

## **Proposed Rosewood Neighbourhood Concept Plan Amendment**



May 2, 2014



## **PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT**

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# PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT

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## **PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT**

### **Executive Summary**

The Proposed Rosewood Concept Plan Amendment Area (CPAA) has been developed by Stantec Consulting Ltd. on behalf of Arbutus Properties. The CPAA is intended to increase the overall Rosewood neighbourhood density while creating a more sustainable suburban model. The CPAA is a complete neighbourhood with a mix of residential options, mixed use areas, and commercial amenities providing an opportunity to live, work, and play. The CPAA was designed based on a modified grid pattern to facilitate pedestrian access to the village square, parks, and commercial amenities.

When fully developed, the Rosewood neighbourhood as a whole will have a residential population of approximately 11,900 people. A diverse range of housing options will be provided in the CPAA to appeal to people of varying income levels and ages. The CPAA was designed to connect with the existing Rosewood neighbourhood transportation networks and park systems to provide purposeful linkages throughout Rosewood as a whole.

A fundamental change noted in the CPAA that differs from the original Rosewood Concept Plan is the inclusion of the lands east of Zimmerman Road. This area is envisioned as a district commercial and light industrial area, which will provide amenities for residents of the neighbourhood and the larger surrounding area.

Additional documents supporting this work include a Phase 1 Environmental Assessment, Environmental Noise Study, Natural Resource Inventory and Ecological Assessments, and an Environmental Vibration Study, all of which are summarized in this report. Full copies of these studies can be provided upon request.

# **PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT**

## **1.0 Development Context**

### **1.1 LOCATION & AREA**

The CPAA is located in the southeast quadrant of the City of Saskatoon. As shown on Figure 1 in Appendix A, the development is bounded on the east by the CP Railway; on the south by Highway 16, on the north by Hillcrest Memorial Gardens, and on the west by the first half of the Rosewood Neighbourhood (bound by Rosewood Gate running north-south). The CPAA has a total land area of approximately 170 hectares (420 acres).

### **1.2 PLANNING CONTEXT**

This Concept Plan Amendment has been prepared within the context of the City of Saskatoon's Official Community Plan (Bylaw No. 8769) and Zoning Bylaw (Bylaw No. 8770). These documents provide guidance for future land use and development in the City of Saskatoon. Currently the CPAA area is designated "Residential" and "Urban Holding" in the Official Community Plan Land Use Map. Zoning districts in the CPAA area includes "Future Urban Development," "RMTN," and "R1A." Amendments to the Land Use Map and Zoning Map will be required to accommodate the proposed land uses in CPAA.

### **1.3 PLAN OBJECTIVES**

The objectives of the CPAA are to:

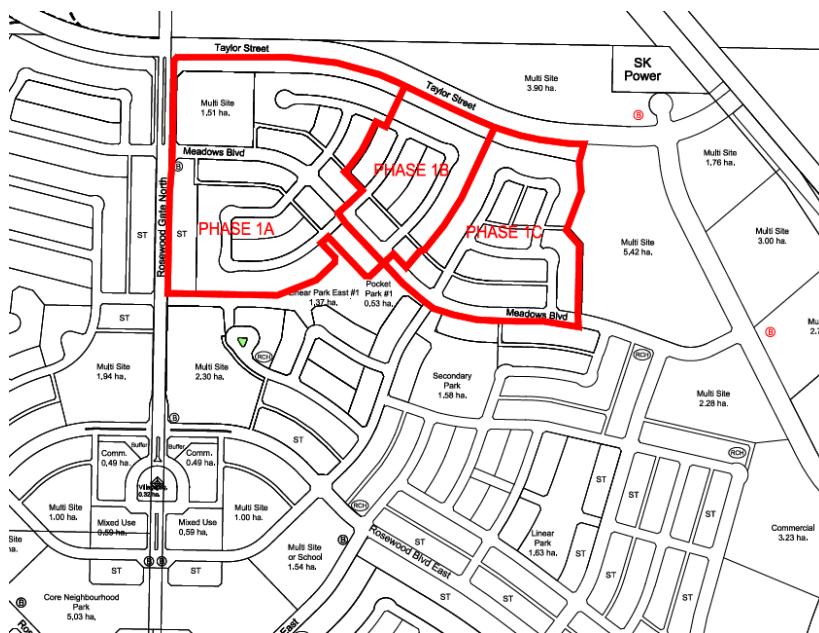
- Provide a compatible and functional interface between existing neighbourhoods and the CPAA;
- Develop a strong connection from all parts of the neighbourhood to the natural wetland amenities in the northwest and the mixed use and commercial amenities in the southeast;
- Provide functional accessibility to commercial and institutional services, with focus placed on ensuring pedestrian access to services within the neighbourhood;
- Ensure efficient access and egress to the neighbourhood;
- Create an integrated design between housing mixes while promoting innovative housing forms; and,
- Maximize aesthetic appeal of the neighbourhood by providing balanced green space throughout.

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## 2.0 Background Information

### 2.1 EXISITNG CONDITIONS

The majority of the CPAA has been cultivated for agriculture. Other land uses in the CPAA include a trucking facility operated by Kleysen Group Ltd., and a natural gas compressor site operated by TransGas, both located in the southeast corner. Additionally, Phases 1A and 1B of the original Rosewood Concept Plan east of Rosewood Gate North are nearing full built-out, and Phase 1C is nearing servicing completion (see index map below). These 3 residential development phases were part of the original Rosewood Concept Plan. The CPAA has considered the arrangement and servicing of these phases in the new layout.



### 2.2 ENGINEERING & ENVIRONMENTAL ASSESSMENTS

A number of background studies and assessments were completed for the original Rosewood Concept Plan in accordance with the City of Saskatoon's requirements for the development of new neighbourhoods. While these studies span back over a few years (5 to 12 years), the base information and conditions on which they were executed remain largely unchanged. For that reason it is believed that these studies and their findings remain valid. A short summary of each of the study findings is provided in the following sub-sections 2.2.1 to 2.2.6.

It should be noted that the area east of Zimmerman Road was excluded from the area of study for the background reports discussed in this section. However, this area is bound by the same restrictions as the main study area (CP Rail line and Highway 16) and it is assumed that any natural resources or ecological features present would be the same as those found in the original study area.

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### **2.2.1 Phase 1 Environmental Impact Assessment, April 2005**

A Phase 1 Environmental Impact Assessment (EIA) of the original subject area was completed to document environmental information related to the subject property and to identify any environmental concerns. This document outlines the measures taken to assess the site for potential environmental contamination, conduct interviews and site visits, determine potential environmental risks and liabilities, establish land ownership, review historical documents, conduct regulatory screenings and provide mitigation for any concerns. No major concerns were noted.

### **2.2.2 City of Saskatoon Technical Memorandum No.4 – Natural Resource Inventory, 2001**

This report was prepared by Johnson & Weichel Resource Management Consultants Ltd. for Associated Engineering Alberta Ltd. (2001). It recognizes that the landscape was substantially altered when it was cultivated for agricultural purposes; however, they recommend mitigation measures to alleviate a net loss of habitat through the use of wildlife corridors or connections.

### **2.2.3 Ecological Assessment, April 14, 2005**

Erin Consulting Ltd. conducted an ecological assessment to determine wildlife use of the area and to assess the importance of habitats within the proposed development area for wildlife species. This information augments the natural resource inventory information work done by Johnson & Weichel Resource Management Consultants Ltd. in 2001. This report confirmed that the altered landscape is not of great importance to wildlife as a whole in the surrounding area. Preservation programs are in place for six major wetlands in the area.

