In Camera List immediately follows Public Agenda on Page 80.

City of Saskatoon

PUBLIC AGENDA

STANDING POLICY COMMITTEE ON TRANSPORTATION

TUESDAY, AUGUST 19, 2014 AT 9:00 A.M., COUNCIL CHAMBER

Councillor C. Clark
Councillor T. Davies
Councillor R. Donauer
Councillor D. Hill
Councillor M. Loewen
His Worship the Mayor, D. Atchison (Ex-Officio)

1. Call to Order

1.1 Appointment of Chair
1.2 Appointment of Vice-Chair
1.3 Introductions

2. Confirmation of Agenda

3. Adoption of Minutes

4. Unfinished Business

5. Communications *(requiring the direction of the Committee)*

5.1 Delegated Authority Matters

5.2 Matters Requiring Direction

5.2.1 Request for Access Transit budget increase, Janet Barnes & Jane McPhee, Co-Presidents, Saskatoon Council on Aging [File No. CK. 612-2]

6. Requests to Speak *(new matters)*

6.1 Chester Dobni, street cleaning issues in Willowgrove [File No. CK. 6315-3]

7. Reports from Administration

7.1 Delegated Authority Matters

7.1.1 Capital Project #2407 – IS North Commuter Parkway and Traffic Bridge – Operation and Maintenance [File No. CK. 6050-10 x 6050-8]

Recommendation
That the information be received.

7.2 Matters Requiring Direction

7.2.1 Expansion of School Zone – 20th Street between Avenues M and O [File No. CK. 5200-5]

Recommendation
That the Standing Policy Committee on Transportation recommend to City Council:

That the existing school speed zone for the St. Mary's Education and Wellness Centre be expanded to include 20th Street West from Avenue M South to Avenue O South.

7.2.2 Permanent U-Pass Program with Saskatchewan Indian Institute of Technologies [File No. CK. 7312-1]

Recommendation
That the Standing Policy Committee on Transportation recommend to City Council:

1. That the Administration be directed to finalize an agreement with the Saskatchewan Indian Institute of Technologies for a U-Pass Program based on the terms of this report; and
2. That the City Solicitor be requested to prepare the appropriate agreement and that His Worship the Mayor and the City Clerk be authorized to execute the agreement under the Corporate Seal.

7.2.3 New Pavement Design Guidelines [File No. CK. 6000-1]

Recommendation
1. That the new pavement design guidelines as outlined in the following report be approved; and
2. That the new guidelines be finalized and implemented for all development after January 1, 2015.

7.2.4 Inquiry – Councillor D. Hill (June 22, 2009); and Various Communications to Council – Traffic Calming Measures – Avenue C North of 33rd Street [File No. CK. 6320-1]

Recommendation
That the Standing Policy Committee on Transportation recommend to City Council:

1. That the temporary diverter at the intersection of 38th Street & Avenue C be removed; and
2. That the Neighbourhood Traffic Management Program plan for Mayfair/Kelsey Woodlawn neighbourhoods be adopted as the framework for future traffic improvements in the area, to be undertaken as funding is made available through the annual budget process.

7.2.5 Inquiry – Councillor P. Lorje (July 18, 2012) – Establishment of "Park-and-Ride" Sites in New Neighbourhoods [File No. CK. 7300-1]

Recommendation
That the Standing Policy Committee on Transportation recommend to City Council:

That the information be received.

8. Urgent Business

9. Adjournment

SCOA
saskatoon council on aging
Positive Aging for All

5.2.1 Attachment

Saskatoon City Council
City Clerks Office
City of Saskatoon
222-3rd Avenue North
Saskatoon SK S7K 0J5

Dear City Council:

On behalf of the older adult population of Saskatoon and surrounding communities, and in particular those older adults affected by mobility issues, the Saskatoon Council on Aging writes to request that City Council increase funding to Saskatoon's Access Transit Services.

SCOA is a non-profit organization providing community leadership in creating *Age-Friendly Community; Positive Aging for All;* the promotion of dignity, health and independence on behalf of the approximately 79,000 adults over the age of 50 living in Saskatoon and neighbouring rural communities. A significant number of those individuals require some form of specialized transportation services; a number that will increase significantly as Saskatoon's older adult population grows in numbers and in life expectancy.

Our conversation with older adults in Saskatoon during the **Age-friendly Saskatoon Initiative** further highlighted that transportation was of great interest to this population. People commented positively about Access Transit and its value in making Saskatoon an "accessible city", helping to ensure that older adults are able to live independently for as long as possible. At the same time, many noted the increasing number of "denied rides", delayed trips and a growing length of time required to pre book trips. Statistics indicate that in 2012, almost 12,000 rides were left out and the number is expected to grow in 2014 as the available Access Transit buses and drivers have reached fiscal capacity.

Access Transit service is about more than public transportation; it raises issues about access to jobs, social activities, healthcare and life in the community that run beyond the ambit of a transit agency. Access Transit is the only mode of transportation that can get these individuals to work, school, and doctor's appointments and more importantly, it means this population has the opportunity to live comparable lives as others in the community.

..2/

We acknowledge the City's already significant contribution to Access Transit, of over $3 million per year. This is an important commitment from Council and city residents. Also we note that solutions such as moving more Access customers to fixed route service are in place through the use of kneeling buses and driver training. These actions will provide some relief, though, ultimately, fixed route services often falls short of meeting the needs of disabled older adults. For example, fixed route often involves transfers, while Access is point-to-point travel; and using the fixed route equipment designed to assist the elderly and disabled requires both driver and resident education as this equipment is cumbersome or burdensome to use.

Notably, we will also be asking the provincial government to increase their contribution to para transit funding. Our province has a key leadership role in supporting its growing older adult population; a population that are taxpayers and long time contributors to our economic and social well being. Providing adequate transportation service and the funding to support those services to this population is of utmost importance to ensuring older adults live healthy and successful lives.

We respectfully request that City Council provide a budget increase in the Access Transit to respond to Saskatchewan's growing older adult population.

Sincerely,

Janet Barnes
Co-President

Jane McPhee
Co-President

cc: Jamie Robinson, Access Transit Manager, City of Saskatoon

From: CityCouncilWebForm
Sent: Thursday, July 17, 2014 3:27 PM
To: City Council
Subject: Write a Letter to City Council

TO HIS WORSHIP THE MAYOR AND MEMBERS OF CITY COUNCIL.

FROM:

Chester Dobni
203 Trimble Lane
Saskatoon, Saskatchewan
S7W0Cp

EMAIL ADDRESS:

COMMENTS:

I would like to address outstanding street cleaning issues in Willogrove.

Capital Project #2407 – IS North Commuter Parkway and Traffic Bridge – Operation and Maintenance

Recommendation
That the information be received.

Topic and Purpose
The purpose of this report is to provide the Standing Policy Committee on Transportation with information regarding the assignment of long term operations and maintenance activities for the North Commuter Parkway and Traffic Bridge Project.

Report Highlights
1. The North Commuter Parkway-Traffic Bridge project team has been working to advance the P3 technical performance specifications for the project and a major component of this work is related to the assignment of various operations and maintenance responsibilities between the private partner and the City.
2. The assignment of operations and maintenance responsibilities is predicated on determining which party is best able to absorb the risk, with full consideration for the potential impact of these activities on the integrity of this infrastructure over the 30 year concession period.
3. Following significant consultation with various internal stakeholders and City project advisors, the chart in Attachment 1 summarizes the assignment of operations and maintenance responsibilities proposed for this project.
4. In general, most of the operations and maintenance of the North Commuter Parkway will be performed by the successful proponent for the 30 year concession period. For the Traffic Bridge, the City will continue to perform sweeping and snow removal, with the balance of maintenance activities performed by the successful proponent for the 30 year concession period.

Strategic Goal
The construction of the North Commuter Parkway supports the City of Saskatoon Strategic Goal of Moving Around as it will optimize the flow of people and goods in and around the city.

Background
At its meeting on March 31, 2014, City Council approved that the North Commuter Parkway and Traffic Bridge Replacement project use a P3 delivery model, subject to the City's approval of a funding application to PPP Canada. Upon receiving funding approval from PPP Canada, and before the procurement process commences, the Administration was to report further on the final funding plan.

At its meeting on June 9, 2014, City Council approved the funding plan for the project and that Administration may proceed with the Request for Qualifications stage of procurement.

Report

The North Commuter Parkway project team has been working to complete the P3 technical performance specifications for the Request for Proposal stage of the project. A major component of this work is related to the assignment of various operations and maintenance activities between the private partner and the City. In a P3 project, the assignment of these responsibilities is predicated on determining which party is best able to absorb the risk, with full consideration for the potential impact of these activities on the integrity of this infrastructure over the 30 year concession period. Ensuring the project has a sufficient operations and maintenance component attached is also a critical component of the Value for Money analysis which is completed as part of the business case.

Operations and Maintenance Activity Assignments

Following significant consultation with various internal stakeholders and project advisors, the various operation and maintenance activities have been assigned as shown in the chart in Attachment 1. The boundaries of responsibility are shown in Attachment 2 and Attachment 3 for the North Commuter Parkway and Traffic Bridge, respectively.

A significant consideration in making these assignments was how the City currently delivers these services for existing roadways and bridges, and a risk workshop conducted in late 2013 which evaluated the parties best suited to retain the risks associated with these activities. These assignments were used in the financial analysis completed for the P3 Business Case.

In general, most of the operations and maintenance of the North Commuter Parkway will be performed by the successful proponent for the 30 year concession period. For the Traffic Bridge, the City will continue to perform sweeping and snow removal, with the balance of maintenance activities performed by the successful proponent for the 30 year concession period.

Financial Implications

The approved funding plan is predicated on the information presented in this report.

Public and/or Stakeholder Involvement

Stakeholder involvement will be required at various stages of the project. Community events will be planned in order to engage and educate the citizens. The Administration will coordinate with applicable stakeholders as necessary.

Communication Plan

A communications agency has been retained through the Technical Advisor for the project, and a phased-in communications plan has been developed for the life of the

project. Webpages for the North Commuter Parkway and Traffic Bridge have been updated and an educational video has been developed. Various community events will be planned in order to engage and educate the citizens. Regular project updates will be provided to City Council by the Project Manager, and more broadly to the general public, through the media.

Safety/Crime Prevention Through Environmental Design (CPTED)

A preliminary CPTED review was completed at the Committee's September 5, 2013, meeting. Additional CPTED reviews will be undertaken on staged design submissions during the detailed design period.

Due Date for Follow-up and/or Project Completion

The Administration is currently operating on a realistic target completion date for the North Commuter Parkway project of October 2018.

Public Notice

Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

Attachments

1. Design, Construction, Operation, and Maintenance Responsibility Divisions
2. North Commuter Parkway - General Division of Operations and Maintenance Responsibilities
3. Traffic Bridge – General Division of Operations and Maintenance Responsibilities

Report Approval

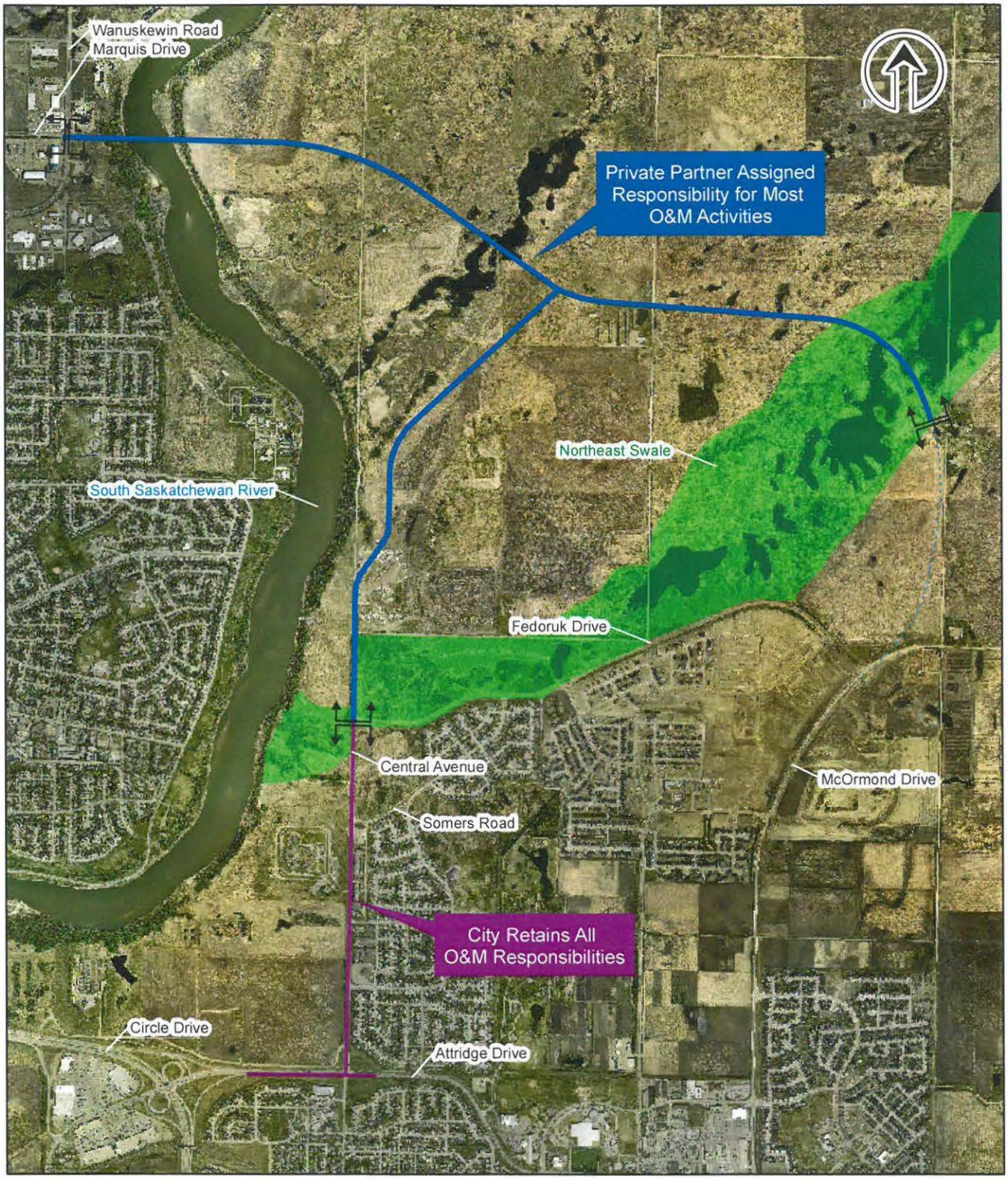
Written by:	Dan Willems, Special Projects Manager, Major Projects
Reviewed by:	Mike Gutek, Director of Major Projects
Approved by:	Jeff Jorgenson, General Manager, Transportation & Utilities Department

TRANS DW – Capital Project 2407 – IS North Commuter Parkway and Traffic Bridge – Operations and Maintenance

Project: ***North Commuter Parkway & Traffic Bridge Project***
Subject: Design, Construction, Operation, and Maintenance Responsibility Divisions
Date: June 20, 2014

