

City of Prince Albert

## **West Hill Master Plan – 2018 Update**

**Prepared by:**

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**Project Number:**

60562933 (402.29)

**Date:**

October 12, 2018

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October 12, 2018

Craig Guidinger, RPP MCIP  
Director of Planning & Development Services  
City of Prince Albert  
1084 Central Avenue  
Prince Albert, SK S9A 2Y6

Dear Craig:

**Project No: 60562933 (402.29)**  
**Regarding: West Hill Master Plan 2018 Update**

We are pleased to submit two copies of the West Hill Master Plan 2018 Update. The document has been updated to incorporate pertinent information from the following documents completed by the City since the issuance of the original West Hill Master Plan in 2012:

- Water Distribution Master Plan (AECOM)
- Sanitary Sewer Master Plan (AECOM)
- Stormwater Master Plan (AECOM)
- Transportation Master Plan (Allnorth)
- Rotary Trail Master Context Plan (City of Prince Albert)
- Design Standards 2017 – Section 8: Parks and Open Space (City of Prince Albert)
- Lake Estates on South Hill Phasing Plan (Associated Engineering)

This assignment has been a very rewarding and enjoyable project for us and we look forward to continuing to deliver quality work for the City of Prince Albert as opportunity permits.

Sincerely,  
**AECOM Canada Ltd.**



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## Revision Log

Revision #	Revised By	Date	Issue / Revision Description
A		November 29, 2011	Draft
1	Ryan King	March 30, 2012	Final
2	Ryan King	October 12, 2018	2018 Update

## AECOM Signatures

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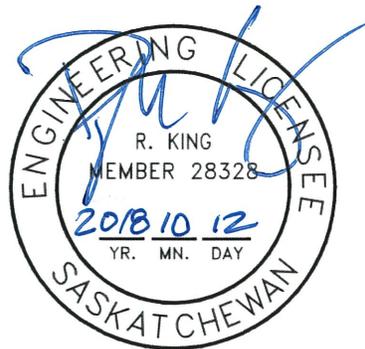


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# Table of Contents

**Statement of Qualifications and Limitations**  
**Letter of Transmittal**  
**Distribution List**

	page
<b>1. Introduction .....</b>	<b>1</b>
1.1 Purpose .....	1
1.2 Location.....	1
1.3 Background .....	1
1.4 Study Process .....	2
<b>2. Present Context .....</b>	<b>3</b>
2.1 Land Ownership.....	3
2.2 Site Characteristics.....	3
2.2.1 Topography.....	3
2.2.2 Drainage .....	3
2.2.3 Vegetation.....	3
2.2.4 Groundwater Conditions.....	3
2.2.5 Surficial Geology .....	4
2.3 Current Land Use – Site and Surroundings .....	4
2.4 Existing Zoning .....	4
<b>3. Development Rationale .....</b>	<b>5</b>
3.1 Historical Perspective – Housing and Residential Land .....	5
3.2 Projections – Population and Housing – City of Prince Albert .....	7
3.2.1 Drivers of Future Growth .....	7
3.2.2 Population and Housing Forecast .....	7
3.3 Projections – Population and Housing – West Hill Area .....	9
<b>4. Master Plan.....</b>	<b>11</b>
4.1 Planning Principles and Goals .....	11
4.2 Land Use Concept.....	11
4.2.1 Neighbourhood Structure .....	11
4.2.2 Residential Land Use .....	12
4.2.3 Marquis Common.....	12
4.2.4 Parks and Open Space System.....	12
4.2.5 School System .....	13
4.2.6 Institutional Uses.....	13
4.2.7 Southland Highway Commercial Park.....	13
<b>5. Infrastructure.....</b>	<b>15</b>
5.1 Transportation Network.....	15
5.1.1 West Hill Transportation Network.....	15
5.1.2 City-Wide Transportation Network .....	16
5.2 Water Supply and Distribution.....	16
5.2.1 Sources of Water Supply and Design Parameters .....	17
5.2.2 Distribution System .....	17
5.2.3 Water Demand Analysis.....	17
5.3 Sanitary Sewage System .....	18
5.3.1 Sanitary Sewer Servicing.....	18

5.3.2	Sanitary Design Flows.....	18
5.3.3	Sanitary Sewer Collection System.....	19
5.4	Surface Drainage and Storm Water Management.....	20
5.4.1	Stormwater Management.....	20
5.4.2	Hydrology.....	20
5.4.3	Hydraulic Design.....	20
<b>6.</b>	<b>Development Considerations.....</b>	<b>22</b>
6.1	Phasing of Development.....	22
6.2	Development Levy Study.....	22
6.3	Multiple Land Ownership.....	23
<b>7.</b>	<b>Summary and Conclusion.....</b>	<b>24</b>
<b>8.</b>	<b>Reference Material.....</b>	<b>26</b>

**List of Tables**

Table 3.1:	City of Prince Albert – Historic Population Growth, 1981 to 2016.....	5
Table 3.1 (Continued):	City of Prince Albert – Historic Population Growth, 1981 to 2016.....	6
Table 3.2:	City of Prince Albert – Permanent Housing Units, 1991 to 2016.....	6
Table 3.3:	City of Prince Albert – Population Forecast – Medium Growth.....	7
Table 3.4:	City of Prince Albert – Medium Growth Scenario 2019-2034 Population and Household Forecast.....	8
Figure 3.1:	City of Prince Albert – Medium Growth Scenario 25 Year Housing Forecast.....	9
Table 3.5:	City of Prince Albert – WHMP: Neighbourhood Area and Population.....	9
Table 3.5 (Continued):	City of Prince Albert – WHMP: Neighbourhood Area and Population.....	10
Table 5.1:	Water Demands.....	17
Table 5.2:	Storm Water Management Design Details.....	21

**List of Figures**

No table of figures entries found.

**List of Drawings**

- Drawing No. 1 – Location
- Drawing No. 2 – Land Ownership
- Drawing No. 3 – Site Characteristics Photo Mosaic
- Drawing No. 4 – Current Land Use
- Drawing No. 5 – Existing Zones
- Drawing No. 6a – Neighbourhood Boundaries
- Drawing No. 6b – Development Modules
- Drawing No. 7 – Land Use Concept
- Drawing No. 8 – Open Space System
- Drawing No. 9 – Transportation Network
- Drawing No. 10 – Water Distribution
- Drawing No. 11 – Sanitary Sewer Collection System
- Drawing No. 12a – Major Drainage System
- Drawing No. 12b – Minor Drainage System

# 1. Introduction

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## 1.1 Purpose

The West Hill Master Plan is intended to provide an overall framework for development within the southwest quadrant of the City of Prince Albert in an orderly and economical manner.

The Master Plan addresses a number of key issues which are important to the potential development of West Hill. These issues include:

- The technical feasibility of providing off-site and on-site infrastructure, especially sanitary and storm water changes
- The optimal sequence of development
- The development potential of the West Hill
- The balance between the interests of a number of land owners
- The optimum scale, density and servicing of development

## 1.2 Location

The West Hill Master Plan area comprises of the southwest quadrant of the City of Prince Albert (Drawing No. 1). The area is defined by the following boundaries:

- The CN rail line, Victoria Hospital and Opawakoscikan Reserve on the north
- Existing residential and commercial development on the east including 7<sup>th</sup> Avenue West and Highway No. 2
- The existing city limits on the south and west boundaries

The R.M. of Prince Albert No. 461 is immediately adjacent to the west and south limits of the study area.

## 1.3 Background

The plan area was first subdivided into river lots extending south from the North Saskatchewan River when Prince Albert was first established in the latter part of the 19<sup>th</sup> century. A number of these river lots were further subdivided into residential lots in the optimism of the pre-war years in the early part of the 20<sup>th</sup> century. However, urban development aspirations were not realized, the lots remained vacant, and many reverted to City ownership through tax sale.

Urban development west of Highway 2 has proceeded virtually to the limits of service capability. The cost and feasibility of servicing the balance of the plan area combined with ample opportunities for residential development in the eastern part of the City, acted as a constraint on further West Hill development. The City's Municipal Development Plan, adopted in 1981, designated the West Hill Area for Stage 2 residential development, to proceed when substantial development in the east and southeast had been achieved.

Substantial development of eastern areas has now taken place. Given landowner interest and proximity of the West Hill to major commercial and service areas along Highway 2, a re-evaluation of the West Hill development potential was warranted. This Master Plan has been prepared to address the feasibility of achieving that development potential.

## 1.4 Study Process

Work commenced on the original West Hill Master Plan in 1998. The first Steering Committee meeting was held on January 16, 1998. Throughout the study, opportunities for stakeholder and public input were provided.

Initial contacts were made with several of the major landowners on January 16, 1998.

A second Steering Committee meeting was held on March 6, 1998. At this meeting, a perspective on development patterns and trends in Prince Albert was presented. Two overall concept plans were presented and reviewed. The same day, meetings were held with superintendents of the public and separate school boards.

All landowners within the West Hill Master Plan area were advised of the planning process formally by letter on April 9, 1998. A series of informal meetings were held with a number of landowners on Monday, April 27, 1998. A revised concept plan and background documentation were presented to the landowners. A third Steering Committee meeting was held the same day.

On October 23, 1998, a public open house was held at City Hall. The West Hill Master Plan and other supporting plans were presented. A one page project brief was also made available to the general public. The open house attracted about 50 people. Subsequent to the public open house, the final Master Plan report was completed.

In 2010, work began on an update to the original plan. The revisions involved updating mapping, revising population estimates and layout, updating water distributions options, storm water infrastructure planning, and storm water management planning.

## 2. Present Context

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### 2.1 Land Ownership

The West Hill Master Plan covers an area of about 613.4 hectares (1515 acres). Recent landownership information was gathered by the city in April 2018, and is reflected in Drawing No. 2, the land ownership map. There are at least 25 landowners within the area and land holdings vary greatly in size. The City of Prince Albert is among the largest of the land owners in the area.

There are a number of landowners occupying smaller parcels in the northeast corner of the plan area. SaskEnergy occupies a parcel and utility corridor in the south eastern portion of the plan area.

### 2.2 Site Characteristics

The West Hill plan area has site characteristics which are favourable for urban development.

#### 2.2.1 Topography

Most of the West Hill plan area lies above and to the south of the escarpment which runs in an east-west direction throughout Prince Albert, separating the West Hill from the West Flat to the north.

The plan area has an overall gentle slope to the north toward the North Saskatchewan River, with steeper slopes along the escarpment (Drawing No. 3). A ridge runs east-west in the southeast portion of the plan area. This ridge constitutes the highest land in the plan area, reaching an elevation of 473 m.

Locally, the land is quite irregular, exhibiting features of “knob and kettle” topography. A number of localized depressions are evident; some of these appear to be semi-permanent sloughs. These local depressional areas provide opportunities for detention and storage of surface runoff.

#### 2.2.2 Drainage

Drainage patterns follow the natural topography. The east-west ridge in the southeast portion of the plan area forms a drainage divide between drainage to the north and to the south. Drainage is internal to localized depressions throughout much of the plan area. An existing ravine (southwest of the Victoria Union Hospital) drains the north central portion of the plan area to an existing storm sewer trunk just south of the CN rail line.

#### 2.2.3 Vegetation

Much of the West Hill plan area is open cultivated farmland. A number of stands of aspen and spruce woodland remain scattered throughout the plan area. There are a number of planted shelter belts located along road allowances and property lines.

This area of the “Prince Albert Plain” forms part of the extensive Mixedwood-Parkland Transition Ecodistrict.

#### 2.2.4 Groundwater Conditions

The study area is located within the North Saskatchewan River Groundwater Basin. The groundwater flow direction in the surficial sediments in the local area is to the North Saskatchewan River. The regional discharge feature exists along an extensive area within this groundwater basin.

### 2.2.5 *Surficial Geology*

Bedrock in the West Hill Area of Prince Albert is roughly 25 m deep and consists of the Lea Park Formation (SCR, 1973, SRC 1967). The study area has significant surficial fluvial deposits of gray calcareous silt and clay resting conformably on underlying till.

## 2.3 **Current Land Use – Site and Surroundings**

The majority of the plan area is open cultivated farmland (Drawing No. 4). A number of residences are located within the area as follows:

- Parcel 3, Plan No. CD214 Extension 0 (Paulsen)
- Lot A, Block 6, Plan No. CW4900 Extension 0
- Parcel J, Plan No. 102244429 Extension 0

The southeast portion of the plan area includes highway commercial development along Highway 2 and Marquis Road. An existing SaskEnergy natural gas regulator facility, town border station (TBS), occupies a parcel immediately south of 6<sup>th</sup> Avenue West and 36<sup>th</sup> Street West. A high pressure gas line to the TBS is contained within a utility corridor running south to the city limits (44<sup>th</sup> Street West). The northeast portion of the plan area includes residential development north and south of 28<sup>th</sup> Street West, along Woodbridge Drive and Lakeview Drive respectively. Alfred Jenkins Field House is also located in the northeast portion of the plan area, at the intersection of 10<sup>th</sup> Avenue West and 28<sup>th</sup> Street West.

The plan area is bordered to the north and east by existing urban development, including the West Flat and West View residential neighbourhoods, Victoria Union Hospital and Chief Joseph Custer #201. Low density residential development, a pocket of medium density residential development, and Highway 2 define the eastern edge of the plan area.

The Prince Albert penitentiary lies to the west of the plan area, farmland within Rural Municipality of Prince Albert lies to the south.

## 2.4 **Existing Zoning**

Most of the plan area is zoned A1 – Agricultural (Drawing No. 5). The area north of 28<sup>th</sup> Street West and west of the 10<sup>th</sup> Avenue West is zoned IG – (Institutional General Service). Land to the north of Marquis Road and east of the plan area is primarily zoned R2 – Large Single Dwelling, with two pockets of R3 – Two Unit Dwelling south of 28<sup>th</sup> Street West and west of Lakeview Drive, and some R5 – Multiple Unit Dwelling along 28<sup>th</sup> Street West. The area south of Marquis Road along Highway 2 is zoned C4 – Highway Commercial, with a portion of R5 – Multiple Unit Dwelling west of 4<sup>th</sup> Avenue West.