### **2.2.4 Environmental Noise Study April 2005**

Green Plan Ltd. in association with ACI Acoustical Consultants Inc. completed a noise survey of the subject property to assess and determine the noise climate due to the major roadways and CP rail activity, generate a computer noise model to determine current and future (projected) noise levels, use the computer model to determine effectiveness of noise mitigation techniques including berms/barriers and construction details, and provide recommendations for noise mitigation measures.

This study contained the following points of note:

- That the current noise climate along the southern and western portions of the development is dominated by traffic on Highway 16 and Boychuk Drive. Noise levels are expected to increase in the next 15 years due to traffic increases, but the projected noise levels still fall below the City of Saskatoon maximums.
- The current noise climate along the northeast region of the development is dominated by the CP rail line. The existing sound levels for the proposed north-east residential locations were slightly over the City of Saskatoon's requirements at the time of the study. As rail activity increases, the sound level was expected to increase and a berm with a minimum height of 3.83 m was

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recommended to help mitigate the sound level. It was suggested that the barrier be wrapped around the northeast edge of the development to extend approximately 100 m west of the northeast corner.

- In addition, it was recommended that a minimum barrier height berm of 3.83 m be installed (where practically possible) along the entire easterly and southerly boundaries and a minimum barrier height berm of 2.83 m be installed along the western boundary. This recommendation was made based upon the probable substantial increase in traffic levels as future roadways are developed.
- Berm/fence construction should be located as close to the source or receiver as possible to achieve maximum benefit (locating the structure directly adjacent to the roadway or at a property line of the closest residents). Fences should be constructed with no visible gaps and a mass of at least 20kg/m<sup>2</sup>.
- Noise mitigating construction measures for the structures themselves were recommended for the perimeter houses adjacent to the rail line, Highway 16 and the intersection of Boychuk Drive and Highway 16.
- As the dominant noise source from the CP rail activity is the train whistles, it was recommended that controlled crossings be installed or an anti-whistle bylaw be put into place to eliminate the need for train whistles. The City has advised that the rail crossings to the east of Rosewood must be upgraded with controls (at the cost of the developer) prior to any whistle cessation order being approved by Transport Canada.
- It was also noted that the noise climate relative to the small electrical substation (SaskPower facility in the north-east corner of the CPAA) be further reviewed before residential development begins near the site.

### **2.2.5 Environmental Vibrations Survey, December 2006**

ACI Acoustical Consultants Inc. completed a vibration survey of the subject property in order to measure the vibration levels adjacent to the CP Rail line which borders the development to the east, and to determine appropriate setback distances for residential construction. Vibration levels were measured at a distance of 15 m from the track centreline at the CP Rail right-of-way. When projected out to the minimum residential construction distance of 30 m from the right-of-way (as per CP Rail guidelines) the projected levels were well below the maximum allowable level of 0.14 mm/s which is the threshold for human perception. It was determined that no additional vibration mitigation was required.

### **2.2.6 Environmental Road Noise Impact Assessment, July 30, 2007**

ACI Acoustical Consultants Inc. updated the April 2005 noise impact assessment (NIA) for modeling noise levels at future interchanges along Highway 16, Boychuk Drive and the future perimeter highway. The purpose of the work was to generate a computer noise model of the study area, determine the

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projected noise levels from the surrounding major roadways, and determine if additional noise mitigation (above the currently proposed earth berms) will be required.

The noise model with the proposed development, roads, 3.83 m perimeter earth berm, and future 20 year traffic resulted in noise levels at all of the perimeter receptors that were well below the limit of 65 dBA L<sub>DN</sub> as well as relatively low night-time noise levels (in the low 50 dBA range). Noise levels further into the development were expected to be lower still due to increased distance from the major roadways and shielding from the perimeter structures. As such, no additional noise mitigation was recommended.

### **2.3 TOPOGRAPHY & DRAINAGE**

The southeast sector of Saskatoon is located in the Saskatchewan River Plain physiographic division. This division is typified by lacustrine deposits, glacio-fluvial deposits, till plains, moraines, deep river valleys, spillways and dunes. Bedrock geology dates from the Cretaceous period and is composed of shale and sandstone from the Bearpaw formation. The soil zone in this region is characterized by Chernozemic dark brown grassland soils with moderately severe limitations where spear grass and wheat grass are the predominate vegetation.

The existing pre-development terrain is level to gently undulating as indicated by the contours in Figure 2 (Appendix A). The direction of drainage generally follows a southeast to northwest pattern towards the Hyde Park Wetlands.

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### 3.0 Concept Plan

The CPAA will provide a range of housing types and densities in close proximity to neighbourhood and district commercial services. The modified grid pattern facilitates pedestrian access to the community centre, park space, recreational facilities, and commercial areas. The CPAA was designed to fit into the existing Rosewood neighbourhood which is focused around the village square. The addition of mixed use and commercial areas in the south-east provides opportunities to live, work, and play within the neighbourhood and promotes sustainable transportation options such as walking and cycling. A figure showing ownership of the lands in Rosewood has been included for reference as Figure 3 in Appendix A. The new concept plan for the CPAA is included as Figure 4.

A detailed breakdown of the various land uses for the CPAA is provided in the table below.

**Table 3.1: Land Use Statistics for the CPAA**

LAND USE DESIGNATION	AREA			DWELLING UNITS			FRONTAGE (metres)	POPULATION (per unit)	POPULATION (total)
	(ha)	(ac)	%	(per ha)	(per ac)	Total			
Low Density (single detached)	30.00	74.1	17.6%	19.5	8	585	8461	2.8	1638
Street Townhouse	8.75	21.6	5.1%	27	11	236	2555	2.2	520
Multi Family	25.75	63.6	15.1%	55	22	1421	1831	1.6	2274
Mixed Use	6.87	17.0	4.0%	48	19	330	727	1.3	429
Commercial - Neighbourhood	7.27	18.0	4.3%	-	-	-	538	-	-
Commercial - Regional	29.15	72.0	17.1%	-	-	-	1528	-	-
Industrial	15.68	38.7	9.2%	-	-	-	1081	-	-
Buffer	8.37	20.7	4.9%	-	-	-	-	-	-
Parks	7.30	18.0	4.3%	-	-	-	-	-	-
Roadways/Lanes	29.81	73.7	17.5%	-	-	-	-	-	-
Utility Parcel	1.19	2.9	0.7%	-	-	-	16	-	-
<b>TOTALS:</b>	<b>170.14</b>	<b>420.43</b>	<b>100.0%</b>	-	-	<b>2572</b>	<b>16738</b>	-	<b>4861</b>

The originally approved Rosewood Concept Plan from 2007 had a total area of 293.02 hectares. The projected population was 10,657 people living in 4,263 dwelling units. The gross neighbourhood density was 14.5 units per hectare. The new overall total area of the Rosewood Neighbourhood (including the CPAA changes) is 354.5 hectares. The new projected population is approximately 11,900 people living in 5,390 dwelling units. The proposed neighbourhood density is now 15 units per hectare. It is important to note the land use statistics for the CPAA reflect a more realistic population and dwelling unit calculation than the original Rosewood Concept Plan. The new overall Rosewood neighbourhood statistics were generated by adding the original Concept Plan land use statistics with the new calculations of the CPAA.

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### **3.1 DESIGN RATIONALE**

#### *Respect for Context*

A new neighbourhood must fit seamlessly into its surroundings with a network and pattern that interconnects with the larger community.

#### *Complete & Resilient*

A broad variety and mix of uses that work together—including an inter-mixed diversity and affordability of housing types for all varied population of different ages and lifestyles, with residential supported by services and amenities (including parks and commercial) to foster a more complete, resilient and healthy neighbourhood.

#### *Compact & Walkable*

An efficient use of land requires a sustainable density, with services and amenities based on a pedestrian-friendly system that fosters good health and interaction. Housing options should include invisible (secondary suites) and gentle (townhouses) density choices allowing persons to age in place along the needs and affordability continuum of housing.