Element of Work	Saskatoon Light and Power	Transportation & Utilities - Transportation	Transportation & Utilities - Public Works	P3 Partner
Street/Bridge Lighting and Power Lines (North Commuter Parkway):				
Lighting Design	✓			
Lighting Civil Works Construction (Butts & Ducts)				✓
Lighting Wiring/Davits/Poles/Fixtures Install & Commission	✓			
Temporary Works (Power Pole Relocations, etc.)	✓			
Operate Lighting	✓			
Maintain Lighting	✓			
Street/Bridge Lighting and Power Lines (Traffic Bridge):				
Lighting Design	✓			
Lighting Civil Works Construction (Butts & Ducts)				✓
Lighting Wiring/Davits/Poles/Fixtures Install & Commission	✓			
Operate Lighting	✓			
Maintain Lighting	✓			
SL&P Transmission Line and Ductwork (Traffic Bridge):				
Ductwork Design	✓			
Ductwork Materials				✓
Ductwork Construction				✓
Temporary Works (Existing Transmission Line, etc.)	✓			
Transmission Line Installation and Commissioning	✓			
Traffic Signals (North Commuter Parkway):				
Traffic Signal Design				✓
Traffic Signal Construction				✓
Traffic Signal Operation		✓		
Traffic Signal Maintenance		✓		
Signage and Pavement Markings (North Commuter Parkway):				
Signing and Pavement Marking Detailed Design				✓
Signage and Pavement Marking Construction				✓
Signage and Pavement Marking Operation				✓
Signage and Pavement Marking Maintenance				✓
Signage and Pavement Marking (Traffic Bridge):				
Signing and Pavement Marking Detailed Design				✓
Signage and Pavement Marking Construction				✓
Signage and Pavement Marking Operation		✓		
Signage and Pavement Marking Maintenance		✓		
Roadways and Pathways (North Commuter Parkway):				
Roadway and Pathway Design				✓
Roadway and Pathway Construction				✓
Roadway and Pathway Operation				✓

Element of Work	Saskatoon Light and Power	Transportation & Utilities - Transportation	Transportation & Utilities - Public Works	P3 Partner
Roadway and Pathway Maintenance				✓
Roadways and Pathways (Traffic Bridge):				
Roadway and Pathway Detailed Design				✓
Roadway and Pathway Construction				✓
Roadway and Pathway Operation		✓		
Roadway and Pathway Maintenance		✓		
Bridge (North Commuter Parkway):				
Bridge Detailed Design				✓
Bridge Construction				✓
Bridge Maintenance				✓
Bridge (Traffic Bridge):				
Bridge Detailed Design				✓
Bridge Construction				✓
Bridge Maintenance				✓
Retaining Walls (North Commuter Parkway):				
Retaining Wall Detailed Design				✓
Retaining Wall Construction				✓
Rertaining Wall Maintenance			✓	
Retaining Walls (Traffic Bridge):				
Retaining Wall Detailed Design				✓
Retaining Wall Construction				✓
Rertaining Wall Maintenance			✓	
Sound Attenuation Walls (North Commuter Parkway):				
Sound Attenuation Wall Detailed Design				✓
Sound Attenuation Wall Construction				✓
Sound Attenuation Wall Maintenance			✓	



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2014-06-20 By:dwillems

June 2014
6050-104-44

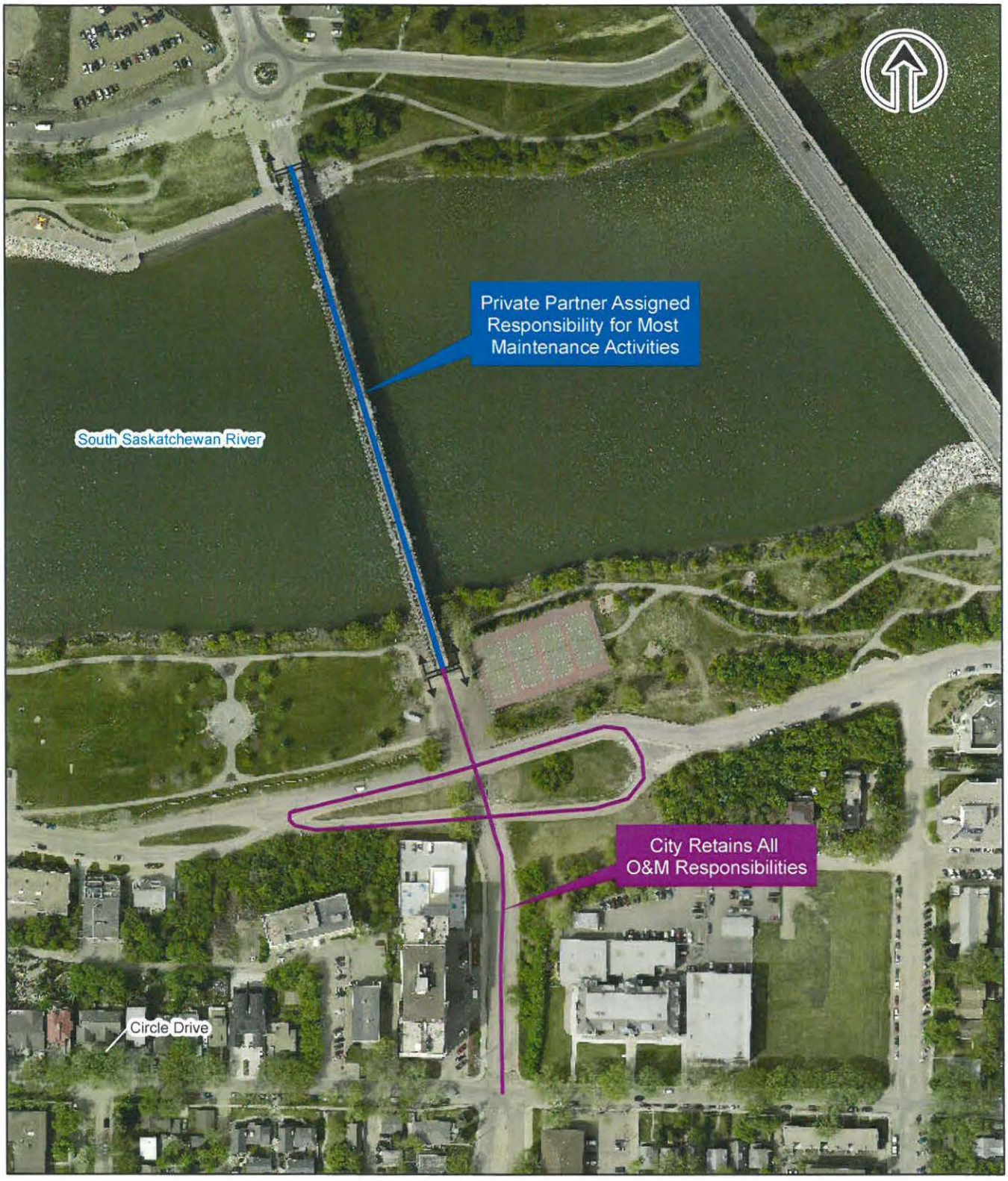
City of Saskatoon

Scale: 1:30,000

Project:
NORTH COMMUTER PARKWAY

Figure No.:
1

Title/Subject:
General Division of Operations and Maintenance Responsibilities



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2014-06-20 By:dwillems

June 2014
6050-104-44

City of Saskatoon

Scale: 1:2,500

Project:
TRAFFIC BRIDGE

Figure No.:
2

Title/Subject:
General Division of Operations and Maintenance Responsibilities

Expansion of School Zone - 20th Street between Avenues M and O

Recommendation
That the Standing Policy Committee on Transportation recommend to City Council:

That the existing school speed zone for the St. Mary's Education and Wellness Centre be expanded to include 20th Street West from Avenue M South to Avenue O South.

Topic and Purpose
This report requests approval to expand the existing school zone for the St. Mary's Education and Wellness Centre in order to improve pedestrian safety.

Report Highlights
1. A number of students use the intersections of Avenue N and Avenue O to cross to the school site.
2. Designating this section of 20th Street as a school zone will reduce speed and improve safety for pedestrians.

Strategic Goal
This report supports the City of Saskatoon Strategic Goal of Moving Around, to provide pedestrian safety and optimize the flow of people and goods in and around the city.

Background
A request was received from the principal of St. Mary's Education and Wellness Centre and members of the school board to expand the school zone to include 20th Street as a number of their students live and cross 20th Street every day to attend school.

Report
Transportation reviewed the request for an expansion of the school zone along 20th Street between Avenue M and Avenue O. A number of site reviews confirmed that students are using the intersections of Avenue N and Avenue O to cross to the school site located at 327 Avenue N South. As a result of the review, Transportation is recommending the expansion of the school zone on 20th Street between Avenue M and Avenue O as shown in Attachment 1.

The school zone will be marked with the standard signage to create awareness of the reduced speed zone.

Public and/or Stakeholder Involvement
On May 22, 2014, a public meeting was held with representatives from the St. Mary's Education and Wellness Centre, area residents, and the Community Association to

discuss their concerns regarding pedestrian safety along 20th Street. All supported the expansion of the school speed zone onto 20th Street.

Communication Plan

A Public Service Announcement will be released to inform motorists of the reduced speed school zone.

Policy Implications

The expansion of the St. Mary's Education and Wellness Centre speed zone is in accordance with Policy C07-015, Reduced Speed Zones for Schools.

Financial Implications

The cost to install the school speed zone signage is approximately $1,000. Funding is available within approved Capital Project #1506 - Traffic Signing Replacement.

Budgeted	Unbudgeted	Capital	Operating	Non-Mill Rate	External Funding
X		$1,000			

Other Considerations/Implications

There are no other options, environmental, privacy or CPTED implications or considerations.

Due Date for Follow-up and/or Project Completion

If approved, the school speed zone signage will be installed prior to September 1, 2014. In addition, the Administration is conducting additional reviews of further measures to improve the safety of pedestrians in the area and will provide recommendations in September 2014.

Public Notice

Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

Attachment

1. Proposed Expansion to St. Mary's School Zone

Report Approval

Written by: Justine Nyen, Traffic Safety Engineer, Transportation
Reviewed by: Angela Gardiner, Director of Transportation
Approved by: Jeff Jorgenson, General Manager, Transportation & Utilities Department

TRANS JN - Expansion of School zone - 20th Street between Ave M and 0

ATTACHMENT 1

PROPOSED EXPANSION TO ST. MARY'S SCHOOL ZONE

EXISTING SCHOOL ZONE

PROPOSED ADDITION TO SCHOOL ZONE

Permanent U-Pass Program with Saskatchewan Indian Institute of Technologies

Recommendation

1. That the Administration be directed to finalize an agreement with the Saskatchewan Indian Institute of Technologies for a U-Pass Program based on the terms of this report; and,

2. That the City Solicitor be requested to prepare the appropriate agreement and that His Worship the Mayor and the City Clerk be authorized to execute the agreement under the Corporate Seal.

Topic and Purpose

Administrations from both Saskatoon Transit and the Saskatchewan Indian Institute of Technologies (SIIT) have deemed the pilot U-Pass Program a success. Your Administration seeks approval to finalize an agreement with the SIIT for a permanent U-Pass Program.

Report Highlights

1. The pilot U-Pass Program with SIIT, approved by City Council on December 5, 2011, was in effect from January 1, 2012 to December 31, 2012 with further extensions granted until May 31, 2014.
2. The new agreement would put into place a permanent U-Pass Program for the SIIT students.

Strategic Goals

The recommendations in this report support the long-term strategy for Saskatoon Transit of attracting and retaining new ridership which builds on the Strategic Goals of Moving Around and Environmental Leadership.

Background

In September 2011, Saskatoon Transit and SIIT entered into discussions with the intent of establishing a U-Pass Program for the students attending the institute and to be designed similar in nature to the U-Pass Program currently in place for students attending the University of Saskatchewan.

On December 5, 2011, City Council approved a pilot U-Pass Program which ran from January 1, 2012 to December 31, 2012 with further extensions granted until May 31, 2014. The pricing for the winter semester 2014 (January 1, 2014 to May 31, 2014), the final semester of the pilot program, was set at $112.23.

Report

Pilot U-Pass Program

Administration from both SIIT and Saskatoon Transit spoke on June 30, 2014, to discuss the pilot U-Pass Program. Both administrations agreed that the pilot U-Pass Program was a success and deemed it appropriate to move toward a permanent U-Pass Program for students at SIIT.

Survey results from SIIT obtained prior to the implementation of the pilot U-Pass Program, showed that out of the 126 students surveyed, 49 used an adult monthly pass, 4 used a student semester pass, 60 indicated they use Saskatoon Transit daily, and 113 indicated they would be in favour of the U-Pass Program. Adoption of the U-Pass Program requires all students enrolled to participate, representing roughly 200 students and an increase in pass sales of 147 (based on the 2011 survey results).

U-Pass Program Agreement

The business terms between Saskatoon Transit and SIIT will be based on the current agreement. The key terms of this agreement are as follows:

- The program is mandatory with exceptions to those living outside City limits, enrolled exclusively in distance education courses, holding a disabilities parking pass, participating in Adult Basic Education Programs whose education expenses are covered under the Province of Saskatchewan's Provincial Training Allowance, or enrolled in the welding program.
- The rates that will be charged and collected by the institution will be $112.23 per student per fall 2014 semester pass. This price will increase yearly by the Municipal Price Index (MPI) and will take effect for the winter semester prices.
- Either party can terminate the agreement by providing 30-day's notice to the other party.
- The program requires either unique passes or stickers on student cards.
- A student that graduates or leaves the institution loses the transit pass privileges.
- The institution is responsible for the handling and distribution of the passes and reporting on this to Saskatoon Transit.

Options to the Recommendation

The available options would be to discontinue the U-Pass Program with SIIT or extend the trial period for one year. These options are not being recommended at this time since the U-Pass Program with SIIT has proven to be both effective and well received.

Public and/or Stakeholder Involvement

The body of this report outlines engagement with Saskatchewan Indian Institute of Technologies as an important Saskatoon Transit stakeholder.

Communication Plan

Accessible, clear and concise information on Transit routes and schedules, along with the advantages of travelling on transit will help SIIT students realize the full potential of

their U-Pass. This information is available on the City's website (www.saskatoon.ca and click on "T" for Transit) through Click and Go and Google Transit.

Financial Implications

The U-Pass will increase ridership, remain revenue neutral for Saskatoon and provide cost-effective transportation for students of the institution. The U-Pass price per term for SIIT will be as follows and will increase yearly based on increases in the MPI:

September 1, 2014 – December 31, 2014 (fall term) – $112.23
January 1, 2015 – April 30, 2015 (winter term) – $115.85

These values will increase yearly based on increases in the MPI.

During the trial period, there were approximately 150 passes sold per term to SIIT students. Based on these numbers, it is estimated that $34,200 in revenue will be earned in the first year of the agreement. Since this amount represents a decrease in sales from other fare types, there will be no net increase in operating revenue.

The proposed U-Pass Program for the SIIT has been based on an existing template for groups and institutions pursuing similar agreements. These partnerships have the potential to increase ridership for Saskatoon Transit. The U-Pass Program is financially viable as there will be an increase in the passes purchased by students who attend classes at SIIT.

The Administration is confident that, at this time, there will be no incremental cost for bus operations to Saskatoon Transit for implementing a U-Pass Program for SIIT. However, as ridership increases through subsequent U-Pass Programs, additional buses and service hours may be required subject to the number of new riders, the time of day new riders use the bus, and which part of the city new riders are transporting to and from.

Environmental Implications

The U-Pass Program will provide a positive environmental impact as a result of reducing greenhouse gas emissions.

When looking at the commuting patterns of the students surveyed, 38 did not use Saskatoon Transit as their primary mode of transportation for their daily commute to classes. The result of having 38 fewer vehicles making the daily commute to school would reduce greenhouse gas emissions by 23.4 tonnes annually. This result was based on Statistics Canada's 2006 Census, which indicates the average daily commute in Saskatoon was 5 km one way, Canadian average motor vehicle fuel economy of 21 mpg/City and 200 days of classes for the school year. There could be a further reduction if these 38 students choose to use Saskatoon Transit on the weekends.