## 3. Development Rationale

A comprehensive long-term growth forecast will serve as a meaningful tool that will be used for land use planning, long-term infrastructure requirements, water and waste water facilities and capital budgeting. In 2008, Watson & Associates Economists Ltd. (W&A) was retained to prepare the City of Prince Albert, Population, Household and Employment Forecast Study. The following sections of this document refer to the population, housing and land needs forecasts within the study.

### 3.1 Historical Perspective – Housing and Residential Land

An examination of historical trends provides a context for projecting rates of future development. The population between 1971 and 1986 grew from 28,465 to 33,686, an increase of 5,221 for an average of about 350 (1.2%) per year. By comparison, between 1986 and 2006, the City of Prince Albert's population grew at an annual rate of 0.3%. The majority of the population growth occurred between 1981 and 1986, when the average annual growth rate was 1.4%. During the following 10-year period, the annual growth rate slowed to 0.3%. Table 3.1, which is an excerpt from the Population, Household and Employment Study, summarizes the historic population growth for the 1986 – 2008 period and has been updated to include Statistics Canada 2011 and 2016 data.

**Table 3.1: City of Prince Albert – Historic Population Growth, 1981 to 2016**

Year	Prince Albert (City)	Saskatoon (City)	Saskatchewan (Province)
1981	31,380	154,210	968,313
1986	33,686	175,465	1,009,615
1991	34,181	184,020	988,930
1996	34,777	193,647	990,237
2001	34,291	196,845	978,933
2006	34,138	202,340	968,157
2008	34,400	N/A	991,500
2011	35,129	222,189	1,033,381
2016	35,926	246,376	1,098,352
Average Annual Population Growth			
1981-1986	461	4,251	8,260
1986-1991	99	1,711	-4,137
1991-1996	119	1,925	261
1996-2001	-97	640	-2,261
2001-2006	-31	1,099	-2,155
2006-2011	198	3,970	13,045
2011-2016	159	4,837	12,994
1981-2016	130	2,633	3,715
Average Annual Growth Rate			
1981-1986	1.4%	2.6%	0.8%
1986-1991	0.3%	1.0%	-0.4%
1991-1996	0.3%	1.0%	0.0%
1996-2001	-0.3%	0.3%	-0.2%

**Table 3.1 (Continued): City of Prince Albert – Historic Population Growth, 1981 to 2016**

Year	Prince Albert (City)	Saskatoon (City)	Saskatchewan (Province)
2001-2006	-0.1%	0.6%	-0.2%
2006-2011	0.6%	2.0%	1.3%
2011-2016	0.5%	2.2%	1.3%
1981-2016	0.4%	1.7%	0.4%

*Note: Excludes Quarterly Population Report, Third Quarter 2008, Saskatchewan Bureau of Statistics.  
Source: Watson & Associates Economists Ltd., Population, Household and Employment Forecast, 2009  
Updated to include Statistics Canada 2011 and 2016 data.*

During the 15 year period from 1973 to 1988, a total of 5,806 houses were constructed, approximately 387 per year including both single and multiple unit dwellings. By contrast, during the 15 year period from 1991 – 2006, 830 housing starts were recorded about 15% of the average annual housing starts from 1973 to 1988. As summarized in Section 3 of the City of Prince Albert, Population, Household and Employment Forecast Study, the City of Prince Albert's housing stock grew at an annual rate of 0.3% during the 1991 – 2006 period. From 2001 – 2006, 225 new units were added to the housing stock, an average of 45 units annually. More recently, between 2006 and 2011, housing growth averaged 0.6% annually, double the rate of the 1996 – 2006 period. The 2011 – 2016 period saw this increase reverse, with the annual housing growth rate returning to 0.3%. Table 3.2, demonstrates the change in housing units from 1991 - 2016.

**Table 3.2: City of Prince Albert – Permanent Housing Units, 1991 to 2016**

Year	Prince Albert (City)	Saskatoon (City)	Saskatchewan (Province)
1991	12,405	71,840	363,150
1996	12,875	76,295	372,820
2001	13,010	81,275	379,680
2006	13,240	84,384	387,160
2011	13,637	90,936	409,645
2016	13,847	98,565	432,622
Average Annual Housing Growth			
1991-1996	94	891	1,934
1996-2001	27	996	1,372
2001-2006	45	626	1,492
2006-2011	79	1,310	4,497
2011-2016	42	1,526	4,595
Average Annual Growth Rate			
1991-1996	0.7%	1.2%	0.5%
1996-2001	0.2%	1.3%	0.4%
2001-2006	0.3%	0.8%	0.4%
2006-2011	0.6%	1.6%	1.2%
2011-2016	0.3%	1.7%	1.1%
1991-2016	0.5%	1.5%	0.8%

*Source: Watson & Associates Economists Ltd., Population, Household and Employment Forecast, 2009. Updated to include Statistics Canada 2011 and 2016 data.*

## 3.2 Projections – Population and Housing – City of Prince Albert

### 3.2.1 Drivers of Future Growth

The population, household and housing forecast for a 25-year period (2009-2034) is shown per section 7 of the City of Prince Albert, Population, Household and Employment Forecast Study. The Medium Growth Scenario was chosen as the most appropriate scenario.

Prince Albert's population and housing growth was relatively modest between 1986 and 2006, but there are a number of factors which indicate that long-term growth will be considerably stronger, and will build on the economic growth experienced in 2007 and 2008. The growth drivers that lead to this conclusion are as follows:

1. A continually diversifying economic base, founded the following economic sectors:
  - a) Continued growth in key commodities sectors
  - b) Growing importance as a regional retail and service centre for northern Saskatchewan
  - c) Growth of the forestry sector
  - d) Growth of the Tourism /Recreation industry
  - e) A developing Agri-Business industry
2. Continued in-migration from northern Saskatchewan, especially from First Nation communities, with a much younger population than non-aboriginal populations.

### 3.2.2 Population and Housing Forecast

Table 3.3 summarizes the forecast population growth under a medium growth scenario, which has been previously adopted by the City. As per the Medium Growth Scenario of the Population, Household and Employment Forecast Study, the population is forecasted to reach 42,000 by 2034, an increase of 7,500 people, which represents an annual growth rate of 0.8%.

**Table 3.3: City of Prince Albert – Population Forecast – Medium Growth**

Year	Population	Year	Population
2019	37,200	2030	40,600
2020	37,500	2031	41,000
2021	37,800	2032	41,300
2022	38,100	2033	41,600
2023	38,400	2034	42,000
2024	38,800	2035	42,300
2025	39,000	2036	42,600
2026	39,400	2037	43,000
2027	39,700	2038	43,300
2028	40,000	2039	43,600
2029	40,400	2040	44,000

*Population figures have been rounded.*

*Source: Watson & Associates Economists Ltd., Population, Household and Employment Forecast, 2009*

The Medium Growth Scenario assumes a moderate rate of housing growth, building on the housing activity experienced in 2007 and 2008. New housing is predominantly single –family type. Between 1997 – 2008, 87% of the housing completions were single and semi-detached units, while 5% were medium density units and 8% were high density units.

Over the forecast period, the average occupancy of existing households is expected to decline. Household occupancy has a significant correlation between future population growth and future housing requirements. New housing units constructed over the forecast period are expected to have the following housing occupancy (i.e. persons per unit or PPU).

- Low density – 3.19 PPU
- Medium Density – 2.01 PPU
- High Density – 1.52 PPU

Figure 3.1 (on the following page) illustrates the annual housing growth for Prince Albert from 2009 – 2034. Table 3.4 below summarizes the results of the Medium Growth Scenario projected through 2019 – 2034. A few observations include:

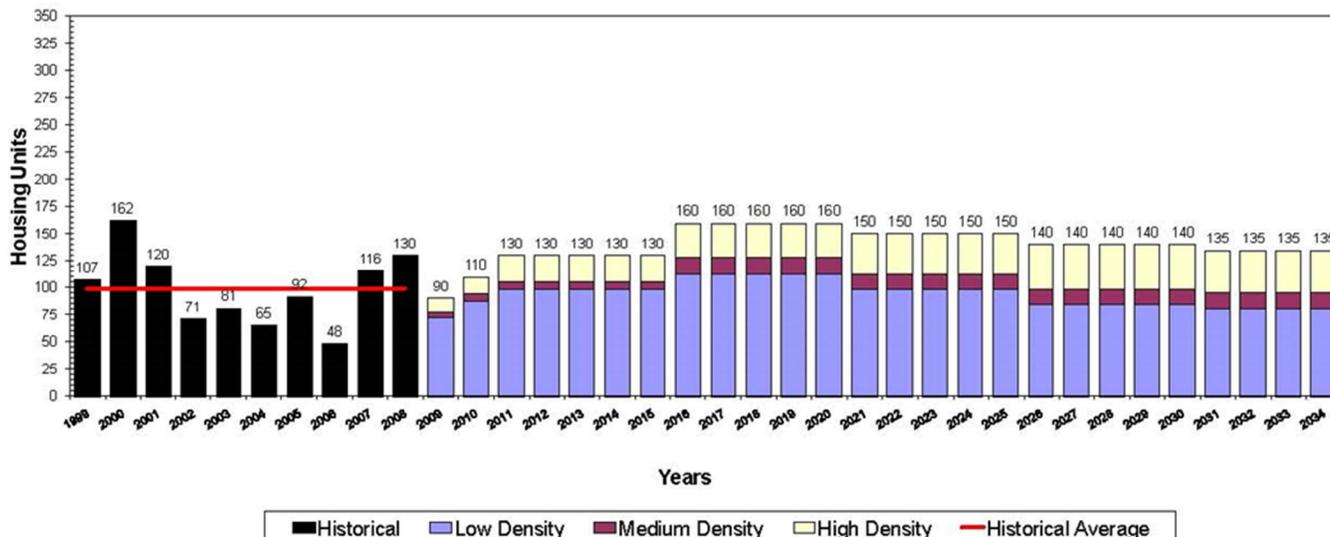
- A total of 2,170 housing units are forecast to be built between 2019 and 2034, an average of about 145 per year, of which 63% are low density, 10% are medium density, and 27% are high density;
- The percentage of new housing is expected to shift moderately towards medium and high-density housing during the medium and longer term to reflect an aging population and increased need for more affordable housing.

**Table 3.4: City of Prince Albert – Medium Growth Scenario 2019-2034 Population and Household Forecast**

Year	Population	Households					Person Per Unit (PPU)
		Low Density (single family, semi-detached)	Medium Density (townhouses, rowhouses)	High Density (apartments, condominiums)	Other (mobile homes)	Total	
2019	37,200	10,300	910	3,640	25	14,875	2.50
2024	38,800	10,820	980	3,810	25	15,635	2.48
2029	40,400	11,260	1,060	4,010	25	16,355	2.47
2034	42,000	11,670	1,130	4,220	25	17,045	2.46
Incremental Change							
2019-2024	1,600	520	70	170	0	760	
2019-2029	3,200	960	150	370	0	1,480	
2019-2034	4,800	1,370	220	580	0	2,170	

Note: Population and household units have been rounded.

Source: Watson & Associates Economists Ltd., Population, Household and Employment Forecast, 2009



Source: Watson & Associates Economists Ltd., Population, Household and Employment Forecast, 2009  
 Note: The above information may not align with Census data, as the graph is taken directly from the 2009 Forecast

**Figure 3.1: City of Prince Albert – Medium Growth Scenario 25 Year Housing Forecast**

### 3.3 Projections – Population and Housing – West Hill Area

The West Hill Master Plan area comprises approximately 613.4 ha. (1515.1 ac) of land. Of this, about 500 ha. would be available for residential development, after discounting for commercial land use, institutional land use and arterial roads.

The target for dwelling units per gross acre for the West Hill Area has been set to 7.0 which is an increase from existing densities within Prince Albert but similar to target used by other municipalities. Assuming a household size of 2.50, the resulting theoretical population potential for the study area is estimated to be 20,615. The actual population will depend on the ultimate land use allocation, the range of housing densities, and the household size at completion. Table 3.5 summarizes the potential units and population for each neighborhood in the study area School System.

**Table 3.5: City of Prince Albert – WHMP: Neighbourhood Area and Population**

Neighbourhood	Area		Units Dwelling Units per Gross Acre @ 7.0	Average Household Size	Total Population	Student Population @ 0.40 students per household
	Hectares	Acres				
W1	80.57	199.1	1,394	2.50	3,484	557
W2	70.91	175.2	1,227	2.50	3,066	491
W3	109.20	269.8	1,889	2.50	4,722	756
<b>W Total</b>	<b>260.68</b>	<b>644.2</b>	<b>4,509</b>	<b>2.50</b>	<b>11,273</b>	<b>1,804</b>
E1	43.31	107.0	749	2.50	1,873	300
E2	19.76	48.8	342	2.50	855	137
E3	48.65	120.2	842	2.50	2,104	337
E4	104.31	257.8	1,804	2.50	4,511	722
<b>E Total</b>	<b>216.03</b>	<b>533.8</b>	<b>3,737</b>	<b>2.50</b>	<b>9,342</b>	<b>1,495</b>

**Table 3.5 (Continued): City of Prince Albert – WHMP: Neighbourhood Area and Population**

Neighbourhood	Area		Units Dwelling Units per Gross Acre @ 7.0	Average Household Size	Total Population	Student Population @ 0.40 students per household
	Hectares	Acres				
Suburban Centre	14.26	35.2	0	0	0	0
Hwy Commercial	43.58	107.7	0	0	0	0
North 1	44.75	110.6	0	0	0	0
<b>Total</b>	<b>579.30</b>	<b>1,431.5</b>	<b>8,246</b>	<b>2.50</b>	<b>20,615</b>	<b>3,298</b>

## School System

An important objective of the Master Plan is to provide for the future educational needs for the residents of the West Hill Area. As part of the development of the original Master Plan, the superintendents of each school division were contacted regarding the capacity of the existing system and guidelines for the number and location of schools in the West Hill Area.

