First Draft Report

Road Classification

City of Saint John
Transportation Strategic Plan Phase 3

Prepared for City of Saint John
by IBI Group
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1 Introduction

1.1 Background

A road classification system establishes a hierarchical structure of roadway groupings according to their physical and functional characteristics and the type of service they are intended to provide. Having clear classification standards help to avoid confusion and uncertainty during the planning of new developments and the operations of the existing road system, which can lead to disputes between stakeholders. A road classification system that considers future demands of motorists as well as the future movements of pedestrians, cyclists and transit in a connected transportation system will ensure the road network is prepared to accommodate safe residential neighbourhoods and accessible industrial and commercial developments for all modes of travel.

Currently, the Saint John Municipal Plan (PlanSJ), under Section 8.5 and Schedule C, includes four basic road classifications for the City:

- Local Streets
- Collector Streets
- Arterial Streets
- Freeways

When PlanSJ was being developed, a *Transportation Background Report* (2010) was prepared by exp Services Inc. which included a more robust road classification system. The purpose of the *Transportation Background Report* was to describe and preserve the intended traffic function and geometric requirements of each of the road classes. It reported that the City employ a roadway classification system that assigns all roads within the City to one of ten functional classes rather than the four that are presented in the final PlanSJ Municipal Plan:

- Freeway
- Major Arterial
- Minor Arterial
- Urban Collector
- Commercial Local
- Local
- Rural Collector
- Rural
- Private
- Undeveloped

City staff have expressed concern that the existing road classification system is too broad for some categories of streets and needs to be revised to more clearly define roadway standards and requirements for various roadway functions and land uses. For example, the Urban Collector classification includes residential, commercial, and industrial collector roads. The intended function and standards

of these types of collectors can be very different, in terms of street widths, vehicle composition and sidewalk requirements.

In response, the 2014 Terms of Reference for the City of Saint John Transportation Strategic Plan (MoveSJ) required that a review be conducted of its four-category existing road classification system presented in Schedule C - Transportation of PlanSJ. It also required the development of a revised or new classification system using both Transportation Association of Canada (TAC) guidelines and factors unique to Saint John. This classification potentially may involve sub-classes of Local, Collector or Arterial streets. Once this updated classification system is finalized, streets in Saint John are to be re-classified using the developed system and definitions.

The following factors are considerations in developing a new road classification system for Saint John:

- **Speed Limits** – use of lower speed limits (40 km/h compared to existing 50 km/h and 70 km/h speed limit zones) (addressed in Move SJ Phase 1 in March 2017).
- **Road Geometry Considerations** – changes to the current cross-sections in the City's General Specifications to provide improved accommodation for pedestrians, cyclists and other vulnerable road users that incorporate design features that limit the need for reactive traffic calming measures.
- **Development Impacts** – changes to road classification over time such as the conversion of a Local street to a Collector through future street connections or new development.
- **Private Streets** – continuing to include a "Private" streets category in the classification system to identify those roadways that are not owned nor maintained by the City.
- **Street Connectivity / Future Roadway Linkages** –classifications for future road linkages based largely on the City's Future Land Use Plan and potential improvements to transit, emergency services and other City operational vehicle routings. This may involve changes in the classification of particular streets as a result of these future connections.
- **Complete Streets** – incorporating complete streets principles to consider the needs of all roadway users in the design of new roads and road retrofit projects.

1.2 Benefits of Road Classification

Implementing an expanded road classification system beyond the basic four-class system in PlanSJ can provide the following benefits:

- Establish geometric design standards for consistent application on all City roads; [1]
- Establish standards for functional characteristics such as land access, traffic flow thresholds, level of service (LOS), speed limits, accommodation of cyclists and pedestrians, and parking provisions;
- Differentiate design and functional standards between roads in urban versus rural settings, and between residential and non-residential land use;
- Improve coordination and planning of land use and transportation;
- Prioritize winter maintenance levels based on street roles in the network;
- Set appropriate speed limits based on street geometry, function and abutting land use; and
- Preserve the intended service function of planned roadways and promote a safer environment with operational integrity.