#### *Interconnected Networks*

A modified grid pattern of streets (supplemented by pedestrian connections and multi-use trails) will provide a balanced neighbourhood design with logical and safe walking and cycling amenities.

#### *In Harmony with Nature*

It is critical to maintain and protect valuable natural features with open spaces, parks, boulevards and corridors to create an integrated, looped and connected system—connecting the community with nature, fostering biodiversity, optimizing the tree canopy, and providing recreation.

#### *A Sense of Place*

Neighbourhoods need a unique and exceptional community character, in both built form and public realm, which residents will cherish. This requires an emphasis on street orientation place-making, and high quality urban design for public spaces.

### **3.2 RESIDENTIAL**

Residential development within the CPAA will offer a combination of low, medium, and high density housing options to span a range of purchase price points. Low density residential uses will include single detached dwellings on a variety of lot widths. Medium density residential uses will include ground-oriented row housing at a variety of densities, oriented towards the street or on a site basis. High density residential uses will include low-rise apartment buildings and stacked housing.

The intent is to provide a combination of housing forms, types, and densities dispersed throughout the neighbourhood to encourage a strong social and economic mix, accommodate a diverse demographic, and

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allow individuals to age in place. A portion of the higher density forms will be allocated towards the commercial and mixed use areas to provide a critical mass of residents within walking or cycling distance to commercial services.

### 3.3 MIXED USE DEVELOPMENTS

Mixed use residential developments in the CPAA are located along Zimmerman Road. These sites will provide a combination of institutional, commercial, and residential uses. The mixed use designation provides a live, work, and play opportunity in the neighbourhood. There is a total of 6.87 hectares (17 acres) of mixed use proposed in the CPAA.

### 3.4 COMMERCIAL AND INDUSTRIAL DEVELOPMENTS

Commercial land uses are expected to consume a significant area in the CPAA. Commercial land uses totaling 36.42 hectares (90 acres) are primarily located in the southeast of the neighbourhood. Commercial land uses in the CPAA fall into two categories; neighbourhood commercial and district commercial. Neighbourhood commercial land use will be located west of Zimmerman Road, and district commercial land uses are located east of Zimmerman Road. The neighbourhood commercial will provide everyday services for Rosewood residents, while the district commercial will service a much larger area.

Industrial land uses are located in the southeast of the neighbourhood adjacent to Highway 16 and the CP rail lines. The existing industrial land uses (trucking and gas compressor station) were considered and accommodated in the CPAA. Industrial land uses total 15.68 hectares (38.7 acres) of the CPAA.

### 3.5 PARKS & PEDESTRIAN LINKAGES

Parks and open spaces provide linkages throughout the neighbourhood and into the wetlands as shown on Figure 5 (Appendix A). Park types in the CPAA include linear, pocket, and secondary. Linear parks and local roads facilitate pedestrian access to the village centre and to the mixed use and commercial areas in the southeast. Linear parks in the CPAA connect to the existing Rosewood park system and provide logical pedestrian linkages throughout the entire neighbourhood.

Municipal reserve land dedicated to park space is generally 10% of the gross land mass. However, previous plans for district and multi-district park space development in the Lakewood Suburban Centre area has drawn from this 10% reserve. As a result only **17.87 hectares was available for dedication** as municipal reserve within the original Rosewood Concept Plan. The addition of 15.68 hectares of industrial land and 37.24 hectares of commercial land increased the municipal reserve requirements by **4.51 hectares**. The value of 4.51 hectares was determined after discussion with the City after questions were raised on how to calculate the appropriate area for the MR dedication. The new total municipal reserve requirement for the Rosewood neighbourhood is **22.38 hectares**.

The actual municipal reserve dedication in the Rosewood Neighbourhood is 22.66 hectares, 0.28 hectares over the requirement. Municipal reserve represents 6% of the Rosewood neighbourhood (including land east of Zimmerman Road). Municipal reserve dedication as a percentage of the Rosewood neighbourhood remains consistent with the Original Rosewood Concept Plan.

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**Table 3.2: Park Designation Statistics for the CPAA**

PARK DESIGNATION	AREA		
	(ha)	(ac)	%
Secondary	3.41	8.4	46.7%
Linear	3.29	8.1	45.1%
Pocket	0.60	1.5	8.2%
<b>TOTALS:</b>	<b>7.30</b>	<b>18.04</b>	<b>100.0%</b>

**Table 3.3: Park Designation Statistics for the Rosewood Neighbourhood**

PARK DESIGNATION	AREA		
	(ha)	(ac)	%
Secondary	6.22	15.4	27.4%
Linear	9.65	23.8	42.6%
Village	0.32	0.8	1.4%
Core	5.03	12.4	22.2%
Wetland Park Exentions	0.84	2.1	3.7%
Pocket	0.60	1.5	2.6%
<b>TOTALS:</b>	<b>22.66</b>	<b>55.99</b>	<b>100.0%</b>

### 3.6 GROWING FORWARD! SHAPING SASKATOON

The *Growing Forward! Shaping Saskatoon: A Bridging Document... For the Growth Plan to Half a Million* outlines a transit, land use, roadway, and water and sewer servicing strategy for the growth of Saskatoon to a population of 500,000. The document has outlined nine strategies for implementation of the growth plan. The strategies address new neighbourhood development and established neighbourhood redevelopment. This concept plan amendment addresses the plan's strategic goal of Sustainable Development and addresses multiple topics in the plan including the following:

- New Development: Building Integrated Communities:
  - Main Streets and Transit-Oriented Development;
  - New Employment Areas; and
  - Suburban Centre as a Focal Point.
- Principles for New Development:
  - Focus development on sites that are convenient to planned transit services, neighbourhood amenities and services;

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- Site design along identified corridors should be oriented primarily towards pedestrians with buildings being street-oriented and parking preferably located behind or possibly flanking the buildings;
- Promote affordability through the use of strategies such as an appropriate range of lot sizes, maximizing amount of saleable developable frontage, residential sites with rear lane access – allowing for narrow lots; and
- Provide for local economic sustainability through the provision of opportunities for employment.

## **4.0 Transportation**

### **4.1 BACKGROUND**

The entire Rosewood neighbourhood was reviewed in order to properly assess the transportation requirements of the CPAA.

Within the Rosewood neighbourhood a hierarchical roadway network has been established to ensure efficient traffic flow and minimize volumes and speed through the residential nodes. The roadway network effectively distributes traffic into separate areas of the subdivision.

The following are the major changes to the roadway system as compared to that provided in the original Rosewood Concept Plan:

- The Perimeter Highway that defined the east boundary of the Rosewood neighbourhood has been reclassified as an arterial roadway and is now retained as Zimmerman Road. Zimmerman Road will remain on its current alignment. An interchange is proposed for Highway 16/Zimmerman Road and signalized at-grade intersections are proposed for Zimmerman Road/Rosewood Boulevard and Zimmerman Road/ Connector Road. In the short term Zimmerman Road will continue to cross the CP Rail tracks at-grade with a grade separation being provided in the long term.
- The two at-grade intersections along Zimmerman Road will provide access to the residential area east of Zimmerman Road. This area was not included in the original Rosewood Concept Plan. Patience Lake Road will connect into a proposed collector roadway that will connect to Zimmerman Road.
- The Highway 16/Rosewood Gate interchange included in the original Rosewood Concept Plan has been removed in the CPAA. The interchange is no longer required as Zimmerman Road will provide access to the east residential portions of Rosewood.

The Highway 16/Rosewood Gate interchange was located 1.6 km from the future Highway 16/Boychuk Drive interchange and 1.05 km from the Highway 16/Zimmerman Road interchange.

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Ideally interchanges should have a minimum spacing of 2.0 km in an urban environment. Close interchange spacing results in inadequate ramp merging and weaving distances.

