

Street Network Planning Principles and Street Hierarchy

ISSUE

A section of Bylaw No. 8769, Official Community Plan, sets out street classification; however, details on the street classification's function and service have not been approved by City Council in a formal document. The public and the Administration have been referring to the street classification system in various business plans, maintenance processes, land development, and application of traffic calming. A street network plan has been prepared and used by the Administration historically, but this plan has also not been approved by City Council.

This report outlines the street classification details and street network plan for City Council to formally approve.

RECOMMENDATION

That the Standing Policy Committee on Transportation recommend to City Council:
That the use of the street classification system and street network plans as outlined in this report be approved.

BACKGROUND

Bylaw No. 8769, Official Community Plan, Section 12.2.2 in part states:

“Street Classification a) Streets shall be classified as freeway/expressway, arterial, collector, and local streets. Such classification shall be based on the function the streets serve and the type and amount of service they should provide.”

The following hierarchical street classification is used to define the street network: freeways/expressways, arterials, collectors, locals, and lanes. Street classification is used to determine a variety of services and operational requirements, such as:

- Level of service for a variety of maintenance practices;
- Transit services;
- Access management;
- Posted speed limits;
- Location of traffic calming measures;
- Street cross-section features;
- Sector and neighbourhood planning; and
- Assessed value.

DISCUSSION/ANALYSIS

The Transportation System of the City of Saskatoon Design & Development Standards Manual, Section 8, currently references street classifications, function, and service.

Street classification is the orderly grouping of streets into systems according to the type of service and function they provide the public. When a street system is properly classified, the function and characteristics of each street are readily understood.

The street network is comprised of various street types, each of which performs a particular function in facilitating the way people and goods move through and within the city. The current street classification system used by the City considers many principles and factors including land use, land service function, typical traffic volume, traffic flow characteristics, posted speed, vehicle type, network connections, and design user groups and modes with the goal of providing a connected street network for all types of transportation. These principles and factors are described in more detail below and are summarized in Appendix 1.

Street Classification System Principles and Factors

Principles	Factors
Land Use	• Major factor in determining the classification of the street and dictates: ○ access needs; ○ type of vehicle to design for; and ○ anticipated traffic volumes. • Street design must also meet other objectives such as: ○ minimizing unnecessary vehicular traffic; ○ accommodating pedestrian and bicycle activity; ○ providing space for social activities; and ○ facilitating economic success of the area.
Land Service Function	• All streets provide either service to traffic, access to land, or both (relationship between access and mobility as it relates to the various street classifications is illustrated in Appendix 2). • In general: ○ highest order streets (freeways/expressways) are designed with mobility in mind; ○ lower order streets (locals) are designed with few constraints to access to adjacent parcels; ○ collector streets balance mobility and access; and ○ arterial streets are designed to facilitate mobility and higher-order network connectivity.
Typical Traffic Volume	• Higher volumes of traffic are carried on the higher-order streets, such as freeways/expressways. • Lower volumes of traffic are carried on lower-order streets, such as locals and collectors. • Expected traffic volume used during the design of new streets and traffic volumes for existing streets demonstrate their relative importance in the network, but are not intended to be regulatory.
Traffic Flow Characteristics	• Traffic flow characteristics can be impacted by a number of possible street uses, such as: ○ amount or number of accesses provided; ○ pedestrian usage; ○ on-street parking; and ○ the amount of traffic crossing, entering, and leaving the roadway. • Traffic flow is typically described as interrupted, or free flow with various degrees between these extremes.

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Principles (continued)	Factors (continued)
Posted Speed	• Typically higher on the higher-order street classifications. • Lower on the lower-order street classifications.
Vehicle Types	• Depends on the purpose of the street and the surrounding land use. • Vehicle types using a street have a significant impact on the overall design of the street. There are three anticipated vehicles considered: ○ Design vehicle – largest typical vehicle that will frequently use the street; ○ Control vehicle – largest vehicle that will infrequently use the street; and ○ Managed vehicle – most common vehicle to use the street.
Network Connections	• Streets reflect the normal progression of connectivity. • An ideal system, allows for street users to adjust to gradual changes in the street cross-section features: ○ lanes connect with locals; ○ locals with collectors; ○ collectors with arterials; and ○ arterials with freeways/expressways. • Other connections should be minimized. • Connections by classification are summarized in Appendix 3.
Design User Groups and Modes	• To create a connected street network for all modes of use, pedestrians, cyclists, and transit users must be considered. • Each of these user groups will receive varying facilities and service based on the street classification.

Street Network Plan

In creating a street network plan for arterials and freeways/expressways, there are several aspects that should be considered:

- Travel demand;
- Level of transportation service;
- Energy considerations;
- Urban form;
- System continuity;
- Mode shifts;
- Traffic operations and control;
- Environmental and urban impacts: air quality, noise, visual impact, and urban development; and
- Fiscal considerations.

The arterial system is the basic component of a street system. In most cities, arterials meet the basic travel need and handle major volumes of through trips. The freeways/expressways system is overlaid on the surface street system as a supplement to provide additional capacity and the ability to make longer trips in less time. The arterial and freeways/expressways street network:

- Maintain system continuity – continuity of direction and capacity;
- Maintain system geometry – normally conforming to something approaching a rectangular grid, a radial-circumferential pattern, or an irregular pattern;
- Consider topography and other sensitive features;

- Protect neighbourhoods and activity centers; and
- Service the activity centers.

By applying the outlined street classification system principles and factors, the City is able to produce a street network plan. The freeways/expressways (high speed controlled access) street network plan is illustrated in Appendix 4. The arterials street network plan is illustrated in Appendix 5. The collector street network plan is illustrated in Appendix 6.

IMPLICATIONS

There are no financial, legal, social, or environmental implications.

NEXT STEPS

1. The approved street classification system principles and factors will be incorporated into the Transportation Master Plan.
2. The approved street network plans will be incorporated into the Transportation Master Plan.
3. Changes to the street network plans would occur through Sector Plans, Neighbourhood Concept Plans, or transportation studies that would be approved by City Council.

APPENDICES

1. Characteristics of City of Saskatoon Street Classifications
2. Figure – Service Function
3. Connections by Classifications
4. Freeways/Expressways (High Speed Controlled Access) – Street Network Plan
5. Arterials – Street Network Plan
6. Collectors – Street Network Plan

Report Approval

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