

**APPENDIX E**  
**Regional Right-of-Way Guidelines**

# The Road to *Change*

## Halton Region Transportation Master Plan



## Regional Right-of-Way Guidelines

July 2011



Final Report

2031

**URBAN  
STRATEGIES  
INC .**





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# 1.0 INTRODUCTION

## 1.1 Study Purpose and Contents

This document provides a set of implementable Regional Road right-of-way guidelines in support of the Transportation Master Plan. These guidelines are meant to be consulted at the beginning of any process or project undertaken that involves Regional Roads.

The guidelines are illustrated with a set of typical cross sections and plan view drawings that reflect and accommodate the range of functional requirements anticipated to the year 2031. Conceptual images of future Regional Roads are illustrated through imagery and photomontage. Each category of guidelines – Rural, Corridor and Node - is supported with applicable regional planning policy and illustrated with a complete drawing set. Site specific conditions may require modifications to the guidelines and these will be reflected during the Class EA process.

## 1.2 Balanced Transportation

Traditionally, the role of Regional Roads has been limited to being thoroughfares primarily designed to move vehicular traffic. These guidelines reflect a shift in direction towards the delivery of a balanced transportation system that aims to reduce automobile dependency in the transportation network. In terms of functional right-of-way requirements, a balanced transportation system provides an allocation of right-of-way and road design to accommodate options for multi-modal transportation, including transit and active transportation<sup>1</sup>. In the context of sustainability, balanced transportation works toward easing congestion and commute times, and reducing transportation-related emissions and greenhouse gases. Balanced transportation also supports Regional health initiatives to promote transportation as a form of regular physical activity through the provision of transit and active transportation infrastructure<sup>2</sup>.

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<sup>1</sup> Active transportation is defined as non-motorized travel such as walking, cycling, rollerblading and the use of mobility devices (e.g. wheelchairs).

<sup>2</sup> As per Halton Region Health Department: *Creating Walkable and Transit-Supportive Communities in Halton*, February 2009.

## 1.3 Integrating Balanced Transportation with Land Use

Regional right-of-ways play a role in creating a balanced transportation system by:

- Promoting transit-supportive development and the viability and optimization of transit infrastructure by including functional requirements for dedicated transitways, High Occupancy Vehicle lanes (HOV), reserved bus lanes and other transit priority measures;
- Encouraging active transportation with continuous sidewalks, multi-use paths, designated on-road cycling facilities, and their respective crossing treatments; and
- Supporting motorized travel through dedicated turning lanes and signals, HOV lanes, and where appropriate, with on-street parking.

The integration of transportation planning, transportation investment, and land use planning comes together with the practice of *placemaking*, or the transformation of Regional Roads from single purpose roads into multi-faceted corridors where people will live and work, where residents and visitors can come, shop or gather. Through attractive and context-sensitive design, Regional Roads can become a platform for long-term growth and economic development in urban areas. By thinking over the long-term, Regional Roads can be built with the flexibility to respond to the gradual maturing of neighbourhoods and an expanding mix of uses. In order for Regional Roads to be experienced as actual places, *placemaking* needs to be reinforced with a land use mix that supports investments in transit and active transportation. Supportive land use policies would minimize instances of rear-lotting onto or parallel to Regional Roads and favour development with fronting uses that animate and define the street edge. In rural areas, *placemaking* means respecting the natural qualities of a rural setting.



## 2.0 POLICY CONTEXT

Over the past few years the Province issued the *Places to Grow Growth Plan for the Greater Golden Horseshoe* (2006), created a new regional transportation agency (Metrolinx), and prepared a new transportation plan for Greater Toronto and Hamilton (*The Big Move*, 2008). In response to these Provincial initiatives, Halton Region has prepared Regional Official Plan Amendment (ROPA) 38 that will provide a long term plan for the Region to the year 2031, as well as a Transportation Master Plan to the year 2031. ROPA 38 identifies where growth in population and employment will occur. The illustration in Figure 1 indicates the location of Regional Roads – in red – in relation to that growth. The design of Regional Roads will need to support this growth by anticipating the appropriate density and land use mix of future and existing communities through which Regional Roads travel.

- Regional Road
- - - Proposed Regional Road
- Waterfront Park (See Map 2)
- Major Transit Station
- Proposed Major Transit Station
- Rail Line
- Proposed Major Arterial
- Major Road
- Provincial Freeway
- Lot and Concession Line
- Municipal Boundary
- Urban Area
- Hamlet
- Agricultural Rural Area
- Regional Natural Heritage System
- Regional Natural Heritage System Overlay
- Greenbelt Plan Policy Area
- Greenbelt Natural Heritage System
- Mineral Resource Extraction Area
- North Aldershot Policy Area
- Greenbelt Plan Protected Countryside Boundary
- Niagara Escarpment Plan Boundary
- Parkway Belt West Plan Boundary
- Built Boundary
- Employment Area
- Urban Growth Centre
- Area Eligible for Urban Servicing
- Halton Waste Management Site

This map should be viewed and interpreted in conjunction with the text of the Official Plan.

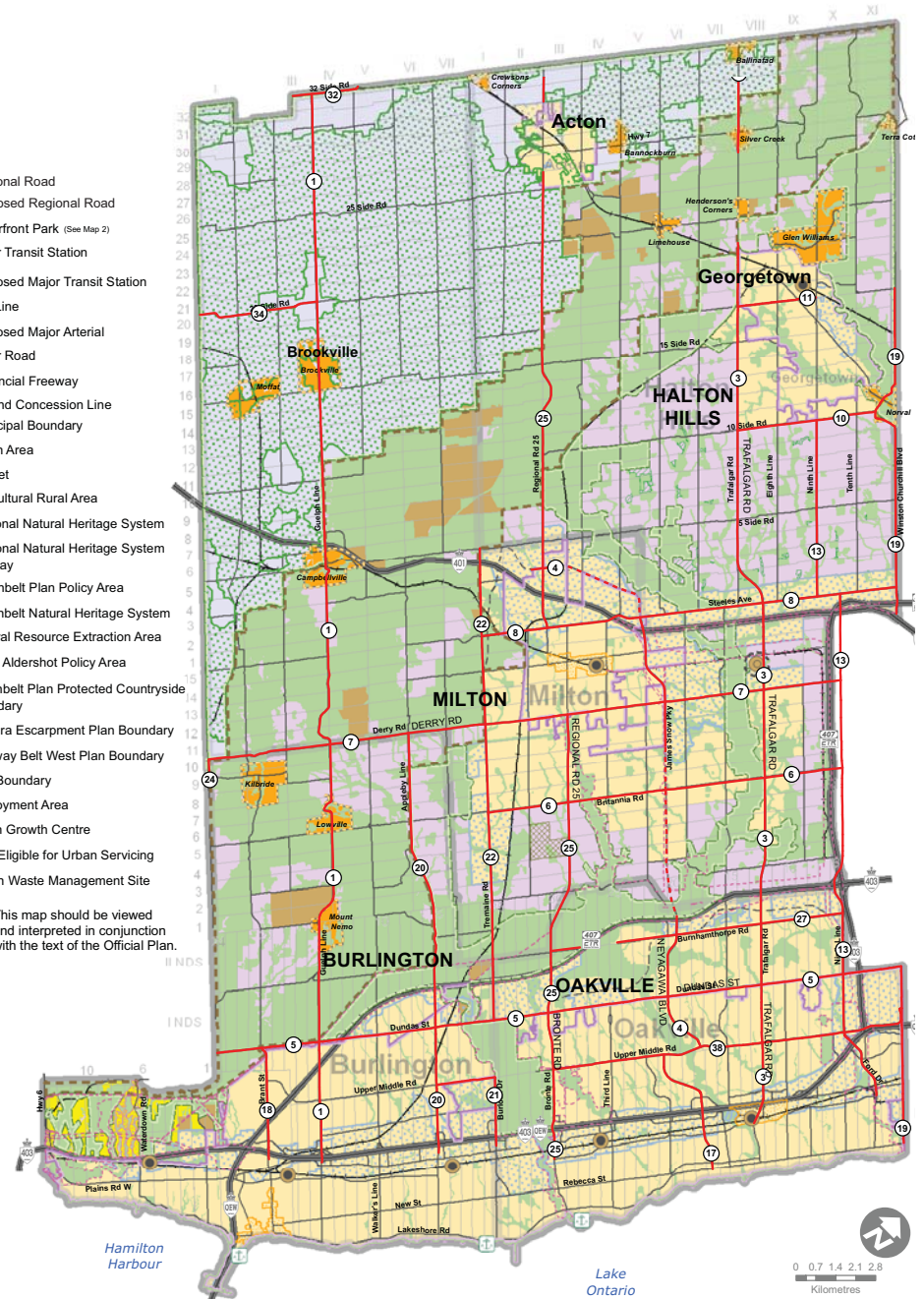


Figure 1: Regional Structure  
Source: ROPA 38, as approved by Council December 2009



## 3.0 ROADWAY DESIGN

### 3.1 Right-of-Way Categories

The guidelines are grouped into three categories: Rural/Natural Heritage System, Corridor and Node. They reinforce an urban structure model that directs growth away from rural and natural heritage areas and towards identified intensification areas<sup>3</sup>.

#### 1. Rural / Natural Heritage System

Rural lands are designated areas for agriculture and protection of infrastructure that supports farming, and Natural Heritage Systems are lands designated for natural area conservation. In planning for intensification and new urban lands, the Region is seeking to minimize development of prime agricultural lands. Regional Roads in Rural / NHS lands should respect the rural character of the area.

