BUILDING BETTER ROADS
SASKATOON'S ROAD PLAN

Pavement Design Values

Project Title _____
Company Project #: _____ **Developer Project #:** _____
Design Company: _____ **Developer Company:** _____
Designer: _____
Submittal Date: _____ **Developer Agreement Date:** _____

	Build-Out Phase	Intermediate Phase	Full/Remaining Phase		
	Value	Value	Value	Units	Comments
1. Drainage Considerations					
a. Subgrade Elevation:				m	
b. Water Table Elevation:				m	
c. Difference of Water Table Elevation to Subgrade Elevation:				m	
2. Sub-Drainage System					
a. Edge Drain:					
b. Drainage Layer:					
3. Subgrade Support Conditions					
a. Soil Type:					
b. Design CBR:					
c. Subgrade Resilient Modulus (Mr):				Mpa	
4. Roadway Classification					
a. Cross Section:					
b. Road Group:					
c. Design Period:					
5. Transportation Report					
a. Annual Average Daily Traffic (AADT):				Vehicles/day	
b. Traffic Growth Rate:				%	
c. Percent Commercial:				%	
d. Percent Single Axle Trucks (SUT):				%	
e. Percent Semi-Trailer Combination (TTC):				%	
f. Number of Buses/Day:				Busses/Day	
h. Direction Split:				%	
i. Number of Lanes in each Direction:					
j. Commercial Lane Distribution Factors (LDF):					
k. Bus Lane Distribution Factors (LDF):					
l. Load Equivalency Factors SUT:	1.2	1.2	1.2	Fixed	Based on the Design Guide
m. Load Equivalency Factors TTC:	2	2	2	Fixed	Based on the Design Guide
n. Load Equivalency Factors BUS:	3	3	3	Fixed	Based on the Design Guide
o. Commercial Load Equivalency Factor (LEF)					
p. Bus Load Equivalency Factor (LEF)	3	3	3	ESALs/vehicle	Based on the Design Guide value for Bus LDF
q. Traffic Growth Factor:					
r. Commercial Design ESALs				ESALS	
s. Bus Design ESALs				ESALS	
t. Sub Total Design ESALs:				ESALS	
r. Total ESALs				ESALS	
5. Serviceability					
a. Reliability (R):	75	75	75		
b. Standard Normal Deviate (Zr):	-0.674	-0.674	-0.674		
c. Standard Error (So):	0.45	0.45	0.45		Fixed
d. Initial Serviceability (pi):	4.2	4.2	4.2		Fixed
e. Final Serviceability (pt):	2.5	2.5	2.5		Fixed
f. ΔPSI	1.7	1.7	1.7		Fixed
6. Structure Layers					
b. Total Design SN					mm

b. Pavement Layer	Material	Layer Coefficient	Drainage Coefficient	Minimum Layer (if required)	Option 1	Option 2	Option 3
ACP Thickness (mm)	ACP - Polymer Modified	0.42	N/A	0	0	0	0
ACP Thickness (mm)	ACP	0.4	N/A	0	0	0	0
Granular Base Course Thickness (mm)	Granular Base Course	0.13	1	0	0	0	0
Granular Sub-Base Course Thickness (mm)	Granular Sub-Base Course	0.1	1	0	0	0	0
Geo-textile/membrane	None	1.00 Review Combi Grid Chart	N/A	N/A	No	No	No
Drainage Layer Thickness (mm)	Drainage Rock	0.1	1	0	0	0	0
Geo-textile/membrane	None	1.00 Review Combi Grid Chart	N/A	N/A	No	No	No
		SN Provided by the Pavement Structure:		**0.0**		**0.0**	**0.0**
		Total Thickness of the Pavement Structure (mm):		0	0	0	0

Purpose

The purpose of this spreadsheet is to be used a guideline when submitting pavement designs for review.

