



City of Hamilton

**Development of Policy Papers for Phase Two of the
Transportation Master Plan for the City of Hamilton
RURAL ROAD STANDARDS POLICY PAPER**

FINAL REPORT

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1. INTRODUCTION

1.1 Study Background and Objectives

The City of Hamilton *City-wide Transportation Master Plan* will provide inputs to the *Growth Related Integrated Development Strategy* (GRIDS) and make recommendations to Council on the adoption of a City-wide Transportation Policy that is cognisant of Vision 2020 and other City of Hamilton long-term planning objectives. The project has been divided into three distinct phases. The first phase consisted of the technical calibration of the existing transportation model to reflect current transportation conditions in Hamilton. The second phase, which is the object of this and other policy papers, will focus on the development of 23 policy papers in the following areas: Travel Demand, Urban Development, System Performance, Infrastructure Planning and Infrastructure Financing. Following the completion of the Policy Papers, the City will proceed to develop transportation scenarios (Phase 3 of the project) based upon the results of the policy work performed in Phase 2 and the land use scenarios developed through the broader GRIDS study and will test the efficiency and viability of these scenarios by integrating them into the calibrated model.

This policy paper addresses the issue of **Rural Road Standards**. The remainder of this introduction provides a description of Rural Road Standards, including benefits and examples. Section 2 provides an overview of the existing situation in Hamilton. Section 3 provides supporting information on rural road standards. Section 4 outlines the development and refinement of policy options and potential supporting actions. Section 5 presents the recommended policies and Section 6 summarizes the impacts of these policies.

1.2 Description of Rural Roads and Key Issues

The City of Hamilton's roadway network contains roads built and maintained to both urban and rural standards. The focus of this Policy Paper is on the rural roadway network. As discussed in the Road Classification Policy paper, most municipalities classify rural roads based on the Ministry of Transportation's hierarchy of roadway function:¹, or the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads², with variations as necessary to reflect historical practices. Some municipalities also designate sub-classes in their roadway hierarchy (i.e. Major/Minor, Class I/Class II) as required to meet their local needs. As discussed in Section 2, the City of Hamilton utilizes three categories for rural roads –

- Rural Local,
- Rural Collector, and;
- Rural Arterial.

Rural roads can be characterized by factors that make their operational characteristics, design requirements and associated impacts different from roads in urban areas as summarized on Exhibit 1.1 below.

¹ Ministry of Transportation Geometric Design Standards Manual

² .Transportation Association of Canada (TAC) Geometric Design Guidelines for Canadian Roads (2000)

Exhibit 1.1: 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 (i.e. one-way streets)
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 farm vehicles	May include high degree of heavy vehicles but only on designated major routes

The term “Rural” refers to the predominant characteristics of adjacent land use along roads, and as indicated in Exhibit 1.2, rural roads have fundamentally different characteristics than urban roads regarding density and type of land use, density of street and roadway network, natural of travel patterns and the way in which these elements of the City are related.

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, residential, industrial or commercial areas being served. For example, roads in rural residential areas, serving individual farmsteads up to rural estate subdivisions, are designed to achieve many objectives other than serving passenger car residential traffic, including accommodating agricultural and industrial (i.e. aggregate extraction) 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).

One of the primary issues to be addressed by this policy paper is whether or not basic design standards are acceptable for rural roads, or whether higher standards (e.g. paved shoulders, pedestrian and cycling amenities, etc.) should be considered.

1.3 Benefits and Effects of Rural Roads to Hamilton

The main function and benefit of Hamilton’s rural roadway network is to provide the multiple route choices and associated high degree of connectivity required within the rural area. The grid of local, collector and arterial rural roads enhances rural connectivity, which in turn reduces vehicle hours of delay, vehicle-kilometres travelled trip lengths in the entire Hamilton rural area, as well as the socio-environmental impacts generated by rural traffic.

A related function of rural roads is to provide access for farm vehicles between farm parcels. It is not uncommon to see a tractor on one of Hamilton's rural roads. At times this may suggest a potential conflict with the desire to move traffic safely and at a reasonably high speed.