The information received was the basis for the following assumptions for the pattern of schools in the West Hill Area:

1. The nearest public elementary school, Arthur Peachey, has recently been expanded. A new elementary school would not be required for some time in the West Hill Area.
2. The existing public high school is large, with considerable capacity for additional students. Therefore no site for a high school has been designated in the West Hill Master Plan.
3. Elementary schools should be located on streets which can accommodate school buses. Hence a location on a collector or arterial has been incorporated into the Master Plan.
4. The separate school system may encounter some capacity problems at both the elementary and high school levels. An elementary school for West Hill may be required at a fairly early stage and could be designated as a K-8 facility. The threshold for additional schools would be a minimum of 200 students. A capacity problem in the separate high school system may warrant a new high school in the West Hill Area. Consequently, a site is designated in the Master Plan.
5. Peak school populations of 300 students for the separate system and 500 students for the public system were used. Applying these figures to the population potential of the West Hill Area led to the designation of sites for four public and separate elementary schools.

## 4. Master Plan

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### 4.1 Planning Principles and Goals

The West Hill Master Plan is a framework for development within the southwest area of Prince Albert. The Master Plan is based on several fundamental principles which are derived from the site analysis and the public participation process. These fundamental principles are stated below:

1. Proposed land use will complement existing West Hill development to the east and also the west flat area to the north.
2. The Master Plan will provide opportunities for all market segments. The Master Plan area is of sufficient size to allow for the development of a range and a variety of housing types in a compatible manner.
3. The Master Plan is consistent with the City of Prince Albert's Official Community Plan, Transportation Plan and other planning documents.
4. The Master Plan has considered and the wishes of the current constituent land owners, who will be responsible for plan implementation.
5. Street patterns, where shown, are intended to illustrate a particular development option, and land owners are free to provide optional local street patterns. However, where multiple land ownership exists within a neighbourhood unit, cooperative planning between land owners is essential in order to achieve equitable distribution of land uses and a coherent land use and street pattern.
6. The Master Plan integrates the storm water management system with the natural topography of the plan area.
7. The Master Plan provides a framework for an integrated open space system, providing continuous links between neighbourhood parks and storm water management facilities.

### 4.2 Land Use Concept

This section presents the major features of the Master Plan development concept. These features are illustrated in Drawing No. 6a (Neighbourhood Boundaries), Drawing No. 6b (Development Modules), Drawing No. 7 (Land Use Concept), Drawing No. 8 (Open Space System) and Drawing No. 9 (Transportation Network).

#### 4.2.1 Neighbourhood Structure

The West Hill Development Area is comprised of two residential neighbourhoods anchored on a suburban centre (Marquis Common) at the intersection of Marquis Road and 16<sup>th</sup> Avenue West (see Drawing No. 6a).

The west neighbourhood (approximately 267 ha.) is defined by the existing City limits to the south and west, existing rail line, railway on the north, 16<sup>th</sup> Ave. W. on the east and excludes the northwest and southwest suburban centre quadrants within Marquis Common. The east neighbourhood (approximately 223 ha.) is defined by the existing City limits along the south, 16<sup>th</sup> Ave. W. on the west. The north limits of this neighbourhood are 28<sup>th</sup> St. W. and 25<sup>th</sup> St. W. in the northeast.

The east limits are defined by existing residential development and the SaskEnergy T.B.S. and gas line right-of-way excluding the northeast and southeast suburban centre quadrants within Marquis Common. Also excluded from the east neighbourhood is the HC module in the southeast as well as development module N1 north of 28<sup>th</sup> St. W. The West Hill area is further defined by development modules (see Drawing No. 6b). The west neighbourhood is comprised of modules W1, W2 and W3. The east neighbourhood is comprised of modules E1, E2, E3 and E4. Modules HC and N1 are not part of this neighbourhood.

#### **4.2.2 Residential Land Use**

Residential land use is a major component, comprising the largest percentage of the developable area. Single detached housing is the primary designation. The form and density of housing will be determined by prevailing market conditions and through the zoning regulations development standards determined by the City of Prince Albert.

Development modules within each of the neighbourhoods will be comprised of:

1. Low Density: single-detached units, duplexes, walkout lots and conventional lots
2. Medium Density: single-detached units, duplexes, triplexes, fourplexes and townhouses at lower densities (i.e. maximum density of 30 units per hectare)
3. High Density: fourplexes, townhouses and apartment-style development
4. Mixed Use: designated land is identified adjacent to the “Marquis Common” to accommodate potential work/live development

A number of guidelines have been applied in locating medium and high density residential sites, and are to be applied in designating additional sites. Multiple unit residential sites shall be located as follows:

- Near or adjacent transit services
- Near or adjacent to parks and open spaces
- Near or adjacent to arterial or collector roads

#### **4.2.3 Marquis Common**

The proposed suburban centre is located at the intersection of Marquis Road and 16<sup>th</sup> Ave. W. It is divided into four quadrants that are anchored to the residential areas by plazas that connect formal open space amenities to Municipal Reserve (MR) at each external corner. The formal plazas would be dedicated MR land that provide pedestrian connectivity of street and park pathway systems. The use of plazas could be for such events such as amphitheatre, special gatherings, family barbeques, and for use by community residents.

Marquis Common will accommodate suburban centre commercial and arterial commercial. The four quadrants provide approximately 14 hectares of potential commercial development.

#### **4.2.4 Parks and Open Space System**

The parks and open space system will be dispersed throughout the two neighbourhoods. Both the east and west neighbourhood will feature combined school/park sites and storm water pond areas. Located centrally will be a high school and associated district park which could include such amenities as soccer pitches, ball diamonds, playgrounds, and open space areas. Connecting these areas will be a network of open space corridors and

walkways including the primary and connectors for the Rotary Trail system and standard park and street pathways (see Drawing No. 8). The result will be a continuous, inter-connected open space system and streetscape corridors.

Neighbourhood, district parks, and open space corridors will be provided through the 10% Public Reserve dedication provided for the *Planning and Development Act*.

#### **4.2.5 School System**

##### **Elementary Schools**

Each neighbourhood has designated school sites to accommodate a public and separate school anchored by a joint use neighbourhood community centre. The west neighbourhood school facilities are located in the central module W2. The east neighbourhood school facilities are positioned in module E4 at the south extension of 10<sup>th</sup> Ave. W. and the internal collector/major local roadway. The T-intersection aligns with the neighbourhood community centre with school sites on each side.

In each neighbourhood, a dedicated MR has been allocated to accommodate future programming needs for the schools for use by neighbourhood students/community residents. Common to the location of the schools in each neighbourhood is the design criteria/rationale of not positioning elementary schools on or adjacent to arterial roads on major through-flow collector roads for safety reasons and also for continuous flow of arterial vehicular traffic. In each case, all elementary schools and community centers are located on internal collector or major local streets.

The continuous pedestrian pathway network (street/parks) is designed to facilitate students walking to school.

##### **High School**

A future high school site has been designated in module E3. It is positioned along 28<sup>th</sup> St. W. between internal collector roads on the west and east. Vehicular access egress for the high school and parking areas would be via the collectors on the west and east. It is recommended that no direct access would be off of 28<sup>th</sup> St. W. A municipal buffer strip would be incorporated along the south position of 28<sup>th</sup> Street to ensure legal restricted access. Vehicular traffic along 28<sup>th</sup> Street could free flow without having to reduce speed.

The proposed high school site's proximity to the Soccer Centre was also a factor for its location. A large MR has been allocated south of the school site to accommodate programming needs, as well as pedestrian access to the Marquis Common northeast plaza.

In accordance with the *Education Act*, the elementary school sites and high school site have been designed to accommodate the required special needs for facilities and programming.

#### **4.2.6 Institutional Uses**

In addition to the institutional uses located within Marquis Common, a second institutional area is located south of the Victoria Union Hospital. It is anticipated that this area will provide opportunities for health and medical services, seniors' housing and care homes, public protection services, community facilities, offices and related uses.

#### **4.2.7 Southland Highway Commercial Park**

The Southland Highway Commercial Park is designated in the southeast portion of the plan area. It comprises 40 ha. of land of which 16 ha. is already developed, providing a further 24 ha. for future development.

The Southland Highway Commercial Park's westerly limit is defined by the existing SaskEnergy TBS site and the high pressure gas line which extends south from the TBS site. The gas facilities thus define the edge between commercial and residential uses.

The Southland Highway Commercial Park will provide opportunities for a wide variety of retail, service, office and wholesale uses.

## 5. Infrastructure

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This section of the report presents the municipal infrastructure that will be required in support of the proposed Master Plan. Municipal infrastructure includes the water distribution system, sanitary collection, storm drainage and roadways.

The planning of municipal infrastructure reflects the natural topography and drainage patterns of the plan area. While the overall slope of the land is to the north, the east-west ridge in the southeast portion of the plan area creates a drainage basin in the southeast corner which drains to the south. The depressional areas throughout the plan area provide opportunities for storm water detention and storage.

The planning for municipal infrastructure also considers that the east neighborhood will likely contain immediate residential development for the next 25 to 30 year time period. However, the short term servicing of the E1 development module must be compatible with the long term servicing of the entire Master Plan area.

### 5.1 Transportation Network

#### 5.1.1 West Hill 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 major arterial network will comprise of the following elements (see Drawing No. 9):

1. The extension of 28<sup>th</sup> Street West from 10<sup>th</sup> Avenue to 16<sup>th</sup> Avenue West.
2. The extension of Marquis Road West to 16<sup>th</sup> Avenue West.
3. The extension of 16<sup>th</sup> Avenue West from Marquis Road West northward to the CN rail line to the south limit of the plan area at 44<sup>th</sup> Street West.
4. The existing 10<sup>th</sup> Avenue West to Marquis Road West.

The major collector network will comprise the following elements:

5. The extension of 28<sup>th</sup> Street West and Marquis Road West from 16<sup>th</sup> Avenue West to 24<sup>th</sup> Avenue West, the west limit of the plan area.
6. The development of 24<sup>th</sup> Avenue West from 28<sup>th</sup> Street West south to the south limit of the plan area.
7. The extension of 16<sup>th</sup> Avenue West from Marquis Road West to the south limit of the plan area at 44<sup>th</sup> Street West.
8. The extension of 44<sup>th</sup> Street West from Highway No. 2 to 24<sup>th</sup> Avenue West, the west limit of the plan area.
9. The extension of 10<sup>th</sup> Avenue West northward from Marquis Road.

The major arterial/collector network will form a grid pattern at a spacing of 700 m to 1000 m to provide access to neighbourhood modules and traffic movements through the plan area.

Within neighbourhood units, vehicle and pedestrian movement will be provided by a network of collectors, major local and minor local roadways.

To the north of Marquis Road, all residential areas are within 400 m straight radius line distance of the major roadway network. Hence, it is possible to locate transit routes on the major roadway network only. South of Marquis Road, transit routes may need to use the neighbourhood collector system to ensure all residences are within 400 m of a transit route.

### **5.1.2 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 provinces 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 analysed the impact the development of West Hill 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 West Hill modules E1 and E2.

As identified in the Transportation Master Plan, in order to accommodate the additional traffic from the development of West Hill, the installation of new traffic signals at the intersection of 6<sup>th</sup> Avenue West and 28<sup>th</sup> Street West is currently underway.

The recommended staging of the roadways within West Hill included the newly constructed Marquis Road from 4<sup>th</sup> Avenue West to 6<sup>th</sup> Avenue West to increase capacity and improve safety for short term improvements (0-5 years). The extension of Marquis Road from 6<sup>th</sup> Avenue West to 10<sup>th</sup> Avenue West and the extension of 10<sup>th</sup> Avenue West from 28<sup>th</sup> Street West to Marquis Road was recommended to increase traffic capacity for the medium term (5-10 years). Finally, the extension of Marquis Road from 10<sup>th</sup> Avenue West to 16<sup>th</sup> Avenue West, the construction of 16<sup>th</sup> Avenue West from Marquis Road to 15<sup>th</sup> Street West, and the extension of 28<sup>th</sup> Street West from 10<sup>th</sup> Avenue West to 16<sup>th</sup> Avenue West was determined to be required for the full buildout of West Modules E1 and E2.

## **5.2 Water Supply and Distribution**

The water supply system for the proposed West Hill development contains two distinct systems:

- Primary Water Main System
- Local Distribution System

The purpose of the primary system is to transport treated water from the source to the development. The local system will distribute treated water within the development to various users. Only the primary system has been considered as a part of this master plan; however the water mains have been sized so that the local system will meet the City's minimum pressure and fire flow requirements when joined to the primary system.

### 5.2.1 Sources of Water Supply and Design Parameters

Four sources of water supply for West Hill were identified from the Water Distribution Master Plan (see Drawing No. 10). The first source is the existing 350 mm diameter PVC water main which was installed at 28<sup>th</sup> Street West and 10<sup>th</sup> Avenue West in 2009. This water is ultimately supplied from the 2<sup>nd</sup> Avenue reservoir.

The second source is the existing 200 mm diameter water main at 4<sup>th</sup> Avenue West and 38<sup>th</sup> Street. The 200 mm diameter water line is connected to the Marquis Road Reservoir at Central Avenue.

The third water supply for this development is a 250mm diameter water main located at 44<sup>th</sup> Street and Highway No. 2/11.

The fourth source is the 400mm West Hill Trunk Main which was installed from Marquis Road Reservoir to the future intersection of Marquis Road and 7<sup>th</sup> Avenue West in 2016. This project was undertaken by the City of Prince Albert to meet the future peak water demands and fire flow requirements of the West Hill development.