2 Best Practices Review

The research component of this report involved a review of road classification systems adopted by other selected Atlantic Canada municipalities as a cross-section of how road classification is addressed elsewhere. These municipalities were Moncton NB, Fredericton NB, Rothesay NB (as an example of an abutting municipality to Saint John), Charlottetown PE, Halifax NS and St. John's NL. There are some differences and many similarities in how each of these example municipalities classify their roads. Some focus on road strategies, while others reflect road role and function. However, most use a designated set of classifications to create a hierarchy of roads, determined by a set of design and operational criteria such as right-of-way widths, land use and intended purpose of the road.

2.1 Transportation Association of Canada (TAC)

The most common approach taken from municipal comparisons is to classify roads as the basic Highway, Arterial, Collector and Local as per the Transportation Association of Canada (TAC) *Geometric Design Guide for*

[1] The main reference source for road classifications in Canada is the Transportation Association of Canada's *Geometric Design Guide for Canadian Roads.*

Canadian Roads. Some municipalities also differentiate between existing and future or planned roads using these basic TAC classifications.

Chapter 2.6 of the current TAC Design Guide (June 2017), named *Design Classification*, provides a general structure for roadway classification with recommended standards. The information and tables introduced in this chapter are the most commonly referred to sources for road classification across the country.

Under the TAC Design Guide, roadways are divided into primary divisions under the classifications of “Rural” and “Urban”. The terms Rural and Urban refer to the primary characteristics of adjacent land use and not necessarily jurisdictional boundaries. The primary divisions that are most commonly referenced are shown in Exhibit 2.1. The divisions are organized from “low-level” to “high-level”, where the lowest level primarily provides land access to low traffic volumes without consideration to mobility, and the highest-level primarily provides mobility to high traffic volumes with less consideration to access. Each division type typically connects to divisions of one level higher or one level lower. These divisions can be further subdivided to reflect the individual needs of residential, industrial, and commercial land uses.

Exhibit 2.1: TAC Design Manual Road Classification Divisions

Rural	Urban	
	Public Lanes	↑ *Land Access*
Locals	Locals	
Collectors	Collectors	
Arterials	Arterials	
	Expressways	
Freeways	Freeways	↓ *Mobility*

To identify the appropriate classification for any roadway, the service function and operational characteristics need to be considered. The TAC Design Guide recognizes the following factors as the most important characteristics to consider when assigning a roadway classification:

- **Land Use** – Land use is an important factor when classifying roadways because of its relationship with access demands, geometric requirements, prevalent vehicular traffic, and site-specific objectives. For example, an industrial land use may serve heavier vehicles and may have different geometric requirements than a residential land use. Also, residential roads may have specific objectives such as traffic calming and the promotion of cycling and walking.
- **Service Function** – All roads service traffic and land access by varying degrees of priority. For example, freeways and arterials mainly service traffic mobility, whereas local roads and public lanes

almost exclusively service land access, while collectors typically provide service to both.

- **Traffic Volume** – Road classes that mainly service traffic movement (i.e. freeways and arterials) are typically associated with high traffic volumes, whereas road classes that do not consider the movement of traffic are typically associated with low volumes (i.e. locals and public lanes). The volume range for each classification is wide and overlaps that of other classifications. It is important to note that traffic volume should not be used at the main criteria for classifying roadways because it reflects how a road is serving demand in a particular part of the network, rather than a road's role in the network. For example, a collector connected to more than one arterial may experience high volumes, but this alone does not justify it being classified as an arterial. Improvements to the arterial grid capacity often alleviate escalating volumes on collectors or local roads.
- **Flow Characteristics** – Traffic flow greatly impacts the performance of a roadway and therefore plays a major role in road classification. Uninterrupted traffic flow is expected for roadways serving traffic movement such as freeways and arterials (except at controlled intersections and crosswalks). Interrupted flow is expected on collectors and local roads where traffic movement is restricted by traffic entering, leaving and crossing the roadway, or by features such as on-street parking and traffic calming.
- **Design Speed/Running Speed** – Typically, design and running speeds increase from locals to collectors, arterials and freeways. However, to ensure a safe running speed, care must be taken to select the design speed that appropriately corresponds to the adjacent land use, service function, and speed zoning policy for the roadway. An inappropriately selected design speed (i.e. a residential collector with a design speed of 80 km/h) can encourage high running speeds and high variations in speeds between vehicles, compromising the safety of road users.
- **Vehicle Types** – The proportion of passenger cars and heavy vehicles (trucks) served by a roadway is dependent of the purpose of that roadway. Therefore, vehicle type is related to road design and classification. Freeways and arterials are generally designed to carry a higher proportion of commercial vehicles than local and collectors which typically service passenger cars and small trucks. However, allowances can be made within the classification subgroups for the operational needs of vehicle types accessing industrial and/or commercial areas.
- **Connections** – Ideally, public lanes, private roads and local streets connect with collectors, collectors connect with arterials, and arterials connect with freeways. Maintaining such connectivity increases