Other Considerations/Implications

There are no policy, privacy, or CPTED implications.

Due Date for Follow-up and/or Project Completion

If approved, consultation with SIIT will occur yearly, starting in one-year's time, to discuss the U-Pass Program's success and determine any possible improvements.

Public Notice

Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

Report Approval

Written by:	Mike Moellenbeck, Accounting Coordinator
Reviewed by:	Bob Howe, Director of Saskatoon Transit
Approved by:	Jeff Jorgenson, General Manager, Transportation & Utilities Department

TRANS - Permanent U-Pass Program with Saskatchewan Indian Institute of Technologies

New Pavement Design Guidelines

Recommendation

1. That the new pavement design guidelines as outlined in the following report be approved; and

2. That the new guidelines be finalized and implemented for all development after January 1, 2015.

Topic and Purpose

The purpose of this report is to provide information on the Administration's recommended new pavement design guidelines for construction of new roadways. The design guideline is based on the design procedures outlined in the American Association of State Highway and Transportation Officials (AASHTO) 1993 Guide for Design of New Pavement Structures.

Report Highlights

1. The City's current pavement design standards need to be improved in order to better accommodate existing soil conditions, water table issues and serviceability in the urban environment as Saskatoon expands, and to ensure the most cost-effective product is delivered to its citizens.
2. It is recommended by the Administration to proceed with implementing the AASHTO 1993 design methodology, supplemented with a sub-surface drainage requirement, as the City's standard for roadway design.
3. Implementing the AASHTO 1993 design standard will generally result in thicker asphalt, a sub drainage system for all new roadways, and a mandatory deferred top lift asphalt layer on local, collector and select arterial roadways with substantial utilities installed below.
4. For a typical residential roadway, there would be an increase in initial direct capital cost of approximately 14% to 43% depending on the soil and groundwater conditions.
5. For a typical paved lane, there would be an increase in initial direct capital cost of 33% to 67% depending on the soil and groundwater conditions.

Strategic Goals

Upgrading the pavement design guidelines aligns with the City's Building Better Roads plan and supports the Strategic Goals of Asset and Financial Sustainability and Moving Around.

Background

Improvement of Pavement Design Guidelines

The Administration is looking to improve the City's current pavement design standards in order to better accommodate existing soil conditions, water table issues and serviceability in the urban environment as Saskatoon expands, and to ensure the most cost-effective product is delivered to its citizens.

The Administration commissioned a study to review, compare and recommend a design methodology that would provide the City with the best, most cost-effective roads for the long term. Methodologies such as the Saskatchewan Method, AASHTO, Mechanistic Empirical Pavement Design Guide and mechanistic design methodologies were assessed and evaluated as part of the study.

The City's current design standards are based on the Saskatchewan Shell Curve design method, modified to deal with local climate and soils. This methodology is only practiced in Saskatchewan and is being used by the Saskatchewan Ministry of Highways and Infrastructure. The City of Saskatoon has been utilizing this method for over 25 years.

Reviewing the design standards is intended to address roadway issues related to moisture sensitive soils, water infiltration and increased heavy traffic during build out of neighbourhoods.

Report

The City's goal is to have an improved pavement design guide that follows a design methodology that:

- is well understood and widely used throughout North America;
- is geared towards pavement structural design for urban conditions;
- can be reviewed and checked in-house by City Staff;
- can be easily adopted well in advance for roadway design work required for the 2015 construction season; and
- offers the ability to provide additional design and rehabilitation options by utilizing non-destructive testing and analysis.

Tetra Tech EBA Inc. (Tetra Tech) was commissioned to evaluate and recommend a design methodology that would provide for the above points. The three tasks undertaken were:

1. Identify, evaluate and recommend a preferred pavement design methodology for new pavements;
2. Determine appropriate values or methods to establish the inputs and parameters required for the preferred design method; and
3. Develop a Pavement Design Guide for new pavement.

Recommended Design Methodology

A number of methodologies such as the Saskatchewan Method, AASHTO, Mechanistic Empirical Pavement Design Guide and mechanistic design methodologies were

assessed and evaluated. The above methodologies were thoroughly reviewed by Tetra Tech and it is recommended to proceed with the AASHTO 1993 methodology which is a North American best practice. Many jurisdictions in Canada utilize the AASHTO 1993 methodology including British Columbia, Alberta, Manitoba, Ontario, Quebec, and Nova Scotia, as well as most of the United States. The Administration instructed the consultant to move forward with the AASHTO 1993 methodology for the purpose of generating a new roadway design guide (Attachment #1). The Administration wishes to adopt the new methodology for any new development after January 1, 2015.

The new design guidelines provide the following features:

- Accommodation of alternative materials in the design process such as recycled concrete, drainage materials, high performance polymer-modified asphalt concrete (PMAC);
- Provides a reliability-based approach to account for variations in traffic and performance prediction and to manage this risk based on roadway traffic loading (or roadway classification);
- Is technically straightforward and generally well understood by pavement practitioners;
- Has design inputs (traffic loading and subgrade support condition) that are relatively inexpensive to quantify;
- Is a procedure that is empirically based and has been used in Western Canada for 20 plus years with good performance experience;
- Can be used in the design of pavement rehabilitation options using non-destructive testing;
- Can be implemented quickly by the City; and
- Will provide the option to possibly adopt the new AASHTO Mechanistic-Empirical Pavement Design Guideline in the future.

<u>Resulting Factors of the New Design Guideline</u>

The key differences with the current design standards and the proposed design standards are:

- a required sub drainage system for all roadways;
- designs will be developed using AASHTO 1993 criteria, which will typically result in a thicker hot mix asphalt layer; and
- a mandatory deferred top-lift asphalt on all local roadways, all collector roadways and select arterial roadways with substantial utility installations.

The sub drainage system is to mitigate water or frost related failure mechanism. This is the primary cause of premature failures in the City's roadway network. The changes proposed will result in longer service life of the City's roadway system. The changes will also minimize the risk of future full-depth structural rehabilitations, which are extremely costly and disruptive. The deferred top-lift asphalt process will provide staged construction to help deal with short-term settlements from utility installations and provides a new driving surface close to substantial neighbourhood build out once construction traffic has been removed from the area and damage to the roadways can be minimized.

While the design guide is near its final draft, there will be minor modifications to include items including minimum paved lane structures, mandatory deferred pavement lifts and modifications to ensure the guide aligns with the City of Saskatoon Standard Specifications and Drawings.

Communication Plan

The Developer's Liaison Committee was presented the new design guidelines on July 29, 2014. The Administration has taken comments and concerns from the committee into account for further follow-up and review prior to final implementation of the design standards. Any changes resulting from reviews will be based on best engineering practices.

Any change to current practices, with regard to the items listed above, will continue to be coordinated with Transportation, Water and Sewer, Public Works and other divisions or stakeholders as required. Communication activities will be integrated when possible into relevant communication plans involving roadway design, preservation or construction practices.

The communication of the new standards will be integrated with the City's Building Better Roads communication plan including news conferences, advertisements, and social media as required.

Financial Implications

The most significant change to building our roads includes a thicker asphalt layer, the required installation of a sub drainage system and mandatory deferred pavement lifts on lower class roadways and roadways with substantial infrastructure installed below.

For a typical residential roadway, there would be an increase in cost of approximately $10 to $30 per square meter depending on the sub drain system required resulting from the soil and water table conditions. On a typical 10m roadway, these changes will add between $762 and $2,287 to the development cost of the lot.

To construct a new residential roadway, based on the City's current design standard, it costs approximately $70 per square meter. Under the new design guidelines and given the same bearing strength of the subgrade, the cost to construct could range from approximately $80 to $100 per square metre including a sub drainage system and thicker asphalt.

Paved back lanes will be required to have the same roadway structure as a local roadway with a centre drain or a full drainage layer depending on the estimated level of the water table. To construct a new paved back lane, based on the City's current design standard, it costs approximately $60 per square meter. Under the new proposed design guidelines and given the same bearing strength of the subgrade, the cost to construct could range from approximately $80 to $100 per square metre. These changes will add between $1,174 to $2,881 to the development cost of each lot.

It should be noted that although the initial capital cost is higher, the Administration is confident that the new roadway standard will provide higher quality roadways that require less expensive treatments over their lifecycle to maintain their good condition. Investing more up front will result in savings in the future.

Other Considerations/Implications

There are no options, policy, environmental, privacy, or CPTED implications or considerations.

Due Date for Follow-up and/or Project Completion

The City Administration plans to adopt the new methodology for January 1, 2015.

Public Notice

Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

Attachment

1. Tetra Tech EBA Inc. – City of Saskatoon New Roadway Pavement Design Guide

Report Approval

Written by:	Mitchell Parker, Manager, Asset Preservation for Roads
Reviewed by:	Rob Frank, Manager, Preservation Services
Reviewed by:	Mike Gutek, Director of Major Projects
Approved by:	Jeff Jorgenson, General Manager, Transportation & Utilities

TRANS MG – New Pavement Design Guideline – July 30 2014

TETRA TECH

CITY OF SASKATOON NEW ROADWAY PAVEMENT DESIGN GUIDE

BUILDING BETTER ROADS
SASKATOON'S ROAD PLAN

PRESENTED TO
The City of Saskatoon

JUNE 2014
ISSUED FOR USE
FILE: E32103173-01

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LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of The City of Saskatoon and their agents. Tetra Tech EBA Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than The City of Saskatoon, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech EBA Inc.'s Agreement with the City of Saskatoon dated March 7, 2014.

1.0 PURPOSE

The purpose of the City of Saskatoon New Roadway Pavement Design Guide (Design Guide) is to define the pavement design methodology and procedures to be used for new flexible pavement design within the City of Saskatoon. The Design Guide is based on the design procedures outlined in the American Association of State Highway and Transportation Officials (AASHTO) 1993 Guide for Design of New Pavement Structures modified for the City of Saskatoon's conditions.

This Design Guide focuses on addressing three primary components concerning the design of new flexible pavement structures:

1. Drainage,
2. Subgrade Support, and
3. Traffic Loadings.

Design methodology has been provided for both rural and urban roadway cross-sections. For the purpose of this Design Guide, urban and rural cross sections can be defined as follows:

- Urban cross-section – roadway with surface drainage controlled with curb and gutter, catch basins and a storm sewer system; and
- Rural cross-section – roadway with surface drainage directed to ditches on both sides of the road, with a minimum of 1 m from ditch bottom to the top of subgrade and with lateral drainage of the granular material extended through the shoulder to drain out onto the side slope.

The design methodology presented in this Design Guide addresses the various design steps and inputs the Pavement Designer must consider when completing a new flexible pavement design. These steps are presented in Figure 1 located in the Figures section of this Design Guide.

2.0 DESIGN INPUTS

2.1 Drainage Considerations

It is important to consider geometric aspects that influence pavement drainage. Adequate surface drainage is important and minimum cross-slopes and longitudinal grades should be established. Sufficient grade at the top of subgrade is important to promote water being evacuated as quickly as possible along the granular base-subgrade interface. These influencing geometric factors apply to both urban and rural cross-sections.

2.1.1 Urban Cross-section

Guidelines for the pavement design drainage for urban cross sections are presented in the following sections. A hydro-geological study should be carried out for areas incorporating new or reconstructed roadways. Note that "seasonal groundwater" represents the most shallow groundwater condition anticipated, based on the hydro-geological study for the area. Sample cross sections for urban drainage conditions are presented in Figure A.

Seasonal Groundwater Greater than 1.0 m below Subgrade Elevation

Where the seasonal groundwater is located 1.0 m or greater below the anticipated subgrade elevation longitudinal edge drains should be provided within the sub-base material at the top of subgrade. For crowned roads a drain is

required on both sides of the pavement. If superelevated the drain is only required on the low side. A notch at the edge of the subgrade using a motor grader is often used to avoid the drain pipe from creeping during sub-base placement. The subdrain should be a 100 mm diameter (or greater if required by the roadway width) perforated plastic pipe with a filter sock. Positive outfall of the drains should be provided at catchbasins. Where catch basins do not exist, outfall can be made to ditches with a preferred spacing of 100 m.

Seasonal Groundwater Less than 1.0 m below Subgrade Elevation

Where the seasonal groundwater is located less than 1.0 m below the anticipated subgrade elevation, a minimum 200 mm thick drainage layer should be provided. The drainage layer should be enveloped in non-woven geotextile to prevent fines from entering the drainage layer. To evacuate the collected water the same subdrain configuration as described for the "groundwater greater than 1.0 m" condition should be installed. The drain should be located within the drainage layer material and geotextile with positive outfall at catchbasin locations.

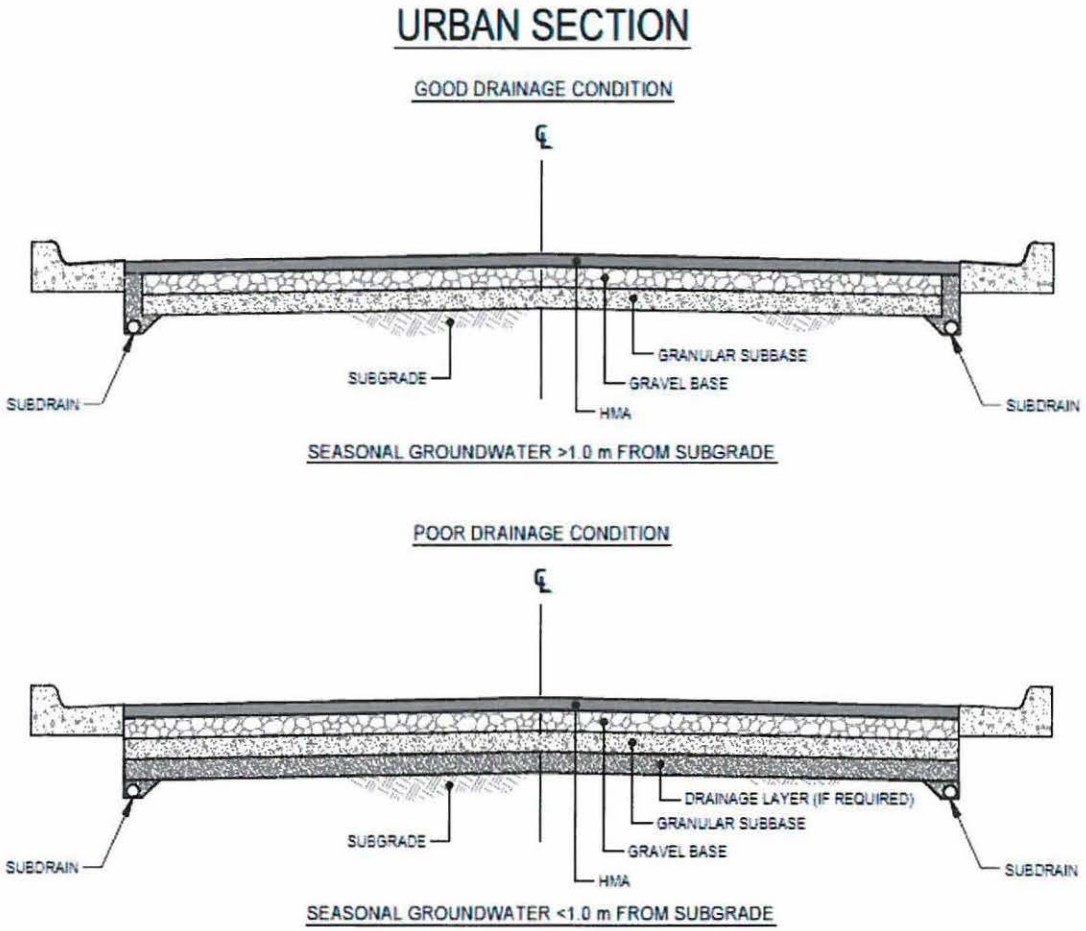

Figure A: Sample Urban Cross Section Drainage Conditions

2.1.2 Rural Cross-section

Guidelines for the pavement design drainage for rural cross sections are presented in the following sections. In the case of rural cross sections, the drainage design is based on the distance from the top of subgrade to the ditch invert.