### 5.2.2 Distribution System

Prince Albert's water distribution system has two distinct pressure zones. The northern zone is known as pressure zone 1 and has pipes that span both sides of the North Saskatchewan River and is serviced by River Street WTP. Pressure zone 2 has an average elevation 30 m higher than pressure zone 1 and is located to the south of the North Saskatchewan River Valley. The pressure in the water distribution system of Zone 2 is sustained via pump stations at Second Avenue Reservoir and Marquis Road Reservoir.

Pressure zones 1 and 2 only connect in two locations apart from the fill mains dedicated to Second Avenue and Marquis Reservoir. The 6<sup>th</sup> Avenue West and 15<sup>th</sup> Avenue East connections both contain pressure reducing/sustaining (PRV/PSV) valves that allow water to flow between the zones in the event of a pressure drop or surge in either of the two zones. Such events could be caused by pump station failure, water main breaks, firefighting efforts, or transient forces (water hammer). The future West Hill area will be serviced entirely by Zone 2, although a pipe connection across the two zones may be constructed to supplement pressure and flows to Zone 1.

### 5.2.3 Water Demand Analysis

Two scenarios are assessed in designing a water distribution network: (1) Peak Hour Demand (PHD) with a minimum residual pressure of 40 psi, and (2) Maximum Day Demand (MDD) plus Fire Flow (FF), with a minimum residual pressure of 20 psi.

The future West Hill development area will contain a number of different land-uses, including single family and multi-family residential, highway and suburban commercial, institutional (e.g. schools), and parks. Each land-use will have a particular water demand (based on net area) and fire flow requirement, as shown below.

**Table 5.1: Water Demands**

	MDD	PHD	FF
<b>Single Family</b>	0.463 l/s/ha.	0.810 l/s/ha.	60 l/s
<b>Multi-Family</b>	0.772 l/s/ha.	1.350 l/s/ha.	120 l/s
<b>Commercial</b>	0.694 l/s/ha.	1.157 l/s/ha.	120 l/s
<b>Institutional</b>	0.694 l/s/ha.	1.157 l/s/ha.	120 l/s
<b>Industrial</b>	0.694 l/s/ha.	1.157 l/s/ha.	180 l/s
<b>Park</b>	0.300 l/s/ha.	0.480 l/s/ha.	

A West Hill water distribution model was constructed in WaterCAD (Version 8) for the 2012 issue of the WHMP using the water demands from the table above. The size of the water distribution piping was then set to achieve the pressure constraints of the two scenarios.

A major 300 mm diameter loop is required to service the Marquis Common and southern portion of the development area because of the relatively flat topography and high water demand and fire flow requirements. Along the northwest portion of the development where the overall slope of the land increases, the distribution piping reduces to 200 mm diameter as the drop in ground elevation partially offsets pressure loss through the system. The water distribution system is shown on Drawing No. 10.

For the 2015 Water Distribution Master Plan, data was gathered from facilities, record drawings, city databases, field testing and discussions with operators to construct the city-wide WaterCAD model used for analysis. The links and nodes of the West Hill WaterCAD model were imported into the city-wide WaterCAD model to carry out a staged modeling analysis of the future water system. This approach assumed that the Crescent Acres neighbourhood would be completely developed prior to starting to develop West Hill. Each sequential development module of West Hill was then added to the model and then a simulation was run to see if the addition of that module triggered the need for water system infrastructure upgrades.

The addition of another reservoir at Marquis Road, pumping facility improvements at both Marquis Road and Second Avenue Reservoirs, and the addition of the West Hill Primary Main were the recommended future water distribution system upgrades which will help the city deliver adequate supply and pressure to West Hill. With the exception of building another reservoir at the Marquis Road location, the City of Prince Albert has addressed each of the recommended future system upgrades since the Water Distribution Master Plan was issued.

### **5.3 Sanitary Sewage System**

#### **5.3.1 Sanitary Sewer Servicing**

The future West Hill development area has an overall slope to the north where it meets the North Saskatchewan River escarpment. The escarpment runs approximately parallel to the north boundary of the study, and the land slopes steeply. The topography generally allows for sanitary sewer service with a gravity system by strategic pipe routing.

#### **5.3.2 Sanitary Design Flows**

The sanitary design flows were developed based on City of Prince Albert Design Standards. The design flow is the addition of dry weather flow (includes only sewage flow) and inflow/infiltration into the sewer system during a 25 year 4 hour rainfall event.

The dry weather flow was determined based on specific land-use areas (single family/multi-family residential, commercial, school, and institutional). For residential flow, an average per capita flow of 200 lpcd was used. The per capita flow was converted to flow per area by the assumed household size (2.5 persons/unit) and development density (single family – 18 units/ha.; multi-family – 30 units/ha.). Note that there may be a slight discrepancy between these values and those used for neighbourhood planning and this should be expected as sanitary design follows a different method.

The commercial flow was further divided into highway commercial and suburban centre commercial, with an average flow of 68 m<sup>3</sup>/ha./day and 86 m<sup>3</sup>/ha./day, respectively. For school and institutional uses, an average flow of 86 m<sup>3</sup>/ha./day was used.

The average dry weather flow was calculated based on the net land-use area (excluding roads and parks). The average dry weather flow was then multiplied by a peaking factor to determine the peak dry weather flow. The peaking factor was calculated using the Harmon's formula (1) for residential land-uses. For commercial, school, and institutional land-uses, the peaking factor was calculated based on the City of Edmonton design standards (2):

$$PF = 1 + \frac{14}{\sqrt{P}} \quad (1)$$

$$PF = 10Q_{AVG}^{0.45} \quad (2)$$

where  $PF$  is the peaking factor,  $P$  is the population (in thousands),  $Q_{AVG}$  is the average flow (L/s)

The wet weather flow for the 2012 issue of the WHMP was initially calculated by multiplying the gross area (including streets and parks) by an inflow and infiltration allowance of 0.17 L/s/ha.

The wet weather flow has since been updated after the Sanitary Sewer Master Plan was completed in 2016. A dynamic model of the City's sanitary sewer system was developed in XPSWMM. This software uses links (pipes) and nodes to represent connection points (manholes, wet wells, pumps, etc.). The City provided their sanitary sewer system in database format which was imported into the model to create links. The XPSWMM software solves two "layers": the runoff layer and the hydraulics layer. The runoff layer simulates the hydrology and the Rainfall-Derived Inflow and Infiltration (RDII), which is exported as a hydrograph at each node that the model then inputs into the nodes in the hydraulics layer. The hydraulics later simulates the domestic dry weather flow at each of the nodes and adds the RDII hydrograph solved in the runoff layer. The flow is then routed through the downstream system.

The sizing of the West Hill sanitary collection system was verified and upgraded in some locations based on the RDII response within the XPSWMM model from the 25 year 4 hour rainfall event. The sanitary sewer system is shown on Drawing No. 11.

### 5.3.3 Sanitary Sewer Collection System

One of the primary objectives of the Sanitary Sewer Master Plan was to analyse how the buildout of each of the proposed West Hill development modules would impact the City's existing sanitary infrastructure; as this was previously unknown during the first issue of this WHMP.

The buildout of modules E1 & E2 of West Hill identified two locations of concerns in the sewer system. The first location is on 12<sup>th</sup> Avenue West from 15<sup>th</sup> Street West to 19<sup>th</sup> Street West. The second location is along 15<sup>th</sup> Street West from 10<sup>th</sup> Avenue West to 9<sup>th</sup> Avenue West. Both locations have 375 mm sewers that have insufficient capacity to convey the additional wet weather flow from West Hill caused flow to surcharge upstream. This surcharge also causes expected basement flooding in the neighbourhood around 15<sup>th</sup> Avenue West and River Street West.

The addition of modules N1, E3, E4, and HC identified portions of the 15<sup>th</sup> Street Trunk and 17<sup>th</sup> Street West Trunk that were undersized. The existing 900 mm diameter section of the 15<sup>th</sup> Street West Trunk becomes overwhelmed from 2<sup>nd</sup> Avenue West to 1<sup>st</sup> Avenue East. This is caused by the additional flow being introduced into the trunk from the development of West Hill. This simulation assumed that flow from West Hill would be redirected to the 17<sup>th</sup> Street Trunk to accommodate the additional wet weather flow from modules E1 & E2.

Installing a new sanitary trunk (the West Hill Trunk) was recommended to redirect sanitary flow from West Hill, bypassing the existing portions of the sanitary collection system which are undersized, and enter the existing system where there is sufficient capacity. The trunk would commence near the Victoria Hospital at 10<sup>th</sup> Avenue West and 22<sup>nd</sup> Street and extend across the City connecting to the existing trunk sewer at 15<sup>th</sup> Street East and 6<sup>th</sup> Avenue East. A diameter of 900 mm was recommended for the West Hill Trunk to convey the peak wet weather flow of the West Hill development. The City has begun making plans to construct the West Hill Trunk and it is anticipated to be complete by the year 2020.

## 5.4 Surface Drainage and Storm Water Management

### 5.4.1 Stormwater Management

The future West Hill development area is comprised of an undulating landform that drains to a number of sloughs located throughout. Overall, there is relatively low surface relief with the exception of the North Saskatchewan River escarpment that runs close to the north boundary of the study area. At the escarpment, there is a steep drop down to the West Flat neighbourhood, with an elevation drop of approximately 15 m.

West Hill's storm sewer system was designed for the 2 year storm 1 hour design storm, and the ponds designed for the 100 year design storm with the most critical of the 1 hour, 12 hour, and 24 hour durations.

The stormwater system will consist of storm sewer piping (minor system) and wet ponds (major system) that will route the flow to the existing stormwater infrastructure located to the north. The existing stormwater infrastructure includes an 1800 mm diameter (RCP) storm sewer trunk along 28<sup>th</sup> Street (installed in 2009), Storm Retention Pond 1, and a 1350 mm diameter (CSP) storm sewer trunk along 15<sup>th</sup> Avenue (installed in 1967).

### 5.4.2 Hydrology

The existing land use is predominantly agriculture. As development proceeds, the land will be gradually developed into a variety of land uses, including single family and multi-family residential, commercial, and parks. There is a possibility that a portion of the study area south of the future Marquis Drive extension would be developed as industrial land.

Present surface drainage is localized to a number of sloughs interspersed throughout the area. The overall slope of the land is to the north except for the southeast portion of the study area. This area slopes to the south where it drains through a series of sloughs to the Red Deer Creek and eventually to the South Saskatchewan River.

It is decided to include this area within the West Hill stormwater system and drain it north to the North Saskatchewan River. The use of stormwater retention ponds would reduce the peak runoff flow rate draining south to the sloughs; however, the total volume of runoff would be increased due to the increased imperviousness of the developed land. Although the peak flow rate may be reduced to the pre-development condition, the increased runoff volume may cause flooding concerns further downstream if the conveyance is poor (which is fairly typical of drainage through a series of sloughs).

Historical rainfall data published by Environment Canada for the period of 1960 to 2001 was used to generate IDF equations for the 2 year and 100 year return periods. From the IDF equations, design storms for the 1 hour, 12 hour, and 24 hour durations were developed. The 1 hour duration storm was illustrated with the Chicago distribution, which typically has a short lasting peak of high intensity. The 12 and 24 hour duration storm were illustrated with the Huff II distribution, which typically has a lower intensity spread over a long period and delivers a large volume of rainfall. The 1 hour duration is used for designing piping, while the longer durations typically are critical for the design of stormwater retention ponds. The design storms were modeled in XPSWMM to generate the runoff hydrographs.

A total of 8 ponds are located throughout the study area within natural low areas (Drawing No. 12a & 12b). Note that Pond 1 was constructed in 2009 and currently serves a portion of the existing West Hill neighbourhood. It was constructed with excess capacity to provide service to the future development area.

### 5.4.3 Hydraulic Design

The hydraulic design for the stormwater system was completed using the modeling software XPSWMM and included both the stormwater retention ponds and the major storm sewer trunks.

The stormwater ponds were assumed to have an active storage depth of 2.0 m, except for Pond 5 that had an active storage depth of 1.5 m to facilitate drainage to Pond 6 downstream. 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 ponds were 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 volumes for all the ponds. The NWL and HWL areas were sized to contain the storage volume within the allowable active storage depth. The dimensions of the ponds are shown below.

**Table 5.2: Storm Water Management Design Details**

Ponds	Elevation		Surface Area		Inflow	Outflow	Storage Volume
	NWL	HWL	NWL	HWL			
Pond 1	453.0 m	455.0 m	2.02 ha.	2.68 ha.	5.08 cms	3.00 cms	47,000 m <sup>3</sup>
Pond 2	447.1 m	450.1 m	2.10 ha.	2.90 ha.	3.71 cms	1.50 cms	70,000 m <sup>3</sup>
Pond 3	437.0 m	439.0 m	0.81 ha.	1.34 ha.	1.61 cms	0.64 cms	21,000 m <sup>3</sup>
Pond 4	461.0 m	463.0 m	1.97 ha.	2.78 ha.	1.85 cms	0.16 cms	47,000 m <sup>3</sup>
Pond 5	457.5 m	459.0 m	4.01 ha.	5.29 ha.	3.64 cms	0.18 cms	70,000 m <sup>3</sup>
Pond 6	457.0 m	459.0 m	3.98 ha.	5.16 ha.	4.94 cms	0.30 cms	91,000 m <sup>3</sup>
Pond 7	457.0 m	459.0 m	1.92 ha.	3.09 ha.	2.41 cms	0.44 cms	50,000 m <sup>3</sup>
Pond 8	450.0 m	452.0 m	1.70 ha.	2.93 ha.	3.10 cms	0.50 cms	46,000 m <sup>3</sup>

The flow to the existing 15<sup>th</sup> Ave storm trunk, which is the sum of the outflow from Pond 2 and Pond 3, is approximately 2.14 cms. The storm trunk is able to convey both its current flow and this additional flow without surcharge. This was confirmed during the analysis of the existing and future stormwater infrastructure in the 2016 Stormwater Master Plan. Considering that the upstream ponds would take a number of days to completely drain, the 15<sup>th</sup> Ave storm trunk was then modeled with a 2 year storm occurring at the same time the ponds were draining at their maximum flow. It is confirmed that the storm trunk is able to pass the flow with only a small amount of surcharge. This small amount of surcharge would have no consequence to the existing 15<sup>th</sup> Ave storm trunk and existing West Flat neighbourhood.