- The traffic volumes that were assigned to the Highway 16/Rosewood Gate interchange were distributed to the Boychuk Drive/Rosewood Boulevard, the Zimmerman Road/Connector Road intersection and the Zimmerman Road/Rosewood Boulevard intersection.
- Internal collector and local roadways within the CPAA have been revised to accommodate a higher density of development consistent with the IGP.

Figure 6 shows existing and proposed roadway classifications within, and adjacent to, Rosewood.

Provincial Highway 16 is located along the south boundary of Rosewood. Highway 16 is a controlled access roadway. At-grade intersections currently exist at Boychuk Drive and at Zimmerman Road. The Highway 16/Boychuk Drive intersection is currently signalized. An interchange will be constructed at this location at some point in the future. A Parclo interchange configuration is proposed with a loop in the southeast quadrant. The Highway 16/Zimmerman Road intersection is currently controlled by stop signs on Zimmerman Road. When warranted by traffic conditions the intersection will be signalized followed by the construction of an interchange in the future.

Arterial roadways are located along the west (Boychuk Drive) and north (Taylor Street) boundaries of Rosewood. Both roadways are existing or planned four lane divided roadways with controlled access. Zimmerman Road is a proposed arterial roadway. Zimmerman Road will have a right of way width sufficient to ultimately provide a six lane divided roadway with a multi-use trail or sidewalk on one side.

Collector roadways will be provided as shown on Figure 6. Major collector roadways with 22 m right of ways will bisect the residential area of the neighbourhood in the east-west and north-south directions. Minor collector roadways with 20 m right of ways will provide access to local roadways and provide bus routes. Collector roadways are shown within the commercial area east of Zimmerman Road. These roadways are classified as collector roadways due to the amount of traffic expected to occur on these roadways and that they provide direct access to developments on each side of the roadway. These roadways have a 24 m right-of-way width and will provide two lanes in each direction. A four lane divided collector roadway is proposed to connect Taylor Street to Zimmerman Road. This roadway is referred to as Connector Road. It will have a right-of-way width similar to Boychuk Drive and Taylor Street.

Local roadways will have 18 m or 15 m right of ways depending on the traffic expected on the roadway and if the roadway provides amenities such as streetscaped boulevards. Traffic in the residential nodes will be primarily local traffic.

The commercial area in the centre of the neighbourhood is served by laneways and local roadways that will facilitate access to the sites while maintaining flow on the collector roads. The mixed use and multi-unit sites in this area will also be served by lanes and local roads. Lanes servicing the neighbourhood commercial centre are 10m in width. All lanes will be paved.

Proposed roadway right of way widths are shown on Figure 7.

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Access and egress to the Rosewood neighbourhood are from the arterial roadway intersections shown on Figure 6. The intersections include:

- Boychuk Drive/Rosewood Boulevard
- Taylor Street/Rosewood Gate
- Taylor Street/Connector Road
- Zimmerman Road/Rosewood Boulevard
- Zimmerman Road/Connector Road

The Highway 16/Boychuk Drive and Highway 16/Zimmerman Road intersections provide access to Rosewood from Highway 16. These intersections are considered highway intersections. Highway 16 provides a direct connection between Rosewood and the Circle Drive freeway. Rosewood motorists can use Circle Drive to access the City's north, west and central areas.

A traffic impact study (TIS) was completed for the amended Rosewood Concept Plan. The purpose of the TIS was to evaluate the impact of the proposed amended Rosewood Concept Plan on the existing adjacent street network and to determine the requirements of new roadways and intersections. The principal objectives of the TIS were to:

- Determine existing conditions at key intersections leading into the development;
- Determine the new traffic generated by the development;
- Distribute the new trips to different origins and destinations;
- Assign the new traffic to the adjacent existing and proposed street system at existing and proposed access points;
- Determine key performance indicators such as Levels of Service (LOS), volume to capacity ratios (v/c) and vehicle queue lengths for key intersections; and,
- Identify changes to existing intersections and roadways and determine the requirements for new intersections and roadways.

The following TIS tasks were completed in order to determine projected traffic operating conditions at the arterial intersections:

1. The Rosewood neighbourhood was divided into seven traffic zones. The zones were selected based on land uses and where trips would likely access arterial roadways. The traffic zones are shown on Figure 8.

## **PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT**

2. The amount of traffic generated at full build out of Rosewood was determined for the weekday morning, weekday afternoon and Saturday afternoon peak hour periods for each traffic zone. The trip generation rates included in the Institute of Transportation Engineers Trip Generation Manual – 9th Edition were used for this purpose.
3. A 25% trip reduction factor was applied to commercial trips to account for internal trips in traffic zones that contained a large amount of commercial development.
4. A 15% trip reduction factor was applied to residential trips to account for internal trips that would not leave the Rosewood neighbourhood.
5. Trips generated in each zone were distributed to different geographic areas beyond the neighbourhood. Trip distribution was based on knowledge of existing and future travel patterns within the City of Saskatoon.
6. Trips within each zone were assigned to the study intersections and roadways. A nodal approach to trip assignment was used. Nodes were located to serve as the point where the generated traffic is assigned to the road network and routed to and from their destination based on logical travel routes.
7. Traffic level of service analysis was completed for the study intersections. The traffic analysis programs Synchro 8 and SimTraffic 8 were used to determine levels of service for the three peak periods based on full build-out of the development. The results of the traffic analysis were used to determine intersection geometry and controls.

The results of the traffic analysis are presented below. The traffic analysis was based on all intersections being signalized when warranted by traffic conditions.

### **4.2 TRIP GENERATION**

The following table shows the trips generated by Rosewood that would be external to the neighbourhood. Only external trips are considered at this time as only intersections along the exterior of Rosewood are being analyzed. For the purposes of this analysis the Zimmerman Road/Rosewood Boulevard and Zimmerman Road/Connector Road intersections are considered as external intersections as they are major intersections within the overall Rosewood neighbourhood and serve as access/egress points to/from the residential area west of Zimmerman Road and the commercial/industrial area east of Zimmerman Road.

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### External Trips Generated

Zone	Weekday Morning			Weekday Afternoon			Saturday Afternoon		
	In	Out	Total	In	Out	Total	In	Out	Total
A	86	232	318	237	167	404	204	178	382
B	182	517	699	538	355	893	450	387	837
C	95	283	378	291	185	476	241	204	445
D	64	145	209	173	154	327	197	174	371
E	177	472	649	532	387	919	508	440	948
F	139	418	557	433	274	707	356	302	658
G	247	514	761	676	637	1,313	929	825	1,754
H	646	268	914	1,316	1,490	2,806	1,587	1,653	3,234
<b>Total</b>	<b>1,636</b>	<b>2,849</b>	<b>4,485</b>	<b>4,196</b>	<b>3,649</b>	<b>7,845</b>	<b>4,472</b>	<b>4,163</b>	<b>8,629</b>

The above table shows that the Rosewood development will generate 4,485, 7,845 and 8,629 external trips during the weekday morning, weekday afternoon and Saturday peak hour periods at full build-out respectively.

### 4.3 TRIP DISTRIBUTION

The following trip distribution at full build out was used for the traffic analysis. The distribution below was applied to trips external to Rosewood.

## **PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT**

### **Trip Distribution at Full Build-out**

To/From	Via	Weekday	Saturday
North and west	Taylor Street	30%	25%
North and east	Taylor Street	10%	13%
North and east	Zimmerman Road	5%	12%
East	Highway 16	5%	5%
North and west	Highway 16	35%	35%
West	Kingsmere Boulevard	5%	2%
North and west	Boychuk Drive	10%	8%

The above trip distribution was not applied evenly over all traffic zones. For example trips in Zones A and B had a higher percentage of traffic assigned to the Boychuk Drive intersection than traffic in Zone F due to its proximity to that intersection.

