Sand	Grey	Water
34	Sandy Clay	Unknown	Water
40	Clay	Unknown	Unknown



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **RUSSELL** WWDR #: **024312**

Well Location

Land Location	**NE-13-048 -26 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**07**
Elevation (ft)	**1425**	SubBasin:	**29**
Aquifer			

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1963.08.24**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**36**
Bit Dia (in)	**33**
Water Level	**20**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**36**	**33**	**Wood**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

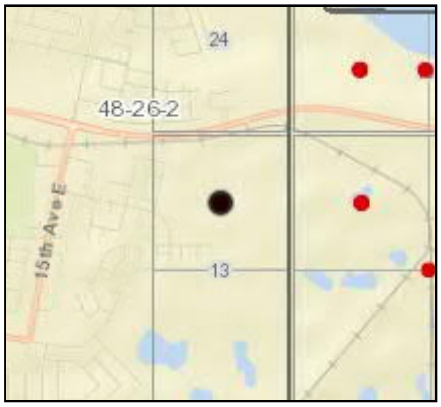
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**42**	deg. F
Rec. Pumping Rate	**70**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
1	Topsoil	Unknown	Unknown
23	Sand	Unknown	Unknown
25	Clay	Blue	Unknown
34	Sand	Unknown	Unknown
36	Clay	Blue	Unknown



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **FOX BILL & ENGE CAROL** WWDR #: **081048**

Well Location

Land Location	**NE-13-048 -26 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**06**
Elevation (ft)	**1475**	SubBasin:	**30**
Aquifer			

Well Information

Driller	**ANDERSON DRILLING**
Completion Date	**1985.05.27**
Hole #	**001**
Install Method	**Bored**
Borehole Depth (ft)	**50**
Bit Dia (in)	**42**
Water Level	**29**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Well Screen And Gravel Pack**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
52	**50**	**30**	**Steel**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

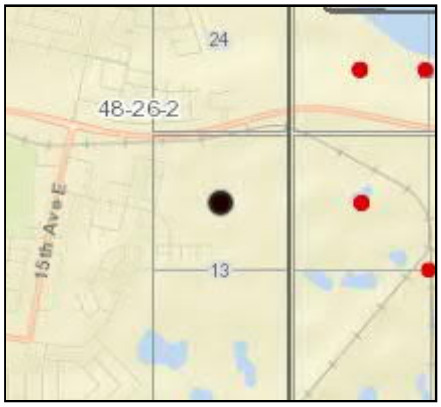
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
24	**50**	**30**	**188**	**Steel Casing**
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**2**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
21	Sandy Clay	Brown	Unknown
29	Clay	Grey	Unknown
33	Sand	Brown	Silty
43	Sand	Grey	Silty
50	Clay	Grey	Unknown



Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **CHRISTOPHERSON** WWDR #: **024010**

Well Location

Land Location	**SE-18-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**06**
Elevation (ft)	**1475**	SubBasin:	**30**
Aquifer			

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1962.11.08**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**40**
Bit Dia (in)	**33**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

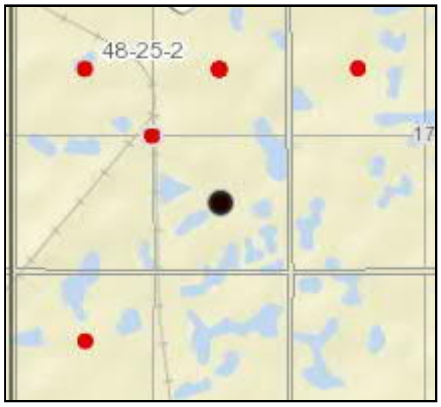
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
10	Sandy Clay	Yellow	Unknown
30	Clay	Yellow	Unknown
40	Clay	Blue	Unknown



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **RUSZKOWSKI** WWDR #: **012742**

Well Location

Land Location	**SW-19-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**07**
Elevation (ft)	**1450**	SubBasin:	**29**
Aquifer			

Well Information

Driller	**PRAIRIE WATER LTD**
Completion Date	**1974.07.29**
Hole #	**001**
Install Method	**Bored**
Borehole Depth (ft)	**68**
Bit Dia (in)	**36**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**68**	**36**	**Porous Concrete**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

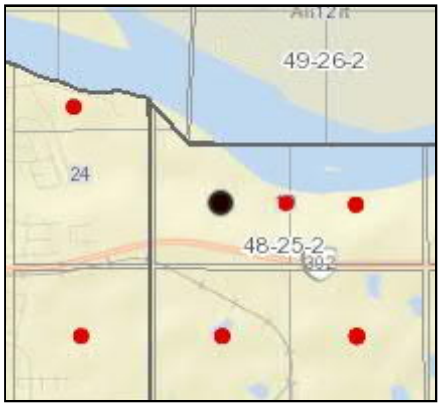
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
1	Topsoil	Unknown	Unknown
10	Clay	Yellow	Unknown
16	Sand	Yellow	Unknown
29	Clay	Unknown	Hard
68	Clay	Unknown	Silty



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **RUSZKOWSKI** WWDR #: **012743**

Well Location

Land Location	**SW-19-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**07**
Elevation (ft)	**1450**	SubBasin:	**29**
Aquifer			

Well Information

Driller	**PRAIRIE WATER LTD**
Completion Date	**1974.07.30**
Hole #	**003**
Install Method	**Bored**
Borehole Depth (ft)	**32**
Bit Dia (in)	**36**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Curbed**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**32**	**36**	**Porous Concrete**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

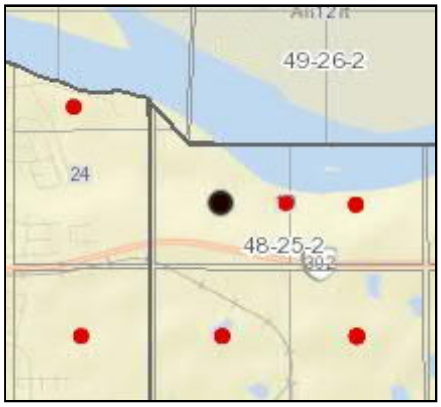
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
6	Clay	Yellow	Unknown
9	Sand	Unknown	Unknown
23	Clay	Yellow	Unknown
25	Sand	Yellow	Unknown
32	Clay	Yellow	Unknown



Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **RUSZKOWSKI** WWDR #: **012744**

Well Location

Land Location	**SW-19-048 -25 -W2**	Location of Well (in Quarter)	
LSD	**00**	**0** ft from N/S Boundary	
Reserve		**0** ft from E/W Boundary	
RM:			
NTS Map:	**73H00**	Major Basin:	**07**
Elevation (ft)	**1450**	SubBasin:	**29**
Aquifer			

Well Information

Driller	**PRAIRIE WATER LTD**
Completion Date	**1974.07.30**
Hole #	**002**
Install Method	**Bored**
Borehole Depth (ft)	**32**
Bit Dia (in)	**36**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

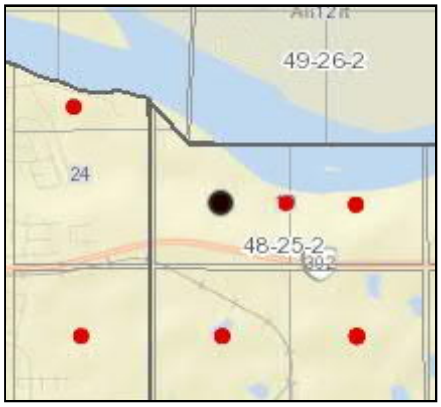
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
15	Clay	Yellow	Unknown
22	Clay	Blue	Unknown
26	Silt	Grey	Unknown
32	Clay	Blue	Unknown



Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **FRACK** WWDR #: **024014**

Well Location

Land Location	**SW-19-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**150**	ft from N/S Boundary	**S**
Reserve		**300**	ft from E/W Boundary	**W**
RM:				
NTS Map:	**73H00**	Major Basin:	**07**	
Elevation (ft)	**1580**	SubBasin:	**29**	
Aquifer				

Well Information

Driller	**HERON WATER WELL DRILLING LTD**
Completion Date	**1964.04.14**
Hole #	
Install Method	**Drilled**
Borehole Depth (ft)	**230**
Bit Dia (in)	**0**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

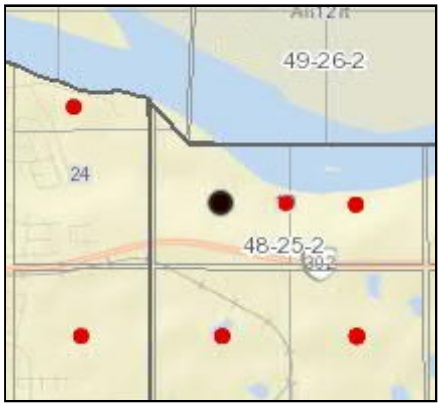
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
35	Sandy Clay	Brown	Unknown
170	Clay	Blue	Soft
230	Clay	Blue	Hard



Water Security Agency

Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **WATTS** WWDR #: **023997**