consistency within a road network and facilitates short and long term planning.

In addition to the above key factors, the TAC Design Guide also includes provisions for the following:

- Transit Service;
- Accommodation of Cyclists;
- Accommodation of Pedestrians;
- Parking;
- Minimum Intersection spacing; and
- Right-of-way width.

The TAC Design Guide provides a good starting point for road design classifications, including a high level of detail among the many functional characteristics. Jurisdictions across Canada commonly adopt the TAC system but may modify the guidelines to meet their specific needs. Some municipalities have chosen to abandon the traditional classification structure for a more unrestricted and flexible convention. Despite the more open nature of this practice, roadway class definitions becomes fuzzy, which leads to confusion and uncertainty during the planning of new developments and the operations of existing road networks. Too much room for interpretation can lead to disputes between stakeholders while attempting to protect their best interests (i.e. residential neighbourhoods).

The City of Saint John needs to consider these classification examples in terms of how they serve the specific needs of this city in managing their road network, for example involving road design, traffic control, speed control, adjacent land use control and Active Transportation.

2.2 Atlantic Canada Comparisons

A summary table of road classes by municipality is presented in Exhibit 2.2. None of the peer municipalities in Atlantic Canada further sub-categorize below the basic TAC classification (e.g., Major / Minor or Residential / Non-Residential classifications). Some municipalities do specifically classify “Scenic Roads”.

Exhibit 2.2 – Atlantic Canada Classification Comparisons

MUNICIPALITY	SOURCE	ROAD CLASSIFICATIONS
Moncton, NB	Municipal Plan Schedule 5	Freeway, Arterial (existing/future), Collector (existing/future), Local (existing/future). Note, road classification is not addressed in the Regional Sustainable Transportation Master Plan (May 2015)
Fredericton, NB	Municipal Plan Schedule B	Local, Major / Minor Arterial Major / Minor Collector, Freeway
Rothesay, NB	Municipal Plan 2010	Local, Collector, Arterial, Highway, Private Lane
Charlottetown, PE	Official Plan 2019	Civic Street, Potential Street, Connection, Arterial Highway, Collector, Local, Private Road
Halifax, NS	Integrated Mobility Plan 2017: Policies & Strategies, Halifax Regional Plan 2014 Section 4.2.5 & Map 1	Planned / Programmed, Future Potential, Future Community Connection (focused on road role, not function)
St. John's, NL	1998 Transportation Study updated, Envision St. John's Draft Municipal Plan 2019 Chapter 7 Transportation & Appendix A P-4 Road Class	Roads, Scenic Roads, Protected Roads

3 Recommended Saint John Road Classification System

As previously noted, the existing basic Saint John road classification system offers limited differentiation for the design, operation and maintenance of roads in rural areas compared to urban areas. Considering the current and planned patterns of land use and development in the City, and the remaining large extent of rural lands, a new classification structure is proposed that includes:

- Rural and Urban designations;
- Rural road classes;
- Urban road classes of arterials, collectors, locals and public lanes;
- Community (primarily residential) and Industrial sub-classes for Urban Collector roads; and
- A comprehensive set of classification characteristics.