Ditch Invert 1.0 m or Greater below Subgrade Elevation (Good Condition)

Where the ditch invert is located a 1.0 m or more below the subgrade, the pavement drainage condition is considered as good. In this case the granular materials, base and sub-base, should extend to the road sideslope to enable water to escape. No other drainage detail is necessary.

Ditch Invert between 0.5 m to <1.0 m below Subgrade Elevation (Marginal Condition)

Where the ditch invert is located less than 1.0 m below subgrade, but greater than 0.5 m, the pavement drainage condition is considered marginal. Project and location specific conditions should be considered that would influence the potential depth of water that may be held in the ditch. This would include the longitudinal ditch grade, sideslope angle, width of ditch, surface drainage pattern from surrounding area, etc. .

If the potential for standing water greater than 200 mm in depth is considered unlikely, the "good condition" detail of daylighting the granular materials to the sideslope is considered appropriate. If the potential for standing water greater than 200 mm in depth is considered likely, the pavement structure should be designed as for an urban section with the same details for either a shallow or deep groundwater condition (but not curb and gutter). The material outside of the roadway footprint (i.e. the material forming the sideslope) should be constructed with fine-grained low permeable material to act as a "plug" preventing water from entering the pavement structure from the ditch.

Ditch Invert less than 0.5m below Subgrade Elevation (Poor Condition)

Where the ditch invert is located less than 0.5 m below subgrade, the pavement drainage condition is considered poor. The pavement structure should be designed as for an urban section with the same details for either a shallow or deep groundwater condition (but not curb and gutter). The material outside of the roadway footprint (i.e. the material forming the sideslope) should be constructed with fine-grained low permeable material.

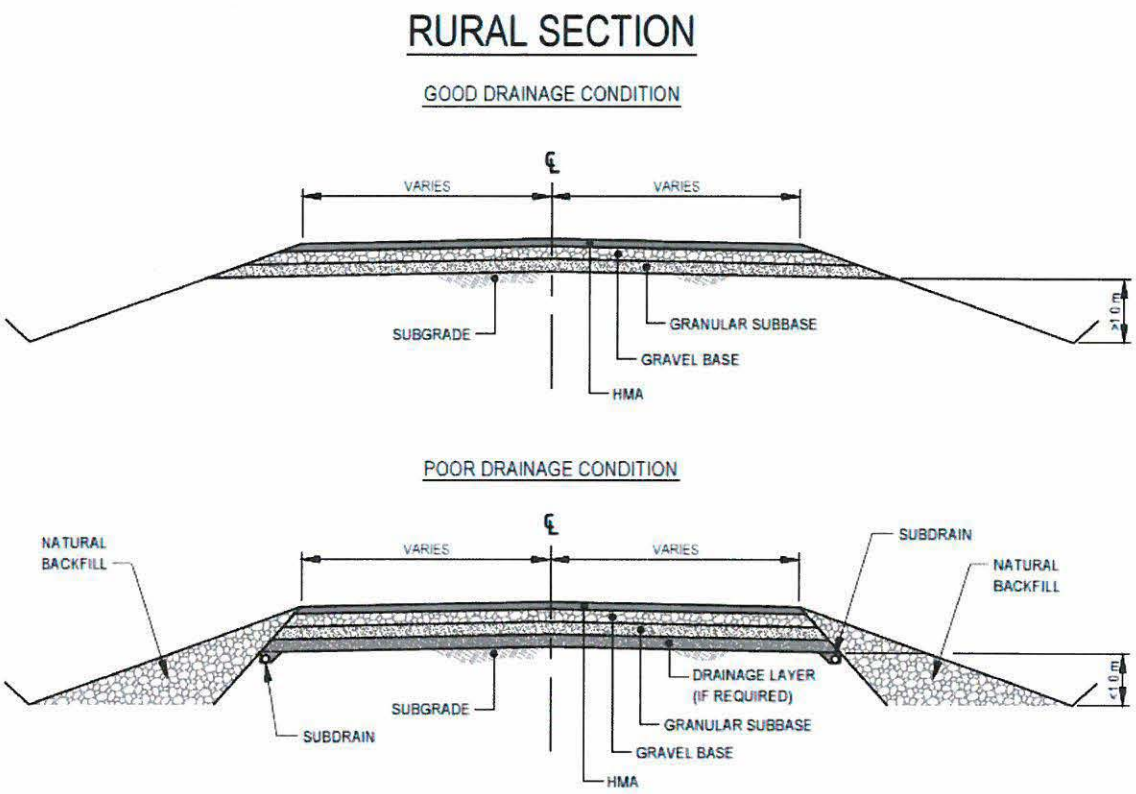

Figure B: Sample Rural Cross Section Drainage Conditions

2.2 Subgrade Support Conditions

Subgrade support is to be expressed in terms of resilient modulus (M_R). Two acceptable methods for classifying subgrade support are as follows:

1. Estimating the Subgrade Resilient Modulus from California Bearing Ratio (CBR); and/or
2. Determining the Resilient Modulus from Non-Destructive Testing of Prototype Pavements.

Estimating the Resilient Modulus from CBR

Correlations have been established by researchers that allow the resilient modulus to be estimated from other soil properties. The correlation for fine grained soils with a soaked CBR of 10 or less is:

Equation 1

$$M_R\ (MPa) = 10.3 \times (CBR)$$

An appropriate number of tests should be performed to reflect the test repeatability, the range of soil types expected to be encountered on the project, and the size of the project. The recommended minimum frequency for CBR testing is one test for every 3,000 sq.m. of pavement, with a minimum of three tests per project.

Determining the Resilient Modulus from Non-Destructive Testing of Prototype Pavements

The resilient modulus may be determined by testing a prototype pavement structure with a Falling Weight Deflectometer (FWD) and the deflection data analysed to determine the back-calculated subgrade modulus. For the design of new construction pavement structures, the subgrade modulus can be estimated using an existing representative roadway located near the new project, with similar subgrade soils and drainage conditions, as a prototype. The prototype should preferably meet the following criteria:

- be a minimum of 3 years old;
- be a minimum of 0.5 km in length;
- be reasonably free of structural distress;
- be slightly under-design for the loading condition on the new project being designed; and
- have the same pavement structure type as proposed for the new project being designed.

Alternatively, for a roadway that is being reconstructed to increase capacity or improve geometrics, the existing road can be tested with an FWD prior to reconstruction.

The recommended method for determining design M_R from FWD testing requires an adjustment factor (C) to adjust the value used to represent subgrade conditions consistent with the AASHO road test and to account for regional climate effects. The intent of this adjustment is to ensure the design M_R is representative of the aggregate "year-round" subgrade support condition.

The Effective Roadbed Resilient Modulus for design purposes can be determined by the following equation:

Equation 2

$$Design\ M_R = 0.36 \times (Backcalculated\ M_R), where\ M_R\ is\ in\ MPa$$

This combined adjustment factor would apply to pavement tested by the FWD during the mid-summer through early fall months when the subgrade is in a relatively stable and unfrozen condition. Unusual spring conditions (earlier or later than normal) may affect this period of stability and should be considered when interpreting the results.

The City must approve the use of this method to determine the resilient modulus for pavement design purposes on a project-by-project basis.

Selection of the Resilient Modulus Value for Design

It is important to note that the design of a pavement structures following the 1993 AASHTO Guide is based on the average M_R value for a representative soil type. The designer must not select a design M_R value based on some minimum or conservative criteria as this will introduce increased conservatism in design beyond that provided in the reliability factor.

2.3 Design Traffic

Design Traffic is defined in terms of Equivalent Single Axle Loadings (ESALs). Based on the information provided in this section of the Design Guide, the new Roadway Design ESALs can be determined using the following procedure:

Step 1: Determine the roadway Classification (from the City)

Step 2: Estimate the new roadway AADT and % Commercial as appropriate (from the City's Transportation Division)

Step 3: Determine the required Design Period based roadway Classification and roadway cross section type (urban or rural) using Table 1

Table 1: Recommended Design Period

Roadway Classification	Design Cross Section Type	
	Rural (years)	Urban (years)
Class B	15	15
Class C	15	15
Class A - Local Commercial	15	15
Collector	15	20
Industrial	15	20
Arterial	20	30
Freeway	30	30

Step 4: Estimate the Direction Split for two-way roads

Instances where commercial vehicle loadings may not be equally distributed between travel directions should be considered.

Step 5: Estimate the Lane Distribution Factor (LDF) for multi-lane roadways using Table 2

Table 2: Lane Distribution Factors

Roadway Cross-Section	LDF		
	1 Lane Section	2 Lane Section	3 or more Lane Section
Urban	▪ 100% in each lane	▪ 60 to 70% in each lane ▪ 100% buses in outside (slow) lane	▪ 50 to 65% in outside (slow) lane and center lanes ▪ 30% in inside lanes ▪ 100% buses in outside (slow) lane
Rural	▪ 100% in each lane	▪ 85% in outside (slow) lane ▪ 40% in inside (fast) travel lane	▪ 50 to 70% in outside (slow) lane ▪ 50 to 65% in center lanes ▪ 25 to 35% in inside lane

Table 2 provides recommended Lane Distribution Factors. For freeways of 3 or more lanes, a traffic study may be warranted to estimate project specific LDF values.

Step 6: Estimate the Load Equivalency Factor (LEF) for the expected axle classifications/loadings

Ideally a blended LEF is determined from detailed axle spectra, which would include the anticipated range of axle classifications and weights. It is understood however that this information is not always available, and therefore a blended LEF must be estimated by other means.

Commercial Traffic is typically expressed in terms of percentage Single Unit Trucks, Tractor Trailer Combinations, and Transit Bases. The following range of LEFs is recommended for each commercial vehicle classification:

- Single Unit Trucks (SUT) – 0.8 to 1.2 ESALs per truck;
- Tractor Semi-Trailer Combinations (TTC) – 1.2 to 2.0 ESALs per truck; and
- Transit Buses (Bus) – 2.0 to 3.0 ESALs per bus.

A blended LEF can be determined from the LEF values for each truck/bus classification and the estimated proportion of each truck/bus type using Equation 3.

Equation 3

$$Load\ Equivalency\ Factor\ (LEF) = \frac{[(\#SUT) \times SUT_{LEF} + (\#TTC) \times TTC_{LEF} + (\#Bus) \times Bus_{LEF}]}{(\#SUT) + (\#TTC) + (\#Bus)}$$

Step 7: Determine the Traffic Growth Factor (TGF)

Estimate the traffic growth rate and determine the Traffic Growth Factor (TGF) for the corresponding Design Period from Step 3. The TGF can be determined using Equation 2.

Equation 4

$$Traffic\ Growth\ Factor\ (TGF) = \frac{[(1+g)^n - 1]}{g}$$

Where:

- g = growth rate (expressed as a decimal, e.g. 3% = 0.03); and
- n = design period in years.

Step 8: Determine the new roadway Design ESALs as per Equation 5

Equation 5

$$Design\ ESALs/lane = (\text{AADT}) \times (\%\ \text{Commercial}) \times (\text{Direction Split}) \times (\text{LDF}) \times (\text{LEF}) \times (365\ \text{days/year}) \times (\text{TGF})$$

3.0 DESIGN PROCEDURE FOR NEW CONSTRUCTION

The methodology presented in this Design Procedure is based on AASHTO 1993 modified for local conditions including materials, climate, etc. The premise of this Design Procedure is founded on the following principles:

1. Drainage Condition Evaluation;
2. Evaluation and Classification of Subgrade Support Conditions;
3. Estimation of Design Traffic (ESALs);
4. Define Pavement Material Characteristics;
5. Define AASHTO Design Inputs and Complete Design Alternatives; and
6. Validate Design Against Layer Thickness Minimums and Construction Costs.

3.1 AASHTO Design Inputs; Reliability, Serviceability and Overall Standard Deviation

The Design Inputs recommended for completing new flexible pavement designs are presented in Table 3:

Table 3: AASHTO Pavement Design Inputs

AASHTO Design Input		Value
Design ESALs		As Determined in Section 2.3
Reliability (Function of Design ESALs per lane)		
	Design ESALs (per lane) Range	
	< 100,000	75
	> 100,000 – 1,000,000	80
	> 1,000,000 – 5,000,000	85
	> 5,000,000 – 10,000,000	85
	> 10,000,000	90
Serviceability		
	Initial Serviceability Index (p_i)	4.2
	Terminal Serviceability Index (p_t)	2.5
	Serviceability Loss (Δpsi)	1.7
Overall Standard Deviation (S_o)		0.45
Subgrade Resilient Modulus (M_R)		As Determined in Section 2.2

In instances where the Design Reliability could vary by lane across a roadway width (as determined by Design ESALs), the lane with the highest reliability shall govern and shall be used for the design of all lanes. The design reliability is used to determine standard normal deviate (Z_R), which is a normally distributed random variable with expected value 0 and variance 1.

3.2 Material Characterization

The material layer properties and corresponding AASHTO layer coefficients recommended for use in the design of new pavement structures are presented in Table 4. The material properties for Granular Base, Granular Sub-base and Drainage Layers are based on material specifications used by the City of Saskatoon (Saskatoon 2014-2).

Table 4: Recommended AASHTO Layer Coefficients

Material Type	Material Properties	AASHTO Layer Coefficient
ACP	n/a	0.40
ACP - Polymer Modified	n/a	0.42
Cold In-place Recycled Asphalt Concrete	n/a	0.30
Full Depth Reclamation with Stabilization	n/a	0.30
Granular Base Course	CBR 65	0.13
Granular Sub-base Course	CBR 25	0.10
Drainage Rock	CBR 25 - 35	0.10
Drainage Recycled Concrete	CBR 25 -35	0.10
Drainage Sand	CBR 10 - 20	0.08

AASHTO 1993 also provides guidelines for addressing the expected drainage conditions of the pavement structure through the use of modified layer coefficients. The factor for modifying the layer coefficient has been integrated into the structural number equation as a drainage coefficient for each pavement layer. Drainage considerations pertaining to pavement design have been addressed in detail in Section 2.1 of this Design Guide.

The drainage coefficients recommended for use in the design of new pavement structures are presented in Table 5.

Table 5: Recommended AASHTO Drainage Coefficients

Material Type	Urban and Rural Drainage Coefficient for Good Drainage	Rural Drainage Coefficient for Poor Drainage
ACP	n/a	n/a
ACP - Polymer Modified	n/a	n/a
Granular Base Course	1.0	0.8
Granular Sub-base Course	1.0	0.8
Drainage Rock	1.0	1.0
Drainage Recycled Concrete	1.0	1.0
Drainage Sand	1.0	1.0

The recommended gradation and permeability requirements for drainage layer materials are provided in Table 6.

Table 6: Recommended Drainage Layer Gradation and Permeability Requirements

Sieve Size	% Passing		
	Drainage Rock	Reclaimed PCC	Sand
50 mm	100	100	
25 mm	0 - 80	0 - 80	
12.5 mm	0 - 18	0 - 18	100
5 mm	0 - 12	0 - 12	75 - 100
2 mm	-	-	55 - 100
800 µm	-	-	35 - 75
400 µm	-	-	20 - 50
71 µm	0 - 5	0 - 5	0 - 5
Permeability (cm/sec), minimum			
1×10^{-4}			

3.3 AASHTO Design Procedure

An AASHTO Design SN is determined from design ESALs, subgrade resilient modulus, and AASHTO design inputs using one of the following methods:

Method 1: Using the AASHTO DARWin 3.1 Software Program

Method 2: Solving the AASHTO Structural Number Equation, presented as Equation 6

Equation 6

$$\log_{10}(W_{18}) = Z_R \times S_o + 9.36 \times \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left(\frac{\Delta PSI}{4.2-1.5}\right)}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 \times \log_{10}(M_R) - 8.07$$

Note: inputs are in Imperial units (i.e. inches, psi etc.).