The main storm sewer trunks were modeled in XPSWMM and were designed to convey the flow from the 2 year 1 hour design storm with no surcharge. With the study area divided into a number of smaller catchments draining to their respective ponds, the quantity of large diameter storm sewer is reduced. The storm sewer system is shown in Drawings No. 12a & 12b.

At the western boundary of the study area, there are three locations where a natural drainage run would become blocked once development occurs. It is recommended that the drainage continuity be maintained by installing a small diameter storm sewer to drain these areas. This storm sewer could also be used to service future development outside of the present study area.

## 6. Development Considerations

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### 6.1 Phasing of Development

The optimal development phasing for the plan area will depend on access to key infrastructure systems and cost extending these systems. Generally, it is logical to extend sanitary and storm water systems from the downstream to the upstream portion of the drainage basin.

The West Hill Infrastructure Project completed in 2009 provided expansion of underground services along 28<sup>th</sup> Street and 10<sup>th</sup> Avenue which allows for easy access to the services for development along these corridors. Development can start at these corridors and advance away from them. From this perspective, neighbourhood units E1 and E2 are the logical initial phases to develop. Development of these modules would have the benefit of being contiguous to an existing preferred residential area.

Neighbourhood unit N1 can also proceed. However, the cost advantages of this phase would be to some extent offset by the front-end costs of extending the water main, sanitary main and road linkages from the existing system to service this development module.

Following the development of neighbourhood unit N1, development can proceed to modules E3, E4, and HC in that order. The West neighbourhood can also proceed following N1 and proceed from W1 to W2 and finally W3.

Ultimately, the staging of development will be influenced by the willingness and financial capability of the respective landowners in any of the three modules to “front-end” the costs of infrastructure extension relative to prevailing market conditions.

### 6.2 Development Levy Study

In 2010 AECOM, with support from Watson and Associates Economists (WAE), authored a Development Levy Study for the City. The conclusion of this study was to develop a 25 year growth horizon upon which to base the levy calculation. WAE also studied growth rates for the City and ultimately established a medium growth scenario upon which was adopted by the City and used throughout the development levy study. For the 25 year growth scenario growth areas were identified within the City including the West Hill area. The majority of the future residential growth will come from Crescent Acres and the West Hill for the City of Prince Albert. Crescent Acres would not serve the 25 year growth for the City and would be fully built out in 10 – 15 years where the primary growth would then come from the West Hill Neighborhood.

The Development Levy identified the following West Hill infrastructure in the 25 year growth levy calculation:

- Extension of 28<sup>th</sup> Street (10<sup>th</sup> Avenue to 16<sup>th</sup> Avenue)
- Extension of 10<sup>th</sup> Avenue (28<sup>th</sup> Street to Marquis Road)
- Construction of 16<sup>th</sup> Avenue (Marquis Road to 28<sup>th</sup> Street)
- Primary Water Main on 10<sup>th</sup> Avenue (28<sup>th</sup> Street to Marquis Road)
- Primary Water Main on 28<sup>th</sup> Street (10<sup>th</sup> Avenue to 16<sup>th</sup> Avenue)
- Primary Water Main on Marquis Road (7<sup>th</sup> Avenue to 16<sup>th</sup> Avenue)
- Trunk Sanitary Sewer on 10<sup>th</sup> Avenue (28<sup>th</sup> Street to Marquis Drive)
- Trunk Sanitary Sewer on 18<sup>th</sup> Street West (10<sup>th</sup> Avenue to 2<sup>nd</sup> Avenue)

- Storm Retention Pond No. 2
- Neighbourhood Park Development (linear storm pond area – Vic Hospital)
- Neighbourhood Park Development (Future School Site)

As noted in both the WHMP and the Development Levy study system wide capacity analysis capacity studies need to be undertaken for the sanitary sewer collection and water distribution systems. Once this analysis is completed further infrastructure upgrades may be identified due to growth from the West Hill Neighbourhood. The 2011 Development Levy study established a charge of \$98,372/ha which would be applied on a system wide basis and eliminates the somewhat area specific charge system the city had been utilizing to date. Development levies are adjusted at the beginning of each year with the most recent Industrial Product Price Index (IPPI) released by Statistics Canada.

### **6.3 Multiple Land Ownership**

Multiple ownership of land is a problematic feature of Neighbourhood Units E-1 and E-2, especially E-1. Differing land owner objectives and financial capabilities can be barriers to consensus regarding the optimal development pattern, the development process and the equitable share of development costs.

Nevertheless, it is essential that each neighbourhood unit be developed on the basis of a comprehensive plan for each unit. All landowners must participate in an equitable sharing of dedication for streets, public utilities and public reserve, as well as an equitable sharing of the development opportunity, in order to ensure that the overall development pattern is rational, coherent and efficient. This can be accomplished through the replot process for each neighbourhood unit.

The development schemes shown Figure for Neighbourhood Unit E-1 is meant to illustrate a workable, rational and efficient development pattern for each module. Landowners are free to accept, modify or replace the development schemes for each unit.

However, it is essential that the first stage of implementing the Master Plan is to provide an intermediate level of planning and servicing feasibility for each neighbourhood unit, with coordination between adjacent intermediate plans in terms of access, land use and servicing.

## 7. Summary and Conclusion

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The Master Plan provides a broad framework for future urban development within the West Hill sector of the City of Prince Albert. Future development in the West Hill area will serve a diverse population and accommodate a variety of land use. The Plan's creation has been driven by requirements to incorporate the existing development in West Hill and West Flats, and as well, the current municipal planning policy. As much as possible, the goals of current land owners have been addressed.

Overall, the West Hill sector structures two neighbourhoods (East and West) around the Marquis Common core. Each neighbourhood contains development modules to be phased in according to population growth, market demand and infrastructure services. Development module boundaries follow the structured grid pattern of the primary vehicle transportation network. This allows suitable road construction to coincide with phasing implementation.

Residential areas provide various housing types including: single family dwellings, two-unit dwellings, care homes, and multiple-unit dwellings. Multiple-unit dwellings will include: street townhomes, grouped/parcel townhouses and apartment style structures. The core area is the sector's central node for commercial, institutional/mixed use development with MR plazas within at the perimeter integrating the area to an overall open space system.

The open space network provides pedestrian and cycling transit routes throughout the sector. It links storm ponds, schools, commercial, residential and larger programmable open space. The development modules segmented by formal park space and freeflow arterial roads will ensure growth proceeds in a balanced contiguous manner.

The West Hill Master Plan area encompasses approximately 613 hectare (1515 acres) of land which includes about 500 hectares planned for residential development and the remaining land available for commercial land use, institutional land use, and arterial roads. The projected population for this area is 20, 600 with an approximately division between east and west neighborhoods of 9,300 and 11,300 respectively.

For the water system, a 300 mm diameter (12 inch) primary loop is suggested, extending from the existing water main at 28<sup>th</sup> Street West and 10<sup>th</sup> Avenue West and ultimately connecting into the Marquis Road water main as the E-1 area is developed, and another future connecting to an existing south of the HC area.

The sanitary system for the future West Hill area may be serviced solely by a gravity pipe system. There are three main trunks (East, Centre, and West trunks) that will route the flow to the north. The East trunk connects to an existing 525 mm sanitary sewer at 10<sup>th</sup> Avenue and 28<sup>th</sup> Street. The Centre and West trunks combine into a new 675 mm trunk at 16<sup>th</sup> Avenue near the north boundary of the development area. The new trunk will head east and combine with the 525 mm sewer into a new 900 mm trunk.

The 900 mm trunk will head east and connect to the City's existing sanitary sewer system. The trunk will convey a design flow of 570 L/s, which would be a substantial addition to the existing flows. Before any significant development progresses in the future West Hill area, it is important to analyze the conveyance of the downstream sanitary sewer system and assess the implications of including this additional future flow.

The current in storm water management is to incorporate On-site detention in order to minimize the construction of large downstream trunks. A system of storm water management ponds is proposed in the West Hill Master Plan to take advantage of the natural topography and to remain within the capacity of the downstream receiving trunk.

Stormwater management for the future West Hill development area would be provided with a system of storm sewers and a total of 8 retention ponds and routes the runoff north to the existing 15<sup>th</sup> Ave storm trunk. The ponds reduce the size of the individual drainage catchments, which in turn reduces the amount of large diameter storm sewer. The ponds also attenuate the peak runoff flow before it reaches the 15<sup>th</sup> Ave storm trunk so that the downstream infrastructure may be fully utilized without requiring upgrades.

Phasing of development in an efficient manner depends on the accessibility of key infrastructure. For this reason, the corridors along the existing portions of 28<sup>th</sup> Street and 10<sup>th</sup> Avenue are ready for development and it should advance away from this corridor. Further to the west, development should start at the downstream end of the sanitary and storm systems near West Flat and proceed south. Staging will also be influenced by the readiness of the individual land owners to proceed with the development of their properties. Due to multiple land ownership in the area, the City will be required to coordinate the progression of developments.

The Southland Highway Commercial Park is located south of the height of land and has no natural drainage outlet. There are numerous local sloughs west of the developed area. The natural topography indicates a slight gradient towards the south west. The proposed option to alleviate the drainage problem is to construct a storm sewer piping system connecting all the local sloughs and divert the water to Neighbouring Unit E-4. This work will have to be carried out in conjunction with the site grading within the commercial area.

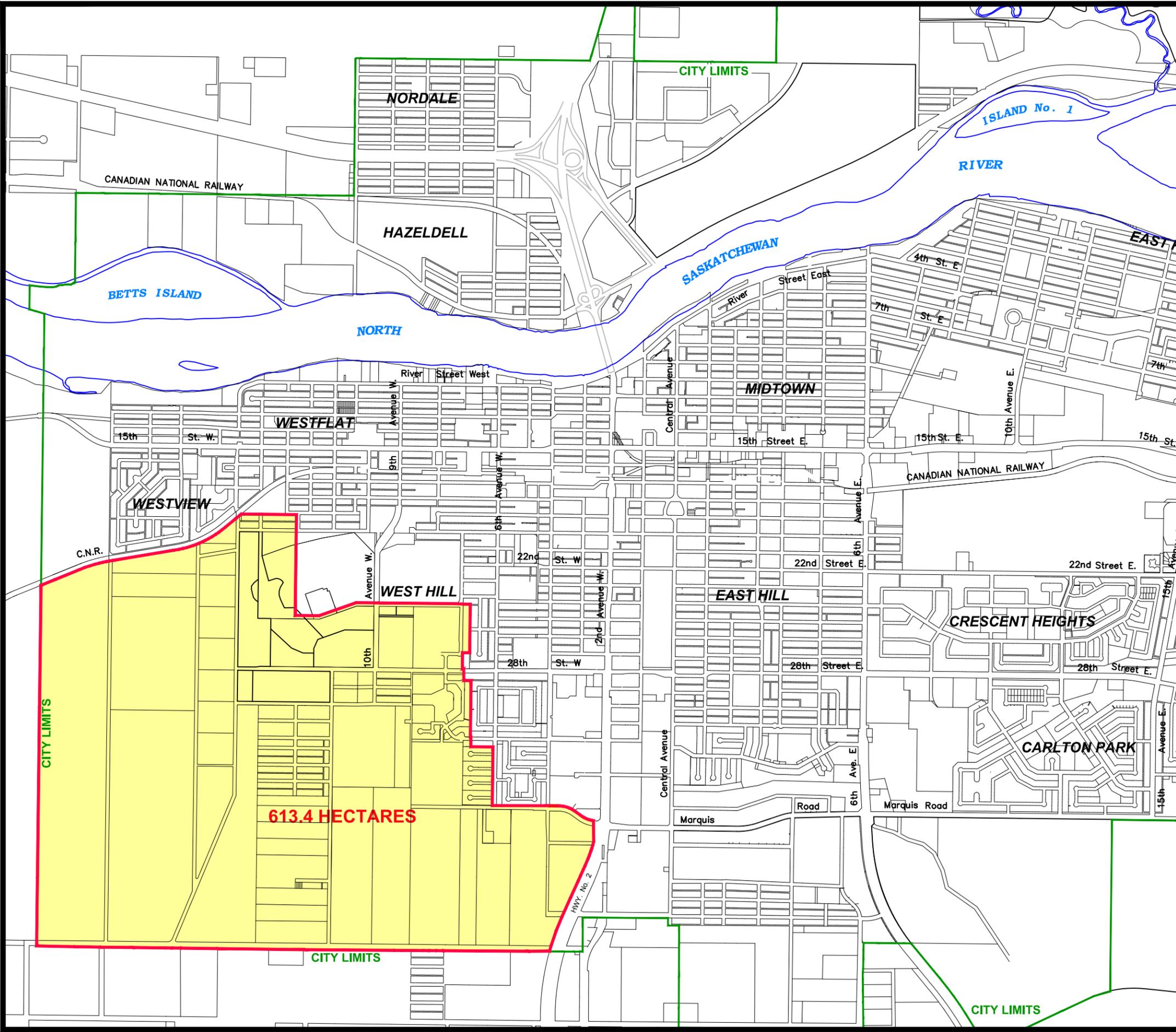
## 8. Reference Material

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- Population, Household and Employment Forecast Study (Watson and Associates Economists, 2008)
- Statistics Canada
- Environment Canada
- Water Distribution Master Plan (AECOM, 2015)
- Sanitary Sewer Master Plan (AECOM, 2016)
- Stormwater Master Plan (AECOM, 2016)
- Transportation Master Plan (Allnorth, 2017)
- Rotary Trail Master Context Plan (City of Prince Albert)
- Design Standards – Section 8: Parks and Open Space (City of Prince Albert, 2017)
- Lake Estates on South Hill Phasing Plan (Associated Engineering)