### **4.4 TRIP ASSIGNMENT**

Trip assignment is the allocation of trips to and from a zone to a particular route. The assignment considers the type of land use within the zone, its proximity to external roadways and intersections and the origins and destinations of motorists. Weekday morning and afternoon peak hour trips were assigned the same route to and from the neighbourhood. Routes for Saturday peak hour trips recognize that the regional commercial area east of Zimmerman Road will be more of a destination for Rosewood residents than during weekdays.

The weekday peak hour trip assignments are shown in the table below:

## PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT

### **Weekday Peak Hour Trip Assignments**

<b>Route To and From</b>	<b>Traffic Zone</b>							
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
North & West Via Boychuk Drive	45%	45%						
West Via Kingsmere Boulevard	10%	10%	10%	10%	5%			
West Via Highway 16	45%	45%	30%	30%	40%	40%	40%	30%
North & West Via Taylor Street			50%	50%	30%	40%	30%	30%
North & East Via Taylor Street			10%	10%	10%	10%	10%	10%
North & East Via Zimmerman Road					10%	5%	10%	10%
East Via Highway 16					5%	5%	10%	10%
East Via Rosewood Boulevard								10%
Total	100%	100%	100%	100%	100%	100%	100%	100%

The Saturday peak hour trip assignment is shown in the table below:

## PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT

### Saturday Peak Hour Trip Assignments

Trips To or From	Zone							
	A	B	C	D	E	F	G	H
North & West Via Boychuk Drive	35%	35%						
West Via Kingsmere Boulevard	5%	5%	5%	5%	5%			
West Via Highway 16	35%	35%	35%	35%	40%	35%	25%	30%
North & West Via Taylor Street			35%	35%	30%	40%	25%	30%
North & East Via Taylor Street	10%	10%	10%	10%	5%	10%	15%	15%
North & East Via Zimmerman Road	5%	5%	5%	5%	10%	5%	15%	15%
East Via Highway 16							10%	10%
East Via Rosewood Boulevard	10%	10%	5%	10%	10%	5%		
East Via Connector Roadway			5%			5%	10%	
Total	100%	100%	100%	100%	100%	100%	100%	100%

The external trips generated by Rosewood were assigned to the existing and planned roadway system using the above trip assignments.

### 4.5 TRAFFIC ANALYSIS

Traffic analysis was completed for the arterial intersections and the Highway 16/Zimmerman Road intersection. The Highway 16/Boychuk Drive intersection was not analyzed as it is planned to be upgraded to an interchange in the short term future.

2025 traffic volumes were determined for the study intersections. It was assumed that the Rosewood neighbourhood would be fully developed by 2025. For existing intersections this was done by adding the new trips generated by Rosewood to current traffic volumes. Northbound and southbound through traffic volumes on Boychuk Drive at Rosewood Boulevard and at Taylor Street were increased at 2% per year as were the eastbound and westbound through volumes on Highway 16 at Zimmerman Road. To account for 2025 “background” traffic at the new intersections, 500 vehicles per hour (vph) in each direction were added to the northbound and southbound through movements on Zimmerman Road during the weekday peak periods and 300 vph for the Saturday peak period. Similarly 300 vph was added to the eastbound and westbound through movements on Taylor Street for the weekday and Saturday peak periods.

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The traffic analysis programs Synchro 8 and SimTraffic 8 were used to determine levels of service (LOS), v/c ratios and vehicle queue lengths for the weekday morning, weekday afternoon and Saturday peak periods for the 2025 time period.

Level of service measures the average signal delay per vehicle during a 15-minute analysis period. Levels of service range from A to F (minimal delay to unacceptable delay) and may be measured on an intersection, approach, or per movement basis. The following table indicates the ranges of delay associated with each LOS.

### Signalized Intersections - HCM Level of Service Characteristics

HCM Level of Service	Average Signal Delay per Vehicle (sec/veh)	Characteristics
A	≤ 10	Free flow, low volumes and high speeds, most drivers can select own speed
B	> 10 and ≤ 20	Stable flow, speed restricted slightly by traffic
C	> 20 and ≤ 35	Stable flow, speed controlled by traffic
D	> 35 and ≤ 55	Approaching unstable flow, low speed
E	> 55 and ≤ 80	Unstable flow & speeds, volumes at/near capacity
F	> 80	Forced flow, low speed, volume above capacity

LOS D is considered acceptable for peak traffic conditions.

Synchro 8 predicts volume to capacity ratios. A v/c ratio indicates the utilization of a traffic movement. A v/c ratio of 0.85 or less is considered acceptable.

The 95<sup>th</sup> percentile queue length as predicted by SimTraffic 8 was used to determine turning bay lengths. 95<sup>th</sup> percentile queue lengths of 100 m for major traffic movements are considered acceptable. Minor traffic movements can expect queue lengths in the order of 60 to 70 m.

The results of the traffic analysis are presented below for the weekday morning, weekday afternoon and Saturday peak hour periods for 2025. A description of the geometry is also provided. The analysis assumes that all intersections will be signalized.

### Highway 16/Zimmerman Road

The intersection geometry at the Highway 16/Zimmerman Road intersection will consist of:

#### Eastbound Approach

Two left turn lanes  
Two through lanes  
One right turn lane

#### Westbound Approach

One shared through/left lane  
One through lane  
One right turn lane

## **PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT**

### Northbound Approach

Combined left turn/through lane  
Single right turn lane

### Southbound Approach

Single left turn lane  
Single through lane  
Right turn ramp with acceleration lane

The Highway 16/Zimmerman Road intersection will operate at an acceptable level of service during the weekday morning peak hour. During this period the intersection will operate at LOS B with all movements operating at LOS C or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the weekday afternoon peak hour the intersection operates at LOS C with all movements operating at LOS D or better. The EB to NB left turn movement has a v/c ratio of 0.87, slightly above the threshold value of 0.85, however the movement operates at LOS D which indicates that delays for this movement are considered acceptable. Queue lengths are acceptable.

During the Saturday peak hour the intersection operates at LOS B with all movements operating at LOS C or better. The EB to NB left turn movement has a v/c ratio of 0.86, slightly above the threshold value of 0.85, however the movement operates at LOS C which indicates that delays for this movement are considered acceptable. SimTraffic 95% queue lengths are acceptable.

The analysis shows that the Highway 16/Zimmerman Road intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics indicated above. The only concern is the EB to NB left turn during the weekday afternoon and Saturday peak hours which show v/c ratios slightly above the 0.85 guideline but still operates at acceptable levels of service.

## **Zimmerman Road/Rosewood Boulevard**

The intersection geometry at the Zimmerman Road/Rosewood Boulevard intersection will consist of:

### Eastbound Approach

One left turn lane  
One through lane  
One right turn lane – free flow

### Westbound Approach

Two left turn lanes  
One through lane  
One right turn lane

### Northbound Approach

Two left turn lanes  
Two through lanes  
One right turn lane – free flow

### Southbound Approach

One left turn lane  
Two through lanes  
One right turn lane

The Zimmerman Road/Rosewood Boulevard intersection will operate at an acceptable level of service during the weekday morning peak hour. During this period the intersection will operate at LOS B with all movements operating at LOS C or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the weekday afternoon peak hour the intersection operates at LOS C with all movements operating at LOS D or better. The SB through movement has a v/c ratio of 0.94. The movement operates at LOS C

## **PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT**

which indicates that delays for this movement are considered acceptable and the queue length is acceptable.

During the Saturday peak hour the intersection operates at LOS C with all movements operating at LOS D or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

The analysis shows that the Zimmerman Road/Rosewood Boulevard intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics indicated above. The SB through movement will have a v/c ratio above the 0.85 guideline during the weekday afternoon peak hour but the movement operates at LOS C which implies the movement will experience an acceptable level of delay. The queue length for this movement is acceptable.