Once the design structural number (SN) has been determined using one of the methods described above, it is necessary to identify a set of pavement layer thicknesses which, when combined, will provide the load-carrying capacity corresponding to the design SN. The following equation (Equation 5) provides the basis for converting SN into actual thickness of Asphalt Concrete Pavement (ACP), granular base course, and granular sub-base course:

Equation 7

$$SN = a_1 D_1 + a_2 D_2 m_2 + a_3 D_3 m_3 + \cdots a_n D_n m_n$$

Where,

- a_1, a_2, a_3,a_n = layer coefficient for each pavement layer (a_1 is the asphalt concrete layer);
- D_1, D_2, D_3 , D_n = actual pavement layer thickness (mm) (D_1 is the asphalt concrete layer); and
- m_2, m_3, m_n = drainage layer coefficients for each corresponding pavement layer.

The SN equation does not have a single unique solution, and there are many combinations of layer thicknesses that provide satisfactory thickness design solutions.

3.4 Minimum Pavement Layer Thicknesses

Consideration should be given to minimum design thicknesses of the various pavement materials. Minimum thicknesses have been established primarily for two reasons:

1. Material properties (i.e. aggregate top size and gradation) dictate the minimum constructable layer thickness, and

2. Minimum pavement layer thicknesses should be determined for the purpose of sufficiently limiting the stresses and strains at pavement layer boundaries as to prevent permanent deformation for the design traffic loading (ESALs).

Recommended minimum layer thicknesses for each roadway classification are presented in Table 7.

Table 7: Recommended Minimum Pavement Layer Thicknesses

Roadway Classification	Minimum ACP Thickness (mm)	Minimum Granular Base Course Thickness - if Used (mm)	Minimum Granular Sub-base Course Thickness - if Used (mm)	Minimum Drainage Layer Thickness (mm)
Class B	75	100	150	200
Class C	75	100	150	200
Class A - Local Commercial	75	100	150	200
Collector	95	100	150	200
Industrial	110	100	150	200
Arterial	160	100	150	200
Freeway	175	100	150	200

There may be instances (economic, constructability, etc.) where the Designer may elect to design the pavement structure granular layers entirely out of granular base course, or a combination of base gravel and drainage layer. In these instanced the following minimum granular base course layers are recommended:

- Granular Base Course over Drainage layer – minimum base thickness of 200 mm; and
- Granular Base Course over Subgrade - minimum base thickness of 300 mm.

Figure C presents example cross sections showing alternative minimum granular base/sub-base course layer thicknesses.

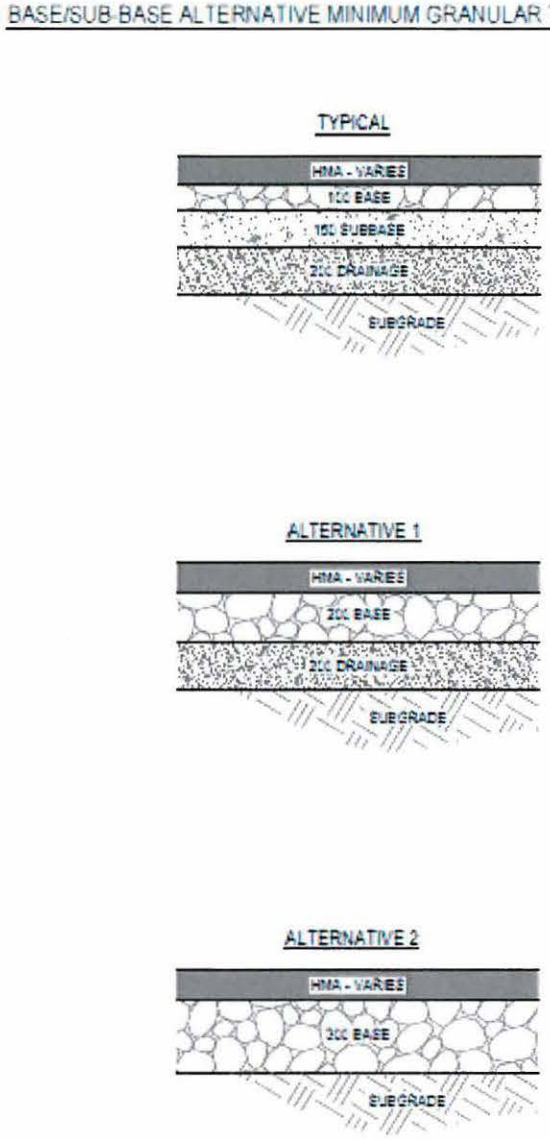

Figure C: Granular Base/Sub-base Alternative Minimum Granular Thicknesses

It is ultimately the designer's responsibility to ensure the AASHTO layer designs conform with the pavement layer minimums.

3.5 Deferred Top Lift Construction

Deferred top lift construction includes the application of a first stage ACP layer with deferment of up to 2 years of a final stage ACP layer until a point where the majority of the new development construction is complete. Deferring the final stage ACP layer provides two major benefits:

1. Staged construction provides an opportunity for any corrections to the roadway profile due to settlement, additional utility installation, or initial pavement deficiencies/defects, and

2. Staged construction provides a final surfacing to the roadway following the majority of the heavy vehicle loading (construction traffic), and restores the roadways serviceability.

Table 8 provides recommendations for minimum ACP thicknesses for first and final stage construction for each roadway classification.

Table 8: Minimum Recommended ACP Thicknesses for Deferred Construction

Roadway Classification	Minimum Constructed ACP Thickness (mm)	
	First Stage	Final Stage
Class B	50	35
Class C	50	35
Class A - Local Commercial	50	35
Collector	60	35
Industrial	60	50
Arterial	110	50
Freeway	125	50

If deferred top lift construction is selected, it is the ultimately the Designer's responsibility to ensure all ACP layers conform with the design ACP thickness as well as the minimum ACP layer thicknesses presented in Table 8. For the purposes of table, the final stage lift is to be constructed within two years.

3.6 Sample Design

The following is an example of a new flexible pavement design using the Design Procedure presented in Figure 1 and in this report.

Sample Project Description:

The City would like to complete a new pavement design for a 2-lane (1-lane per travel direction) Urban Arterial Roadway with and estimated AADT of 7000 vehicles/day and Total Percent Commercial = 6% with 40 Transit Buses per day.

Step 1: Establish Drainage Condition

Proposed roadway geometric, geotechnical and subsurface drainage conditions indicate that this Urban Section pavement will be subjected to groundwater conditions less than 1.0 m from the top of subgrade elevation. Therefore, a drainage layer consisting of drainage rock with longitudinal sub drains is selected for this pavement structure and drainage layer coefficients of 1.0 are to be used for each pavement layer material.

Step 2: Establish Subgrade Support Condition

Laboratory testing of the subgrade materials indicated an expected bearing capacity equivalent to a soaked CBR = 3.0%.

From equation 1:

$$M_R\ (MPa) = 10.3 \times (CBR) = 10.3 \times (3.0) = 31\ MPa$$

This design M_R was confirmed from FWD testing of prototype roadways in the vicinity with showed seasonally adjusted resilient moduli ranging between 25 and 35 MPa.

Step 3: Estimate Design ESALs

A limited traffic review of the City's historical traffic information foo the surrounding areas suggests the following traffic inputs should be used in determining Design ESALs:

- 2-Way AADT = 7000 vehicles/day with 3% Growth;
- Directional Split = 0.5 (50% of AADT in each travel direction);
- LDF = 1.0 (only a single lane in each travel direction);
- Commercial Volumes = 6% of AADT of which 4% are Single Unit Trucks (SUT) (280 total) and 2% are Tractor Trailer Combinations (TTC) (140 total) with an additional 40 buses per day;
- Estimated LEF for SUT = 0.9;
- Estimated LEF for TTC = 1.7; and
- Estimated LEF for buses = 2.0.

From Equation 3:

$$Load\ Equivalency\ Factor\ (LEF) = \frac{[(\#SUT) \times SUT_{LEF} + (\#TTC) \times TTC_{LEF} + (\#Bus) \times Bus_{LEF}]}{(\#SUT) + (\#TTC) + (\#Bus)}$$

$$LEF = \frac{[(280)(0.9) + (140)(1.7) + (40)(2.0)]}{(280) + (140) + (40)} = 1.24\ ESALs\ per\ Commercial\ Vehicle$$

From Table 1, the Design Period for an Urban Arterial = 30 years. Therefore from Equation 4:

$$Traffic\ Growth\ Factor\ (TGF) = \frac{[(1+g)^n - 1]}{g}$$

$$TGF = \frac{[(1+0.03)^{30} - 1]}{0.03} = 47.6$$

From Equation 5:

$$Design\ ESALs/lane = (\text{AADT}) \times (\%\ \text{Commercial}) \times (\text{Direction Split}) \times (\text{LDF}) \times (\text{LEF}) \times (365\ \text{days/year}) \times (\text{TGF})$$

$$Design\ \frac{ESALs}{lane} = (7{,}000) \times (0.06) \times (0.5) \times (1.0) \times (1.24) \times (365) \times (47.6) = 4.6M\ ESALs/lane$$

Step 4: Determine AASHTO Structural Number (SN)

Using the following Design Inputs from Steps 2 and 3 above:

- From Step 3 Design ESALs (W18) = 4.6M ESALs/lane;
- From Table 3 Design Reliability (R) = 85%;

- Initial Serviceability (p_i) = 4.2;
- Terminal Serviceability (p_t) = 2.5;
- **Serviceability Loss Factor** (ΔPSI) = 4.2 – 2.5 = 1.7; and
- From Step 2 Subgrade Soil Resilient Modulus (M_R) = 31 MPa = 4495 psi.

Solving for SN in Equation 6:

$$\log_{10}(W_{18}) = Z_R \times S_o + 9.36 \times \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left(\frac{\Delta PSI}{4.2-1.5}\right)}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 \times \log_{10}(M_R) - 8.07$$

SN = 5.06 inches = 129 mm

Step 5: Complete AASHTO Layer Design Alternatives

The following design alternatives have been generated based on Equation 7:

$$SN = a_1D_1 + a_2D_2m_2 + a_3D_3m_3 + \cdots a_nD_nm_n$$

Structural Layer Coefficients are from Table 4, Drainage Coefficients from Table 5, and the Minimum Layer Thicknesses from Table 7:

Pavement Layer	Design Layer Coefficient	Drainage Coefficient	Option 1	Option 2	Option 3
ACP Thickness (mm)	0.40	n/a	160[1]	160[1]	175
Granular Base Course Thickness (mm)	0.13	1.0	150	350	150
Granular Sub-base Course Thickness (mm)	0.10	1.0	250	0	200
Drainage Layer Thickness[2]	0.10	1.0	200[1]	200[1]	200[1]
Total SN Provided (mm)	-	-	**129**	**130**	**130**

[1] – Minimum layer thicknesses govern.
[2] – Assumes Drainage Rock.

Step 6: Finalize Design

Based on an economical evaluation of each Design Option (including constructability, construction costs, material availability, etc.), Option 2 is selected for as the Final Pavement Design. A deferred top lift construction option has also been provided based on Table 8.

Pavement Layer	Design Layer Coefficient	Option 2	Option 2 with Deferred ACP
Final Stage ACP Thickness (mm)	0.40	n/a	50
First Stage ACP Thickness (mm)	0.40	160	110
Granular Base Course Thickness (mm)	0.13	350	350
Drainage Layer Thickness	0.10	200	200

4.0 SUPPLEMENTARY PUBLICATIONS

The **Guide for Design of Pavement Structures, 4th Edition with 1998 Supplement** can be purchased at https://bookstore.transportation.org. It should be noted that AASHTO no longer sells or supports DARWin 3.1 AASHTO software. For organizations that don't have this software, it will be necessary for them to develop the required spread sheets to solve the AASHTO SN equation and other necessary calculations.

5.0 SUBMITTAL REQUIREMENTS

The Pavement Design Report is to be submitted to:

City of Saskatoon
Major Projects
222 3rd Avenue North
Saskatoon, SK S7K 0J5

The pavement design submission should include all supporting information which provides the basis for the pavement design, including, but not limited to, field investigations, test data, design inputs, etc. and be signed and stamped by a Professional Engineer. In addition, supporting reports should be provided, including, but not limited to:

- Geotechnical Report;
- Hydro-geological Report; and
- Traffic Report.

FIGURES

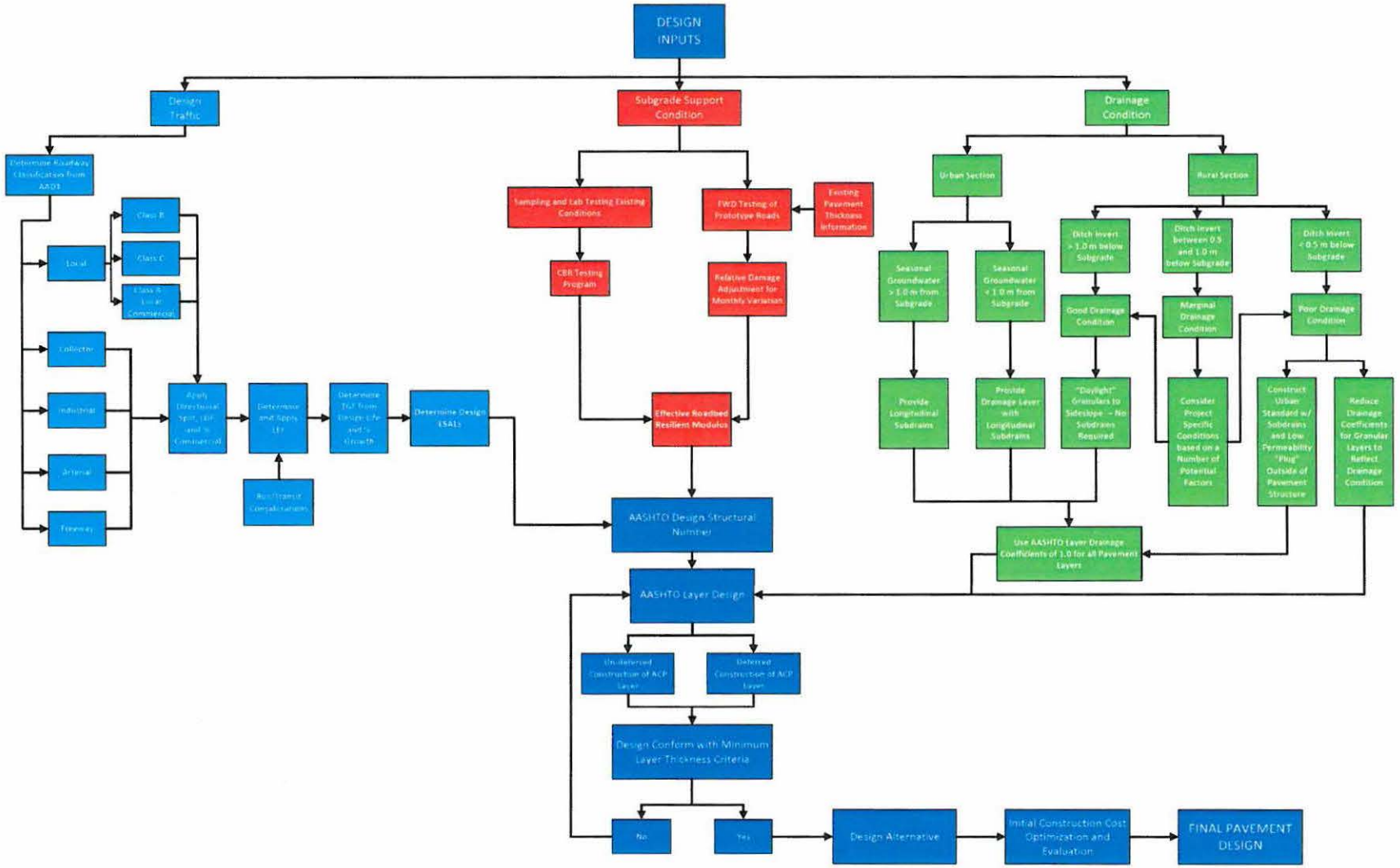

Figure 1 - for Report.docx

TETRA TECH

Inquiry – Councillor D. Hill (June 22, 2009); and Various Communications to Council - Traffic Calming Measures – Avenue C North of 33rd Street

Recommendation
That the Standing Policy Committee on Transportation recommend to City Council:

1. That the temporary diverter at the intersection of 38th Street & Avenue C be removed; and

2. That the Neighbourhood Traffic Management Program plan for Mayfair/Kelsey Woodlawn neighbourhoods be adopted as the framework for future traffic improvements in the area, to be undertaken as funding is made available through the annual budget process.