Well Location

Land Location	**-18-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**900**	ft from N/S Boundary	**S**
Reserve		**400**	ft from E/W Boundary	**W**
RM:				
NTS Map:	**73H00**	Major Basin:	**06**	
Elevation (ft)	**1475**	SubBasin:	**30**	
Aquifer				

Well Information

Driller	**J GOLA DRILLING**
Completion Date	**1963.05.04**
Hole #	
Install Method	**Bored**
Borehole Depth (ft)	**38**
Bit Dia (in)	**30**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Water Test Hole**
Completion Method	
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
0	**0**	**0**	
0	**0**	**0**	
0	**0**	**0**	

Well Screens

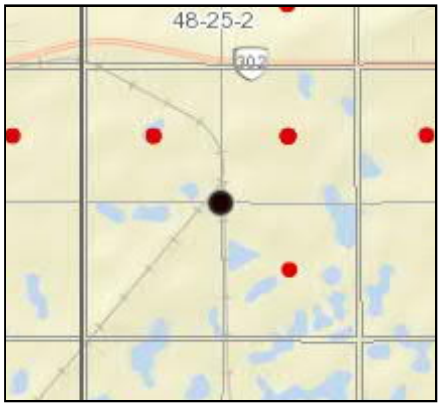
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**0**	igpm
Temperature	**43**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
20	Clay	Yellow	Unknown
30	Sandy Clay	Yellow	Unknown
40	Clay	Blue	Unknown



Water Well Driller's Report

8-Dec-2020
WSaskWWDR01

Well Name: **DODGE** WWDR #: **098493**

Well Location

Land Location	**-19-048 -25 -W2**	Location of Well (in Quarter)		
LSD	**00**	**200**	ft from N/S Boundary	**N**
Reserve		**600**	ft from E/W Boundary	**E**
RM:				
NTS Map:	**73H00**	Major Basin:	**06**	
Elevation (ft)	**1500**	SubBasin:	**30**	
Aquifer				

Well Information

Driller	**DELTA BORING**
Completion Date	**1989.09.28**
Hole #	**1**
Install Method	**Bored**
Borehole Depth (ft)	**50**
Bit Dia (in)	**0**
Water Level	**0**
Flowing Head	**0**
Water Use	**Domestic**
Well Use	**Withdrawal**
Completion Method	**Perforated Casing**
E-Log	**No**

Well Casings

Length (ft)	Btm (ft)	Dia (in)	Material
52	**50**	**30**	**Steel**
0	**0**	**0**	
0	**0**	**0**	

Well Screens

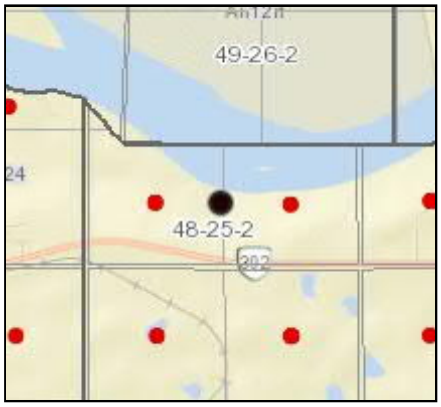
Length (ft)	Bottom (ft)	Dia (in)	Slot (in)	Material
15	**50**	**30**	**60**	**Galvanized Iron**
0	**0**	**0**	**0**	
0	**0**	**0**	**0**	

Pump Test

Draw Down	**0**	ft
Duration	**0**	hrs
Pumping Rate	**2**	igpm
Temperature	**0**	deg. F
Rec. Pumping Rate	**0**	igpm

Lithology List

Depth (ft):	Material	Colour	Description
2	Topsoil	Unknown	Unknown
15	Clay	Yellow	Unknown
17	Sand	Unknown	Water
50	Silt	Unknown	Water



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Appendix

D

Saskatchewan Conservation Data Center

Project Screening Report

Notes: Prince Albert Crescent Acres

Report Generated
12/03/2020

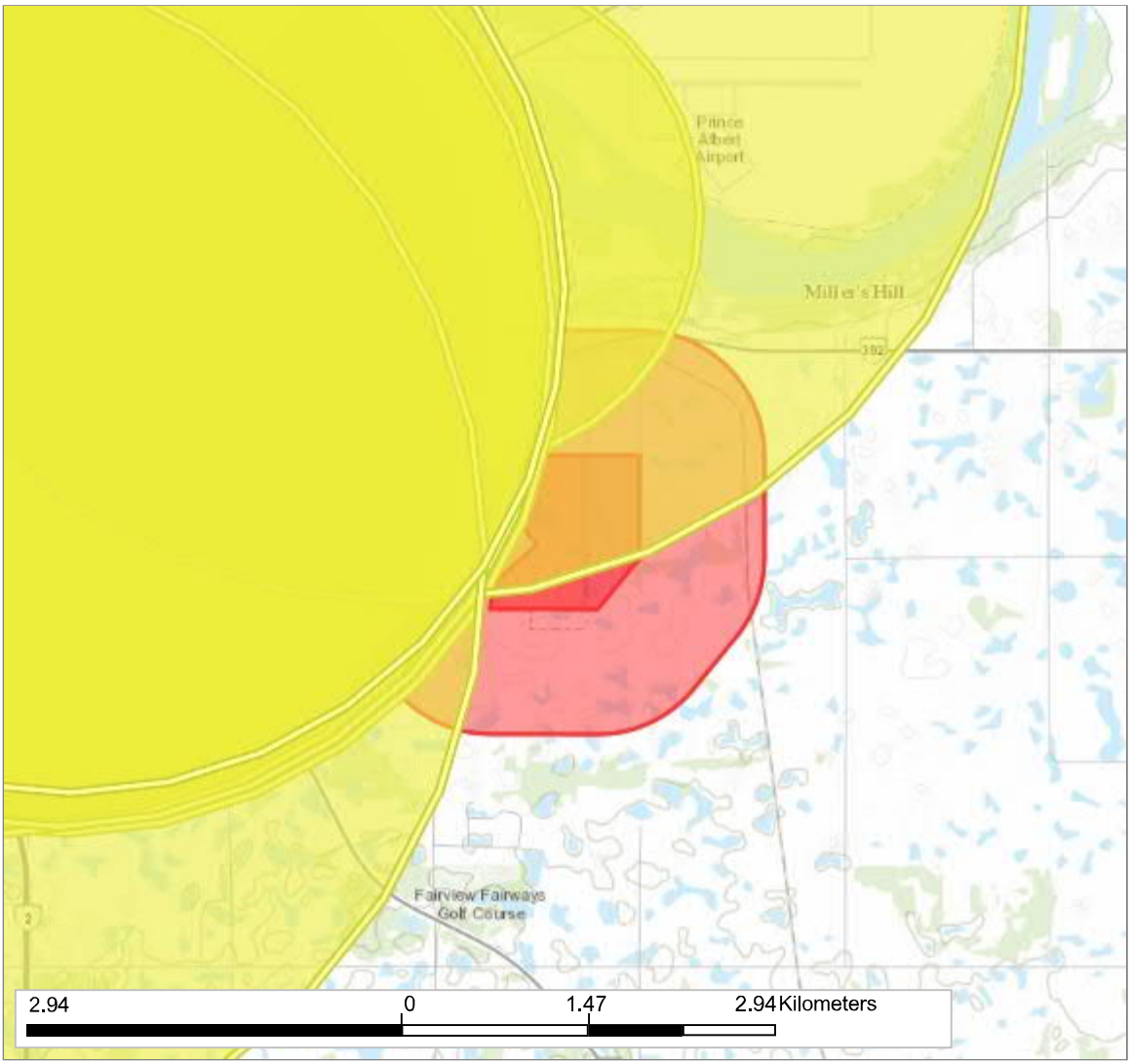
Map Information

Buffer Size:

1000 Meters

Coordinates:
Lat: 53.18584° N
Lon: -105.69706° W

Area of Interest



Screened Areas:

- Ecological Management Specialist (EMS) District
- Compliance & Field Service Area
- Compliance & Field Service (CFS) Region
- Area Fisheries Ecologists
- Area Wildlife Ecologists
- Rural Municipality
- Indian Reserve
- Rare and Endangered Species
- Fish Species
- Woodland Caribou Range
- Species Predictive Models
- Whooping Crane Corridor
- Federal Critical Habitat
- Emergency Protection Order
- Wind Energy Avoidance Zones
- Important Natural Areas
- Provincial Parks
- Recreation Sites
- Game Preserves
- National Wildlife Areas
- Federal Pastures
- Community Pastures
- Wildlife Habitat Protection Act Lands
- Fish & Wildlife Development Fund Lands
- Migratory Bird Sanctuary
- Wildlife Refuge
- Conservation Easements
- Crown Conservation Easements
- Ecological Reserves
- Ramsar Wetlands
- Reservoir Development Areas
- Representative Areas

Project Screening Report

Species Likely to be Present

Known Species

"Known" species are species that have known occurrences in the area from the Saskatchewan Conservation Data Centre's Rare and Endangered Species map layer. However, absence of species observation records does not preclude the existence of species in the area of interest. Observations may simply not have been recorded for the given area or may not have yet been entered into the ministry data holdings – new observation records are continuously being discovered. Information accessible through HABISask is not intended to be a definitive statement on the presence, absence or status of a species within a given area, nor as a substitute for onsite surveys.