#### 2. Corridors

Corridors are intensification areas identified along major roads, arterials or higher order transit corridors that have the potential to provide a focus for higher density mixed-use development and

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<sup>3</sup> Intensification areas are lands identified to be the focus for accommodating intensification, or the development of a property, site or area at a higher density than currently exists. Intensification areas include urban growth centres, intensification corridors, nodes, major transit station areas, infill, redevelopment, and the expansion and conversion of existing buildings or developed areas

<sup>4</sup> ROPA 38

employment use consistent with planned transit service levels<sup>4</sup>. The design and physical appearance of corridors contribute directly to livability and economic success, and therefore should offer a positive community environment and convenient access for residents and businesses to a variety of goods and services.

Corridors will generally vary in use along their length, and their design needs to reflect the change in surroundings. Over time, corridors should include a mix of uses, such as: sidewalk-fronting shops or businesses, offices, civic uses, appropriately scaled and designed public spaces, and a broad mix of residential forms and densities. Corridors that travel through employment lands should provide for development of a quality business environment and include a range of offices, industrial-type buildings, and services supporting employment, such as business-related retail and restaurants, located in buildings with doors and windows that front the street.

#### 3. Node

Nodes are defined as compact, transit-oriented, pedestrian-friendly and mixed-use/residential neighbourhood centres that are areas of more intensive urban uses within a community. They provide area residents with a hub to meet a variety of daily needs (goods and services) and serve as a social focus for the community and as concentrations of office employment uses. Nodes are generally located at the intersections of major transit corridors within the identified intensification areas, and extend approximately 200-400 metres from the intersection.

## 3.2 Design Elements

Different design elements are to be accommodated within the right-of-way according to their rural, corridor or node category. Generally, design elements will vary according to population, travel, and land use demands, adding more design elements as development intensifies. For instance, design elements in rural road sections include a paved shoulder, ditch / swale, trees and plantings, whereas design elements in a corridor could include transit priority measures (e.g. HOV or transitway), a multi use path for active transportation, planted boulevard, and pedestrian scale lighting in key activity areas. The table opposite is provided as a quick-reference guide to distinguish among the road categories. A glossary of design elements is provided at the back of this report.





DESIGN ELEMENT	RIGHT-OF-WAY CATEGORY		
	Rural / NHS	Corridor	Node
		 Employment  Mixed-use	
paved shoulder	yes	n/a	n/a
ditch / swale	yes	n/a	n/a
transit facility	n/a	variable (transit priority / HOV / RBL / transitway)	variable (transit priority / HOV / RBL / transitway)
pedestrian facility	n/a	sidewalk / multi-use path	sidewalk
bicycle facility	paved shoulder	variable (multi-use path / wide curb lane / bicycle lane)	variable (wide curb lane and / or bicycle lane)
parking	n/a	n/a	off-peak (optional)*
trees in boulevard	n/a	yes	yes (potentially in tree pits)
pedestrian scale lighting	n/a	near transit stops, support services & higher density areas	yes
building setback	n/a	variable	minimized

Figure 2: Quick Reference Table

\* Trafalgar Road between Dundas Street and Highway 407

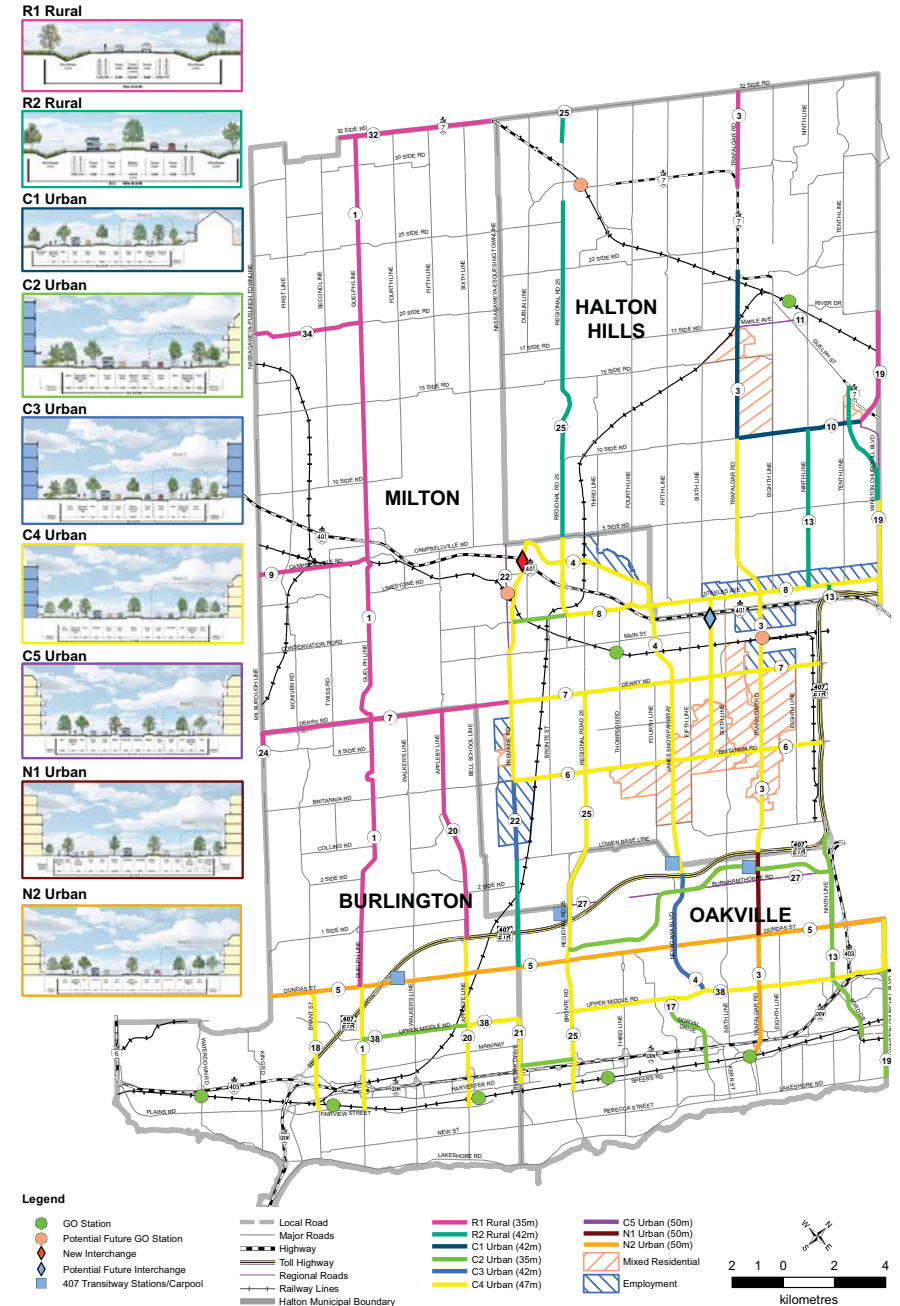
### 3.3 Right-of-Way Classification Code

Each variation within the rural, corridor and node categories is assigned a code, as per the figure below, according to the right-of-way width, the number of shared travel lanes, and presence or absence of priority lanes. Definitions for these terms may be found in the glossary in Appendix C.

Code	Right-of-Way Width	No. of Shared Travel Lanes	No. of Priority Lanes
Rural (R)			
R(1)	35m	2	n/a
R(2)	42m	4	n/a
Corridor (C)			
C(1)	42m	4	n/a
C(2)	35m	4	n/a
C(3)	42m	4	n/a
C(4)	47m	4	HOV / RBL (2)
C(5)	50m	4	Transitway (2)
Node (N)			
N(1)	50m	4	HOV (2); Transitway (2)
N(2)	50m	4	HOV / RBL (2)

Figure 3: Right-of-Way Classification Code

#### Halton Region - 2031 Road Cross Sections (Regional Roads Only)



## 4.0 General Guidelines

### 4.1 Pedestrian Facilities

To encourage pedestrian presence on streets, perceived and actual safety and comfort must be priorities. Implementation of pedestrian facilities shall consider the following:

1. Integrate pedestrian crossings at all street intersections, where possible, and:
  - a. Provide pedestrian crosswalks on all sides of the road;
  - b. Ensure that pedestrian crossings are a natural and convenient extension of the overall pedestrian network;
  - c. Provide pedestrian crossings at locations that are convenient to transit stops; and
  - d. Provide pedestrian crossings whenever a multi-use path crosses an intersection.
1. Provide pedestrian-scale lighting:
  - a. At and within proximity to transit stops / stations;
  - b. Throughout nodes; and
  - c. Within corridors at locations of support services and higher density areas.
2. Avoid pedestrian islands where possible at intersections where pedestrian priority is desirable, including nodes, high activity areas, areas of mixed use, areas of retail, and other areas where

pedestrians are encouraged to gather. This will improve the pedestrian experience.

3. Design facilities according to Accessibility for Ontarians with Disabilities Act (AODA).

### 4.2 Bicycle Facilities

In order to encourage and promote cycling, the following will be considered:

1. Provide cycling facilities on all Regional Roads. On-road facility options include: a paved shoulder at a minimum width of 1.5 metres, shared HOV lanes at a minimum width of 4.2 metres, bicycle lanes at a minimum width of 1.8 metres; and sidewalk / multi-use paths at a minimum width of 3.0m metres.
2. Consider special design treatments at high traffic intersections to reduce conflict for all travel modes, and particularly to avoid conflict between right-turning motorized vehicles and cyclists who are continuing straight through the intersection.