Topic and Purpose
The purpose of this report is to provide information on the Neighbourhood Traffic Management Program for the Mayfair and Kelsey-Woodlawn neighbourhoods.

Report Highlights
1. A traffic plan for both Mayfair and Kelsey-Woodlawn neighbourhoods was developed in consultation with the community in response to concerns such as speeding, traffic shortcutting, traffic congestion and pedestrian safety.
2. The plan will be implemented over time as funding for the improvements is available.

Strategic Goal
This report supports the Strategic Goal of Moving Around by providing the installation of traffic calming devices and pedestrian safety enhancements thus improving the safety of pedestrians, motorists, and cyclists.

Background
City Council at its meeting held on March 18, 2013 resolved, in part, that City Council receive a further report regarding neighbourhood traffic calming after additional review had been done by the Administration. The report was to provide options to deal with the matter in a more comprehensive manner.

The intent of the Neighbourhood Traffic Management Program is to address traffic concerns within neighbourhoods such as speeding, shortcutting and pedestrian safety. This program involves additional community and stakeholder consultation and provides an environment for the community and City staff to work together and develop solutions to address traffic concerns.

A public meeting was held in June 2013 to identify traffic concerns and potential solutions or mitigation measures. Also in attendance were representatives from the Saskatoon Police Service to address traffic enforcement issues. Based on the residents' input provided at the initial public meeting, and the traffic data collected, a Traffic Management Plan was developed and presented to the community at a second public meeting held in October 2013.

Report

Traffic Plan Development

The development of a Traffic Management Plan includes four stages:

1. Identifying existing problems and concerns and possible solutions through a public meeting.
2. Developing a traffic plan based on residents' input and traffic data collected.
3. Presenting the plan to the community and other civic divisions for additional input.
4. Implementing the proposed measures in a specific time frame, short-term (1 to 2 years), medium-term (1 to 5 years), or long-term (more than 5 years).

The majority of concerns from the consultation in June 2013 included shortcutting, speeding, pedestrian safety (specifically near the park and school site), and lack of sidewalks.

The Administration is recommending the existing temporary diverter at the intersection of 38th Street and Avenue C to be removed and additional measures implemented to improve safe movement throughout the Mayfair/Kelsey Woodlawn neighbourhoods.

Traffic Plan Recommendations

The recommended Neighbourhood Traffic Management Plan includes the following:

- 15 locations – traffic calming devices
- 9 locations – installation of new zebra crosswalks
- 8 locations – sidewalk installation
- 1 location – accessible ramp
- 2 locations – addition of left turn arrow at traffic signal
- 1 location – road widening
- 1 location – "no parking" signs
- 2 locations – speed limit signs in back lanes
- Numerous locations for stop and yield signs

The installation of each proposed improvement will be implemented in three phases:

1. Short-term (1 to 2 years) – temporary traffic calming measures, signage, pavement markings, accessible pedestrian ramps;
2. Medium-term (1 to 5 years) – permanent traffic calming devices, roadway realignment, sidewalks (in some cases); and
3. Long-term (5 years plus) – permanent traffic calming devices, roadway realignment, sidewalks.

The Neighbourhood Traffic Management Program plan for Mayfair/Kelsey Woodlawn is included in Attachment 1.

Public and/or Stakeholder Involvement

Discussion with Mayfair residents began in June 2011 regarding options to address shortcutting on Avenue C. The feedback received resulted in the installation of a temporary traffic diverter. As part of the review, a survey of residents on the effectiveness of the diverter was completed in November 2012.

In June 2013, a public meeting was held to discuss traffic concerns and identify potential solutions. The feedback was used to develop the neighbourhood traffic plan which was presented at a follow up public meeting in October 2013.

The internal civic stakeholders of Public Works, Transit, Saskatoon Police Service, and the Saskatoon Fire Department provided feedback on the proposed improvements, which was incorporated into the proposed Traffic Management Plan.

Communication Plan

If the recommendation is approved, flyers will be sent to the residents of the Mayfair/Kelsey Woodlawn neighbourhoods advising them of the upcoming traffic calming and signage installations. The City's website will also be updated to include information on the plan.

Environmental Implications

The overall impact of the recommendations on traffic characteristics including the impacts on greenhouse gas emissions is not known at this time.

Financial Implications

The implementation of the neighbourhood traffic calming plan will have significant financial implications. The costs are summarized in the following table.

Item	2015	Beyond 2015
Traffic Calming	$11,500	$ 402,000
Marked Pedestrian Crosswalks	10,000	-
Stop and Yield Signs	10,500	-
Parking and Speed Limit Signs	1,500	-
Sidewalk Construction	-	2,912,800
Accessibility Ramps	6,400	-
Traffic Operation Improvements	-	85,000
TOTAL	$39,900	$3,399,800

Funding for the costs incurred in 2015 will be included in Capital Project #1512 - Neighbourhood Traffic Management. There is adequate funding within the Traffic Safety Reserve to fund the 2015 component of this work.

Budgeted	Unbudgeted	Capital	Operating	Non-Mill Rate	External Funding
x		x			

The remainder of the work will be considered alongside all other improvements identified through the Neighbourhood Traffic Management Program. The Administration will include in their annual budget submission package the list of projects recommended to be funded, and the rationale used to prioritize the projects.

Other Considerations/Implications

There are no options to the recommendation, policy, privacy or CPTED implications or considerations.

Due Date for Follow-up and/or Project Completion

If approved by City Council, temporary traffic calming devices and signage will be implemented during the 2015 construction season. The Administration will provide a further report on the effectiveness of the changes within one year of implementation.

Public Notice

Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

Attachment

1. 2014 Mayfair/Kelsey Woodlawn Neighbourhood Traffic Management Plan

Report Approval

Written by: Justine Nyen, Traffic Safety Engineer, Transportation
Reviewed by: Angela Gardiner, Director of Transportation
Approved by: Jeff Jorgenson, General Manager, Transportation & Utilities Department

TRANS JN – Inq Councillor Hill-Jun 22-2009-and Various Com to Council – Traffic Calming Measures – Ave C N of 33rd St

Attachment 1

2014

Mayfair/Kelsey-Woodlawn Neighbourhood Traffic Management Plan

City of Saskatoon
Transportation & Utilities Department

July 2014

Executive Summary

The intent of the Neighbourhood Traffic Management Program is to address traffic concerns within neighbourhoods such as speeding, shortcutting, and pedestrian safety. Initially focusing on specific streets or small areas within neighbourhoods, the program was revised in August 2013 to address traffic concerns on a neighbourhood-wide basis. The revised program involves additional community and stakeholder consultation and provides the environment for the neighbourhood residents and City Staff to work together and develop solutions to address traffic concerns. The process is outlined in the ***City of Saskatoon Traffic Calming Guidelines and Tools*** (2013).

A public meeting was held in June of 2013 to identify traffic concerns and potential solutions or mitigation measures. Following the meeting a number of traffic assessments were completed to confirm and quantify the concerns raised by the residents. Based on the residents input provided at the initial public meeting, and the traffic data collected, a Traffic Management Plan was developed and presented to the community at a second public meeting held in October 2013.

Outlined in **Table ES-1** and **Table ES-2** is a summary of the proposed improvements for the Mayfair and Kelsey-Woodlawn neighbourhoods. The summary identifies the locations, the proposed improvement, and a schedule for implementation.

The schedule to implement the Traffic Management Plan can vary depending on the complexity of the proposed improvement. According to the ***City of Saskatoon Traffic Calming Guidelines and Tools*** document, the time frame may range from short (1 to 2 years); medium (1 to 5 years) and long (5 years plus). Accordingly, the specific time frame to implement the improvements for these neighbourhoods ranges from 1 to 5 years. The resulting proposed Mayfair/Kelsey-Woodlawn Traffic Management Plan is illustrated in **Exhibit ES-1**.

Table ES-1: Mayfair Neighbourhood Improvements Summary

Location	Proposed Measure	Time Frame
34 Street & Avenue E; 34 Street & Avenue F; 35 Street & Avenue E; 36 Street & Avenue E; 37 Street & Avenue D; 37 Street & Avenue E; and 37 Street & Avenue F	Zebra (ie. Striped) pedestrian crosswalk	1 to 2 years
34 Street & Avenue I	Standard pedestrian crosswalk	
34 Street & Avenue C; 35 Street & Avenue D; 37 Street & Avenue C; and 37 Street & Avenue F	Change yield signs to stop signs (not shown on map)	
37 Street & Avenue B	No parking signs 10m from intersection (not shown on map)	
Back Lanes between 38 Street/39 Street & Avenue B/Avenue C, and 37th Street/38th Street & Avenue C/ Avenue D	20kph speed signs (not shown on map)	
39 Street & Idylwyld Drive	Accessibility ramps	
34 Street & Avenue E	Curb extensions (northwest and southwest corners)	1 to 5 years (devices will be installed temporarily until proven effective)
34 Street & Avenue I	Median island	
35 Street & Avenue E	Curb extension (southwest corner)	
35 Street & Avenue I	Curb extensions (northwest and northeast corners)	
36 Street & Avenue C	Directional closure	
36 Street & Avenue E	Curb extensions (northwest and southeast corner)	
36 Street & Avenue G	Median island (east leg)	
37 Street & Avenue B	Median islands (north and south legs)	
37 Street & Avenue D	Curb extension (northwest corner)	
37 Street & Avenue E	Median island (west leg)	
38 Street & Avenue C	Directional closure	
38 Street & Avenue D	Median islands (east, west and south legs)	
38 Street & Avenue G	Median island (east leg)	
39 Street & Avenue E	Median island (east and west legs)	
Avenue C – south of railway tracks	Curb extension and median island	
36 Street & Idylwyld Drive	Operations improvement (not shown on map)	5 years plus
39 Street & Idylwyld Drive	Add left turn arrow phase (not shown on map)	
37 Street between Avenue B & Avenue D (both sides)	Sidewalk	
37 Street between Avenue F & Avenue I (north side)		
38 Street between Idylwyld Drive & Avenue G (both sides)		
Avenue D between 38 Street Alley near park (west side)		

Table ES-2: Kelsey-Woodlawn Neighbourhood Improvements Summary

Location	Proposed Measure	Time Frame
1 Avenue between 34 Street & 38 Street; 2 Avenue between 34 Street & 39 Street	Yield signs	1 to 2 years
39 Street & Saskatchewan Avenue; 39 Street & Alberta Avenue	Change yield signs to stop signs (not shown on map)	
39 & Quebec Avenue	Zebra (ie. Striped) pedestrian crosswalk	
Alberta Avenue between 33 Street & 34 Street (both sides)	Sidewalk	5 year plus
Alberta Avenue between 34 Street & 36 Street (west side)		
39 Street between Idylwyld Drive & 1 Avenue (both sides)		
Quebec Avenue between 33 Street and 40 Street (both sides)		
Ontario Avenue Between 33 Street & 39 Street (both sides)		
38 Street between Quebec Avenue & 2 Avenue (both sides)		

Exhibit ES-1: Mayfair/Kelsey-Woodlawn Traffic Management Plan

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1 Study Purpose

The purpose of this project was to develop a Traffic Management Plan for the Mayfair and Kelsey-Woodlawn neighbourhoods following the procedure outlined in the ***City of Saskatoon Traffic Calming Guidelines and Tools*** document adopted by City Council in August 2013.

The development of the Traffic Management Plan includes four stages:

- **Stage 1** - Identify existing problems, concerns and possible solutions through initial neighbourhood consultation and the Shaping Saskatoon Website.
- **Stage 2** - Develop a traffic plan based on resident's input and traffic data collected.
- **Stage 3** - Present a traffic plan to the neighbourhood at a follow-up meeting; present a draft plan to the residents and other civic Divisions for feedback regarding the proposed measures in the plan; and forward to City Council for approval.
- **Stage 4** - Implement the proposed measures in a specific time frame, short term (1 to 2 years), medium term (1 to 5 years), or long term (5 years plus).

2 Issue Identification

A public meeting was held in June 2013 to identity traffic concerns within the neighbourhoods. At the meeting, residents were given the opportunity to express their concerns and identify possible solutions.

A majority of the residents were concerned about speeding, pedestrian safety and shortcutting as a result of the temporary diverter. The temporary diverter was installed at the intersection of Avenue C and 38 Street in 2011 to reduce the shortcutting traffic on Avenue C between 33rd Street and Circle Drive. Following its installation, there was little support for the diverter from the community, and the meeting gave them an opportunity to express their concerns and suggest other possible solutions.

The following pages contain summaries of the neighbourhood concerns collected during the initial neighbourhood consultation, and proposed solutions.

CONCERN 1 - TRAFFIC VOLUME/SHORTCUTTING

Shortcutting through neighbourhoods is often caused by motorists avoiding arterial streets and trying to find the shortest route. Mayfair has experienced a high volume of traffic on Avenue C as a result of higher traffic volumes on Circle Drive, Idylwyld Drive, and 33rd Street.

To address this issue, a temporary diverter was installed at the intersection of Avenue C and 38th Street in 2011. Many of the residents felt that the diverter was causing traffic volume increases on the adjacent streets and back lanes. A majority of the concerns outlined below are believed to be due to the diverter.

Neighbourhood Concerns

- Avenue D near A.H. Browne Park: shortcutting/increased traffic volumes
- 34th Street & Avenue E (south corner of Mayfair School): increased traffic volumes
- 35th Street, 36th Street, 39th Street, Avenue B, and Avenue G: high traffic volumes
- 39th Street & Idylwyld Drive: long queues; delays at the traffic signals; traffic spills back to 4-way stop at Avenue C; McDonalds and strip mall entrance make it worse
- 36th Street & Idylwyld Drive: long queues at traffic signals; road is too narrow to make right turn
- Avenue G north of 33rd Street
- Royal Bank and Co-Op on Avenue C: causes shortcutting and high traffic volumes on Avenue C

Proposed Solutions

- Upgrade traffic signals at 39th Street & Idylwyld Drive to include a dedicated left-turn (arrow)
- 39th Street & Idylwyld Drive: change to right-in/right-out because left-turning cars from these businesses block traffic at McDonalds, Best Western, strip mall
- Make Avenue C and Avenue B one-way streets
- Install signs restricting trucks/semis
- Royal Bank and Co-Op on Avenue C: need to be removed because it's a nuisance to access; need to change exits to encourage use of Circle Drive

CONCERN 2 – SPEEDING

A majority of the residents in the neighbourhood were concerned with speeding of traffic as a result of the diverter, specifically on 38th Street. In addition, speeding near school sites and parks was also raised as a concern since there are many children in the area who walk to schools and play in the parks.