Rare and Endangered Species

Category: Vascular Plant

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
American Bugseed	*Corispermum americanum var. americanum*	G5?T5?	N4?	S3			
Bristly Gooseberry	*Ribes oxyacanthoides var. setosum*	G5T4T5	N2	S2			
Hyssop-leaved Fleabane	*Erigeron hyssopifolius*	G5	N5	S3			
Large White-flowered Ground-cherry	*Leucophysalis grandiflora*	G4?	N3N4	S3			
Mucronate Blue-eyed-grass	*Sisyrinchium mucronatum*	G5	N4	S3			
Pallas' Bugseed	*Corispermum pallasii*	G4?	N4	S2			
Short-stemmed Thistle	*Cirsium drummondii*	G5	N5	S3			

Category: Vertebrate Animal

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
Little Brown Myotis	*Myotis lucifugus*	G3	N2N4B, NNRN, NNRM	S4B,S4N	Endangered	Endangered	

Fish Atlas

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations

Expected Species

"Expected" is based on a modelled prediction if a species might occur in areas based upon developed statistical relationships between local and landscape characteristics and species presence. Models utilized by this report have only been created in the prairie ecozone for a selection of species. The boreal plain, boreal shield and taiga shield will not return any expected species results. Models are not a substitute for on the ground surveys to determine species presence.

Species Predictive Models

Category:

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
No Species Found (*note, predictive model results are for the prairie ecozone only.)							

Whooping Crane Corridor 95% Core Area

Woodland Caribou Habitat

Detailed information concerning woodland caribou habitat, administration units and Caribou Habitat Management areas is provided below.

Currently, information on woodland caribou habitat potential is not available in this report, but users are encouraged to view the dataset "Woodland Caribou Habitat Potential" to determine whether your project falls within high, moderate or low caribou habitat potential areas.

Caribou Conservation Unit(s): Nothing found

Caribou Administrative Unit(s): Nothing found

Caribou Habitat Management Area Tier category: Nothing found

Species with Critical Habitat Present

This dataset displays the geographic areas within which federal Critical Habitat for species at risk listed on Schedule 1 of the federal Species at Risk Act (SARA) occurs in Saskatchewan. Please be aware that not all of the area within these boundaries is necessarily Critical Habitat. To determine if a specific area is Critical Habitat and if your activity might be considered "destruction" of Critical Habitat, other information available in each individual species' Recovery documents (http://www.sararegistry.gc.ca) need to be considered, including biophysical attributes and activities likely to result in destruction of Critical Habitat.

Note that recovery documents (and therefore Critical Habitat) may be amended from time to time. Species are added as the data becomes ready, which may occur after the recovery document has been posted on the SAR Public Registry. Although HABISask will try to provide the latest data, the SAR Public Registry should always be considered as the official source for Critical Habitat information.

Common Name	Scientific Name:	G Rank	N Rank	S Rank	COSEWIC	SARA Status	Wild Species at Risk Regulations
No Critical Habitat found							

Emergency Protection Order

This dataset is comprised of areas under the federal Emergency Order for the Protection of the Greater Sage-Grouse in Canada. The exterior extent polygons are derived from the detailed dataset of the Government of Canada Emergency Order dataset. For specific information regarding the order and the prohibitions set out in the Emergency Order please consult the official documents on the Species at Risk Registry (sararegistry.gc.ca)

Common Name	Scientific Name
No species found	

Important Natural Areas

Important Natural Areas are sites in Saskatchewan that are considered to have conservation significance, but are not necessarily legally protected.

Name	Type
Nothing Found	

Wind Turbine Avoidance Zones Present

The Wind Energy Avoidance Zones were designed to enhance environmental protection and provide more certainty to future wind energy developments. These guidelines clearly identify environmentally sensitive areas that should be avoided for projects that include the siting of wind turbines but can be helpful in siting any development project. The complete report entitled, Wildlife Siting Guidelines for Saskatchewan Wind Energy Projects, can be found on the Government of Saskatchewan website or by selecting the following link: https://publications.saskatchewan.ca/#/categories/78

Land Type
North and South Saskatchewan Rivers

Managed Areas

Managed areas are a diverse collection of lands and waters on which the conservation of biodiversity and ecosystem function are among the goals of the land management programs. Each of the unique or sensitive landscapes, within the network of managed areas, have some level of protection or activity restrictions placed on them by legislation, agreement or policy. These lands include provincial and national parks, ecological reserves, wildlife lands, game preserves, conservation easements and other privately held stewardship lands.

Conservation Easement	***Migratory Bird Sanctuary***	***Representative Area Ecological Reserve***
Nothing Found	Nothing Found	Nothing Found
Crown Conservation Easement	***National Wildlife Area***	***Reservoir Development Area***
Nothing Found	Nothing Found	Nothing Found
Ecological Reserve	***Provincial Park***	***Wildlife Habitat Protection Act (WHPA)***
Nothing Found	Nothing Found	Nothing Found
Fish & Wildlife Development Fund (FWDF)	***Provincial Pasture***	***Wildlife Refuge***
Nothing Found	Nothing Found	Nothing Found
Former Federal Pasture	***Ramsar Wetland***	
Nothing Found	Nothing Found	
Game Preserve	***Recreation Site***	
Nothing Found	Nothing Found	

Rare and Endangered Species Occurrences

The absence of information provided by the Saskatchewan Conservation Data Centre (SKCDC) does not categorically mean the absence of sensitive species or features. The quantity and quality for data collected by the SKCDC are dependent on the research and observations of many individuals and organizations. SKCDC reports summarize the existing natural heritage information, known to the SKCDC, at the time of the request.

SKCDC data should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The user therefore acknowledges that the absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Occurrence ID: 9113 **First Observation:** 1896-06-29
Occurrence Class: Vascular Plant **Last Observation:** 1937-09-07
Scientific Name: Cirsium drummondii
Common Name: Short-stemmed Thistle
Occurrence Rank: H - Historical
General Description: 1. DAMP GROUND. 2. ON OPEN DAMP PRAIRIE 3. RICH PRAIRIE
Occurrence Data: 1896 nad 1937 revisit - species observed in 1 site (3 sites mapped as 1)
Directions: Prince Albert Area

Occurrence ID: 16074 **First Observation:** 1938-08-30
Occurrence Class: Vascular Plant **Last Observation:** 1941-08-31
Scientific Name: Corispermum americanum var. americanu
Common Name: American Bugseed
Occurrence Rank: H - Historical
General Description:
Occurrence Data: 1938 - species observed in 1 site 1941 - species observed in 1 site (revisit?)
Directions: Prince Albert

Occurrence ID: 16101 **First Observation:** 1941-08-31
Occurrence Class: Vascular Plant **Last Observation:** 1942-08-20
Scientific Name: Corispermum pallasii
Common Name: Pallas' Bugseed
Occurrence Rank: H - Historical
General Description:
Occurrence Data: 1941- species observed in 1 site 1942- species observed in 1 site (revisit?)
Directions: Prince Albert

Occurrence ID: 16640 **First Observation:** 1955-08-06
Occurrence Class: Vascular Plant **Last Observation:** 1955-08-06
Scientific Name: Erigeron hyssopifolius
Common Name: Hyssop-leaved Fleabane
Occurrence Rank: H - Historical
General Description:
Occurrence Data: 1955 - species observed in 1 site
Directions: Prince Albert

Occurrence ID: 3373 **First Observation:** 1907-08-24
Occurrence Class: Vascular Plant **Last Observation:** 1963-06-25
Scientific Name: Leucophysalis grandiflora
Common Name: Large White-flowered Ground-cherry
Occurrence Rank: H - Historical
General Description: Bare sandy ridge, with Phacelia,Lilium and Hustonia.
Occurrence Data: 4 historical sites around Prince Albert 1907: specimen collected - pine bush 1919: specimen collected - sandy roadside 1926: specimen collected - no details 1963: specimen collected - sandy ridge
Directions: Rough locations of habitat described as 2 miles N of Prince Albert, above N. Saskatchewan River. and E of Prince Albert

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Occurrence ID: 16695
First Observation: 1905-07-18
Occurrence Class: Vascular Plant
Last Observation: 1905-07-18
Scientific Name: Ribes oxyacanthoides var. setosum
Common Name: Bristly Gooseberry
Occurrence Rank: H - Historical
General Description:
Occurrence Data: 1905 - species observed in 1 site
Directions: Prince Albert

Occurrence ID: 16731
First Observation: 1942-06-07
Occurrence Class: Vascular Plant
Last Observation: 1942-06-07
Scientific Name: Sisyrinchium mucronatum
Common Name: Mucronate Blue-eyed-grass
Occurrence Rank: H - Historical
General Description:
Occurrence Data: 1942 - species observed in 1 site
Directions: Prince Albert

Occurrence ID: 9999101079
First Observation: 1987-06-23
Occurrence Class: Vertebrate Animal
Last Observation: 1999-08-05
Scientific Name: Myotis lucifugus
Common Name: Little Brown Myotis
Occurrence Rank:
General Description: Species detected (1987, 1999)
Occurrence Data:
Directions: PRINCE ALBERT

Wild Species Research Permitting

A Research Permit is required to detect or observe plants or wildlife for commercial purposes, such as pre-screening surveys to collect baseline data or other activities, or to conduct academic research. Research Permits are not required if you are doing surveys for personal, recreational, educational or other non-commercial purposes. Revisions were made to Section 21 of The Wildlife Act in 2015 and to Section 6.2 of The Wildlife Regulations in 2016.