### **Zimmerman Road/Connector Road**

The intersection geometry at the Zimmerman Road/Connector Road intersection will consist of:

#### Eastbound Approach

One left turn lane  
Two through lanes  
One right turn

#### Westbound Approach

One left turn lane  
Two through lanes  
One right turn lane

#### Northbound Approach

Two left turn lanes  
Two through lanes  
One right turn lane

#### Southbound Approach

One left turn lane  
Two through lanes  
One right turn lane

The Zimmerman Road/Connector Road intersection will operate at an acceptable level of service during the weekday morning peak hour. During this period the intersection will operate at LOS B with all movements operating at LOS D or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the weekday afternoon peak hour the intersection operates at LOS C with all movements operating at LOS D or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the Saturday afternoon peak hour the intersection operates at LOS C with all movements operating at LOS D or better. The EB through movement has a v/c ratio of 0.90 however the movement operates at LOS C and has an acceptable queue length. The NB to WB left turn movement has a v/c ratio of 0.92. This movement operates at LOS D which implies that delays for this movement are acceptable. The SimTraffic 95% queue length for this movement is acceptable.

The analysis shows that the Zimmerman Road/Connector Road intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics indicated above. The EB through and NB to WB left turn movements will have v/c ratios above the 0.85 guideline but will operate with acceptable LOS, delays, and queue lengths.

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### **Taylor Street/Connector Road**

The intersection geometry at the Taylor/Connector Road intersection will consist of:

#### Eastbound Approach

Two through lanes  
One right turn lane

#### Westbound Approach

One left turn lane  
Two through lanes

#### Northbound Approach

Two left turn lanes  
One right turn lane

The Rosewood Concept Plan shows a cul-de-sac extending north of Taylor Street at Connector Road. The purpose of the cul-de-sac is to provide access to the SaskPower transformer site and not to the proposed multi-family site west of the cul-de-sac. A road right-of-way is required to provide legal access to the transformer site. It will function as a driveway with very low traffic volumes and as such is not included in the analysis of the Taylor Street/Connector Road intersection.

The Taylor/Connector Road intersection will operate at an acceptable level of service during the weekday morning peak hour. During this period the intersection will operate at LOS A with all movements operating at LOS B or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the weekday afternoon peak hour the intersection operates at LOS B with all movements operating at LOS C or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the Saturday afternoon peak hour the intersection operates at LOS B with all movements operating at LOS C or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

The analysis shows that the Taylor/Connector Road intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics indicated above.

### **Taylor Street/Rosewood Gate**

The intersection geometry at the Taylor Street/ Rosewood Gate intersection will consist of:

#### Eastbound Approach

Two through lanes  
One right turn lane

#### Westbound Approach

One left turn lane  
Two through lanes

#### Northbound Approach

One left turn lane  
One right turn lane

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The Taylor Street/ Rosewood Gate intersection will operate at an acceptable level of service during the weekday morning peak hour. During this period the intersection will operate at LOS B with all movements operating at LOS C or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the weekday afternoon peak hour the intersection will operate at LOS B with all movements operating at LOS B or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the Saturday peak period the intersection will operate at LOS B with all movements operating at LOS D or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

The analysis shows that the Taylor Street/Rosewood Gate intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics indicated above.

### **Boychuk Drive/Rosewood Boulevard**

The Boychuk Drive/Rosewood Boulevard intersection is currently signalized and provides the following geometry:

#### Eastbound Approach

One left turn lane  
One through lane  
One right turn

#### Westbound Approach

One left turn lane  
One through lane  
One right turn lane

#### Northbound Approach

One left turn lane  
Two through lanes  
One right turn lane

#### Southbound Approach

One left turn lane  
Two through lanes  
One right turn lane

The Boychuk Drive/Rosewood Boulevard intersection will operate at an acceptable level of service during the weekday morning peak hour. During this period the intersection will operate at LOS B with all movements operating at LOS C or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the afternoon peak period the intersection will operate at LOS C with all movements operating at LOS D or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the Saturday peak period the intersection will operate at LOS B with all movements operating at LOS C or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

The analysis shows that the Boychuk Drive/Rosewood Boulevard intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics indicated above.

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### **Boychuk Drive/Taylor Street**

The Boychuk Drive/Taylor Street intersection is currently signalized and provides the following geometry:

#### Eastbound Approach

One left turn lane  
Two through lanes  
One right turn

#### Westbound Approach

One left turn lane  
Two through lanes  
One right turn lane

#### Northbound Approach

One left turn lane  
Two through lanes  
One right turn lane

#### Southbound Approach

One left turn lane  
Two through lanes  
One right turn lane

The Taylor Street/Boychuk Drive intersection will operate at an acceptable level of service during the weekday morning peak hour. During this period the intersection will operate at LOS B with all movements operating at LOS C or better. All v/c ratios are below 0.85 and queue lengths are acceptable.

During the weekday afternoon peak hour the intersection operates at LOS C with all movements operating at LOS D or better. The WB through movement has a v/c ratio of 0.93 which is above the maximum 0.85 guideline. This movement operates at LOS C which indicates that delays for this movement are acceptable. The SB to EB left turn movement has a v/c ratio of 0.96 which is above the threshold value of 0.85. This movement operates at LOS C which indicates that delays for this movement are acceptable. SimTraffic 95% queue lengths are acceptable.

During the Saturday peak hour the intersection operates at LOS B with all movements operating at LOS C or better. All movements have v/c ratios at or below 0.85 and queue lengths are acceptable.

The analysis shows that the Taylor Street/Boychuk Drive intersection will operate at an acceptable level of service in 2025. Congested conditions can be expected during the weekday afternoon peak hour. The WB through and SB to EB left turn movements have v/c ratios above the threshold value of 0.85. Both operate at LOS D or better which indicates that delays for these movements are within the acceptable range. The SimTraffic 95% queue lengths for these movements are acceptable.

### **Summary of Traffic Analysis**

The results of the above analysis are summarized below. Unless otherwise noted all movements will have v/c ratios at or below 0.85, have turning movement, approach and intersection levels of service LOS D or better and have acceptable 95% queue lengths for the 2025 weekday morning, weekday afternoon and Saturday peak traffic periods.

1. The Highway 16/Zimmerman Road intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics. The only concern is the EB to NB left turn during the weekday afternoon and Saturday peak hours which show v/c ratios slightly above the 0.85 guideline but still operate at acceptable LOS and queue lengths.

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- 2.** The Zimmerman Road/Rosewood Boulevard intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics. The SB through movement will have a v/c ratio above the 0.85 guideline during the weekday afternoon peak hour but the movement operates at LOS C which indicates the movement will operate at an acceptable level of delay.
- 3.** The Zimmerman Road/Connector Road intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics. The EB through and NB to WB left turn movements will have v/c ratios above the 0.85 guideline but will operate with acceptable LOS, delays, and queue lengths.
- 4.** The Zimmerman Road/Connector Road intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics.
- 5.** The Taylor Street/ Rosewood Gate intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics indicated above.
- 6.** The Boychuk Drive/Rosewood Boulevard intersection will operate at an acceptable level of service in 2025 under signalization and the proposed roadway geometrics indicated above.
- 7.** The Taylor Street/Boychuk Drive intersection will operate at an acceptable level of service in 2025. Congested conditions can be expected during the weekday afternoon peak hour. The WB through and SB to EB left turn movements have v/c ratios above the 0.85 guideline. Both operate at LOS D which indicates that delays for these movements are within the acceptable range. The SimTraffic 95% queue lengths for these movements are acceptable.