An expanded road classification system for the City satisfies the above-mentioned recommendations. The proposed road classification policies for the City are primarily based on the core classification structures outlined in the TAC design manual (see Exhibit 2.1). The classification structure of arterials, collectors and locals, as proposed by TAC, is recommended for urban areas within the City to provide a comprehensive roadway framework for future urban development. However, this more detailed classification structure is not warranted for rural areas where the City's existing Collector and Local classifications can be slightly expanded and applied.

Introducing separate classifications for urban and rural roads is recommended because roads in rural settings are characterized by factors that make their operational characteristics, design requirements and associated impacts different from roads in urban areas. This is summarized in Exhibit 3.1.

More specifically, land use is the most important factor dictating rural road standards. The intensity of access needs change in rural settings, with associated roadway geometric requirements dictated by the agricultural, resource, residential, industrial or commercial areas being served.

For example, unlike in urban areas, rural roads are typically designed to achieve many objectives other than serving passenger car traffic. This can include accommodating agricultural and resource operations (i.e. forestry, aggregate operations) and industrial traffic. Unlike urban roads that serve specific arterial/collector/local functions, rural roads are more multi-purpose, and so geometric design standards for rural roads tend to be more "generous" than in the more strictly controlled urban areas. Rural roads also tend to serve vehicular traffic only, with little if any dedicated facilities for pedestrian and cycling users (i.e. gravel shoulders and no sidewalks) or public transit.

Exhibit 3.1: Comparison of Rural and Urban Roadway Characteristics

ROADWAY CHARACTERISTIC	RURAL	URBAN
Service Function, such as degree of mobility and land access	Relatively unlimited land access and maximum mobility	Controlled land access with associated mobility limitations
Traffic Volume and associated Level-of-Service (LOS)	Generally low traffic volumes and high LOS	Generally medium/high traffic volumes (depending on type of road) with LOS reductions during peak periods
Traffic Flow/ Composition of Traffic	Free Flow Mixed	Interrupted Flows
Running Speed of traffic during off-peak conditions	Medium to High (50-90 km/h)	Low to Medium (40-70 km/h)
Vehicle Types (proportion of cars, trucks, buses)	Can include high percentage of heavy vehicles. May include slow moving vehicles including heavy vehicles	May include high degree of heavy vehicles but only on designated truck routes

Under the recommended road classification system, every road in Saint John that is not under provincial jurisdiction (Route 1 and 7 Freeways plus on/off ramps) would be assigned one of the following nine classifications as shown in Exhibit 3.2:

3.1 Urban Classes

3.1.1 Major Arterial

Examples – Chesley Drive, Fairville Blvd, Loch Lomond Road, Rothesay Avenue.

Basic Description – Primary function is to distribute large volumes of traffic at moderate to higher speeds between other Major Arterials, Minor Arterials, Collectors and to/from Freeways. The primary purpose of these roads is to move people and goods within and through the city. Access to abutting lands is strictly regulated.

3.1.2 Minor Arterial

Examples – Grandview Avenue, King Street, Landsdowne Avenue, Manawagonish Road.

Basic Description – Generally distribute large volumes of traffic (people and goods) between other Major Arterials and Collector Streets. The primary purpose of these streets is to provide mobility for people and goods through and within the City. Access to abutting lands is regulated.

3.1.3 Urban Collector – Community

Examples – Adelaide Street, Catherwood Street, Millidge Avenue, Sandy Point Road.

Basic Description - Generally, Urban Community Collectors balance the provision of mobility in the urbanized City with land access. They do this by collecting and distributing people and goods between urban communities from Local Streets and other Urban Collectors to Arterial Streets (Major and Minor). They provide this functions in Residential, Commercial Corridor, Centres and Employment Areas (except Industrial) as designated in the Municipal Plan (PlanSJ) Primary Development Area. Direct access to property may be permitted.