See the Government of Saskatchewan Wild Species Research Permitting page for more information.

All forms and related information pertaining to Research Permits can be found in the Publications Centre. Be sure to check out the Conservation Standards Terms and Conditions for Research Permits for general, wildlife and research-specific and information submission conditions that pertain to all research permits.

Subscribe to our Mail-out List Subscriptions for updates regarding Species Detection Permits, SKCDC Lists and Ranks, Legislation and Policy and HABISask.

Species Detection Survey Protocols

The Species Detection Survey Protocols are used to detect rare and sensitive species so Activity Restriction Guidelines can be applied. Their use is required by industry/ environmental consultants for proposed or existing commercial activities.

Activity Restriction Guidelines for Sensitive Species

The Activity Restriction Guidelines for Sensitive Species outline restricted activity periods and distance setbacks for rare and sensitive species to assist proponents in minimizing

impacts to rare and sensitive species and habitats.

Administrative Areas

11	Ecological Management Specialist (EMS) District(s)
Prince Albert	Compliance and Field Services Area(s)
Prince Albert	Compliance and Field Services Region(s)
Prince Albert	Area Fisheries Ecologist Area(s)
PRINCE ALBERT	Area Wildlife Ecologist(s)
461 - PRINCE ALBERT	Rural Municipality
Nothing Found	First Nation Reserve

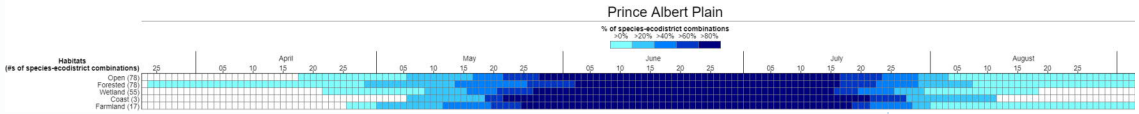
Contact Us

For more information, please contact our Client Service Office:
Email: centre.inquiry@gov.sk.ca
Tel (toll free in North America): 1-800-567-4224
Tel (Regina): 306-787-2584

Nesting Calendar Query Tool

Project NestWatch

Select Birds (311) | Select Locations (1) | Configure Calendar | View Calendar | Instructions | About | Warning



Right click the calendar and select "Save image as..."

Save the calendar as a PNG

AECOM Imagine it. Delivered.

Appendix

E

Heritage Potential Screening Letter

Saskatchewan

Ministry of
Tourism, Parks,
Culture and Sport

Heritage Resources Branch
9th Floor 1919 Saskatchewan Dr.
Regina, Saskatchewan
S4P 4H2

(306) 787-2848
jennifer.thompson@gov.sk.ca

August 30, 2011

Our File: 11-1753

Mr. Bryce Bell
AECOM
200 – 2100 8th Street East, PO Box 539
SASKATOON SK S7H 0V1

Dear Mr. Bell:

RE: City of Prince Albert – Crescent Acres Stage V, VI and VII (Your File: 60220943)
N ½ 12-48-26-W2M and S ½ 13-48-26-W2M;
HERITAGE RESOURCE REVIEW

Thank you for referring this project to our office for review.

In determining the need for, and scope of, heritage resource impact assessment (HRIA) pursuant to S. 63 of *The Heritage Property Act*, the following factors were considered: the presence of previously recorded heritage sites, the area's overall heritage resource potential, the extent of previous land disturbance, and the scope of new proposed land development.

There are no recorded heritage sites located in conflict with the proposed project. As well, the project is mostly located in areas that have been disturbed previously by cultivation or by development. The potential for heritage sites to be adversely affected by this project is low. Our office has no concerns with the project proceeding as planned.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Jennifer Thompson.

Dr. Jennifer A. Thompson
Archaeologist
Archaeological Resource Management

AECOM Imagine it. Delivered.

Appendix

F

CANP Survey

Crescent Acres Neighbourhood Plan Survey

Introduction

In 2013, the Crescent Acres Neighbourhood - Stage 5, 6 and 7 Land Study was prepared. This plan was primarily an engineering study that mapped out the future development of the water and sewer systems, transportation network, residential lots, and the park space in the remaining undeveloped portion of Crescent Acres. Although the plan was completed, it did not proceed beyond the draft stage to public consultation and it was not adopted by City Council. The City is now in the process of updating this plan, ensuring it meets current municipal standards, with the intention of having it formally adopted.

Within the updated Crescent Acres Neighbourhood Plan there will be two maps that show what the future neighbourhood may look like. One was created in 2013 (the Official Land Use Map), and the other was prepared more recently (the Alternative Land Use Map). The Official Land Use Map will be the map the City uses once the plan is adopted. The Alternative Land Use Map will be the map the City uses to guide future changes to the plan. The feedback received on the Alternative Land Use Map will indicate what elements require further study or amendment.

The two maps below show the undeveloped portion of Crescent Acres. The map on the left is the Official Land Use Map. The map on the right is the Alternative Land Use Map. Each of the coloured areas represents a type and density of land use:

Light Yellow: Low Density Residential (one and two unit dwellings, typical of the majority of existing homes in Crescent Acres);

Dark Yellow: Medium Density Residential (allows for a greater variety of housing styles, from one unit dwellings to fourplexes or townhouses);

Orange: High Density Residential (allows for the full spectrum of housing types, from one unit dwellings up to apartment buildings);

Green: Parks and Open Spaces (allows for large parks as well as small buffer strips);

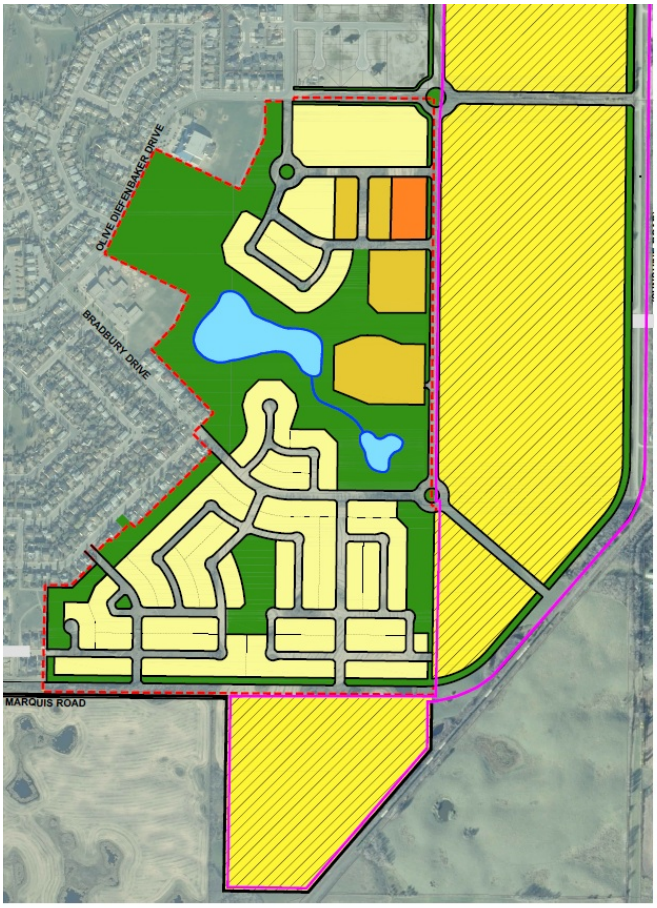
Blue: Public Utilities (stormwater pond in the centre of the neighbourhood);

Yellow with Diagonal Hatching: Future Residential (holding this land for future residential use with no development plan at this time); and

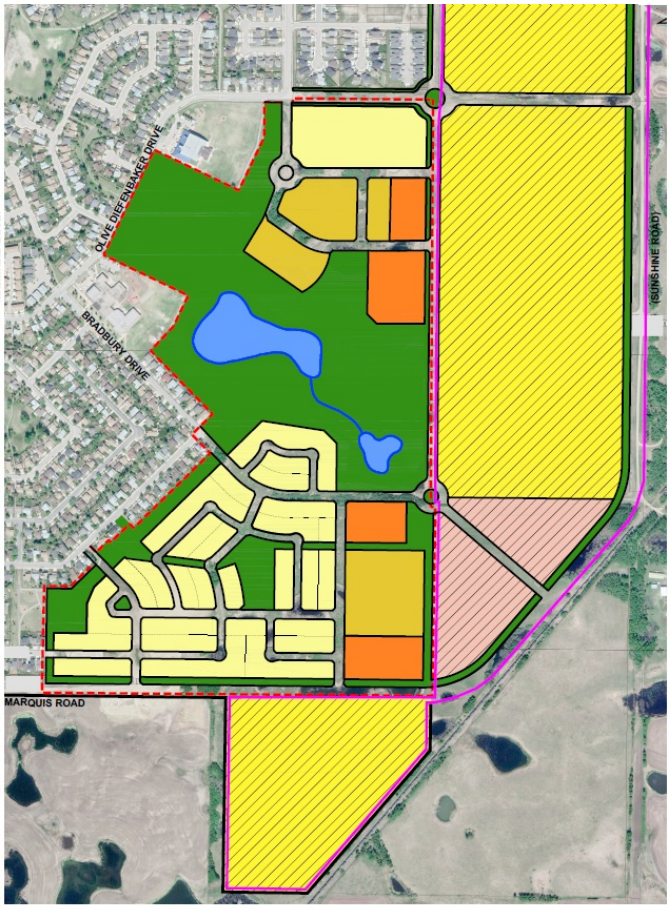
Pink with Diagonal Hatching: Future Commercial Mixed Use (holding this land for

future commercial use with no development plan at this time).