The geometrics proposed for the above intersections that have not yet been constructed are shown in Appendix B. Appendix B also includes cross sections for the proposed Rosewood arterial roadways.

The existing Boychuk Drive/Rosewood Boulevard intersection can accommodate the 2025 queue lengths with its existing geometrics. No changes to the intersection are required.

The existing Boychuk Drive/Taylor Street intersection can accommodate the 2025 queue lengths with the exception of the SB left turn lane. That lane will require lengthening from its current 70 m length to 85 m prior to 2025.

### **Highway 16/Rosewood Gate Flyover**

The original concept plan for Rosewood proposed a directional interchange at Highway 16/Rosewood Gate. This interchange would be located approximately 1.60 km east of Boychuk Drive and 1.05 km west of Zimmerman Road. The interchange was to provide the EB to NB and SB to WB movements into and out of the Rosewood neighbourhood.

The construction of three interchanges within 2.65 km is considered too close by recognized roadway geometric standards. Ideally interchanges should have a minimum spacing of 2.0 km in an urban environment. Close interchange spacing results in inadequate ramp merging and weaving distances.

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Such close spacings of interchanges often require the use of collector-distributor (C-D) roadways and/or auxiliary lanes to resolve merging and weaving issues. A 2010 functional planning study completed for Highway 16 between Boychuk Drive and Zimmerman Road proposed the construction of the Highway 16/Rosewood Gate interchange and identified the additional infrastructure required to implement the interchange including a third westbound lane (auxiliary lane) between Rosewood Gate and Boychuk Drive and an eastbound C-D road from west of Rosewood Gate to Zimmerman Road. This would require eastbound Highway 16 motorists wishing to access Zimmerman Road to exit Highway 16 west of Rosewood Gate and use the C-D road to Zimmerman Road.

The above is suggesting that Rosewood be served by three interchanges from Highway 16. Three interchanges are not warranted as indicated by the results of the traffic analysis provided in Section 3.4. In order to put this matter in context, the Highway 16/Rosewood Gate interchange would have a similar benefit/impact to the Rosewood neighbourhood that the addition of a new Highway 16 interchange between Boychuk Drive and Circle Drive into the Lakeview/Lakeridge area would have on those neighbourhoods. Most would consider an additional interchange for Lakeview/Lakeridge to be unnecessary.

It has been suggested that only the right turn out from Rosewood onto westbound Highway 16 be constructed in order to improve operating conditions at the Boychuk Drive/Rosewood Boulevard intersection. In order to assess this, a trip assignment was completed for the Rosewood neighbourhood with the right turn out ramp provided.

The trip assignment showed that 517 vehicles would use the ramp during the weekday morning peak hour. This would result in 249 less vehicles using westbound Rosewood Boulevard to access Boychuk Drive and 268 less vehicles using Rosewood Boulevard and Connector Road to access Zimmerman Road.

During the weekday afternoon peak hour the trip assignment showed that 392 vehicles would use the ramp. This would result in 187 less vehicles using westbound Rosewood Boulevard to access Boychuk Drive and 205 less vehicles using Rosewood Boulevard and Connector Road to access Zimmerman Road.

The reductions in traffic at the Boychuk Drive/Rosewood Boulevard, Zimmerman Road/Rosewood Boulevard and Zimmerman Road/Connector Road intersections would result in improvements to traffic operating conditions at those intersections. The provision of the right turn out ramp would result in additional traffic on roadways leading to the ramp including those roadways adjacent to the proposed school site. The traffic that would use the ramp originates from Zones B, C, D, E and F. A portion of traffic from those zones would bypass the school site to access the ramp. Much of this traffic would be commuter traffic interested in getting to their destination in a timely manner. This conflicts with the goal of reduced speed zones around schools.

The provision of a right turn out ramp from Rosewood to go west on Highway 16 is not recommended. The intersections that it benefits provide acceptable levels of service without the ramp. The ramp's improvement in traffic operating conditions at those intersections does not justify the introduction of additional traffic in the vicinity of the school site and the potential problems that traffic creates.

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### **4.6 TRANSIT SERVICES**

At the present time Saskatoon Transit Route 60 operates in the northbound direction on Boychuk Drive. It enters Boychuk Drive from eastbound Kingsmere Boulevard and exits at eastbound Slimmon Road.

Saskatoon Transit has identified the following three potential routes that may be implemented to serve Rosewood:

- Extension of current Route 60 as shown on Figure 9
- Local route through Rosewood as shown on Figure 10
- City perimeter route as shown on Figure 11

Initially new neighbourhoods are provided with peak service only. As the neighbourhood grows service is increased to Monday to Friday from approximately 6:30 a.m. to 6:30 p.m.. then increases to full service 18 hours per day including weekends. Service requirements are also dependent on the type of retailers provided within the commercial area.

The routes provide transit service in accordance with City transit service standards of providing transit service within 450 m walking distance to 95% of the neighbourhood.

### **4.7 PEDESTRIAN & BICYCLE FACILITIES**

Pedestrian linkages are provided via sidewalks and park pathways to provide continuous linkages throughout the neighbourhood. Sidewalks and pathways connect residential areas to the school site, neighbourhood square, parks, wetland area, transit routes and commercial areas. The shared-use on-road cycling or signed route on Taylor Street will continue along the connector roadway to Zimmerman and south to Rosewood Boulevard East. Pedestrian and cycling linkages are shown on Figure 5.

A walkability plan indicating a 700 m walking distance from the proposed school site is shown on Figure 5A.

## 5.0 Infrastructure

### 5.1 SANITARY SEWER SYSTEM

#### 5.1.1 Background

When the servicing analysis was completed for the original Rosewood development concept, it was determined that there was limited capacity in the sanitary system infrastructure both directly adjacent and downstream. Discussions with the City of Saskatoon suggest that a servicing solution for the additions in the CPAA may be found for the south-eastern portion of Rosewood, specifically for the addition of the proposed commercial areas east of Zimmerman Road, within the context of large scale east side sanitary diversions and infrastructure capacity projects. These measures require careful development timing that will allow both the short term and long term sanitary sewer capacity concerns to be met.

The Utility Services Department of the City of Saskatoon has completed a servicing analysis for the sanitary sewer system in the Rosewood area. The Utility Services Department has stated that the existing facilities do not have the capacity to service the entire CPAA. A pumping station will be required to direct some of the sanitary flows to a municipal line with available capacity. The proposed pumping station will be located in the north-east corner of the development near the SaskPower station where Taylor Street meets the CPR line. The force main leading from the proposed lift station is planned to be approximately 3,500 meters long connection to the Holmwood trunk main currently under construction near the intersection of Highway 5 and McOrmond Drive. As the City expands in the Holmwood area, and the trunk mains are extended, the force main will eventually be abandoned and the flows can be diverted by gravity into that trunk system. The City has determined that the costs associated with the design and construction of the lift station are to be borne by the Developer.

#### 5.1.2 Sanitary Sewer System Concept

In order to service the land scheduled for development in 2014, a large portion of the CPAA land will be designated as “on hold” for development until a later date when the lift station is operational. The City provided to Stantec an available capacity value of 16.3 L/s in the sanitary main on Meadows Boulevard; this value does not include existing development north of Meadows Boulevard including the proposed 5.2 ha multi-residential site. This capacity was used to determine (by the Developer) which parcels would be prioritized for development soon and which would be placed on hold. Figure 12 shows existing sanitary connection points, the proposed phasing of development based on sanitary system capacity, and the areas shaded and labelled “Future Development on Hold” that cannot be developed until the proposed sanitary lift station is operational. Areas included as part of the CPAA that are not shaded or defined in Figure 12 are planned for connection to the sanitary system at a point along Rosewood Gate North (or South).