The posted speed limit in the neighbourhood is 50kph, and 30kph in the school zone. The specific concerns are outlined below.

Neighbourhood Concerns

- 38th Street between Avenue I to Avenue C
- Near A.H. Browne Park on Avenue D
- Avenue I
- Back lanes; particularly near traffic diverter (38th 39th Street & Avenue B/C; and 37th /38th Street Avenue C/D)
- Avenue F between 35th Street & 36th Street
- 39th Street between Idylwyld Drive & 1 Avenue
- Avenue G north of 33rd Street
- Avenue B between 38th Street & 39th Street

Proposed Solutions

- Increase police presence

CONCERN 3 - TRAFFIC CONTROL

Traffic control signs are used in order to assign the right-of-way and must meet guidelines in Council Policy C07-007 *Traffic Control – Use of Stop and Yield Signs.* Stop and yield signs are not to be used as speed control devices, to stop priority traffic over minor traffic, on the same approach to an intersection where traffic signals are operational, or as a pedestrian crossing device.

An all-way stop must meet the conditions for traffic volume, collision history and must have a balanced volume from each leg to operate sufficiently.

Stop and yield signs were installed throughout the Mayfair neighbourhood to address changing traffic patterns as a result of the diverter. A majority of the concerns outlined below were due to these changes.

Neighbourhood Concerns

- 37th Street & Avenue B: yield sign reorientation has increased speed
- 37th Street & Avenue C: yield sign reorientation has caused many near misses
- 37th Street & Avenue D: not in favour of stop signs that were removed (when diverter was installed); increased speeding on Avenue D between 36 Street & 38 Street
- 36th Street westbound from Idylwyld Drive is dangerous at every intersection (Avenue B, Avenue D, Avenue F, etc.)
- 39th Street & Avenue E: drivers ignoring yield signs
- 34th Street & Avenue E (south corner of Mayfair School): drivers not yielding; many near misses

Proposed Solutions

- 34th Street & Avenue I: 3-way stop
- 36th Street & Avenue I: 3-way stop
- 36th Street & Avenue C: 4-way stop
- Change yield signs to stop signs because people aren't slowing down
- More stop signs to slow drivers

CONCERN 4 - PEDESTRIAN SAFETY

A majority of the residents have children that attend Mayfair School and play in A.H. Browne Park. They expressed a concern that the area lacked safe pedestrian crosswalks and sidewalks.

Pedestrian crosswalks need to meet the City of Saskatoon's Pedestrian Crossing Policy (*C07-018 Traffic Control at a Pedestrian Crossing*).

Neighbourhood Concerns

- 34th Street & Avenue E; and 34th Street & Avenue F (Mayfair School): needs improved crosswalk
- A.H. Browne Park: crossings need to be improved
- 39th Street between 1 Avenue & Avenue C, 39th Street between Avenue C & Ontario Avenue; Ontario Avenue between 33rd Street & 39th Street; and Quebec Avenue between 33rd Street & Circle Drive: need sidewalks, especially near bus stops; pedestrians walking on street along bus routes
- 38th Street between Idylwyld Drive & Avenue G; 37th Street between Avenue B & Avenue D; 37th Street between Avenue F & Avenue I; Alberta Avenue between 33rd Street & 34th Street; all bus routes: need sidewalks
- Alberta Avenue between 33rd Street & 36th Street: students from SIAST and St. Michaels School walk on the street because there are no sidewalks
- 39th Street & Idylwyld Drive: unsafe to reach pedestrian lights because there are no ramps
- Temporary curbs used for traffic calming devices limit accessibility for scooters/wheelchairs
- 33rd Street & Avenue H: vehicles are turning when pedestrians are crossing 33rd Street and there has been near misses

Proposed Solutions

- Install sidewalks
- Install accessibility ramps at 39th Street & Idywyld Drive

CONCERN 5 - TRAFFIC DIVERTER

There were a number of concerns regarding the traffic diverter in addition to the shortcutting concerns previously mentioned. These included the appearance, location, and orientation of the diverter. More details are provided below.

Neighbourhood Concerns

- Driving over lawn to get around diverter
- Pedestrians can't cross; barriers cut off access to sidewalks
- Diverter is unaesthetic/eyesore
- Accessibility for wheelchairs, scooters, cyclists etc.

Proposed Solutions

- Change direction of diverter to direct towards Idylwyld Drive
- Re-route traffic to Avenue B, not Avenue D next to the park
- Move diverter to 37th Street
- Diverter should have been placed on 39th Street & Avenue C so drivers are directed to traffic signals at Idylwyld Drive instead of adjacent local side streets
- Move the diverter one block south so drivers won't speed by the park
- Install 4–way stop instead of diverter
- Traffic circle would be better option
- Use speed humps or rumble strips

CONCERN 6 – MAINTENANCE

Residents feel that streets need improved maintenance**.**

Neighbourhood Concerns

- Potholes
- Icy conditions make trucks slide into diverter hitting signs
- During winter months roads are narrowed from snow buildup and cars park further onto street

Proposed Solutions

- Avenue C between 38th Street & Circle Drive; and 39th Street between Avenue C & Idylwyld Drive needs paving

CONCERN 7 – PARKING

Parking is allowed on all city streets unless signage is posted. Under Bylaw 7200, The Traffic Bylaw, vehicles are restricted from parking within 10 metres of an intersection and one metre of a driveway crossing.

Neighbourhood Concerns

- Avenue D: parking on west side restricts visibility
- 36th Street: parked vehicles make it very narrow for 2-way traffic
- Avenue B: trucks illegally parking

Proposed Solutions

- Increase police presence and parking enforcement

3 Neighbourhood Traffic Management Plan Development

Stage 2 of the implementation process includes developing a Traffic Management Plan using the input received by the residents from the Mayfair and Kelsey-Woodlawn neighbourhoods and undertaking traffic assessments.

1. Traffic Volumes and Travel Speeds

Traffic volumes and travel speeds were measured to determine the need for traffic calming devices. Neighbourhood streets are classified as either local or collector streets. Traffic volumes (referred to as Average Daily Traffic or ADT) on these streets should meet the City of Saskatoon guidelines shown in **Table 1**.

Table 1: City of Saskatoon Roadway Classifications and Characteristics

Characteristics	Classifications					
	Back Lanes		Locals		Collectors	
	Residential	Commercial	Residential	Commercial	Residential	Commercial
Traffic function	Access function only (traffic movement not a consideration)		Access primary function (traffic movement secondary consideration)		Traffic movement and land access of equal importance	
Average Daily Traffic (vpd)	<500	<1,000	<1,000	<5,000	<5,000	8,000-10,000
Typical Speed Limits (kph)	20		50		50	
Transit Service	Not permitted		Generally avoided		Permitted	
Cyclist	No restrictions or special facilities		No restrictions or special facilities		No restrictions or special facilities	
Pedestrians	Permitted, no special facilities		Sidewalks on one or both sides	Sidewalks provided where required	Typically sidewalks provided both sides	Sidewalks provided where required
Parking	Some restrictions		No restrictions or restriction on one side only		Few restrictions other than peak hour	

Travel speeds were measured to determine the 85th percentile speed (the speed at which vehicles are traveling at or below). The speed limit in the Mayfair/Kelsey-Woodlawn area is 50kph, except for school zones where the speed limit is 30kph between September and June (8:00am to 5:00pm) excluding weekends.

The speed studies and average daily traffic on streets where speeding was identified as an issue are summarized in **Table 2**.

Table 2: Speed Studies and Average Daily Traffic Counts (2013)

Location		Classification	Average Daily Traffic (vpd)	Speed (kph)
Street	**Between**			
36th Street	Avenue B & Avenue C	Collector	2,950	48
38th Street	Avenue D & Avenue E		2,430	50
	Avenue E & Avenue F		2,115	52
Avenue I	36th Street & 37th Street		1,808	51
39th Street	Alberta Avenue & Ontario Avenue	Local (Commercial)	3,560	51
	Avenue B & Avenue C	Local	5,405	41
	Avenue D & Avenue E		1,660	48
Avenue B	between 34th Street & 36th Street		765	36
	36th Street & 37th Street		930	43
	38th Street & 39th Street		1,790	36
Avenue C	36th Street & 37th Street		680	43
	39th Street & Railway tracks		5,305	47
Avenue D	36th Street & 37th Street		900	39
	37th Street & 38th Street		1,120	37
	38th Street & 39th Street		410	38
Avenue E	34th Street & 35th Street (School zone)		454	32 (school hours) & 41 (regular hours)
Avenue F	35th Street & 36th Street		555	39
Avenue G	33rd Street & 34th Street		573	43
Back lane	Avenue B/Avenue C & 38th Street/39th Street	Back lane	9	30
	Avenue C/Avenue D & 37th Street/38th Street		3	31

2. Turning Movement Counts

Turning movement counts were completed to determine the need for an all-way (i.e. 3-way or 4-way) stop control. All-way stop controls need to the meet Council Policy C07-007 *Traffic Control – Use of Stop and Yield Signs*. Criteria outlined in the policy that may warrant an all-way stop include a peak hour count greater than 600 vehicles or an ADT greater than 6,000 vehicles per day. Results of the studies are shown in **Table 3**.

Table 3: All-way Stop Studies

Location	Peak Hour Count	ADT (vehicles per day)	All-Way Stop Warrant
34th Street & Avenue E	112	1,170	All-Way Stop Not Warranted
36th Street & Avenue C	422	5,220	
36th Street & Avenue D	439	5,370	
37th Street & Avenue D	178	1,980	
37th Street & Avenue B	151	2,100	
37th Street & Avenue F	110	1,100	
38th Street & Avenue C	429	5,460	
38th Street & Avenue D	378	4,960	
38th Street & Avenue G	367	4,670	
39th Street & Quebec Avenue	1,320	13,710	

The intersection of 39th Street & Quebec Ave meets the traffic volume requirements for an all-way stop; however Council Policy C07-007 *Traffic Control – Use of Stop and Yield Signs* states that the traffic volume from the minor roadway must be no less than 35% of the total traffic volume entering the intersection for an all-way stop to be installed. In this case the traffic entering from the minor roadway was found to be 24% of the total volume; therefore, an all-way stop is not recommended as the traffic flows are not balanced and an all-way stop will create excessive delay for the majority of motorists.

3. Pedestrian Studies

Pedestrian studies are conducted to determine the need for pedestrian actuated signalized crosswalks; which are either active pedestrian corridor (flashing yellow lights) or pedestrian-actuated signals. A warrant system assigns points for a variety of conditions that exist at the crossing location, including: the number of traffic lanes to be crossed; the presence of a physical median; the posted speed limit of the street; the distance the crossing point is to the nearest protected crosswalk point; and the number of pedestrian and vehicles at the location. Pedestrian and traffic data is collected during the five peak hours 8:00am-9:00am, 11:30am-1:30pm, and 3:00pm-5:00pm.

In addition, if a pedestrian actuated crosswalk is not warranted, a marked pedestrian crosswalk such as the standard or a zebra (ie. striped) may be considered. A summary of the pedestrian studies are provided in **Table 4**.

Table 4: Pedestrian Studies

Location	Number of pedestrian crossings	Pedestrian Device Warrant
34th Street & Avenue E	83	Not Warranted
37th Street & Avenue F	47	
39th Street & Quebec Avenue	23	

4 Presentation of Plan to Stakeholders

Stage 3 of the implementation process under the Neighbourhood Traffic Management Program is to draft a plan and present to the residents, and other Civic Divisions for feedback regarding the proposed improvements in the plan.

The tables in this section outline the details of the Traffic Management Plan, including the location, improvement, the reason for the improvement and a planned implementation date for each improvement.

1. Shortcutting on Avenue C

Motorists use Avenue C North as a shortcut between 33rd Street to Circle Drive, avoiding higher traffic volumes on Idylwyld Drive. The devices in **Table 5** are recommended as an alternative to the existing diverter.

Table 5: Avenue C Recommendations

Location	Improvement	Reason
Avenue C - south of railroad tracks (entrance to Mayfair)	Install curb extension* (west side) & median island	Reduce speed; passively inform drivers that they are entering neighbourhood
38th Street & Avenue C	Install directional closure* southbound	Reduce shortcutting; encourage drivers to use 38th Street (which is a collector roadway designed to carry higher traffic volumes)
36th Street & Avenue C	Install directional closure* northbound	Reduce shortcutting; encourage drivers to use 36th Street (which is a collector roadway designed to carry higher traffic volumes); encourage drivers to go to traffic signals at Idylwyld Drive

*For details on these devices refer to the *City of Saskatoon Traffic Calming Guidelines and Tools*

2. Changing Traffic Patterns Caused by Directional Closures

Traffic patterns will change as a result of the directional closures. Motorists will choose to use other routes within the neighbourhood. As a result of the expected traffic pattern changes, a number of traffic calming devices have been recommended to be implemented at the locations identified in **Table 6**.

Table 6: Traffic Calming Recommendations

Location	Improvement	Reason
38th Street & Avenue D	Install median islands* on east, west and south legs	Reduce shortcutting onto Avenue D (near park) caused by directional closure at 38th Street & Avenue C; discourage drivers from turning left onto Avenue D
37th Street & Avenue B	Install median islands on north and south legs; install signage to indicate "no parking" zone 10m from intersection on north and south legs	Reduce speed; discourage drivers from shortcutting onto Avenue B caused by directional closures on Avenue C – 38th Street & 36th Street; ensure motorists can pass between median island and parked vehicles
38th Street & Avenue G; 36th Street & Avenue G	Install median island (east leg)	Reduce speed
39th Street & Avenue E	Install median island (east and west legs) with additional yield signs on median	Reduce speed; provide additional visibility for yield signs
36th Street & Idylwyld Drive	Add left-turn arrow phase at traffic signals and widen 36th Street to include Right-Turn lane (review after traffic calming measures are installed)	Prevent congestion on 36th Street west of Idylwyld Drive
39th Street & Idylwyld Drive	Add dedicated left-turn phase at traffic signals (review after traffic calming measures are installed)	Prevent congestion on 39th Street west of Idylwyld Drive
Back lanes between 38th Street/39th Street & Avenue B/Avenue C; and 37th Street/38th Street & Avenue C/Avenue D	Install speed limit signs	Reduce speeds of motorists shortcutting through back lanes due to directional closure

*For details on these devices refer to the *City of Saskatoon Traffic Calming Guidelines and Tools*

The proposed recommendation for the traffic signals and road widening are a result of the traffic impact that are expected from the directional closure. Typically arterial roadways are reviewed via a corridor study that considers multiple signalized intersections, transit, larger traffic volumes, access management, and adjacent land use. Upon implementation of the traffic calming measures within the neighbourhoods, a review will be undertaken to determine the extent of the modifications required at the signalized intersections.

3. Pedestrian Safety

A.H. Browne Park:

Residents in the area have children that attend the park on a daily basis. The improvements listed in **Table 7** are recommended to improve pedestrian safety and mobility. When the sidewalks have been constructed, accessible ramps will be included.