3. Employ standardized street signage to indicate the cycling facility (e.g. signage to mark exclusive bicycle facilities).
4. Increase cyclist safety and comfort by:
  - a. Ensuring a minimum curb lane width of 4.2 metres in the absence of a dedicated cycling facility.
  - b. Minimizing or avoiding, by appropriate design, conflict in and near transit stops.
  - c. Employing signage or other markings in wide curb lanes, bicycle lanes and multi-use paths to remind motorists and passengers to check for cyclists before opening a car door.
  - d. Minimizing or avoiding, by appropriate design, conflict between cyclists and pedestrians in the design of multi-use paths (i.e. consideration of a separation between bicycles and pedestrians).
  - e Supporting safe crossings for cyclists through an intersection.
2. Plan HOV and Reserved Bus Lanes in a manner that allows for the flexibility to convert from one to the other.
3. Employ standardized street signage to indicate transit priority (e.g. signage for HOV lanes and Reserved Bus Lanes).
4. Provide sheltered seating at transit stops / stations.
5. Provide pedestrian infrastructure (e.g. multi-use path or sidewalk) to and from transit stops.
6. Provide pedestrian-scale lighting at and in proximity to transit stops.
7. Design facilities according to Accessibility for Ontarians with Disabilities Act standards.

## 4.3 Transit Facilities

In order to encourage transit use, the following will be considered:

1. Promote transit use through the provision of HOV lanes, Reserved Bus Lanes, Transitways, and where appropriate, additional transit priority measures (e.g. queue jump lanes).

## 4.4 Landscaping

Landscaping of medians and boulevards on Regional Roads contributes to a sense of place, comfort, and street beautification. Although landscaped boulevards and medians are suitable to a variety of roads, they are most important on wide rights-of-way, where they provide spatial definition and a comfortable sense of enclosure that encourages motorists to slow down, increases the enjoyment of pedestrians, and adds character to the street. Landscaping can also be used to protect pedestrians from the elements and to buffer them from passing vehicles.



The goal in establishing the following guidelines is to ensure a standard of landscaping initiatives - in particular the planting of trees - that will result in healthy trees and plantings that will thrive for generations. Additional information on how to establish healthy trees is located in Appendix A.

In recognition of the above, landscaping practices will consider the following:

1. Encourage a minimum median and / or boulevard width sufficient to support the growth of a row of trees where possible.
2. Plant trees in a row at sufficient distance from each other to promote healthy root growth. Generally, it is recommended that a row of trees planted in urban conditions be planted at a distance of between 8 and 10 metre intervals.
3. Provide approximately 30m<sup>3</sup> of high quality soil for a single tree, whether planted in softscaping or hardscaping; high quality soil is defined as fertile, friable, and free of calcium carbonate, subsoil, refuse, heavy clay, noxious weed seeds, large debris, and other deleterious substances.
4. In instances where a row of trees is to be planted in hardscaping (e.g. sidewalks), provide sufficient volume of high quality soil to support tree growth, at a minimum average soil volume of 15m<sup>3</sup> per tree in shared soil conditions (e.g.

continuous soil planters or soil cells). Soil volume closer to 30m<sup>3</sup> per tree is encouraged in shared soil conditions where feasible in order to foster species maturity (refer to Appendix for further details).

5. In instances of a double row of trees where the distance between the centre of one row of trees and the other row of trees is less than 6.0 metres, the two rows should be staggered slightly rather than planted directly opposite each other.
6. Retain and reuse any high quality soil located on-site, or replace it with soil of equal or better quality.
7. Protect soils from compaction during construction in order to allow for healthy growth of tree roots.
8. Encourage vegetation to improve the appearance of the street, to buffer pedestrians from vehicular traffic, and in places where unique identity or profile is desirable.
9. Plant drought-resistant, non-invasive species and encourage the planting of native species.
10. Protect trees against snow clearing and de-icing activities by planting them at a minimum of 1.5 metres between the curb and the centre of the tree or by planting in a raised median or boulevard where possible.
11. Implement a watering program for the first three years for young and newly transplanted trees.

## 4.5 Ecopassage Considerations

The Region’s Natural Heritage System (NHS) identifies the opportunity to coordinate and implement a parallel network of ecopassages with the Regional Road Network. Ecopassages provide critical movement corridors for a variety of wildlife - from small mammals to reptiles - by ensuring their ability cross physical barriers. A network of ecopassages can be identified by overlaying the NHS with the existing and future road network to locate the most strategic wildlife movement corridors. Identifying ecopassages early in the process will make the best use of existing linkages and enable the formation of a coordinated ecopassage network.

## 4.6 Traffic Calming Considerations

The Regional Road Network is comprised of major arterial roadways whose primary function is to serve mainly inter-regional and regional travel demands and to facilitate relatively high traffic volumes, including commercial traffic, in a safe and efficient manner. Therefore, many traditional traffic calming techniques such as speed humps and bump outs are not suitable for implementation on Regional roads due to the requirements to safely and efficiently handle higher traffic speeds and serve as a critical transportation system for the movement of goods while accommodating all vehicle types such as emergency, heavy trucks and buses.

Typical treatments that may be considered for Regional Roads would be more non-evasive or tactile devices such as textured pavements and crosswalks, gateway treatments, and pavement lane narrowing through the use of pavement markings or median islands. The Traffic Calming techniques or applications that may be considered appropriate for Regional Roads should be based on the suitability to a particular location or situation relative to the specific operational characteristics of the roadway section. As such, these measures will be considered on a case by case basis, and where possible coordinated with capital construction projects.

The following table lists potential traffic calming treatments that may be considered on Regional Roads:

Non-physical Measures	Enforcement measures Radar message board
Tactile Devices	Transverse rumble strips Textured pavements and crosswalks
Horizontal Displacement Devices	Gateway treatments Median islands Roadway narrowing through pavement markings
Signage Measures	Traffic calmed signage
Pavement Measures	Higher visibility crosswalk Colored pavement Textured pavements Transverse pavement markings

Figure 4: Traffic Calming Elements

## 5.0 Guidelines by Classification Code

### 5.1 Rural / Natural Heritage System

#### General Rural (R) Guidelines

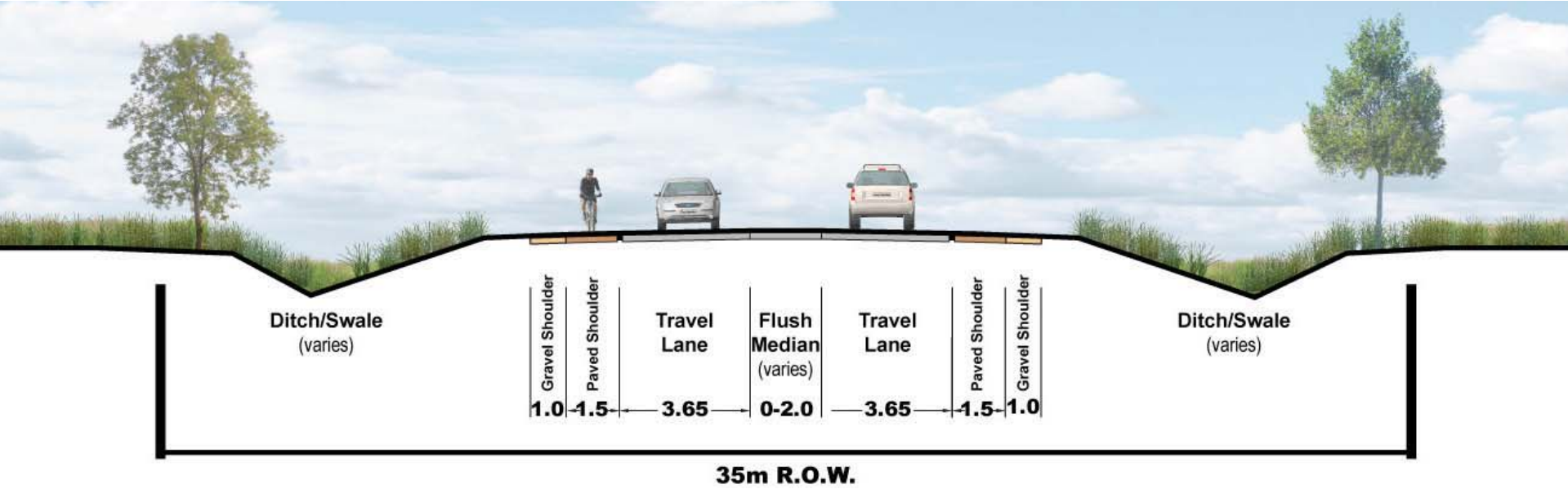
On Rural (R) roads, it shall be a general policy of the Region to:

1. Set a maximum lane width of 3.65 metres, not including any bicycle facilities.
2. Pave and stripe a minimum shoulder width of 1.5 metres on both sides of the street.
3. Provide a minimum unpaved shoulder width of 1.0 metres on both sides of the street.
4. Provide a ditch / swale for drainage.
5. Plant a row of trees on the outside edge of the ditch / swale.
6. Plant native trees and non-invasive plant species in support of the NHS designation.