The pavement design review must follow the AASHTO 1993 guidelines set out in the City of Saskatoon Design and

Values Spreadsheet

This spreadsheet is the an example which needs to be submitted as part of the design.
Please note this spreadsheet will allow you to enter values but will not automatically calculated them. Please use th
Seciton 9- Roadway Pavement Structure Guide.

Example Design Tables Spreadsheet

This spread sheet is broken down examples of the inputs needed for the Values spreadsheet.

Tables

The table spreadsheet is a summary of the design tables from the City of Saskatoon Design and Development Stan

l Development Standards Manual Section 9 - Roadway Pavement Structure Design Guide

e equations that are indicated in the City of Saskatoon Design and Standards Manual

ndards Manual, Section Nine Roadways Pavement Structure Design Guide.

1. Drainage Considerations	Value	Unit
Subgrade Elevation:	512.155	m
Water Table:	511.3	m
Difference of Water Table Elevation to Subgrade Elevation:	-0.855	m

2. Sub-Drainage System	Value	Unit
Edge Drain:	Yes	
Drainage Layer:	Yes	

3. Subgrade Support Conditons	Value	Unit
Soil Type:	ML - Silt	
Design CBR:	4	
Subgrade Resilient Modulus (Mr):	41	MPa

4. Roadway Classification	Value	Unit
Cross Section:	Urban	
Road Group:	Commercial - Arterial	
Design Period:	20	years

5. Transportation Report	Value	Unit
Annual Average Daily Traffic (AADT):	7000	Vehicles/day
Traffic Growth Rate:	3	%
Percent Commercial:	6	%
Percent Single Axle Trucks (SUT):	3	%
Percent Semi-Trailer Combination (TTC):	3	%
Number of Buses/Day:	40	buses/day
Direction Split:	50	%
Number of Lanes in each Direction:	1	lane
Lane Distribution Factors (LDF):	100	%
Load Equivalency Factors SUT:	1.2	Fixed
Load Equivalency Factors TTC:	2	Fixed
Load Equivalency Factors BUS:	3	Fixed

5. Serviceability (ASSHTO Design Inputs)	Value	Unit
Reliability (R):	85	%

Standard Normal Deviate (Zr):	-1.037	
Standard Error (So):	0.45	Fixed
Initial Serviceability (pi):	4.2	Fixed
Final Serviceability (pt):	2.5	Fixed
ΔPSI	1.7	Fixed

6.Structure Layers	Value	Unit
Total SN	160	mm

Comments
As shown in the attached Report
As shown in the attached Report

Comments
Based on the City Manual (Yes or No)
The drainage is Poor, the water table is less than 1m from subgrade. See Pavement Design Guideline

Comments
As shown in the attached Report
As shown in the attached Report
See the City of Saskatoon Design and Development Standards Manual Section Nine Roadway Pavement Structure Design Guide. See Equation 2.

Comments
Roadway cross sectional area will have a curb.
Based on the City's zoning bylaw and estimate traffic demands.
See the City of Saskatoon Design and Development Standards Manual Section Nine Roadway Pavement Structure Design Guide. See Table 2.3.1

Comments
As shown in the attached Report
Statistical average of traffic growth
As shown in the attached Report and Equaition 3 in Design Manual
As shown in the attached Report
As shown in the attached Report
See the City of Saskatoon Design and Development Standards Manual Section Nine Roadway Pavement Structure Design Guide. See Table 2.3.2
Two-way Traffic
2 lanes, 1 lane in each direction
See the City of Saskatoon Design and Development Standards Manual Section Nine Roadway Pavement Structure Design Guide. See Table 2.3.3
See the City of Saskatoon Design and Development Standards Manual Section Nine Roadway Pavement Structure Design Guide. See Table 2.3.4

Comments

See the City of Saskatoon Design and Development Standards Manual Section Nine Roadway Pavement Structure Design Guide. See Table 2.4.1

Comments
See the City of Saskatoon Design and Development Standards Manual Section Nine Roadway Pavement Structure Design Guide. See Equation 9 and 10.