Table 7: Pedestrian Safety Improvements – A.H. Browne Park

Location	Improvement	Reason
37th Street & Avenue D	Install curb extension* & zebra crosswalk (northwest corner)	Reduce speed & improve pedestrian safety near park
37th Street & Avenue E	Install median island (west leg) & zebra crosswalk (east and west leg)	
37th Street & Avenue F	Install zebra crosswalk (north and south leg)	Improve pedestrian safety near park
Avenue D between 38th Street & alley (between 38th Street & 37th Street	Install sidewalk on west side	
37th Street between Avenue B & D	Install sidewalk on both sides	Improve pedestrian safety (connects to park)
37th Street between Avenue F & Avenue I	Install sidewalk on north side	

*For details on these devices refer to the *City of Saskatoon Traffic Calming Guidelines and Tools*

School Sites (Mayfair, St. Michael, SIAST/Kelsey):

It is important to address the school sites where students are encouraged to walk instead of being dropped off. Mayfair/Kelsey-Woodlawn is considered a walkable neighbourhood and by implementing the improvements shown in **Table 8**, pedestrian safety will be enhanced.

Table 8: Pedestrian Safety Improvements – School Sites

Location	Improvement	Reason
36th Street & Avenue E	Install curb extensions (northwest and southeast corners) & zebra crosswalk (west leg)	Reduce speed; improve pedestrian safety (connection between park and school)
34th Street & Avenue I	Install median island & standard crosswalk	Reduce speed; improve pedestrian safety (walkway between Avenue I & Avenue J will be paved in 2014 which connects Henry Kelsey Park/Henry Kelsey School and Mayfair School)
35th Street & Avenue I	Install curb extensions (northwest and northeast corners)	Reduce speed; improve pedestrian safety
35th Street & Avenue E	Install curb extension (southeast corner) & zebra crosswalk (north and south leg)	Reduce speed; improve pedestrian safety near school
34th Street & Avenue E	Install curb extension (northwest and southwest corner) & zebra crosswalk (west leg)	Improve pedestrian safety (connects to school)
34th Street & Avenue F	Install zebra crosswalk (east leg)	Improve pedestrian safety (connects to school)
Alberta Avenue between 33rd Street & 36 Street	Install sidewalk on both sides between 33rd Street & 34th Street; west side only between 34th Street & 36th Street	Improve pedestrian safety (connects to SIAST/Kelsey Campus)

Bus Routes:

The improvements shown below are for the bus routes that run through the Mayfair and Kelsey-Woodlawn neighbourhoods. The improvements shown in **Table 9** will enhance pedestrian safety, notably for those who take the bus.

Table 9: Pedestrian Safety Improvements – Bus Routes

Location	Improvement	Reason
39th Street & Quebec Avenue	Install zebra crosswalk (north and south leg); installed in 2013	Improve pedestrian safety along bus route/near bus stop
39th Street between Idylwyld Dr & 1st Avenue	Install sidewalk on both sides	Improve pedestrian safety on bus route
38th Street between Idylwyld Dr & Avenue I; Quebec Avenue & 2nd Avenue		
Quebec Avenue between 33rd Street & 40th Street		
Ontario Avenue between 33rd Street & 39th Street		

Accessibility for Seniors/Disabled Users:

Improving accessibility for seniors and disabled users is very important; therefore, the following recommendation is made to have a ramp installed at the intersection noted below**.**

Table 10: Accessibility Improvements for Seniors/Disabled Users

Location	Improvement	Reason
39th Street & Idylwyld Drive	Install accessibility ramps on southeast and southwest corners	Improve pedestrian safety; improve accessibility for scooters and wheelchairs

4. Traffic Control

The recommendation below to install traffic control clearly assigns the right-of-way and will improve the safety at intersections.

Table 11: Traffic Control Improvements

Location	Improvement	Reason
1st Avenue between 34th Street & 38th Street; and 2nd Avenue between 34th Street & 39th Street	Install yield signs at all uncontrolled intersections	Provide guidance; improve safety
35th Street & Avenue D; 39th Street & Saskatchewan Avenue; and 39th Street & Alberta Avenue	Change yield signs to stop signs	Improve safety on bus route; encourage compliance
34th Street & Avenue C; 37th Street & Avenue C; and 37th Street & Avenue F	Change yield signs to stop signs	Improve safety; encourage compliance

Follow up Consultation – Presentation of Traffic Management Plan

The other civic Divisions supported the Traffic Management Plan with the following specific comments:

- The Fire Department requested limiting the number of locations for roundabouts and speed humps as they may decrease response times
- Transit requested that all devices installed allow them to manoeuvre around them without causing damage to their vehicles

In a meeting with the residents held in October 2013, further feedback was collected. In general, the Traffic Management Plan was well received with only a few minor changes required.

5 Plan Implementation

Stage 4, the last stage of the process, is to install the improvements for the Mayfair and Kelsey-Woodlawn neighbourhoods within the specified time line. The time frame for the installations depends upon the complexity of the solution. A short term time frame is defined by implementing the improvements within 1 to 2 years; medium-term is 1 to 5 years; and long-term is 5 years plus.

All traffic calming measures will be installed temporarily using rubber curbing and will be implemented in the short-term (1 to 2 years).

Prior to replacing the rubber curbing with concrete, and making the traffic calming permanent, the effectiveness of the measure will be evaluated. The time frame to install permanent traffic calming may depend on the complexity of the device. The permanent device installation will be in the medium-term (1 to 5 years) and depends on the availability of funding.

The placement of pedestrian signage, ramps, and traffic control can be completed in the short-term frame (1 to 2 years), while the traffic signal and sidewalk improvements will be addressed in the long-term (5 years plus) due to the higher cost of construction.

The estimated costs of the improvements included in the Neighbourhood Traffic Management Plan are outlined in the following tables:

- Table 12: Permanent Traffic Calming Cost Estimate
- Table 13: Marked Pedestrian Crosswalks Cost Estimate
- Table 14: Traffic Control Signage – Stop & Yield Cost Estimate
- Table 15: Parking and Speed Limit Signage Cost Estimate
- Table 16: Sidewalks Cost Estimate
- Table 17: Accessibility Ramps Cost Estimate
- Table 18: Traffic Operation Improvements Cost Estimate

Table 12: Permanent Traffic Calming Cost Estimate

Location	Traffic Calming Device (s)	Cost Estimate		Time Frame
		Temporary	Permanent	
34th Street & Avenue E	Curb extensions (northwest and southwest corners	$1,000	$60,000	1 to 5 years
34th Street & Avenue I	Median island	$500	$6,000	
35th Street & Avenue E	Curb extension (southwest corner)	$500	$30,000	
35th Street & Avenue I	Curb extensions (northwest and northeast corners)	$1,000	$60,000	
36th Street & Avenue C	Directional closure	$500	$30,000	
36th Street & Avenue E	Curb extensions (northwest and southeast corner)	$1,000	$60,000	
36th Street & Avenue G	Median island (east leg)	$500	$6,000	
37th Street & Avenue B	Median islands (north and south leg)	$1,000	$12,000	
37th Street & Avenue E	Median island (west leg)	$500	$6,000	
37th Street & Avenue D	Curb extension (northwest corner)	$500	$30,000	
38th Street & Avenue C	Directional closure	$500	$30,000	
38th Street & Avenue D	Median islands (east, west and south legs)	$1,500	$18,000	
38th Street & Avenue G	Median island (east leg)	$500	$6,000	
39th Street & Avenue E	Median islands (east and west leg)	$1,000	$12,000	
Avenue C – south of railway tracks	Curb extension	$500	$30,000	
Avenue C – south of railway tracks	Median island	$500	$6,000	
	Total	**$11,500**	**$402,000**	

Temporary traffic calming will be installed in 2015 and will be monitored to determine its effectiveness. If proven effective, the devices will be made permanent upon approval of sufficient funding. Prior to becoming permanent, the devices will remain temporary and will be maintained on a yearly basis. An estimated cost for maintenance is about $5,000 per year. The maintenance typically involves the replacement of damaged curbs as result of the winter-snow removal, damage from vehicle impact, etc.

Table 13: Marked Pedestrian Crosswalks Cost Estimate

Location	Pedestrian Signs & Pavement Markings	Cost Estimate	Time Frame
34th Street & Avenue E	4 signs and zebra markings	$1,200	1 to 2 years
34th Street & Avenue F	4 signs and zebra markings	$1,200	
34th Street & Avenue I	4 signs and standard markings	$1,200	
35th Street & Avenue E	4 signs and 2 zebra markings	$1,400	
36th Street & Avenue E	4 signs and zebra markings	$1,200	
37th Street & Avenue D	4 signs & zebra markings	$1,200	
37th Street & Avenue E	4 signs and zebra markings	$1,200	
37th Street & Avenue F	4 signs and 2 zebra markings	$1,400	
	Total	**$10,000**	

The operating impact on an annual basis to maintain the painted crosswalks is $12,000, which includes 2 rounds of paint per year.

Table 14: Traffic Control Signage – Stop & Yield Cost Estimate

Location	Number of signs	Cost Estimate	Time Frame
1st Avenue between 34th Street & 38th Street; and 2nd Avenue between 34th Street & 39th Street	30	$7,500	1 to 2 year
39th Street & Saskatchewan Avenue; and 39th Street & Alberta Avenue	4	$1,000	
34th Street & Ave C; 35th Street & Avenue D; 37th Street & Avenue C; and 37th Street & Avenue F	8	$2,000	
	Total	**$10,500**	

Table 15: Parking and Speed Limit Signage Cost Estimate

Location	Number of signs	Cost Estimate	Time Frame
37th Street & Avenue B	2 No parking (north and south leg corners)	$500	1 to 2 year
Back lanes between Avenue B/Avenue C & 38th Street/39th Street and Avenue C/Avenue D & 37th Street/38th Street	4 speed limits signs indicating 20kph	$1,000	
	Total	**$1,500**	

Table 16: Sidewalks Cost Estimate

Location	Estimated Length of Sidewalk	Cost Estimate	Time Frame
37th Street between Avenue B & Avenue D (both sides)	320 m	$140,800.00	5 years plus
37th Street between Avenue F & Avenue I (north side)	240 m	$105,600.00	
38th Street between Idylwyld Drive & Avenue G (both sides)	960 m	$422,400.00	
3th Street between Quebec Avenue & 2nd Avenue (both sides)	400 m	$176,000.00	
39th Street between Idylwyld Drive & 1st Avenue (both sides)	900 m	$396,000.00	
Alberta Avenue between 33rd Street & 34th Street (both sides)	220 m	$96,800.00	
Alberta Avenue between 34th Street & 36th Street (west side)	340 m	$149,600.00	
Avenue D between 38th Street & alley near park (west side)	40 m	$17,600.00	
Ontario Avenue between 33rd Street & 39th Street (both sides	1400 m	$616,000.00	
Quebec Avenue between 33th Street & 40th Street (both sides)	1800 m	$792,000.00	
Total	**6280 m**	**$2,912,800.00**	

Table 17: Accessibility Ramps Cost Estimate

Location	Number of ramps	Cost Estimate	Time Frame
39th Street & Idylwyld Drive	2 (south east and southwest corners)	$6,400	1 to 2 years
Total		**$6,400**	

Table 18: Traffic Operation Improvements Cost Estimate

Location	Improvement	Cost Estimate	Time Frame
36th Street & Idylwyld Drive	Add Left turn arrow phase	$5,000	5 years plus
36th Street & Idylwyld Drive	Widen 36th Street to include right turn lane	$75,000	
39th Street & Idylwyld Drive	Add left turn phase	$5,000	
Total		**$85,000**	

Inquiry – Councillor P. Lorje (July 18, 2012) - Establishment of "Park-and-Ride" Sites in New Neighbourhoods

Recommendation
That the report of the General Manager, Transportation & Utilities Department dated August 19, 2014, be forwarded to City Council for information.

Topic and Purpose
The purpose of this report is to provide the Administration's intention for fully answering this inquiry.

Report Highlights
A detailed review of potential locations and configuration for park-and-ride facilities, and their relationship with transit stations and terminals, will be conducted through the *Growing Forward! Shaping Saskatoon* initiative.

Strategic Goal
This report supports the Strategic Goal of Moving Around through continued improvement of the transit system and the long-term strategy by utilizing park-and-ride facilities where they complement transportation demand, the City's future Rapid Transit system and the supporting transit network.

Background
The following inquiry was made by Councillor P. Lorje at the meeting of City Council held on July 18, 2012:

> "Will the Administration please report on the possibility of establishing "park-and-ride" sites in new neighbourhoods on a go-forward basis, and also the possibility of retro-fitting transit terminals so that we can encourage people to car pool for out-of-town employment destinations, as well encourage increased transit usage."

Report
A Transit Plan is currently being developed as a part of the *Growing Forward! Shaping Saskatoon* initiative. The Transit Plan will review current and projected travel markets to explore opportunities for making future transit service in Saskatoon a more attractive choice for daily travel needs. Potential system investments will be targeted to where there is the greatest potential for supporting ridership and key transit markets. As such, a combination of different transit services and configurations will be explored to meet

the different travel needs of people in Saskatoon. Park-and-ride will be considered as one of the different service options and high level concepts. Potential markets and desirable locations for park-and-ride amenities will be identified.

The Transit Plan and related public engagement through the *Growing Forward! Shaping Saskatoon* initiative will be completed by the end of 2015. Upon adoption of the Transit Plan, it is expected that the City will then begin the process of detailed design and implementation. The details of proposed park-and-ride sites will be established at that time. The Administration feels it is critical to have a comprehensive and integrated approach to the future of Saskatoon Transit, including possible inclusion of park-and-ride locations.

Public and/or Stakeholder Involvement
Engagement regarding the Transit Plan is being completed through the *Growing Forward! Shaping Saskatoon* initiative. Detailed options for long-term transit services in Saskatoon will be vetted publicly in the fall 2014 and a preferred Transit Plan option will be identified for incorporation into the *Growth Plan to Half a Million*.

Detailed development of park-and-ride options for implementation may occur after the completion of the Transit Plan, if recommended, and targeted stakeholder engagement will occur at that time.

Communication Plan
At such a time as park-and-ride plans are being developed, a communication plan will be developed and implemented.

Financial Implications
The financial implications of incorporating park-and-ride into Saskatoon Transit services may not be estimated at this time. They will be considered at a high level with the completion of the Transit Plan through the *Growing Forward! Shaping Saskatoon* initiative and in detail pending development of park-n-ride options when the Transit Plan has been adopted.

Other Considerations/Implications
There are no options, policy, environment, privacy or CPTED implications or considerations.

Due Date for Follow-up and/or Project Completion
No follow-up is required.

Public Notice
Public Notice pursuant to Section 3 of Policy No. C01-021, Public Notice Policy, is not required.

Report Approval

Written by:	Chelsea Lanning, Engineer-in-Training, Transit Planning Engineer Community Services Department
Reviewed by:	Bob Howe, Director of Saskatoon Transit
Approved by:	Jeff Jorgenson, General Manager, Transportation & Utilities Department

TRANS - Inquiry-Councillor P. Lorje (July 18, 2012) Establishment of Park-and-Ride Sites in New Neighbourhoods

IN CAMERA LIST

STANDING POLICY COMMITTEE ON TRANSPORTATION

TUESDAY AUGUST 19, 2014 AT 9:00 A.M., COMMITTEE ROOM A

Councillor C. Clark
Councillor T. Davies
Councillor R. Donauer
Councillor D. Hill
Councillor M. Loewen
His Worship the Mayor, D. Atchison (Ex-Officio)

1. Call to Order

2. Confirmation of Agenda and In Camera Items

3. Adoption of Minutes

4. Unfinished Business

5. Communications *(requiring the direction of the Committee)*

6. Reports from Administration

6.1 Status Update *[Economic/Financial and Other Interests]*

7. Urgent Business

8. Verbal Updates

8.1 Council Members

8.2 Administration

9. Adjournment