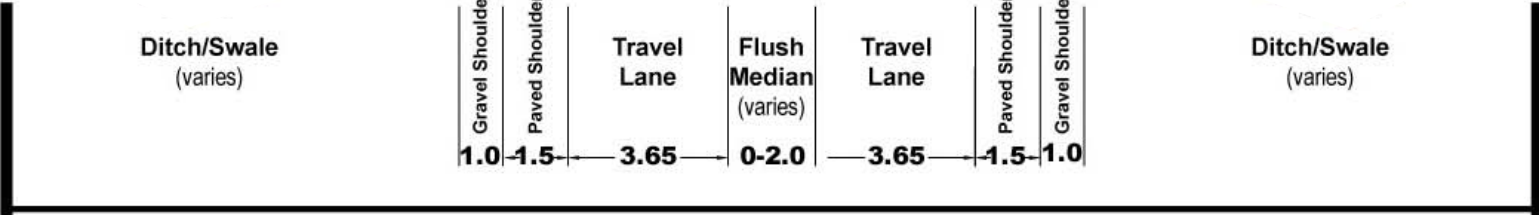
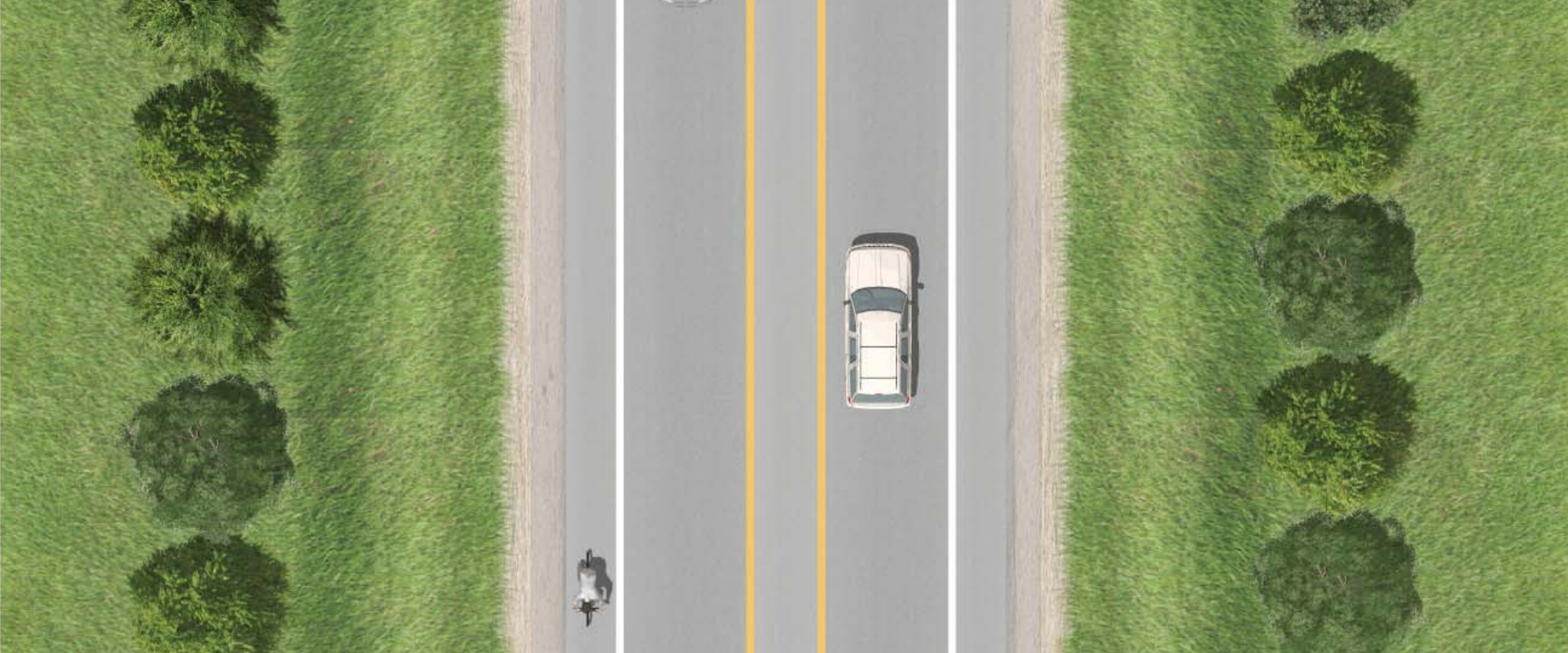
Rural / NHS (R)	Right-of-Way Width	No. of Shared Travel Lanes	Priority Lanes
R(1)	35m	2	n/a
R(2)	42m	4	n/a

Figure 5: Rural (R) Classification Codes

# R(1) Rural



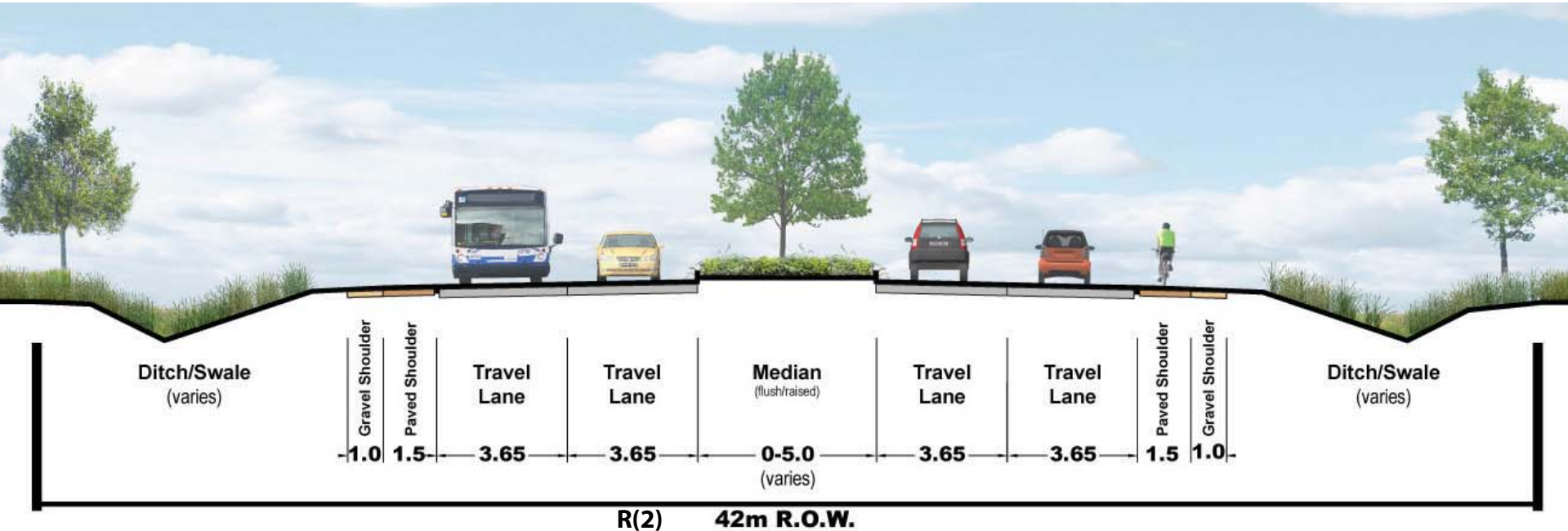
# R(1) Rural



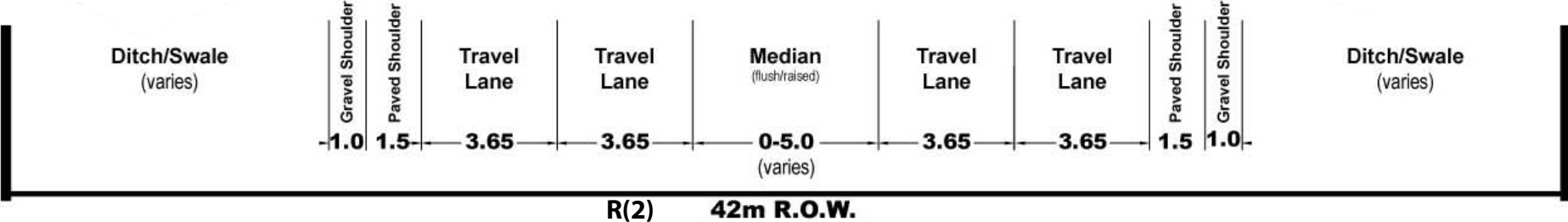
**35m R.O.W.**



# R(2) Rural



# R(2) Rural



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## 5.2 Corridor guidelines

### General Corridor (C) Guidelines

On Corridor (C) roads, it shall be a general policy of the Region to:

1. Set an inside lane width of 3.5 metres.
2. Provide pedestrian and bicycle facilities on both sides of the street according to either Detail 1 or Detail 2:
  - a. Detail 1 sets a curb lane width of 4.2 metres and provides a shared pedestrian-bicycle multi-use path at a minimum width of 3.0 metres.
  - b. Detail 2 sets a curb lane width of 3.5 metres, an on-road bike lane of 1.8 metres, and a sidewalk/multi-use path at a minimum width of 3.0 metres.
3. Whenever width is sufficient, plant a row of trees in medians.
  - a. Sufficient width for tree growth is encouraged, and considered to be 3.0 metres for medians, not including the curb).
4. Plant of a row of trees in the boulevards on both sides of the sidewalk / multi-use path.
5. When a transitway is provided, provide a permanent, raised, tree-lined median on both sides of the transitway.
6. Provide transit stops with sheltered seating in the boulevards; for the transitway in C(5), provide transit stops / stations with sheltered seating in the medians.
7. Provide standardized street lights at regular intervals on boulevards and medians.
8. Provide pedestrian scale lighting at transit stops / stations, support services and higher density areas.