2. EXISTING CITY OF HAMILTON POLICIES

Exhibit 2.1 summarizes the current City of Hamilton road classification policy for rural roads. Under this classification, rural roads are described as follows:

“ Generally characterized by sparsely spaced road network, typically without subdivision-type configuration, often with ditches on one/both sides.”

Exhibit 2.1: Existing City of Hamilton Road Classification for Rural Roads ⁽¹⁾

	Rural		
	Local	Collector	Arterial
traffic service function	traffic movement secondary consideration	traffic movement equal-consideration with access	traffic movement primary consideration
land service/ access	land access primary consideration	traffic movement equal consideration with land access	land access secondary consideration
traffic volume (veh/day typical)	<1000	<5000	> 5000
flow characteristics	interrupted flow	interrupted flow	free flow except at signals
design speed (km/h)	60-80	80-100	80-100
posted speeds	50-70	60-80	60-80
vehicle type	passenger and service vehicles	passenger and service vehicles	all types, truck route
desirable connections	other local and collectors	locals, collectors and arterials	collectors, arterials, freeways, provincial highways
transit service	generally not present	typically not present	buses may be present
accommodation of cyclists	no restrictions or special facilities	no restrictions or special facilities	wider lanes or special facilities desirable, where required
accommodation of pedestrians	pedestrians permitted, no special facilities	pedestrians permitted, no special facilities	pedestrians permitted, no special facilities
parking (typical)	prohibited	prohibited	prohibited
min.intersection spacing (m)	n/a	n/a	n/a
right-of-way width (m) (typical)	20-26	20-26	26-36
traffic calming	not applicable	not applicable	not applicable

Note: ⁽¹⁾ See Road Classification Policy Paper for Proposed Road Classification System, which is similar to table above.

3. SUPPORTING INFORMATION AND ANALYSES

3.1 Review of Existing Rural Road Standards

In Hamilton, the basis for Rural Roadway Standards involves the following three official sources:

- Ministry of Transportation Geometrical Design Standard Manual;
- Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads; and
- Minimum Maintenance Standards for Municipal Highways (Regulation 239/02 of the Municipal Act).

These sources provide detailed design guidance on rural roads and rural road standards.