3.1.4 Urban Collector – Industrial

Examples – Bayside Drive, Grandview Avenue

Basic Description – Balance the movement of people and goods with an emphasis on commercial vehicle movement (trucks) in areas designated as Industrial (Light and Heavy) in the Municipal Plan. These roads are typically suited to Truck Route designation.

3.1.5 Urban Local

Examples – Camarthen Street, Harbourview Drive, Lancaster Street, Park Avenue.

Basic Description – Urban Local streets generally provide access to abutting properties at low travel speeds and volumes within the designated Primary Development Area, and are not intended to carry through traffic.

3.2 Rural Classes

3.2.1 Rural Collector – Community

Examples – Foster Thurston Drive, Rothesay Road, Garnett Settlement.

Basic Description – The primary function of Rural Collector / Community roads is to provide mobility to traffic throughout primarily residential communities beyond the City's Primary Development Area. These areas are characterized by low density and low developmental activity. They typically link centres of activity

separated by large distances and provide connections with Collectors, other Arterials and Freeways. Rural Collector / Community roads typically service relatively moderate volumes of traffic (less than 5,000 veh/day) at medium to high speeds, and therefore flow should be uninterrupted along the majority of the roadway. Features such as transit, parking, and traffic calming are typically not applicable on these Rural Collectors due to the nature of the surrounding land use and intended service function. Pedestrian and cyclist facilities are not generally provided, unless the roadway links two areas of development separated by reasonably short distance, or if the roadway falls along City plans for a walking and cycling network.

3.2.2 Rural Collector – Industrial

Examples - Bayside Drive, Red Head Road.

Basic Description – Similar to Rural Collector / Community Roads but primarily serving areas designated as Light and Heavy Industrial in the Municipal Plan. As such, these roads serve higher volumes of heavy truck traffic at lower speeds compared to Rural Community Collectors.

3.2.3 Rural Local

Examples – Acamac Beach Road, Fisher Lakes Drive, Johnston Road, Owens Road.

Basic Description – Rural Local roads are similar in design to Rural Collectors, but differ mainly in service function which places more importance on land access, serving lower traffic volumes at lower speeds along road sections with multiple rural access driveways. It is recommended that Rural Locals provide connections only with Rural Collectors and other Rural Locals.

3.2.4 Private Road

Examples – Bustin Blvd., Irving Road, Morland Avenue.

Basic Description – Saint John has over 100 private roads, many coming into the City through previous municipal amalgamations. Since they do not form part of the City's public road infrastructure, they generally do not have access to city services like snow clearing, street maintenance, or street lights. However, the history of private roads may lead in some cases to status changes to become part of the public road network.

Exhibit 3.2: Road Classification Matrix

ROAD TYPE	PROV.	CITY URBAN					CITY RURAL			PRIVATE
Classifications	Freeway	Major Arterial	Minor Arterial	Urban Collector		Urban Local	Rural Collector		Rural Local	Private Road
Characteristics	-	-	-	Community	Industrial	-	Community	Industrial	-	-
Basic Width Geometry:										
Right-of-Way Width (typical)	As per NBTI[1]	30m – 36m	26m – 30m	20m – 26m	20m – 26m	18m – 20m	20m – 26m	20m – 26m	20m – 26m	Varies Min. 16m
Pavement Width (curbface to curbface – Typical without bike lanes)[2]	As per NBTI	19.5m 5 lanes	19.5m 5 lanes	12m – 16m	12m -16m	9.2m (4.6m x 2)	7.4m	7.4m	7.4m	7m – 9m
Primary Service:										
Traffic Service Function	Traffic movement primary	Traffic movement primary consideration	Traffic movement major consideration	Traffic movement & land access equally important	Traffic movement & land access equally important	Traffic movement secondary consideration	Traffic movement equal to access	Traffic movement equal to access	Traffic movement secondary consideration	Land access only
Land Service / Access	Not provided	Generally not permitted	Permitted with strict access control	Land access & traffic movement equally important	Land access & traffic movement equally important	Land access primary consideration, traffic movement secondary	Land access & traffic movement equally important	Land access & traffic movement equally important	Land access primary consideration, traffic movement secondary	Land access only
Desirable Connections	Highways, Urban & Rural Arterials	Collectors, Arterials & Collectors	Collectors, Arterials & Freeways	Locals, Collectors & Arterials	Locals, Collectors & Arterials	Locals & Collectors	Locals, Collectors & Arterials	Locals, Collectors & Arterials	Locals & Collectors	Locals & Collectors
Flow Characteristics	Free Flow	Free Flow except at signals	Predominantly Uninterrupted Flow except at signals	Interrupted Flow	Interrupted Flow	Interrupted Flow (driveways, stops controls)	Interrupted Flow	Interrupted Flow	Interrupted Flow	Interrupted Flow
Traffic Management:										
Motorized Vehicle Types Served	All Types	All Types Truck Routes	All Types Truck Routes	Passenger & service vehicles	All Types Truck Routes	Passenger & service vehicles	Passenger & service vehicles	All Types Truck Routes	Passenger & service vehicles	Passenger & service vehicles
Motorized Vehicular Traffic Volume (Typical AADT)[3]	>20,000	>20,000	5,000 – 20,000	<10,000	<10,000	<1,000	<5,000	<5,000	<1,000	<500