Corridor (C)	Right-of-Way Width	No. of Shared Travel Lanes	Priority Lanes
C(1)	42m	4	n/a
C(2)	35m	4	n/a
C(3)	42m	4	n/a
C(4)	47m	4	HOV/RBL (2)
C(5)	50m	4	Transitway (2)

Figure 6: Corridor (C) Classification Codes

# C(1) Rural/Urban

In addition to the general Corridor (C) policy, on C(1) roads the following will be considered:

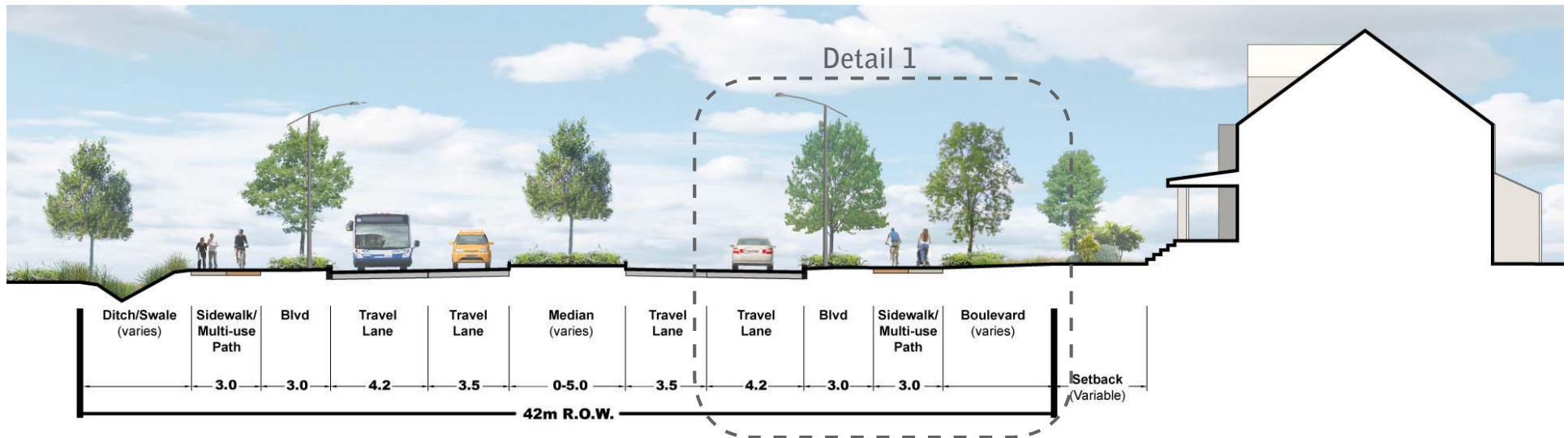
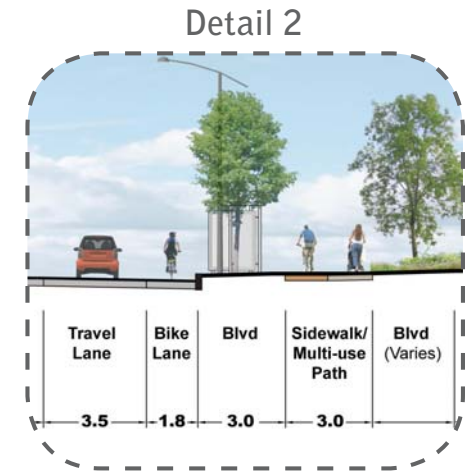
1. Provide a variable centre median.
2. Recognize the transition between rural and urban conditions by employing different design elements for each:

In rural conditions:

- a. Provide a ditch / swale.
- b. Plant a row of trees on the outside edge of the ditch / swale and a row of trees in the boulevard.

In urban conditions:

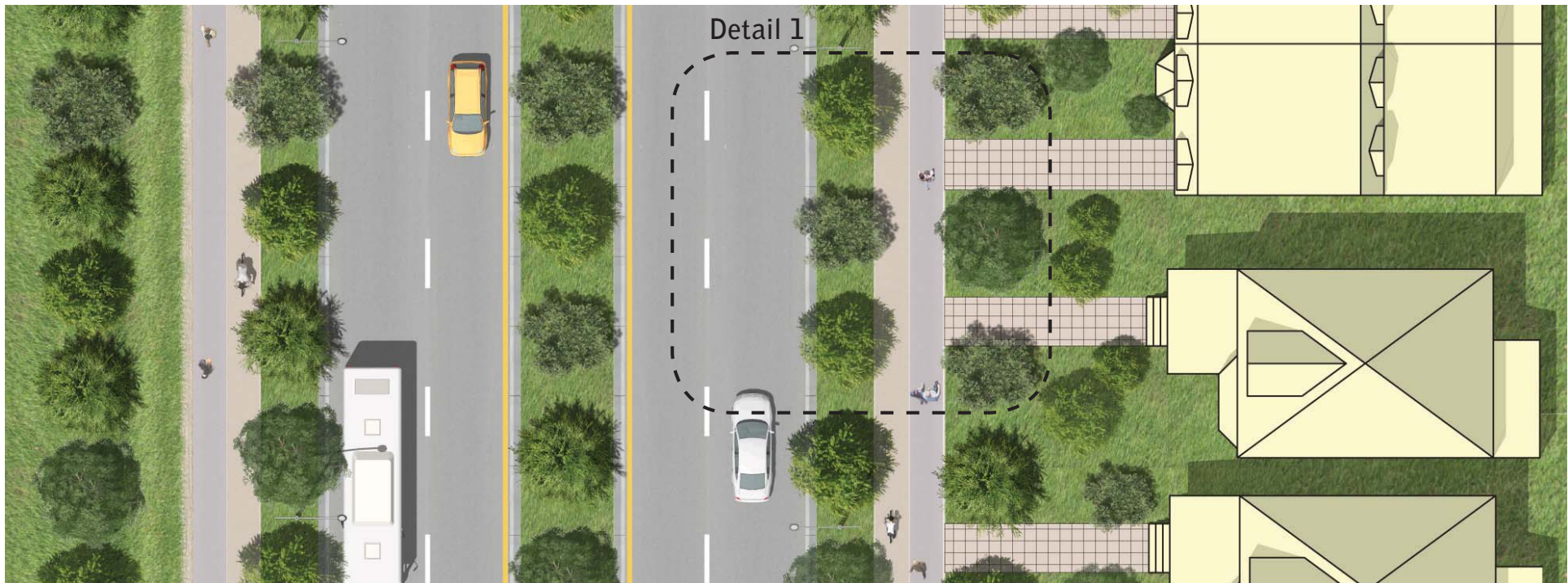
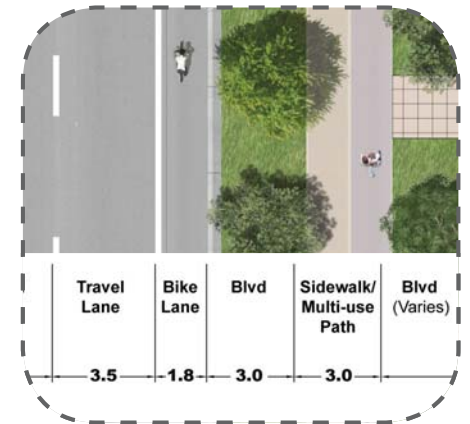
- c. Provide a tree-lined boulevard on both sides of the sidewalk / multi-use path.