Official and Alternative Land Use Maps



Official Land Use Map



Alternative Land Use Map

Question No. 1 - Housing Density

Low Density Residential

Low Density Residential Areas on the above maps are shown by the following colour:

Medium Density Residential

Medium Density Residential Areas on the above maps are shown by the following colour:

High Density Residential

High Density Residential Areas on the above maps are shown by the following colour:

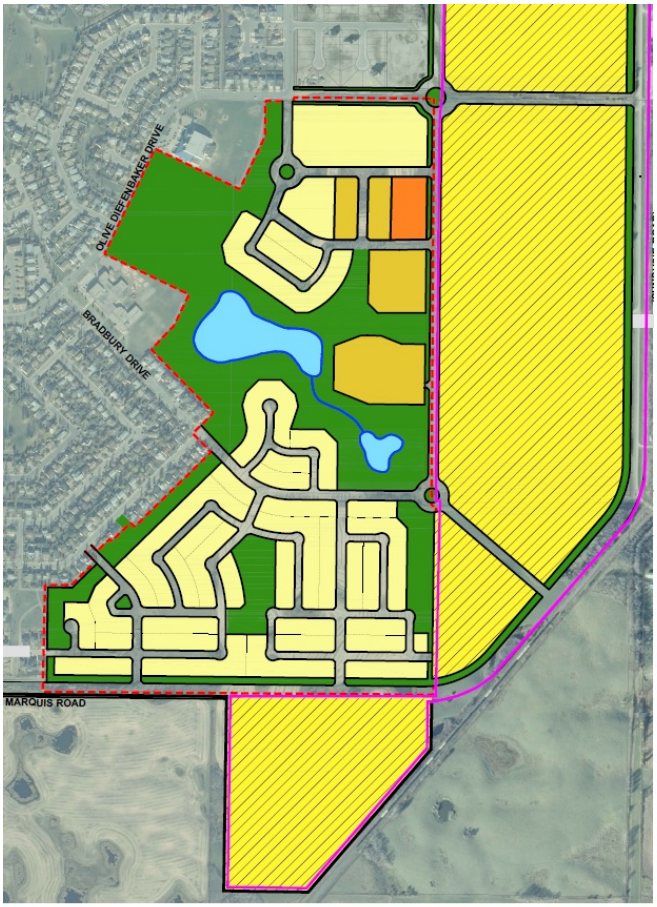
1. The Alternative Land Use Map (on the right above) proposes a greater mix of residential land uses by including more purposeful space for medium and high density residential development (dark yellow and orange on the map). This means there would be more opportunity for a variety of housing styles in certain areas within the neighbourhood.

Based on the information above, please rate your level of satisfaction with the changes made to the mix and location of residential development opportunities (dark yellow and orange on the map) shown on the Alternative Land Use Map.

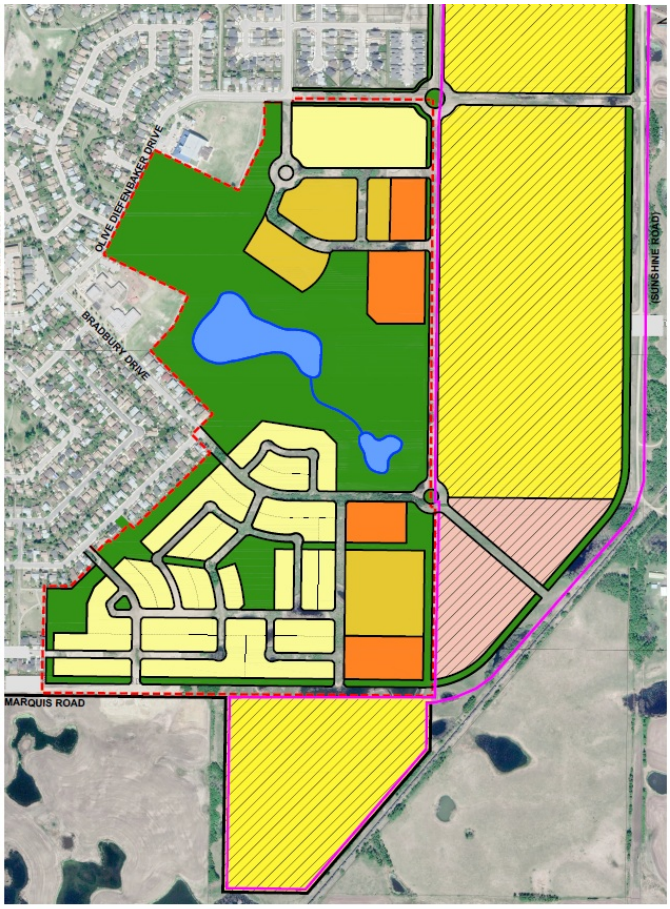
- ○ Very satisfied
- ○ Satisfied
- ○ Neither satisfied nor dissatisfied
- ○ Dissatisfied
- ○ Very dissatisfied
- ○ None of the above

Please provide any comments to explain your level of satisfaction with the mix of residential land use.

Question No. 2 - Park Space



Official Land Use Map



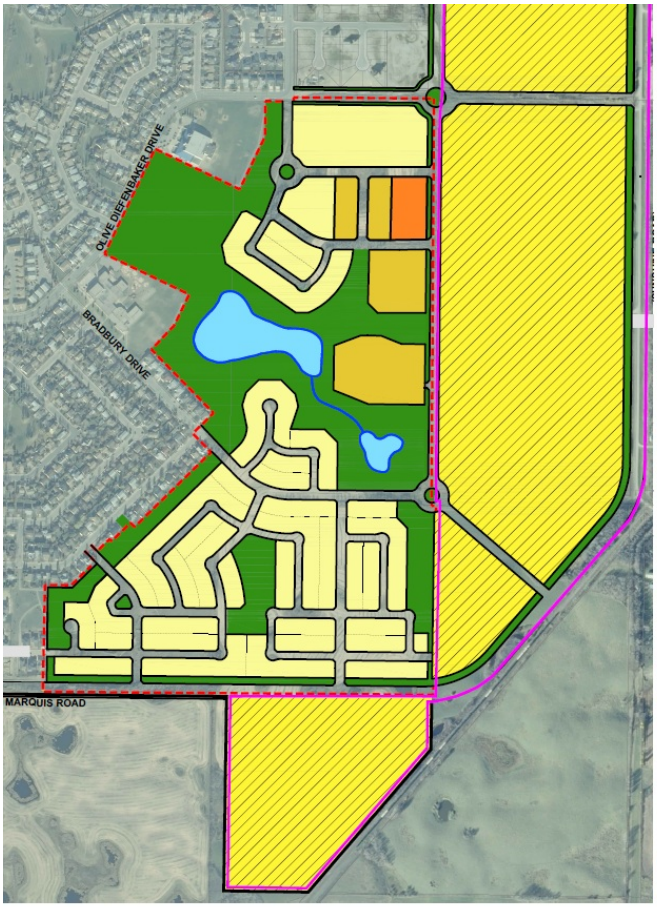
Alternative Land Use Map

2. The Alternative Land Use Map (on the right) shows an increase in the amount of park space provided compared to the Official Land Use Map (on the left). The increase in park space was achieved by removing some residential development areas surrounding the stormwater pond. The Alternative Land Use Map also shows additional linear park space (an open pedestrian pathway similar to the one on Smiley Drive) that runs east and west through the southern half of the neighbourhood.