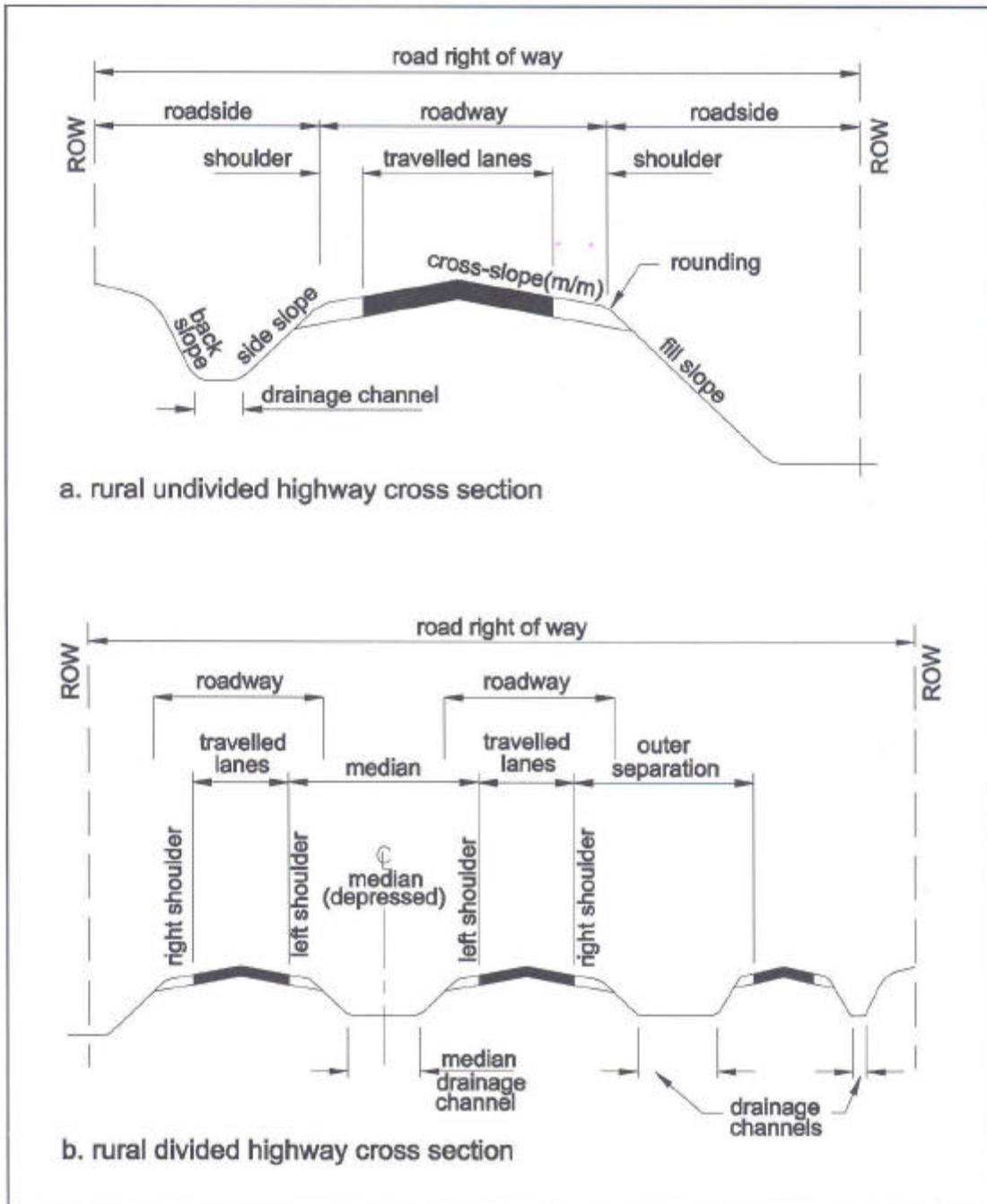
Exhibit 3.1 illustrates typical cross-sections for rural roads. In general, rural roads in Hamilton are constructed with gravel shoulders and ditches leading to natural drainage channels, as illustrated by the photos below.



3.2 Enhanced Rural Road Features

Recently, there has been pressure for the City to construct some rural roads to a higher standard, including providing curb and gutter, paved shoulders and/or sidewalks. Some of these features are illustrated in the photos in Exhibit 3.2. The rationale for these improved standards are that they provide improved safety and improved user comfort (particularly for pedestrians and cyclists). The draw-back is that the cost of roads can be significantly higher if features beyond the basic rural standard are included.

Exhibit 3.1: Typical Rural Roadway Cross-section Elements



Source: Transportation Association of Canada, Canadian Geometric Design Guide for Canadian Roads (1999)

Exhibit 3.2: Example Features that Could be Applied to Rural Roads ⁽¹⁾



Surface Drainage Facilities



Paved Shoulder with Rumble Strips



Partial Paved Shoulder



Multi-use Path Adjacent to Rural Road

Notes: ⁽¹⁾ These photos are intended to be illustrative and are not necessarily accepted practices or follow current design standards.

4. POLICY OPTIONS

Building on the work included in the Road Classification Policy Paper, there are several possible considerations for dealing with rural road issues.

4.1 Road Classification Considerations

The road classification Policy Paper outlined and proposed three categories of rural roads: local roads, collector roads and arterial roads. The characteristics of these types of roadways may vary significantly depending on the location in the City of Hamilton. For example, a local road in a rural area may serve mainly large lot residential homes or it may serve a large farm. In each case, the users of the road would be quite different.