# Drawings

P:\60562933\900-CAD\_GIS\910-CAD\25-SKETCHES AND FIGURES\01\60562933-FIG-20-00-G-FIG01.DWG



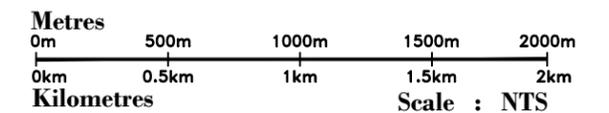
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

- West Hill Master Plan Study Area



### LOCATION

**AECOM**

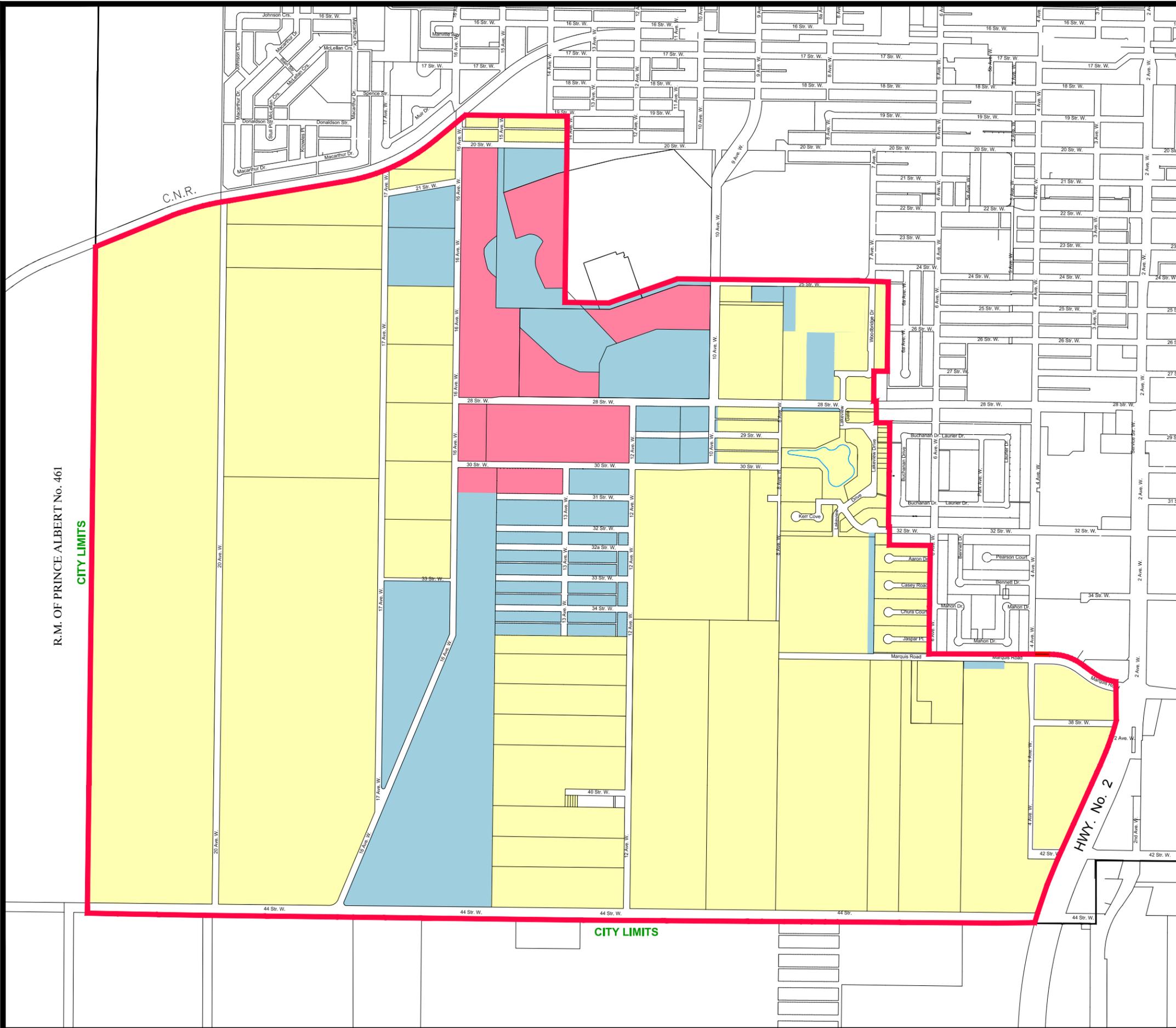
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Drawing No.

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R.M. OF PRINCE ALBERT No. 461

CITY LIMITS

CITY LIMITS



# WEST HILL MASTER PLAN

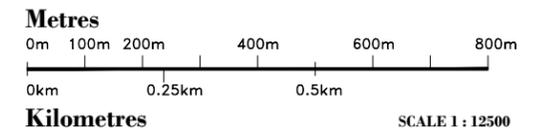


## City of Prince Albert

### LEGEND

#### LAND OWNERSHIP

- City of Prince Albert
- Others
- Prince Albert Parkland Regional Health Authority



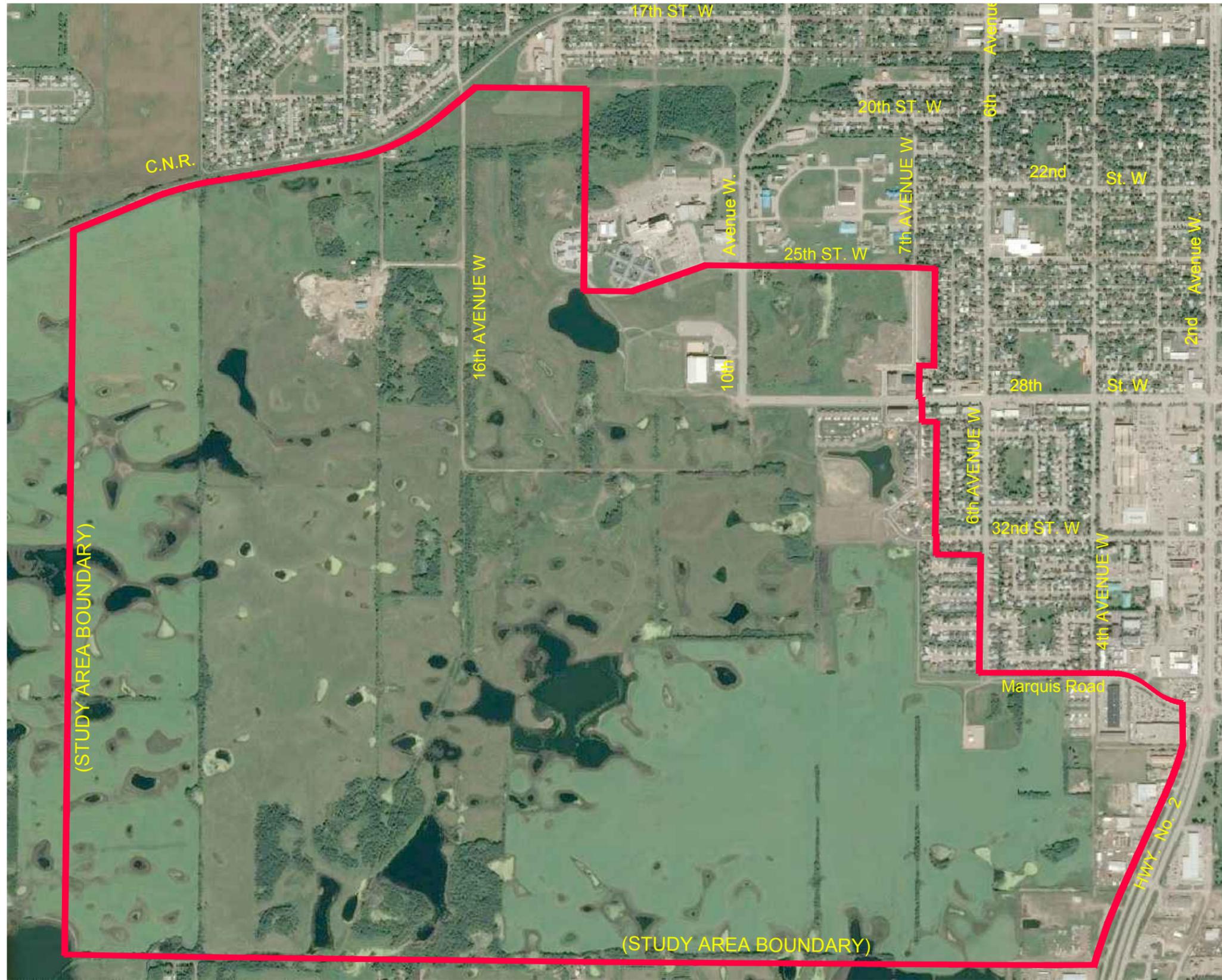
### LAND OWNERSHIP

**AECOM**

2

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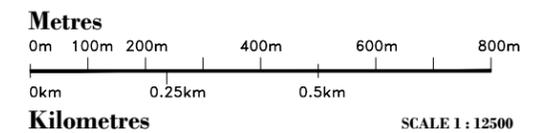
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

 Study Area Boundary



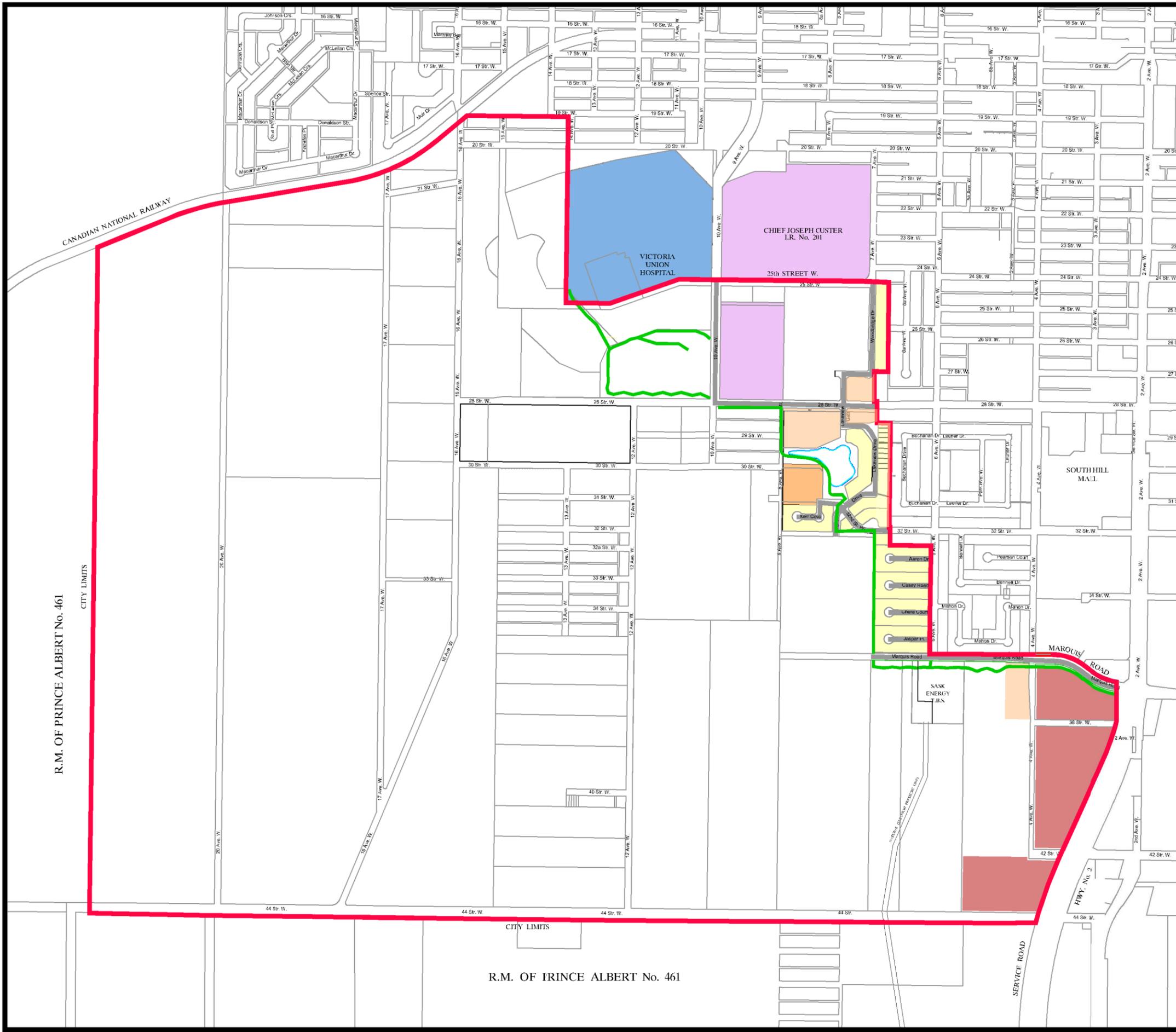
## SITE CHARACTERISTICS PHOTO MOSAIC



3

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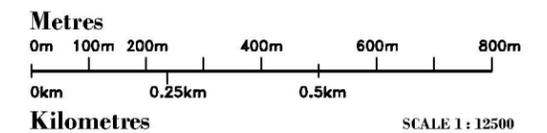
# WEST HILL MASTER PLAN



## City of Prince Albert

**LEGEND**

- Study Area Boundary
- Paved Road
- Trail
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Highway Commercial
- Arterial Commercial
- Institutional
- Chief Joseph Custer L.R. No. 201



### CURRENT LAND USE



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R.M. OF PRINCE ALBERT No. 461

CITY LIMITS

R.M. OF PRINCE ALBERT No. 461

CITY LIMITS

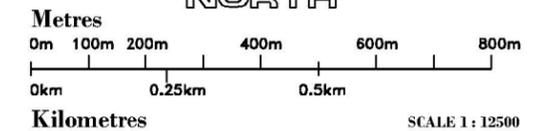
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