Table 2.3.1: Design Periods

Roadway Group	Road Class	Design Cross Section Type	
		Rural (years)	Urban (years)
Residential	Locals	15	20
	Collectors	20	20
	Arterials	20	20
Commercial	Locals	15	20
	Collectors	20	20
	Arterials	20	20
Industrial	Locals	20	20
	Collectors	20	20
	Arterials	20	20
Freeways and Ramps		30	30
Boundary Roads		15	15

Table 2.3.2: Assumed Bus Volumes

Roadway Group	Road Class	# of Routes	# of Buses
Residential	**Locals***	**0***	**0***
	Collectors	**1**	**32**
	Arterials	**1**	**32**
Commercial	**Locals**	**1**	**32**
	Collectors	**2**	**64**
	Arterials	**2**	**64**
Industrial	**Locals**	**1**	**32**
	Collectors	**1**	**32**
	Arterials	**2**	**64**
Freeways and Ramps		**2**	**64**
Boundary Roads		**1**	**32**

Table 2.5.3: AASHTO Drainage Coefficients

Material Type	Urban and Rural	Rural
	Drainage Coefficient for Good Drainage	Drainage Coefficient for Poor Drainage

ACP	n/a	n/a
ACP - Polymer Modified	n/a	n/a
Granular Base Course	1	0.8
Granular Sub-base Course	1	0.8
Drainage Rock	1	1
Drainage Recycled Concrete	1	1
Drainage Sand	1	1

AASHTO Design Input
Design ESALs
Reliability (Function of ESALs)
Serviceability
Overall Standard Deviation (S_o)
Subgrade Resilient Modulus (M_R)

Table 2.5.1: AASHTO Layer Coefficient

Material Type
ACP
ACP - Polymer Modified
Cold In-place Recycled Asphalt Concrete
Full Depth Reclamation with Stabilization
Granular Base Course
Granular Sub-base Course
Drainage Rock
Drainage Recycled Concrete
Drainage Sand

Table 2.3.4: Commercial and Bus Traffic Load

Load Vehicle	Load Equivalency Factor
Single Unit Trucks (SUT)	1.2 ESALs

Table 2.3.3: Lane Distribution Factors

Roadway Cross-Section

Tractor Semi- Trailer Combination (TTC)	2.0 ESALs
Buses (Bus)	3.0 ESALs

Urban
Rural

Table 2.4.1: AASHTO Pavement Design Inputs

	Value	
	As Determined in Section 2.3	
Design ESALs Range	R (%)	Z_R
< 100,000	75	-0.674
> 100,000 – 1,000,000	80	-0.841
> 1,000,000 – 5,000,000	85	-1.037
> 5,000,000 – 10,000,000	85	-1.037
> 10,000,000	90	-1.282
Initial Serviceability Index (p_i)	4.2	
Terminal Serviceability Index (p_t)	2.5	
Serviceability Loss (ΔPSI)	1.7	
	0.45	
	As Determined in Section 2.2	

s

Material Properties	AASHTO Layer Coefficient
n/a	0.4
n/a	0.42
n/a	0.3
n/a	0.3
CBR 65	0.13
CBR 25	0.1
n/a	0.1
n/a	0.1
n/a	0.05

LDF		
1 Lane per Direction	2 Lanes per Direction	3 or more Lanes per Direction

Design ESALs to account for 100% Commercial Traffic and Buses	Design ESALs to account for 70% Commercial Traffic Design ESALs to account for 100% buses	Design ESALs to account for 70% Commercial Traffic Design ESALs to account for 100% buses
Design ESALs to account for 100% Commercial Traffic and Buses	Design ESALs to account for 85% Commercial Traffic Design ESALs to account for 100% buses	Design ESALs to account for 70% Commercial Traffic Design ESALS to account for 100% buses