As with the urban road classification system, which distinguishes between major and minor arterials, and residential and industrial roads, it is also possible that sub categories of rural roads be established. For example, a category for rural residential roads could be considered. The advantage of establishing sub-categories is that design features can be tailored to the rural road characteristics. The primary disadvantage is that it adds an additional degree of complexity to the road classification system. For the purposes of establishing basic road classifications, it is proposed that the three categories be maintained. The proposed road classification system provides for a large range on the features of rural roads. For example, a rural arterial could have a right-of-way width of 20-36 metres and a design speed of 80-100 km/hr.

As outlined in the Road Classification Paper, another consideration related to road classification is that of **special character roads**. There is a legacy of recognizing the special features of Hamilton roadways. The Niagara Escarpment and areas with significant heritage and natural features have influenced policy. As a result, it is important to recognize the legacy of policies relating to those roadways with special characteristics.

It is proposed that special character roads be explicitly recognized, but that this be done outside of the basic road classification system. Special characteristic roads could be recognized through the adoption of policies included area transportation master plans (as was done for the Ancaster Transportation Master Plan) or through special Council by-laws. The elements that could be considered for inclusion in this section include:

- recognition of scenic and historical character
- views of and from the Niagara Escarpment
- potential for alternative winter control practices to reduce road salt

4.2 Design Standards

As noted previously, rural roads vary substantially in terms of characteristics and uses. Many of the most enjoyable and scenic roads in Hamilton could not have been constructed if current design standards were rigidly applied. Therefore, it is appropriate to consider the degree to which applicable design standards will be applied to rural roads in the future. The two basic options are to apply:

- **Desirable standards** where every effort is made to follow prescribed maximum levels to achieve the additional margin of safety and capacity normally associated with a “desirable” design, and at an associated cost. Desirable standards are usually considered for rural highways, arterials and major collectors which are important links

in the rural roadway network, and carry significant traffic volumes at medium to high speeds; or

- **Acceptable standards** where conditions warrant using minimum design levels, for example on rural locals and minor collectors with lower volumes and operating speeds, or where terrain, adjacent land use or economic factors may prevent the use of desirable standards.

There are advantages and disadvantages to each approach. Applying maximum design standards could have significant cost implications as well as environmental implications (e.g. increased cut/fill, wider right-of-ways). However, opting for minimum standards in all cases could have implications on safety.

It is proposed that the decision to use Desirable vs. Acceptable Rural Roadway Standards will be dictated by the category of roadway involved, its operating conditions (traffic volume and type), physical conditions (i.e. terrain), adjacent land use and access needs, and available financial resources. Inclusion of special features such as paved shoulders, bike lanes, adjacent multi-user paths (discussed below) will be assessed during preliminary design stages and will take into account adjacent development, potential user needs, on-going maintenance requirements and potential drainage issues.

4.3 Design Features for Pedestrians and Cyclists

Many rural roads in Hamilton are constructed with gravel shoulders. Gravel shoulders have several disadvantages including:

- Increased maintenance requirements;
- Increased dust;
- Reduced safety for cyclists (who have to ride on the edge of the pavement in the traffic lane) and sometimes pedestrians.

It is beyond the scope of this policy paper to conduct a detailed assessment of the costs and safety implications of providing paved shoulders. However, it is proposed that the default for rural collectors is to provide paved shoulders if traffic volume > 1000 veh/day. Rural arterials should have paved shoulders by default. This is consistent with the recommendations of the former Region of Hamilton-Wentworth's Design Guidelines for Bikeways. Further, it is proposed that rural collector roads include a walkway/sidewalk on one side if it connects rural settlement area to school or community facility less than 2.5 km away. These recommendations would be subject to review for each facility during the preliminary design stages of road construction/reconstruction.

5. RECOMMENDED POLICIES

Based on the above review, the following policies are recommended for consideration in the Hamilton Transportation Master Plan:

<i>Recommended Policy</i>
Use the proposed core roadway classification system and associated enhancements/variations as the basis for considering rural road standards.
<i>Implementation</i>
<ul style="list-style-type: none">• Adopt the proposed road classification system that delineates separate categories for Rural Arterials, Rural Collectors and Rural Local roads. Delineation of sub-categories of rural roads may be considered where warranted as part of area Transportation Planning studies, but will not form part of the official classification system.• The Rural Roadway Standards will be used not only for the design, construction and maintenance of rural roads, but also to determine the warrants for traffic operation and control changes on rural roads such as, but not limited to, right-of-way widths, use of stop controls and construction of exclusive turn lanes.