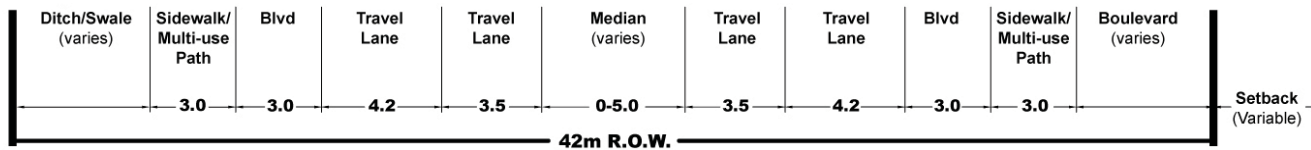


# C(1) Rural/Urban

Detail 2

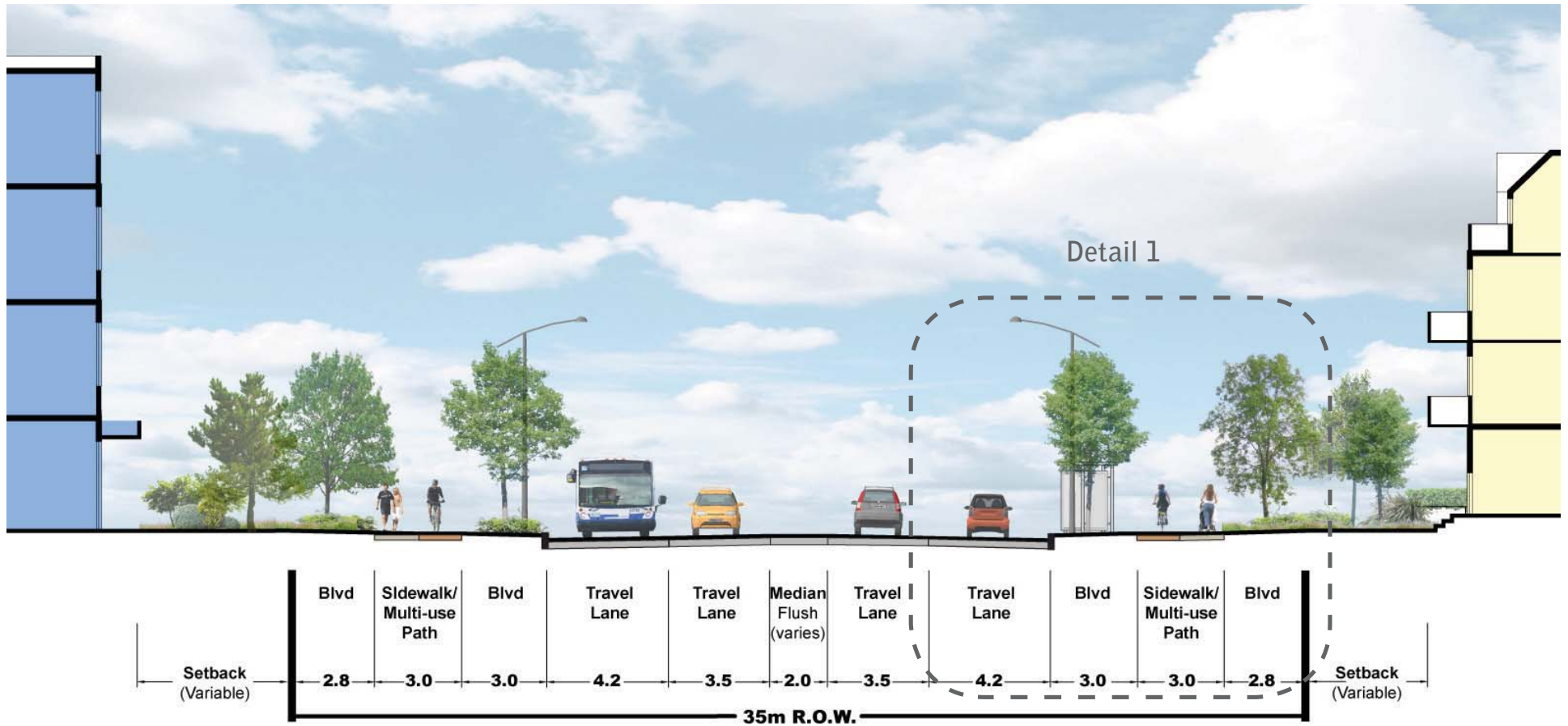
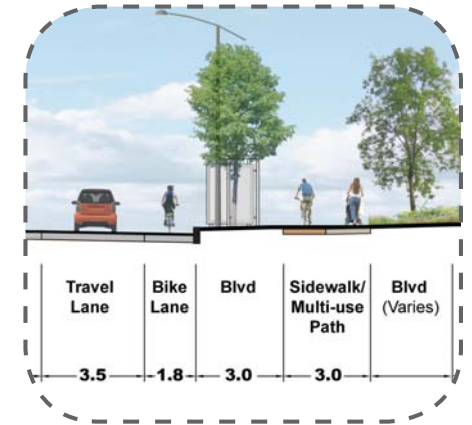


Detail 1



# C(2) Urban

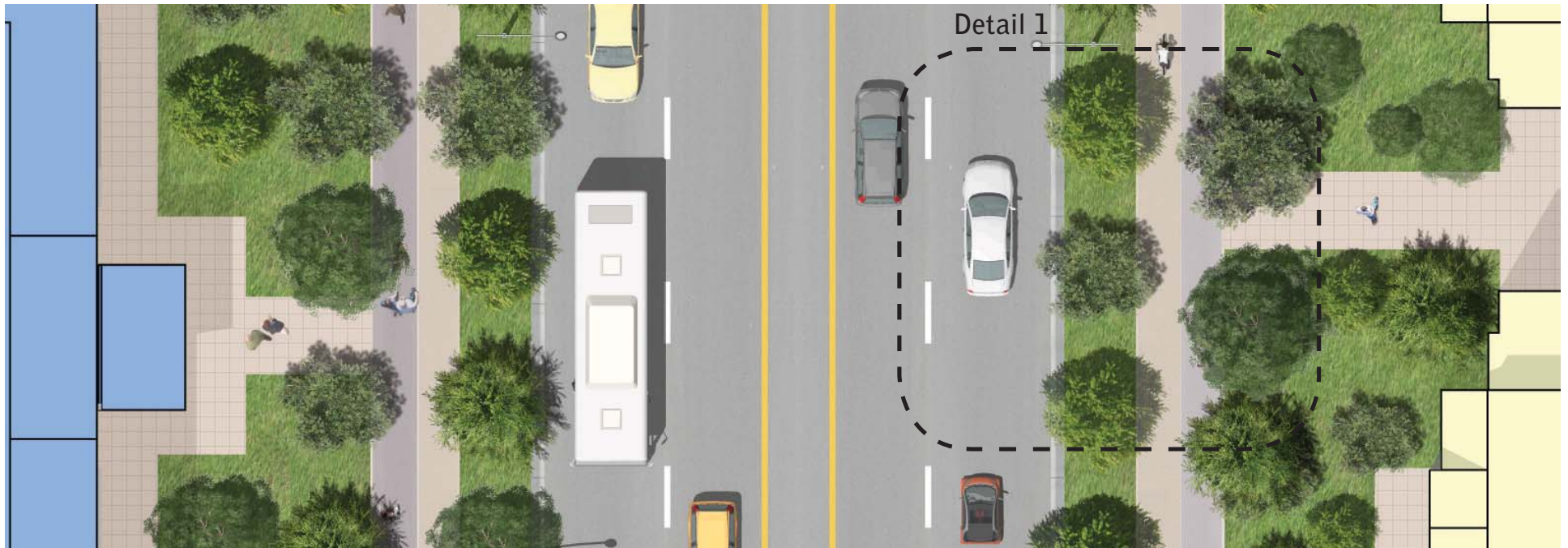
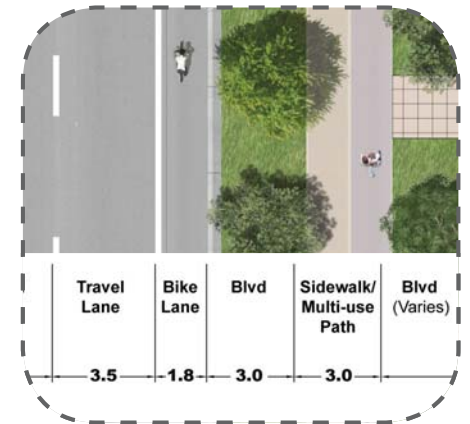
Detail 2



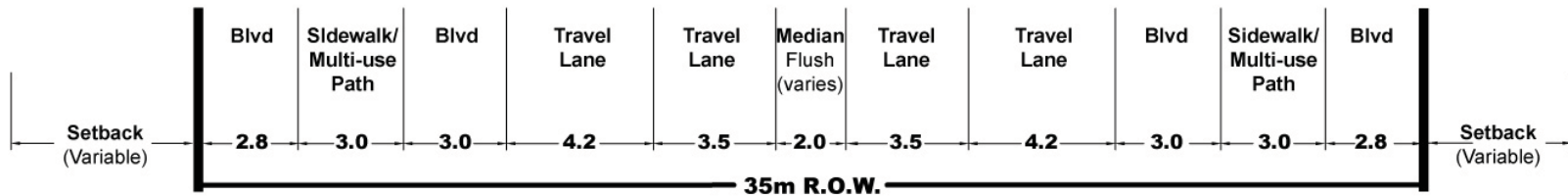


# C(2) Urban

Detail 2

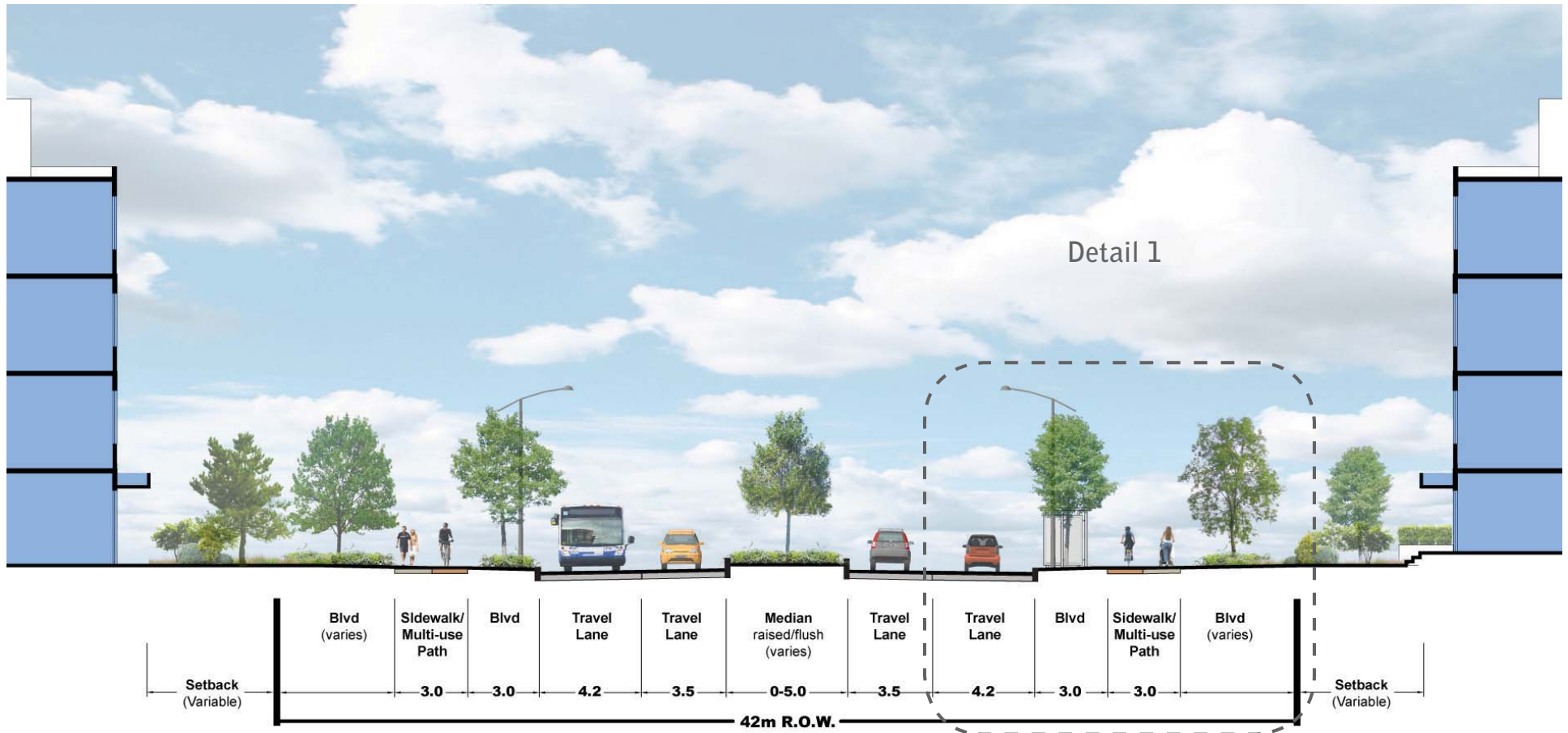
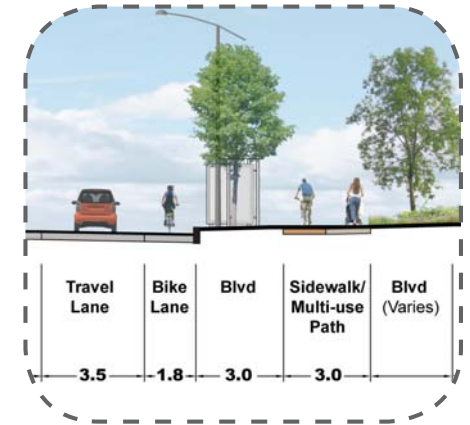