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## 5.2 STORMWATER SYSTEM

### 5.2.1 Background

The stormwater management for the CPAA is governed by the existing stormwater management infrastructure in Rosewood. When compared to pre-development runoff volumes, the proposed commercial and industrial area on the east side of Zimmerman Road is expected to produce a significant volume of storm runoff due to the high ratio of impermeable surfaces. As a result, this area will require retention to slow the discharge rate to the minor system that drains to the stormwater management facility in Rosewood's Hyde Park.

### 5.2.2 Stormwater System Design Criteria

The stormwater system for the CPAA was developed using the design criteria in the COS's *New Neighbourhood Design and Development Standards Manual*. These criteria include:

- Minor system piping sized to handle the 1-in-2 yr. storm event;
- Minor system piping flows determined using the Rational Method, where C values are defined by the City of Saskatoon *New Neighbourhood Design and Development Standards Manual*; and
- Major system designed to handle the 1-in-100 yr., 24 hours storm event, and accommodate volumes equivalent to those generated by the June 24, 1983 storm event for the City of Saskatoon.

### 5.2.3 Stormwater System Concept

The stormwater management system design follows the COS New Neighbourhood Design and Development Standards Manual as well as the Southeast Sector Storm Water Management Master Plan, September 2012. Figure 13 shows the proposed location for two stormwater surcharge ponds in the Regional Commercial area east of Zimmerman Road, as well as the trunk main piping routing and sizes for the minor stormwater system. This system has been developed in conjunction with the City of Saskatoon Infrastructure Services department, and is subject to alteration as detailed design activities progress.

The minor storm system is designed to convey the 1-in-2 year storm event without major ponding around catch basins. The major storm system has been designed to accommodate runoff volumes for the 1-in-100 year design storm and the maximum rainfall even of June 24, 1983. All temporary ponding experienced during the major events has been restricted to public spaces within the subdivision, but not within programmable park space as requested by the City. Design flows leaving the CPAA system are less than or equal to the available capacity of the existing storm sewer that convey the flow to the stormwater management facility in Rosewood for each of the storm events.

The two stormwater surcharge ponds are proposed as dry ponds that will allow for timed storage and release of runoff flows during major precipitation events. These ponds are not intended for use as aesthetic (park or recreational) features and will be designed in accordance with City of Saskatoon

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standards. One pond will manage surcharged water from the commercial parcels between Zimmerman Road and the existing Range Road 3044; the other pond will manage surcharged water from the light industrial parcels east of Range Road 3044.

### **5.3 WATER DISTRIBUTION**

#### **5.3.1 Background**

The CPAA will be serviced by a 300 mm primary water main extended from Taylor Street down Rosewood Gate North which divides Rosewood east and west. Figure 14 shows a proposed layout of the secondary water main system.

Another connection to the CPAA can be made at the northeast end of the neighbourhood on Taylor Street once it is extended. This connection is for redundancy in the system, and will be required within a certain time period due to COS requirements for connections. The additional connection serves for maintenance purposes and emergency back-up for unanticipated breaches in the system.

#### **5.3.2 Water Distribution System Design Criteria**

A conceptual water model of the secondary water main system for the CPAA was completed as per parameters identified in the COS's New Neighbourhood Design and Development Standards Manual, 2012.

Fire flow requirements are dependent on land use values provided from this manual:

- 90 l/s @ 140 kPa for residential;
- 120 l/s @ 140 kPa for medium density residential (street townhouses);
- 150 l/s @ 140 kPa for multi-family residential;
- 220 l/s @ 140 kPa for commercial/high density residential; and
- Velocities not to exceed 1.5 m/s under peak hour flow conditions.

The model was analyzed with WaterCAD software by Auto Desk at a conceptual level and fire flow was selected based on the adjacent land uses to show the feasibility of the delivery system. Fire flow was added to hydrants at each of the individual nodes within Rosewood east under Maximum Day Demand (MDD) condition. Velocities through hydrants were 5.10 m/s, 6.80 m/s, 4.78m/s and 7.01 m/s for fire flow rates of 90 l/s, 120 l/s, 150 l/s and 220 l/s respectively. Hydrant leads are 150 mm or 200 mm based on the required fire flow.

Average Day Demand (ADD) was calculated for areas east of Rosewood Gate and excludes the village square. Land use design values were provided from the City's design manual.

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Peak Hour Demand (PHD) and MDD were calculated for select nodes from multiplication factors provided by the COS:

- PHD = ADD x 3.3
- MDD = ADD x 2.26

The system's normal operating conditions are as follows:

- Pressure: 350-690 kPa
- Velocity: Not exceeding 1.5 m/s

The system was evaluated for MDD, MDD plus fire flow, and PHD; and must meet normal operating conditions. Preliminary analysis of the system was based on a total population of 6,962 persons. Based on the design population ADD is 51.74 l/s, MDD is 116.93 l/s, and PHD is 170.73 l/s.

### **5.3.3 Water Distribution System Concept**

Phase 1 of the original Rosewood Concept Plan east of Rosewood Gate North was constructed with the intention of supplying the remainder of the CPAA. The main connection on Meadows Boulevard in phase 1 is a 250 mm diameter pipe. This 250 mm diameter pipe will continue through the remainder of Rosewood east and connect back to the 300 mm diameter main on Rosewood Gate North. A third connection located at the south end of the subdivision on Rosewood Gate south will provide redundancy to the system. All piping is to be looped to allow for proper water circulation, higher pressures, and to reduce impacted areas if servicing is required.

All data and analysis was completed at a conceptual level. Upon approval of the CPAA, detailed design will be completed on the water main network, including but not limited to the 150 mm distribution mains as well as fire flows for various levels of land use and flows through fire hydrants.

### **5.3.4 Staging of Water Distribution Connections**

The first connection will be an extension of the phase 1 watermain. The second connection will be to the 300 mm diameter on Rosewood Gate North. The third connection will be to the 250 mm diameter on Rosewood Gate South to connect Rosewood east and west. Service connections to the multi-site, commercial and industrial areas to the east will be made from the internal Rosewood east network. A future connection on Taylor Street could be considered in the future to improve water circulation.

## **5.4 SHALLOW UTILITIES**

The original Rosewood Concept Plan Report indicated shallow utility servicing can be provided in the area for all services (SaskPower, SaskEnergy, SaskTel, and Shaw Cable).

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## **6.0 Implementation**

### **6.1 DEVELOPMENT STAGING**

Residential development will expand south and east from Meadows Boulevard. Phasing connections with utility services will progress simultaneously to ensure efficient staging and coordination with utility providers as development occurs.

Commercial and industrial development in the south-east will begin before the residential build-out reaches that area. This is largely driven by demand for serviced lots by potential tenants. As a result, servicing for this area may drive the residential development to expand outward from the main roadways and trunk main network. In either scenario, residential development will be staged to maximize the existing infrastructure and connection locations.

In order to service the commercial development in the south-east under the current sanitary scenario, some lands in this area have been placed on hold as shown in Figure 13. The lands on hold will not be serviced until the construction of a pumping station in the south-east corner of the CPAA.

### **6.2 REGULATORY FRAMEWORK**

This report has been prepared in support of a request to City Council for the approval of the Neighbourhood Concept Plan Amendment for Rosewood. Upon submission to the City of Saskatoon, planning staff will review and prepare a report to be taken through a number of committees for their review and comments. Upon review by these committees the document will be submitted to City Council, with a request that a resolution of Council be passed to amend the Rosewood Concept Plan.

Upon adoption of this resolution, applications for map amendments to the Official Community Plan and Zoning Bylaw, and application for subdivision can be submitted.

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### **Appendix A Figures**

## **PROPOSED ROSEWOOD NEIGHBOURHOOD CONCEPT PLAN AMENDMENT**

### **Appendix B Roadway Cross Sections and Intersection Geometrics**