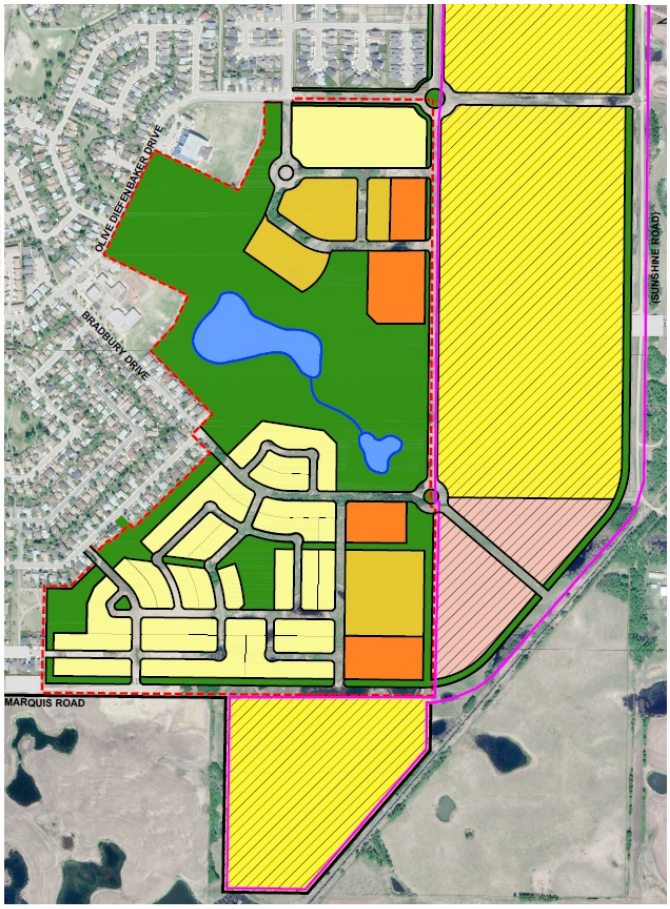
The City is looking for feedback on the size and possible development of the large park space, located at the centre of the neighbourhood. Please select from the list the elements you would like to see in the Crescent Acres park.

- [ ] Play structure and spray park
- [ ] Multi-purpose sports fields and toboggan hill
- [ ] Trail system and naturalized areas with native plants
- [ ] Increased use of the pond (fishing, skating, kayaking)
- [ ] Space for public events and entertainment
- [ ] Other (please specify)

Question No. 3 - Future Commercial Area



Official Land Use Map



Alternative Land Use Map

3. The Alternative Land Use Map (on the right) shows the creation of a Future Commercial Mixed Use area in the southeast corner of the neighbourhood. If this commercial area were to be developed, examples of future businesses could include hair salons, convenience stores, offices, restaurants, medi-clinics, gas stations or emergency services (fire, ambulance).

Based on this information and the maps above, please rate your level of satisfaction with the location and the amount of commercial space shown.

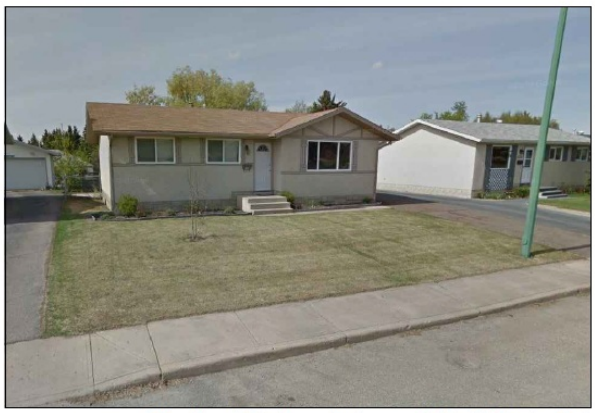
- ○ Very satisfied
- ○ Satisfied
- ○ Neither satisfied nor dissatisfied
- ○ Dissatisfied
- ○ Very dissatisfied
- ○ None of the above

Please provide any comments to explain your level of satisfaction with the proposed commercial area.

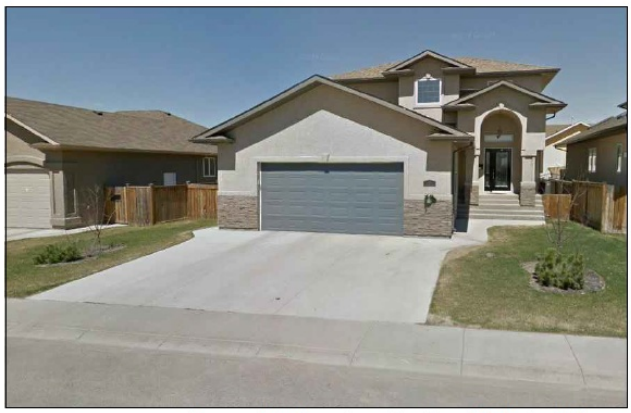
Question No. 4 - Lot Sizes

Below are examples in Prince Albert of various lot sizes

Small lot sizes (less than 40 feet wide)



Medium lot sizes (between 40 to 60 feet wide)



Large lot sizes (greater than 60 feet wide)

4. While the size of the lots is not visible on the land use maps above, the City has heard from the public in the past that there is a desire for a greater variety of lot sizes, ranging from small (lots smaller than 40 feet), to medium (lots between 40-60 feet), up to large (lots larger than 60 feet). A greater variety of lot sizes means that there would also be a greater variety of lot prices.

Based on this information, what size of lots would you like to see developed in the neighbourhood? Please select all that apply.

- [ ] Small lots (smaller than 40 feet)
- [ ] Medium lots (lots between 40-60 feet)
- [ ] Large lots (lots larger than 60 feet)

Please provide any comments about the mix of lot sizes you would like to see in the neighbourhood.

5. Final Thoughts - Do you have any questions, comments, or concerns related to the proposed future land use map for the Crescent Acres neighbourhood?

6. Resident Information - What neighbourhood do you live in?

- ○ Carlton Park
- ○ Crescent Acres
- ○ Crescent Heights
- ○ East Flat
- ○ East Hill
- ○ Goshen
- ○ Hazeldell
- ○ Midtown
- ○ Nordale
- ○ River Heights
- ○ Riverview
- ○ Southwood
- ○ West Flat
- ○ West Hill
- ○ Westview
- ○ Other (please specify)

7. Resident Information - Do you rent or own your home?

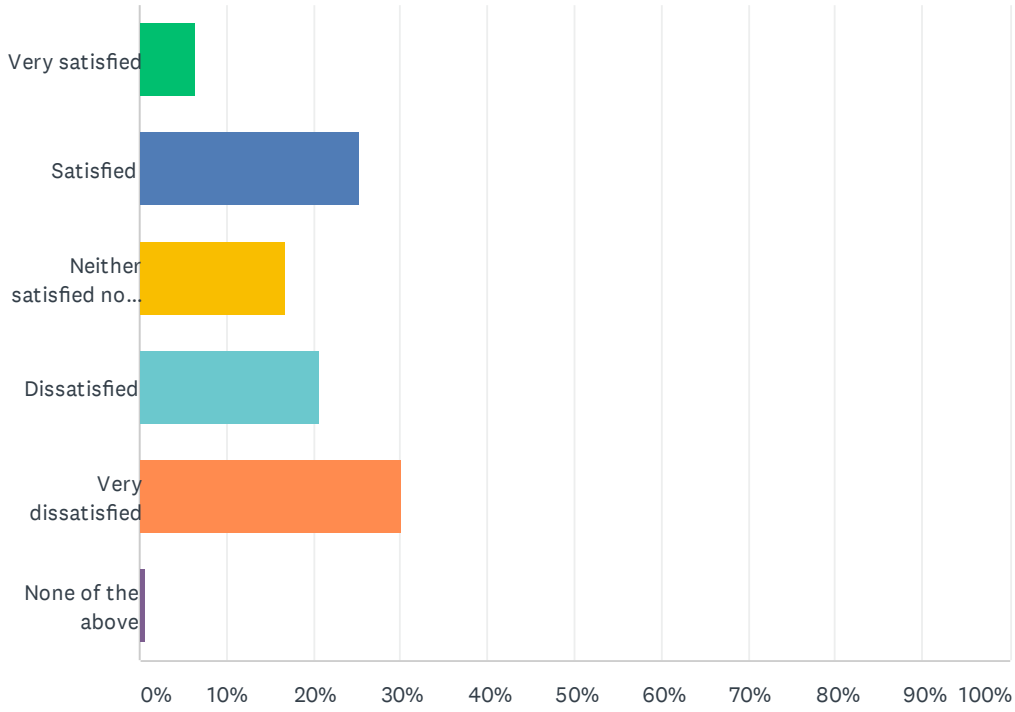
- ○ Rent
- ○ Own
- ○ None of the above

8. Resident Information - What age group do you belong to?

- ○ Under 18
- ○ 18-24
- ○ 25-34
- ○ 35-44
- ○ 45-54
- ○ 55-64
- ○ 65+

Q1 The Alternative Land Use Map (on the right above) proposes a greater mix of residential land uses by including more purposeful space for medium and high density residential development (dark yellow and orange on the map). This means there would be more opportunity for a variety of housing styles in certain areas within the neighbourhood. Based on the information above, please rate your level of satisfaction with the changes made to the mix and location of residential development opportunities (dark yellow and orange on the map) shown on the Alternative Land Use Map.