Detail 1



# C(3) Urban

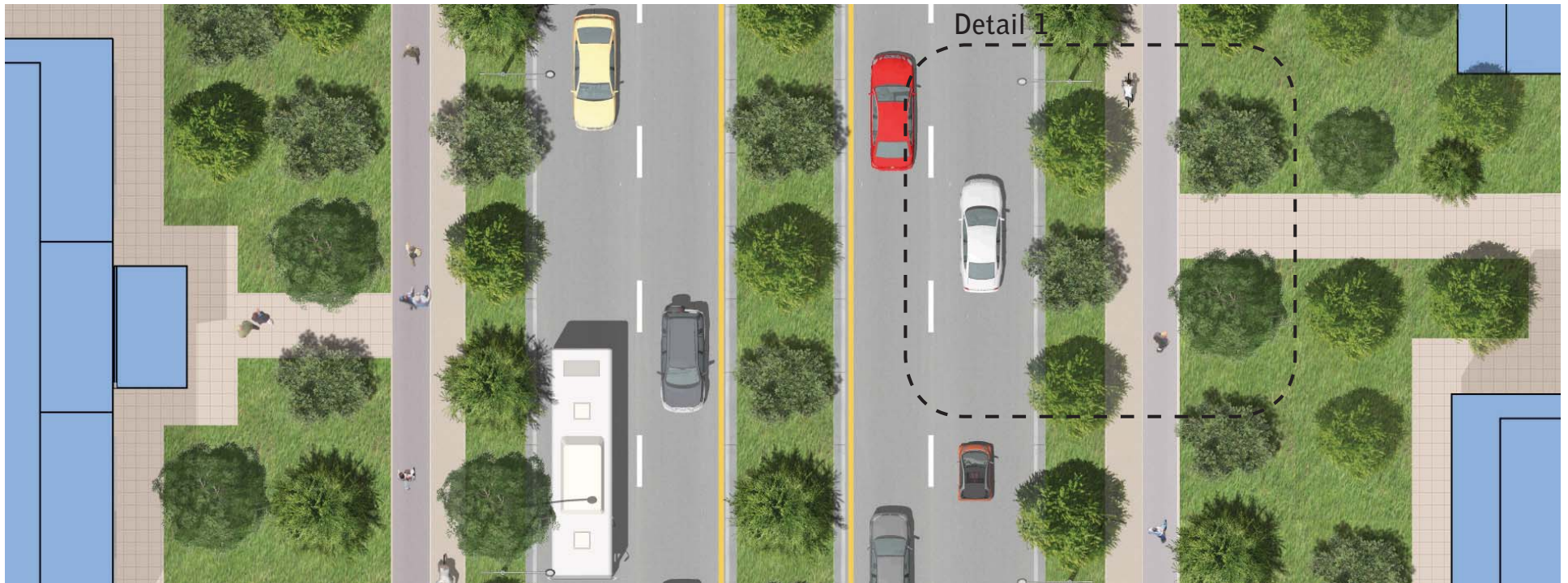
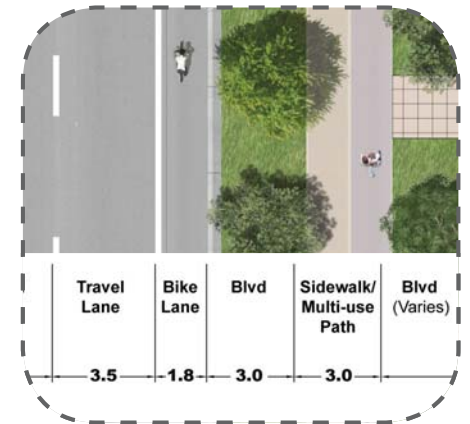
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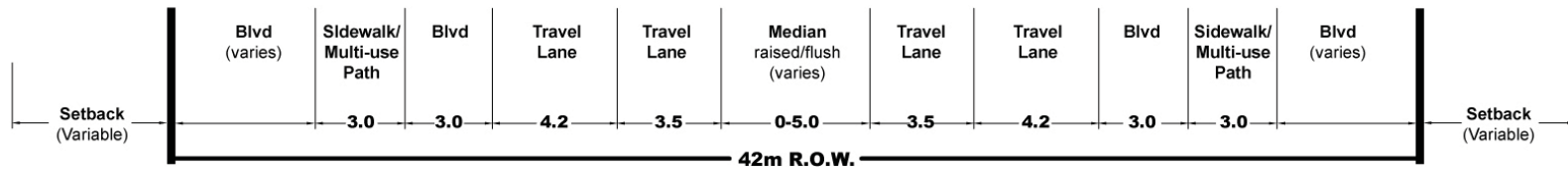


# C(3) Urban

Detail 2



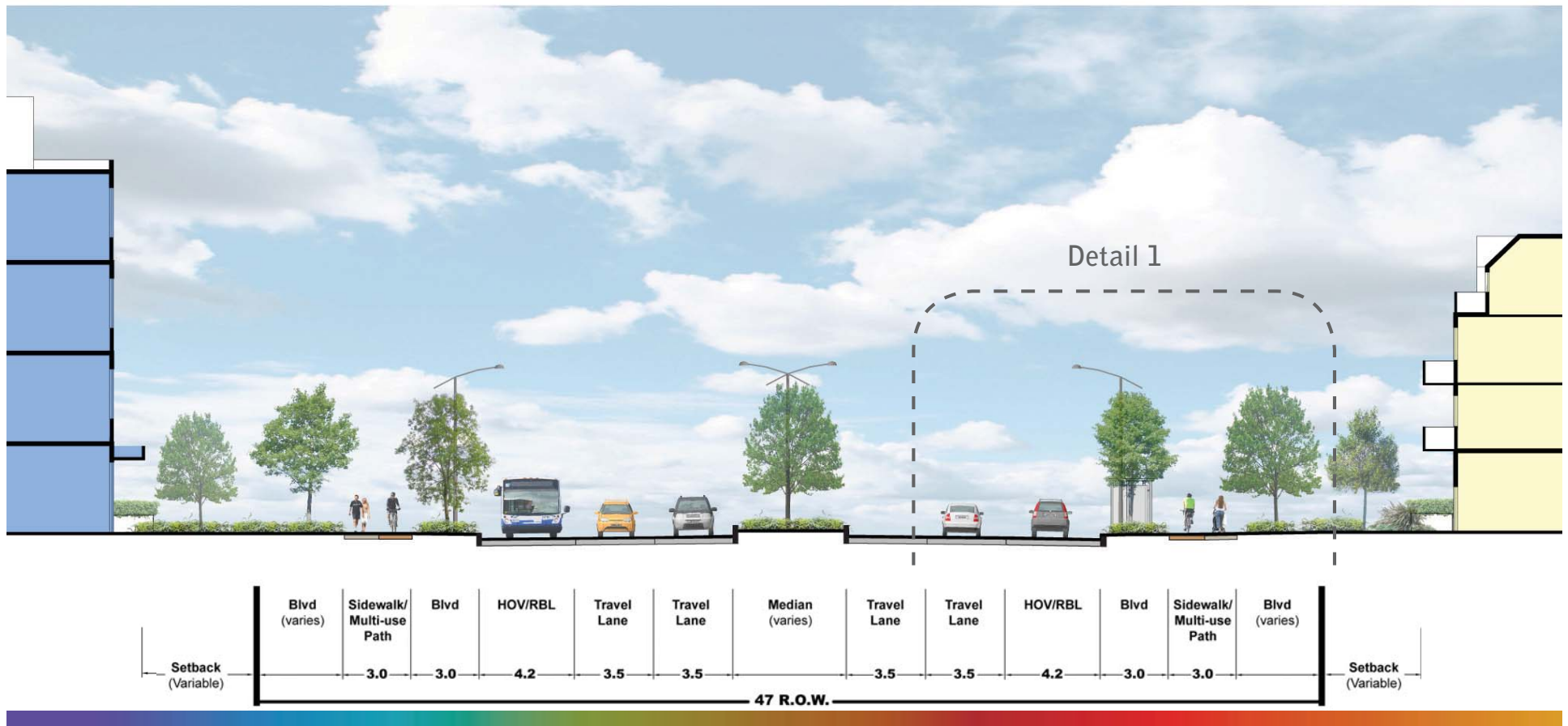
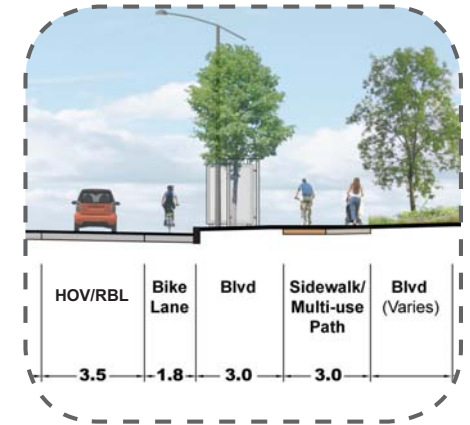
Detail 1