	R1 - Small Single Dwelling
	R2 - Large Single Dwelling
	R3 - Two-Unit Dwelling
	R5 - Multiple Unit Dwelling
	C2 - Service Commercial
	C4 - Highway Commercial
	C5 - Neighbourhood Commercial
	I - Institutional
	IG - Institutional General Service
	M2 - Light Industrial High Density
	A1 - Agricultural
	C - Contract Zone
	P - Park



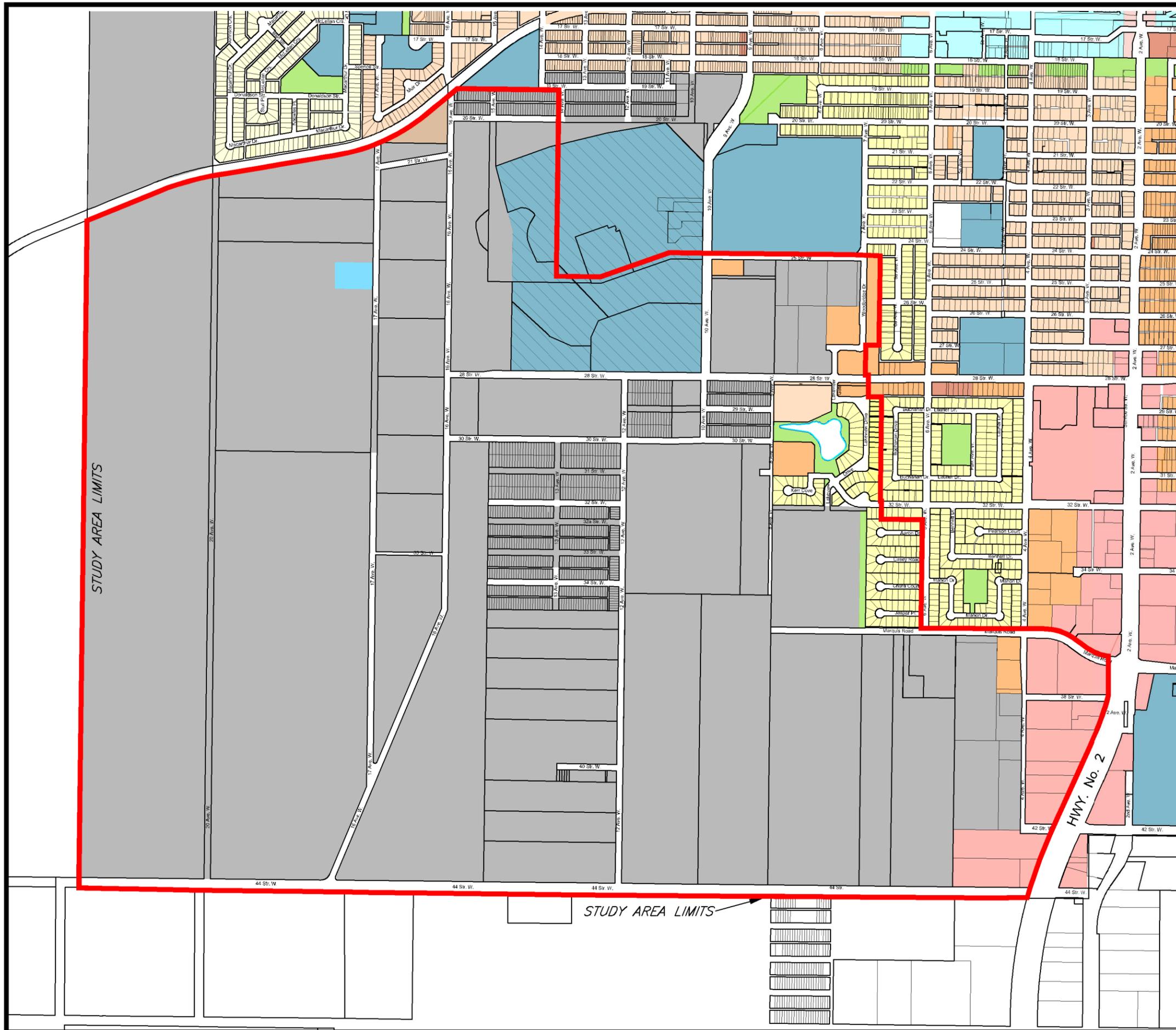
### EXISTING ZONING

**AECOM**

5

Drawing No.

605629.33-FIG-20-00-C-FIG05.DWG



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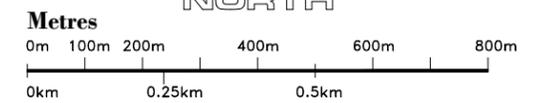
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

MODULE	AREA
West Neighbourhood	266.95ha.
East Neighbourhood	222.97ha.



SCALE 1 : 12500

### NEIGHBOURHOOD BOUNDARIES

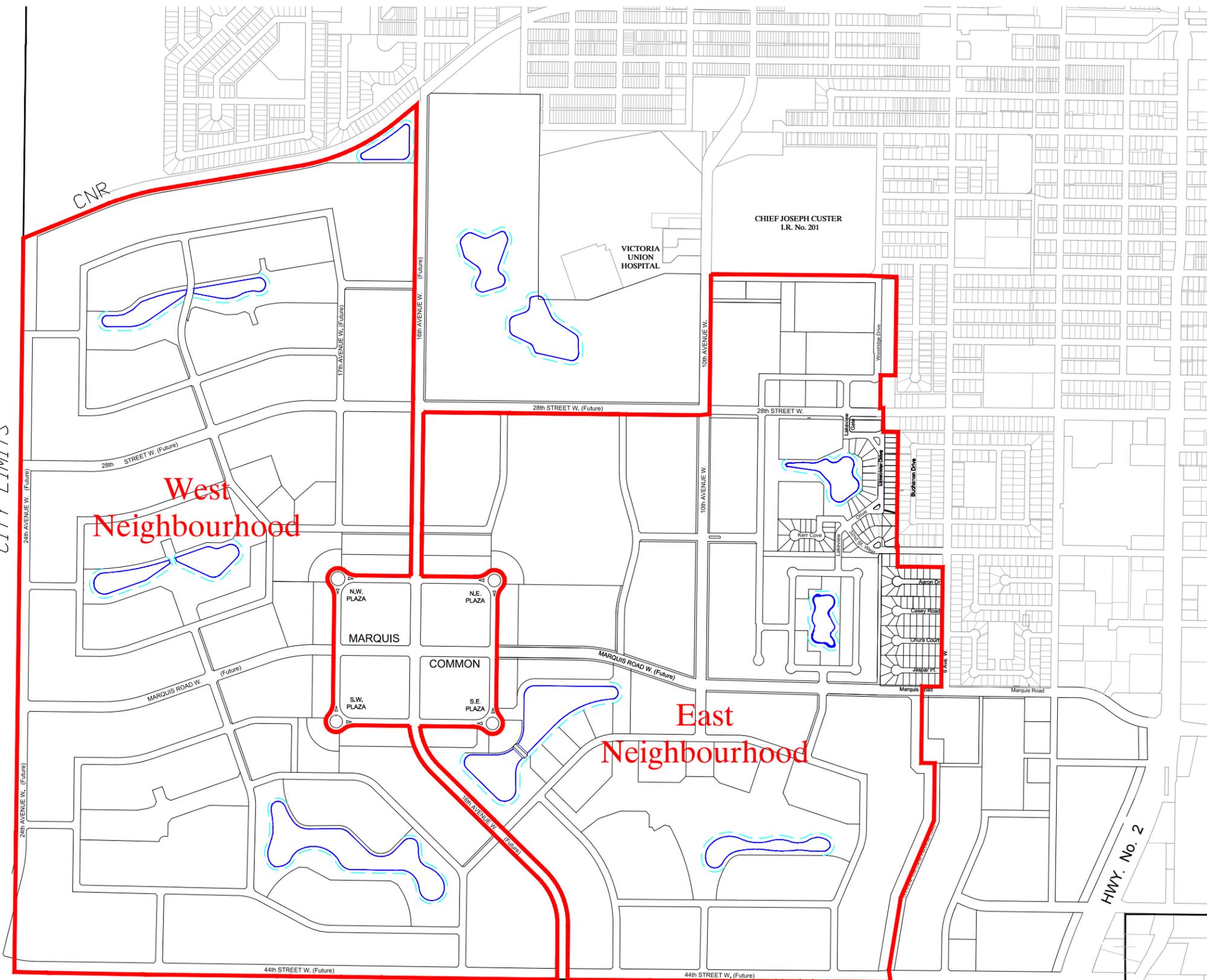
**AECOM**

**6a**

Drawing No.

CITY LIMITS

CITY LIMITS



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# WEST HILL MASTER PLAN

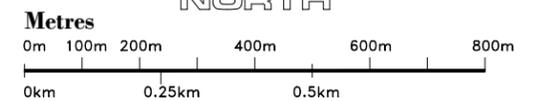


## City of Prince Albert

### LEGEND

MODULE	AREA
E1	46.00ha.
E2	19.76ha.
E3	48.85ha.
E4	100.17ha.
W1	80.57ha.
W2	70.92ha.
W3	109.20ha.
N1	44.75ha.
HC	45.63ha.

NOTE:  
MODULE E1 MEANS EAST NEIGHBOURHOOD  
DEVELOPMENT MODULE #2 IN LEGEND



SCALE 1 : 12500

## DEVELOPMENT MODULES

**AECOM**

**6b**

Drawing No.

CITY LIMITS

CITY LIMITS

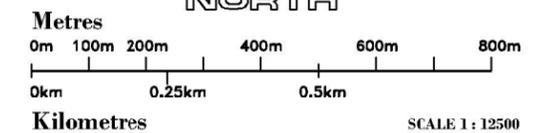
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

- Study Area Boundary
  - Low Density Residential
  - Medium Density Residential
  - High Density Residential
  - Highway Commercial
  - Arterial Commercial
  - Institutional
  - Institutional Urban Reserve
  - Neighbourhood Mixed Use
  - Public Utility
  - Chief Joseph Custer I.R. No. 201
  - Municipal Reserve
- \* May include modules or parcels of Multiple Family residential.



SCALE 1 : 12500

### LAND USE CONCEPT

**AECOM**

7

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60562833-FIG-20-00-G-FIG07.DWG

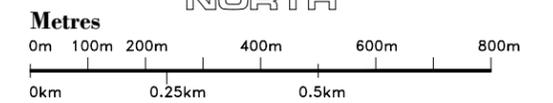
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

- Study Area Boundary
- Municipal Reserve / Buffer
- Rotary Trail
- - - Park and Street Pathways
- Rotary Trail "Connector"
- City Sidewalk



SCALE 1 : 12500

## OPEN SPACE SYSTEM

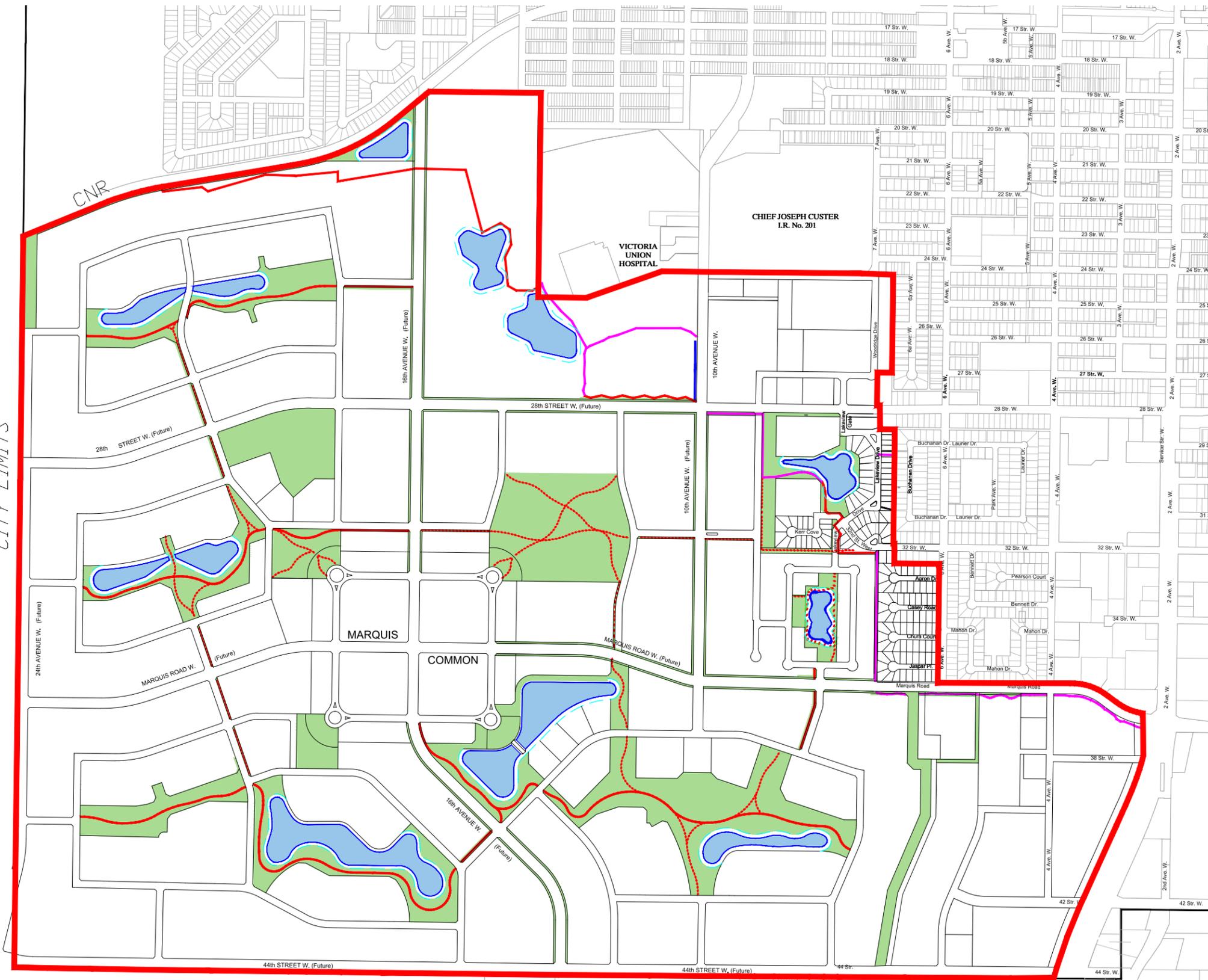
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8