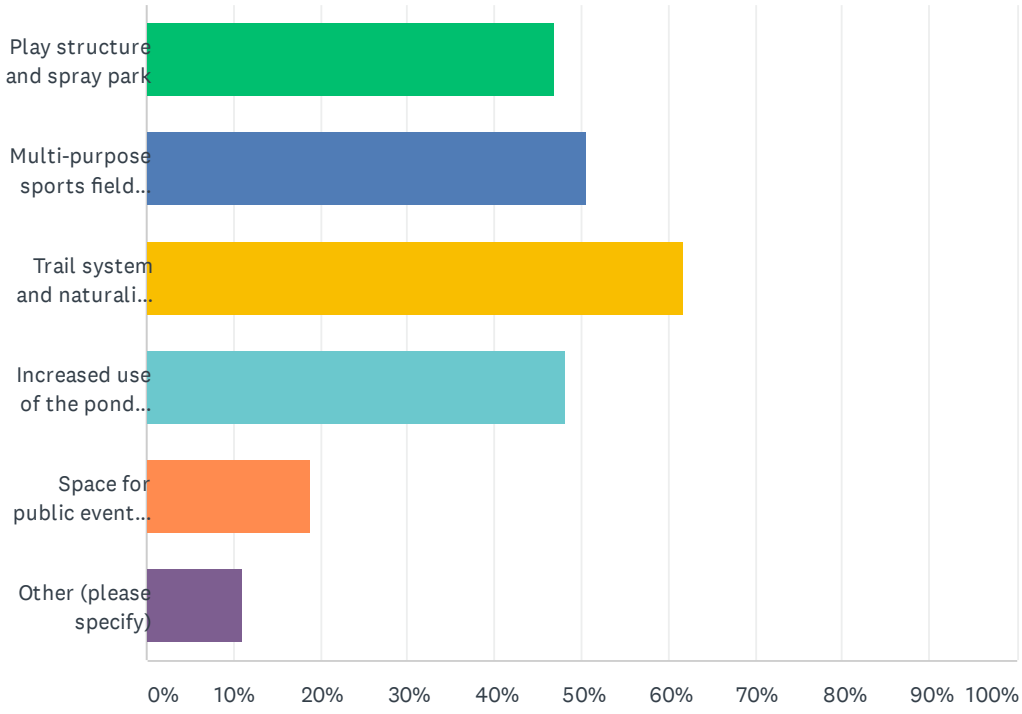
Answered: 375 Skipped: 3



ANSWER CHOICES	RESPONSES	
Very satisfied	6.40%	24
Satisfied	25.33%	95
Neither satisfied nor dissatisfied	16.80%	63
Dissatisfied	20.80%	78
Very dissatisfied	30.13%	113
None of the above	0.53%	2
TOTAL		375

Q2 The Alternative Land Use Map (on the right) shows an increase in the amount of park space provided compared to the Official Land Use Map (on the left). The increase in park space was achieved by removing some residential development areas surrounding the stormwater pond. The Alternative Land Use Map also shows additional linear park space (an open pedestrian pathway similar to the one on Smiley Drive) that runs east and west through the southern half of the neighbourhood.The City is looking for feedback on the size and possible development of the large park space, located at the centre of the neighbourhood. Please select from the list the elements you would like to see in the Crescent Acres park.

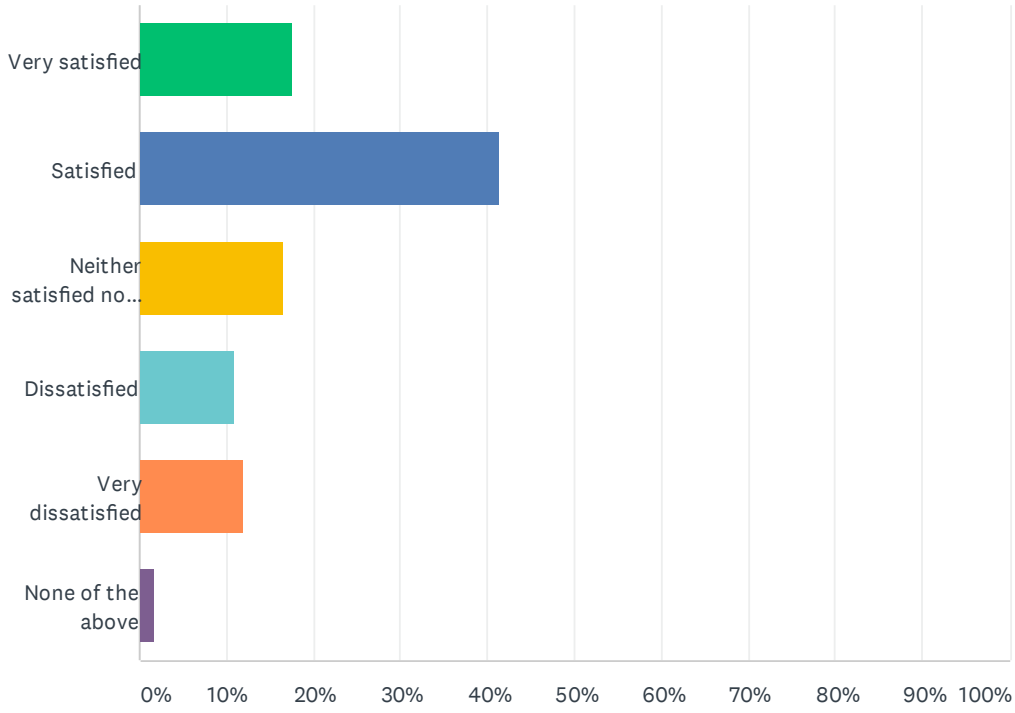
Answered: 378 Skipped: 0



ANSWER CHOICES	RESPONSES	
Play structure and spray park	46.83%	177
Multi-purpose sports fields and toboggan hill	50.53%	191
Trail system and naturalized areas with native plants	61.64%	233
Increased use of the pond (fishing, skating, kayaking)	48.15%	182
Space for public events and entertainment	18.78%	71
Other (please specify)	11.11%	42
Total Respondents: 378		

Q3 The Alternative Land Use Map (on the right) shows the creation of a Future Commercial Mixed Use area in the southeast corner of the neighbourhood. If this commercial area were to be developed, examples of future businesses could include hair salons, convenience stores, offices, restaurants, medi-clinics, gas stations or emergency services (fire, ambulance).Based on this information and the maps above, please rate your level of satisfaction with the location and the amount of commercial space shown.

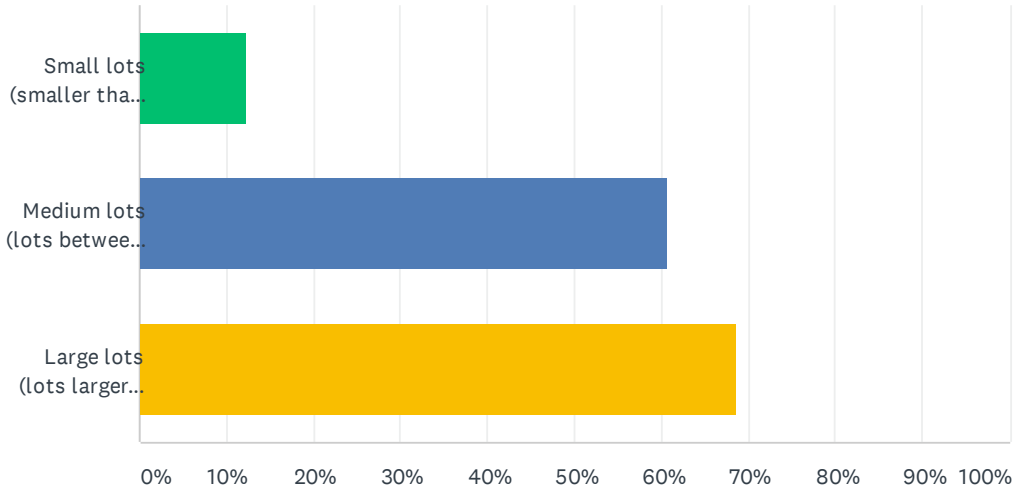
Answered: 376 Skipped: 2



ANSWER CHOICES	RESPONSES	
Very satisfied	17.55%	66
Satisfied	41.49%	156
Neither satisfied nor dissatisfied	16.49%	62
Dissatisfied	10.90%	41
Very dissatisfied	11.97%	45
None of the above	1.60%	6
TOTAL		376

Q4 While the size of the lots is not visible on the land use maps above, the City has heard from the public in the past that there is a desire for a greater variety of lot sizes, ranging from small (lots smaller than 40 feet), to medium (lots between 40-60 feet), up to large (lots larger than 60 feet). A greater variety of lot sizes means that there would also be a greater variety of lot prices.Based on this information, what size of lots would you like to see developed in the neighbourhood? Please select all that apply.