<i>Recommended Policy</i>
Follow “Desirable” or maximum design standards, and “Acceptable” or minimum design standards as warranted by specific needs and conditions.
<i>Implementation</i>
<ul style="list-style-type: none">• Maintain Special Character Roads according to acceptable minimum engineering standards and practices, to levels that will not increase their design capacity.• The decision to use Desirable vs. Acceptable Rural Roadway Standards will be dictated by the category of roadway involved, its operating conditions (traffic volume and type), physical conditions (i.e. terrain), adjacent land use and access needs, and available financial resources.• Inclusion of special features such as paved shoulders, bike lanes, adjacent multi-user paths will be assessed during preliminary design stages and other planning process and will take into account adjacent development, potential user needs, on-going maintenance requirements and potential drainage issues.

Recommended Policy

Consider the need for facilities to accommodate pedestrians, persons using mobility aids and cyclists on all rural roads, and attempt to provide paved shoulders on rural roads where cycling is prevalent and sidewalks where the roadway leads to a school or community facility.

Implementation

- Develop and adopt design standards for rural roads with paved shoulders
- Conduct on-going needs assessments to identify rural roads where cycling/pedestrian facilities may be warranted.

6. IMPACTS OF POLICY OPTIONS

6.1 Assessment Factors

Assessment of policy options is based on factors for achieving sustainable growth and development across all of the policy papers developed in this project. They fall under the three major categories of **social, economic and environmental** impacts, and they are described briefly below.

Exhibit 6.1: Assessment Factors

Impact	Acts on	Description (or examples)
Social	Residential communities	Improves quality of life in neighbourhoods
	Safety and security	Reduces collisions; improves personal safety and security
	Ease of implementation & governance	Provides clarity, measurability, accountability
Economic	Development	Attracts employment, capital, optimal use of transportation infrastructure capacity, and future land use
	Land value	Increases land value, or does not decrease land values
	Operating and capital costs	Reduces or defers public and private costs of transportation capital (construction or acquisition of fixed infrastructure and rolling stock) and operations (maintenance, enforcement, delay, fuel, etc.)
	Congestion	Maintains traffic flow at acceptable level
Environmental	Air quality	Reduction of Criteria Air Contaminants
	Noise and vibration	Minimizes noise impacts
	Natural environment	Improves water quality, green spaces, flora and fauna etc.

The rating system that will be used to apply these criteria is a visual five-point scale, to reflect a range from strong positive impact to strong negative impact. **(+, +, o, --, --)**

+ Represents the strong positive impact, **o** represents absence of significant impact either way, and **--** represents strong negative impact.

6.2 Summary of Evaluation

The assessment factors have been applied to the three recommended policies for Rural Roadway Standards in Hamilton as discussed in Section 5. The results of a preliminary qualitative assessment using the rating scheme described previously are provided in Exhibit 6.2.

Exhibit 6.2: Impacts of Policy Options

Policy Option	Social			Economic				Environmental		
	Residential Communities	Safety and Security	Ease of Implementation and Governance	Development	Land Value	Operating and Capital Costs	Congestion	Air Quality	Noise and Vibration	Natural Environment
Use the proposed core roadway classification system and associated enhancements/variations as the basis for considering rural road standards.	+	+	+	+	+	0	0	+	0	0
Follow “Desirable” or maximum design standards, and “Acceptable” or minimum design standards as warranted by specific needs and conditions.	+	-	-	0	0	+/-	0	0	+	+
Consider the need for facilities to accommodate pedestrians, persons using mobility aids and cyclists on all rural roads, and attempt to provide paved shoulders on rural roads where cycling is prevalent and sidewalks where the roadway leads to a school or community facility.	+	+	+	+	+	-	0	+	+	+