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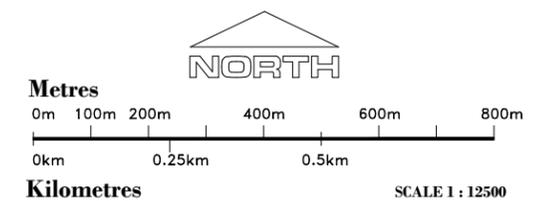
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

- W.M. 200mmØ
- W.M. 250mmØ
- W.M. 300mmØ



### WATER DISTRIBUTION

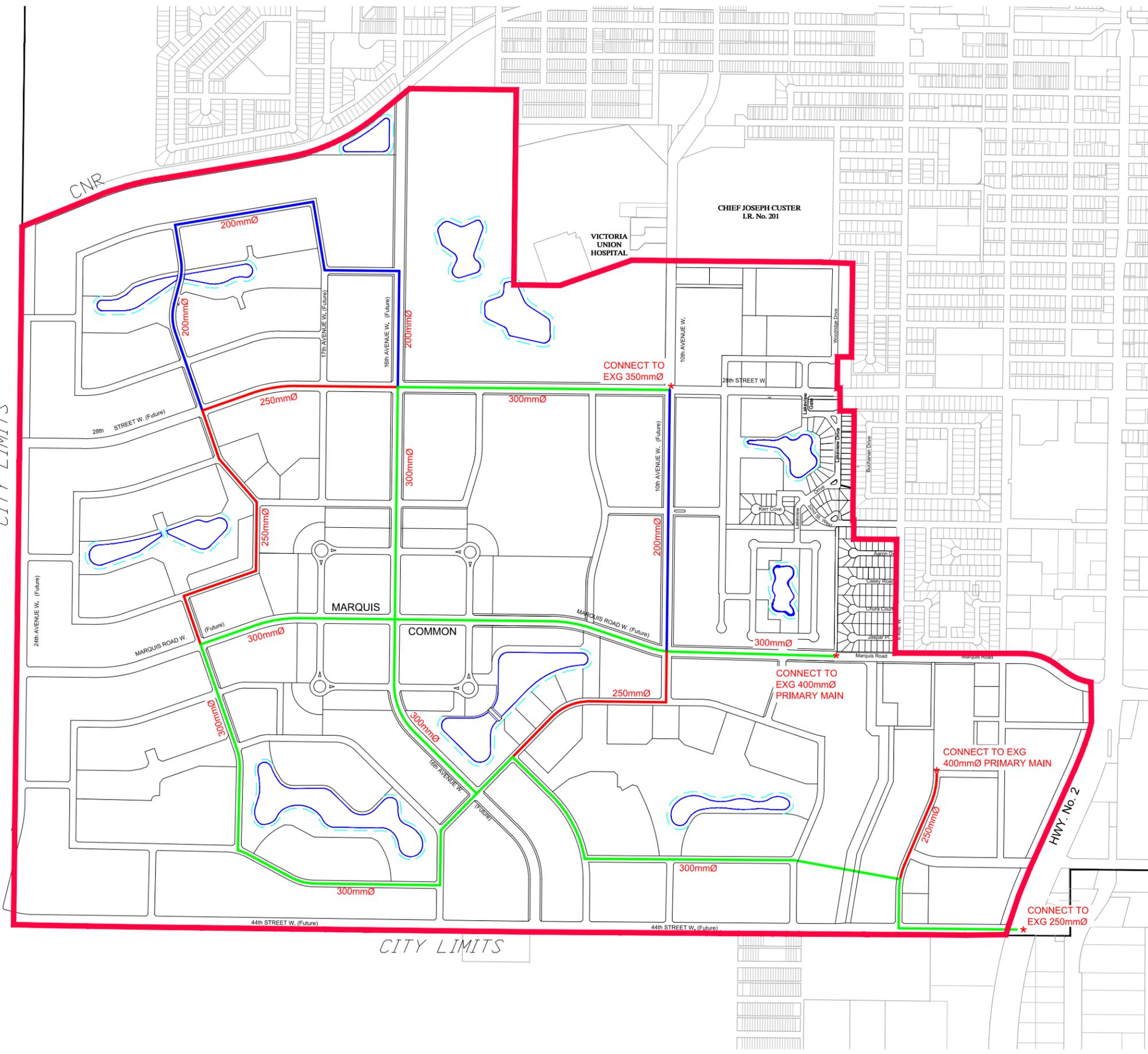


**10**  
Drawing No.

60562933-FIG-20-00-G-FIG10.DWG

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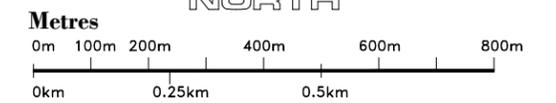
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

- Catchment Boundary
- Sanitary Sewer



SCALE 1 : 12500

### SANITARY SEWER COLLECTION SYSTEM

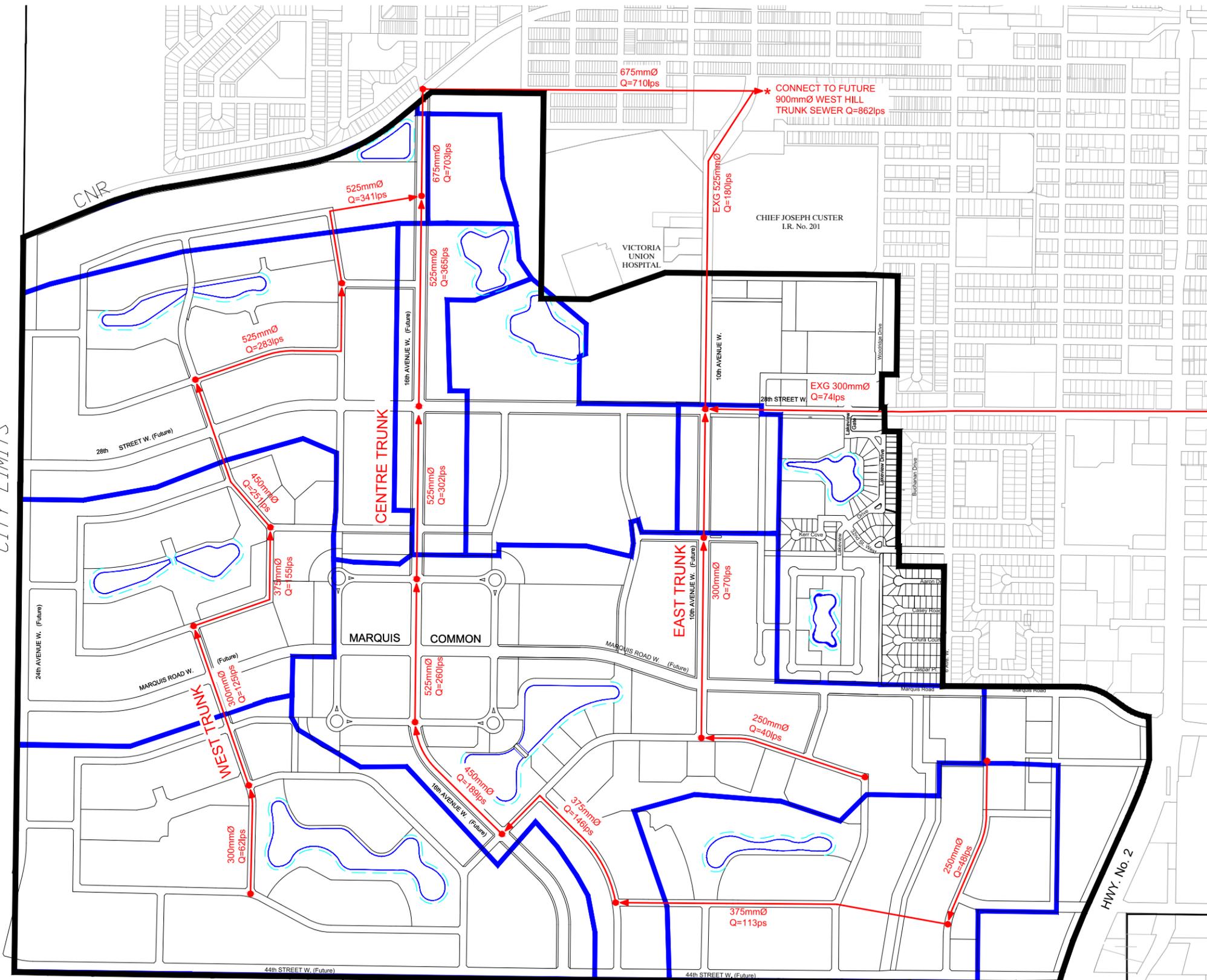
**AECOM**

**11**

Drawing No.

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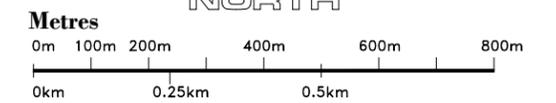
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

 Catchment Boundary



SCALE 1 : 12500

## MAJOR DRAINAGE SYSTEM

**AECOM**

**12a**

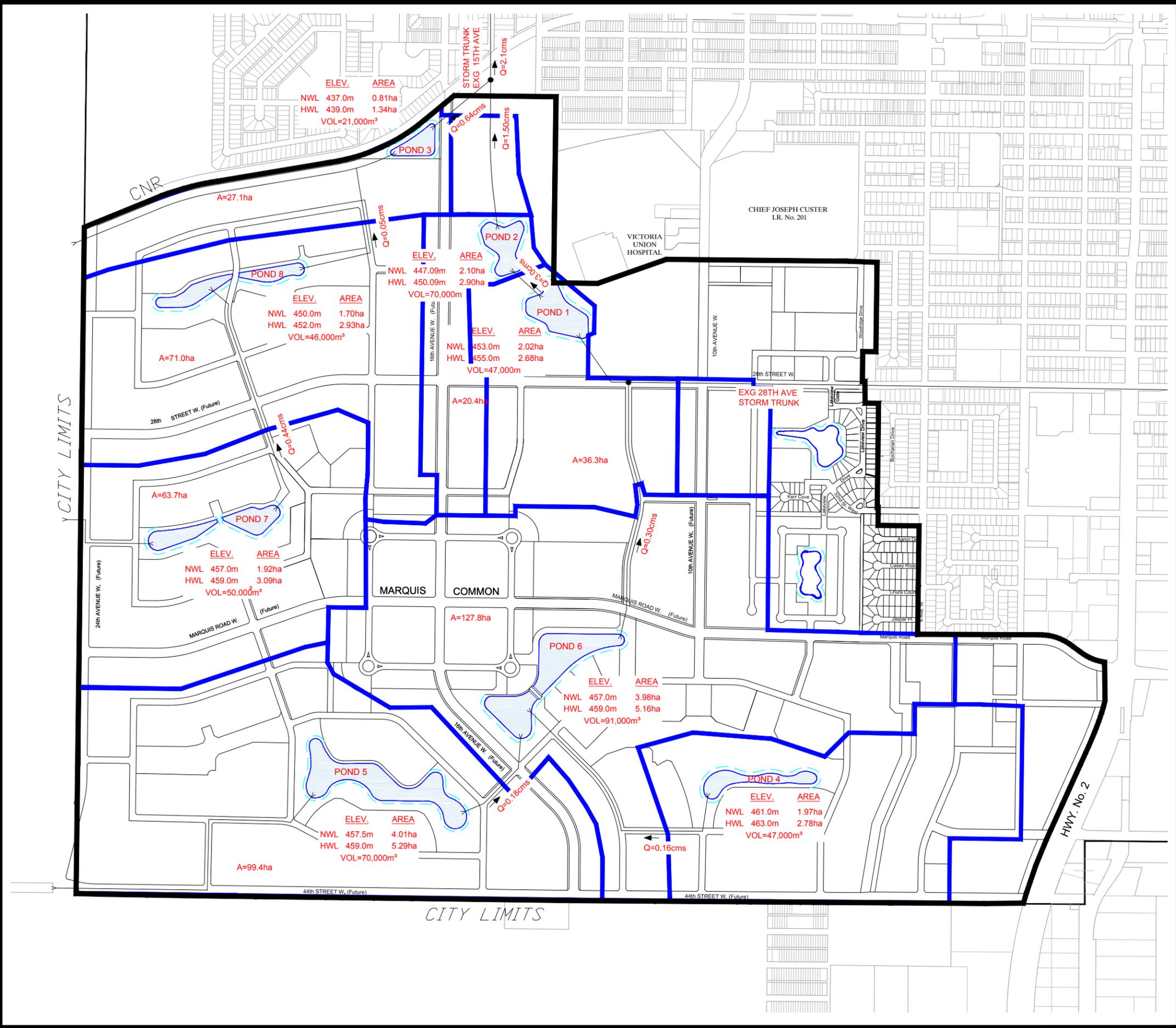
Drawing No.

CITY LIMITS

CITY LIMITS

60562833-FIG-20-00-G-FIG12A.DWG

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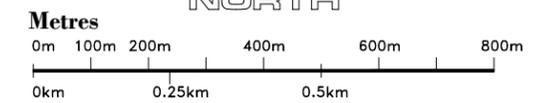
# WEST HILL MASTER PLAN



## City of Prince Albert

### LEGEND

- Catchment Boundary
- Storm Sewer



SCALE 1 : 12500

## MINOR DRAINAGE SYSTEM

**AECOM**

**12b**

Drawing No.

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