Answered: 367 Skipped: 11



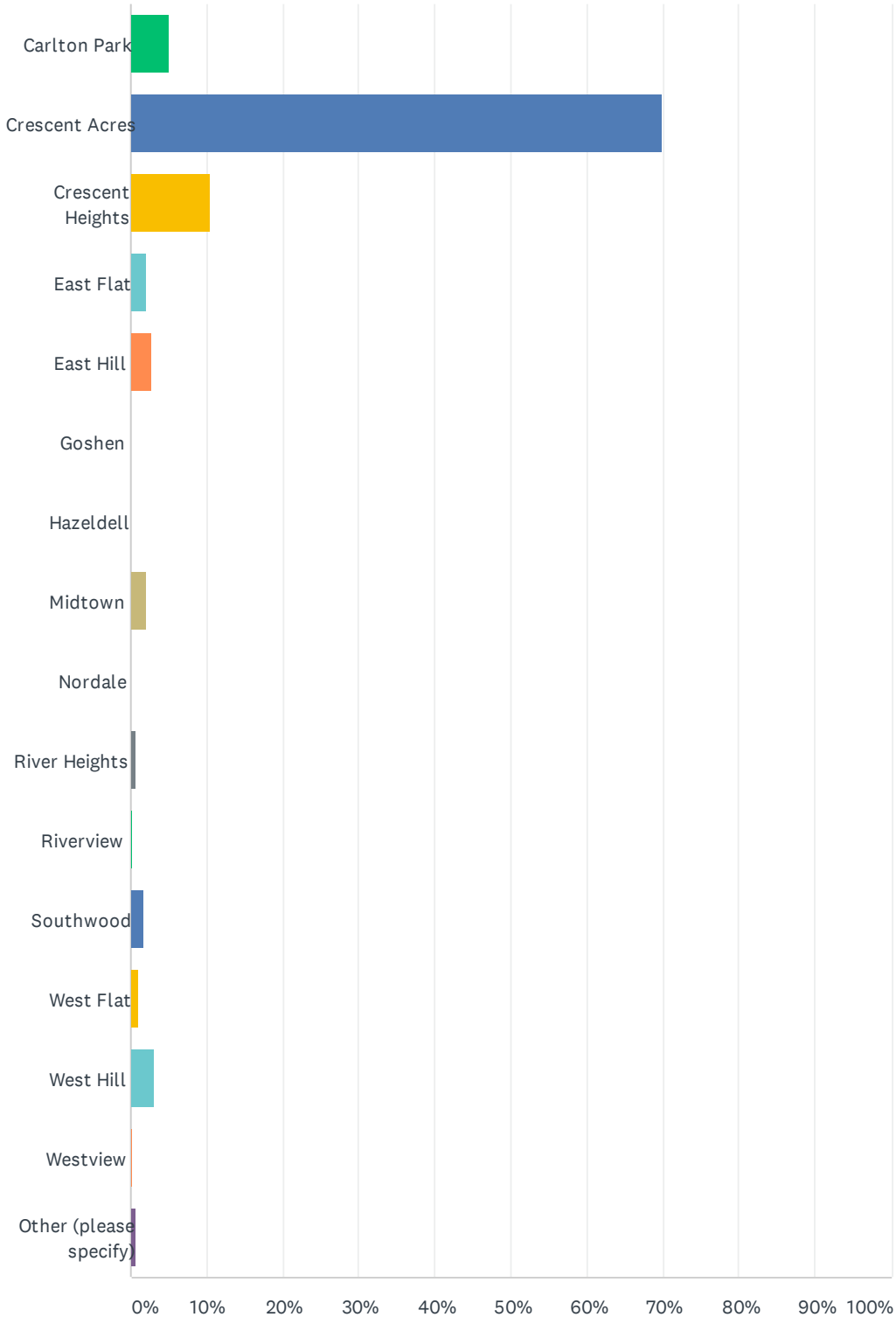
ANSWER CHOICES	RESPONSES	
Small lots (smaller than 40 feet)	12.26%	45
Medium lots (lots between 40-60 feet)	60.76%	223
Large lots (lots larger than 60 feet)	68.66%	252
Total Respondents: 367		

Q5 Final Thoughts - Do you have any questions, comments, or concerns related to the proposed future land use map for the Crescent Acres neighbourhood?

Answered: 109 Skipped: 269

Q6 Resident Information - What neighbourhood do you live in?

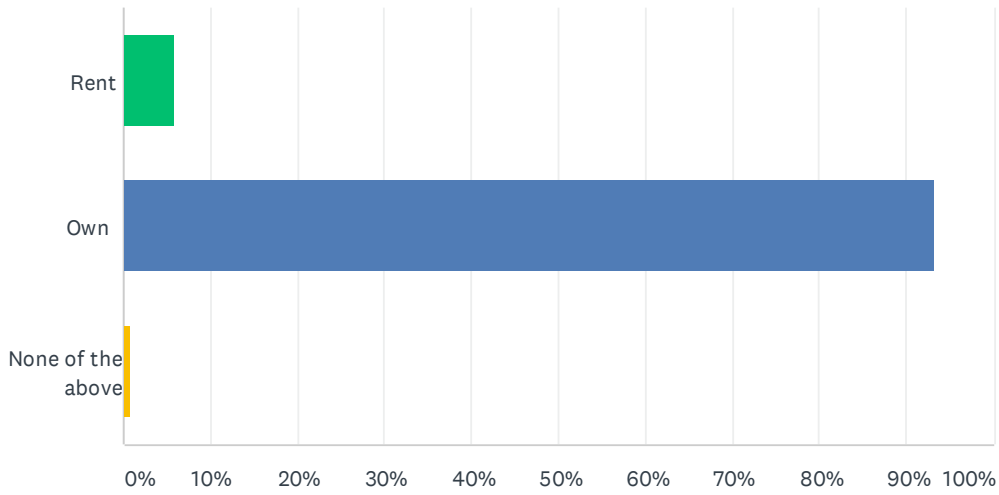
Answered: 372 Skipped: 6



ANSWER CHOICES	RESPONSES	
Carlton Park	5.11%	19
Crescent Acres	69.89%	260
Crescent Heights	10.48%	39
East Flat	2.15%	8
East Hill	2.69%	10
Goshen	0.00%	0
Hazeldell	0.00%	0
Midtown	2.15%	8
Nordale	0.00%	0
River Heights	0.54%	2
Riverview	0.27%	1
Southwood	1.61%	6
West Flat	1.08%	4
West Hill	3.23%	12
Westview	0.27%	1
Other (please specify)	0.54%	2
TOTAL		372

Q7 Resident Information - Do you rent or own your home?

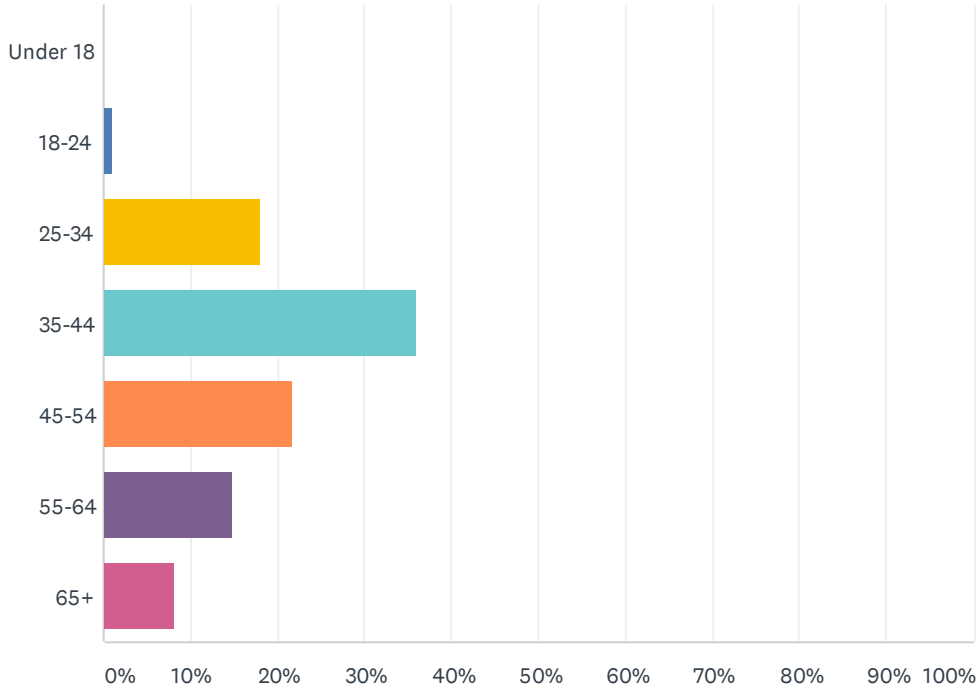
Answered: 375 Skipped: 3



ANSWER CHOICES	RESPONSES	
Rent	5.87%	22
Own	93.33%	350
None of the above	0.80%	3
TOTAL		375

Q8 Resident Information - What age group do you belong to?

Answered: 377 Skipped: 1



ANSWER CHOICES	RESPONSES	
Under 18	0.00%	0
18-24	1.06%	4
25-34	18.04%	68
35-44	36.07%	136
45-54	21.75%	82
55-64	14.85%	56
65+	8.22%	31
TOTAL		377

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