1. New Brunswick Transportation and Infrastructure
2. As per City Typical Cross-Sections except Rural Arterial, Rural Collector
3. Average Annual Daily Traffic

Exhibit 3.2: Road Classification Matrix (continued)

ROAD TYPE	PROV.	CITY URBAN				CITY RURAL				PRIVATE
Classifications	Freeway	Major Arterial	Minor Arterial	Urban Collector		Urban Local	Rural Collector		Rural Local	Private Road
Characteristics	-	-	-	Community	Industrial	-	Community	Industrial	-	-
Traffic Management: (continued)										
Roadway Design Speed km/h	90 - 120	80 - 90	80 - 90	60 - 80	70 - 90	50 - 60	60 - 80	70 - 90	50 - 60	Not applicable
Roadway Posted Speed km/h	80 – 110	70 - 80	70 - 80	50 - 70	60 - 80	40 - 50	50- 70	60 - 80	40 - 50	Not applicable
Complete Streets Services:										
Transit Service	Express Bus Permitted	Express & Local Permitted	Local Permitted	Local Permitted	Local Permitted	Generally Not Provided	Generally Not Provided	Generally Not Provided	Not Provided	Not Provided
Cycling Facilities (bikeways, routes	Not Permitted	Generally Avoided	Segregated or Marked Lanes	Segregated or Marked Lanes	Generally Not Provided	Shared Routes	Paved Shoulders	Generally Not Provided	Shared Routes	Not Provided
Pedestrian Facilities (sidewalks, multi-use trails (MUTs)	None	Sidewalks Both Sides	Sidewalks Both Sides	Sidewalks Both Sides	Sidewalks 1 or 2 Sides	Sidewalks 1 or 2 Sides	Walkway/ sidewalk where required	Walkway,/ sidewalk where required	Pedestrians Permitted No Special Facilities	Not Provided
Associated Services:										
Winter Management Priority	As per NBTI	Priority 1	Priority 2 with Major Bus Routes, Schools, Businesses	Priority 3	Priority 3	Priority 4	Priority 3	Priority 3	Priority 4	Not Provided
On-Street Parking	Prohibited	Prohibited or Peak Period Restrictions	Peak Period Restrictions	Permitted Other Than Peak Period	Permitted Other Than Peak Period	Permitted or Limited One Side	Prohibited	Prohibited	Prohibited	N/A
Traffic Calming Applications	Not Provided	Not Provided	Generally Not Provided	Provided Where Required	Not Provided	Provided Where Required	Not Provided	Not Provided	Not Provided	Not Provided
Streetscape Amenities	Not Provided	Limited Opportunities	Main Street-Type Features (i.e. lighting, sidewalks, vegetation)	Main Street-Type Features (i.e. lighting, sidewalks, vegetation)	Basic Industrial Park Features	Streetscape Features (vegetation, surfaces, amenities)	None	None	None	None