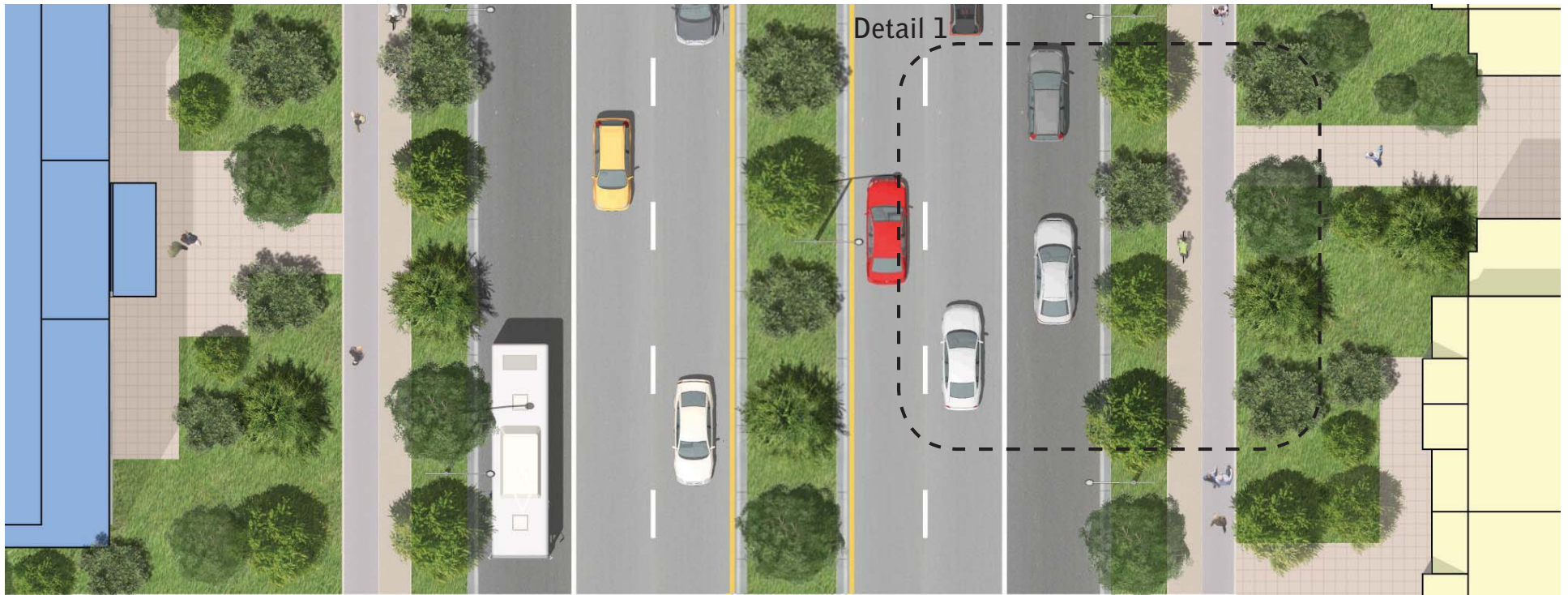
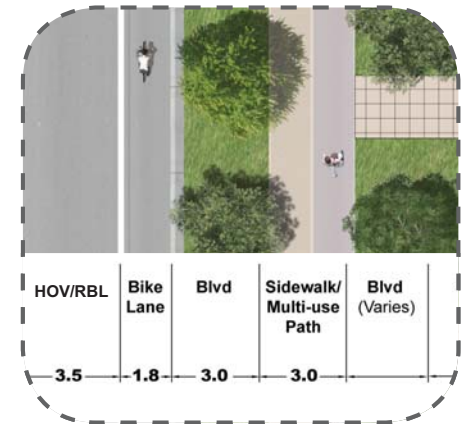
# C(4) Urban

Detail 2

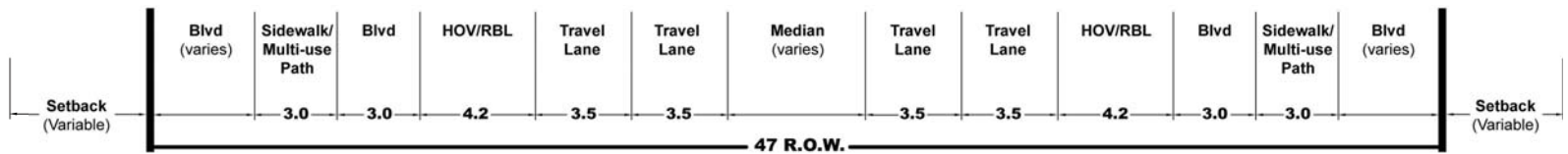


# C(4) Urban

Detail 2

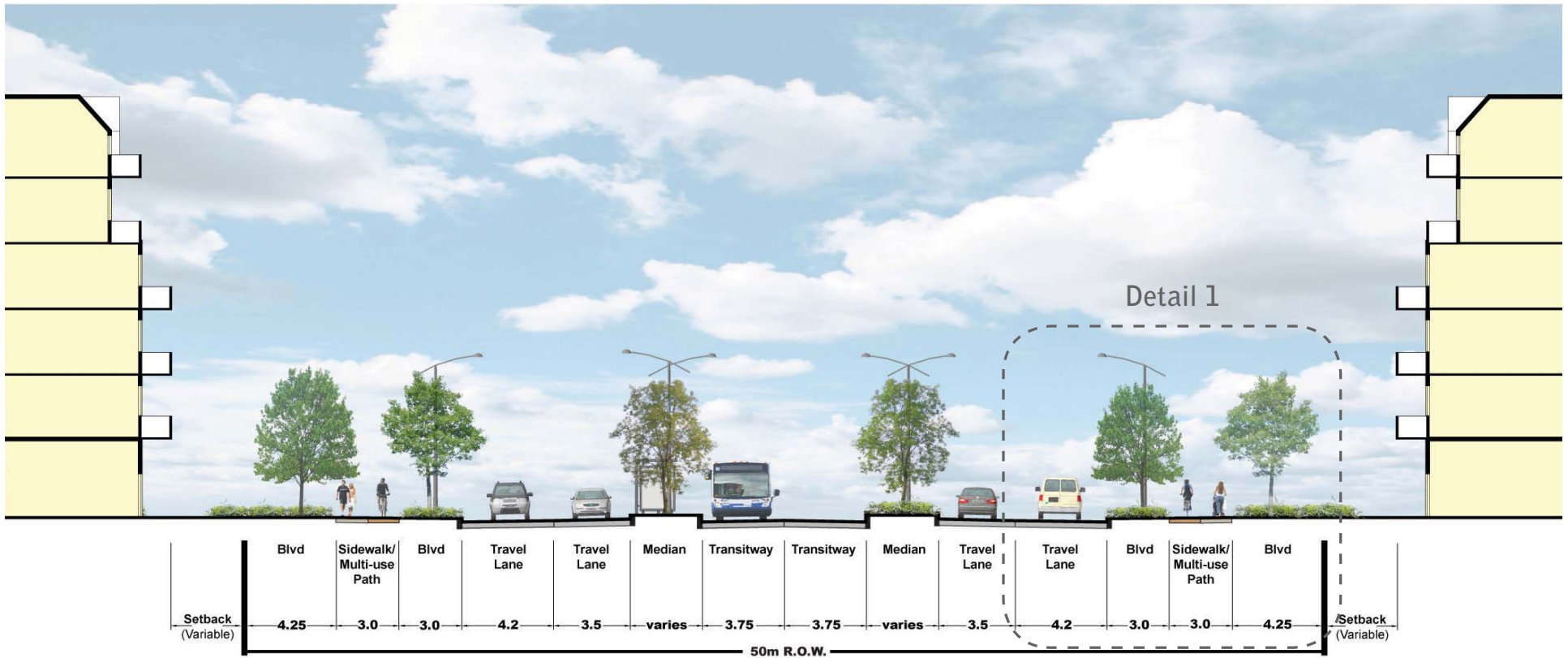
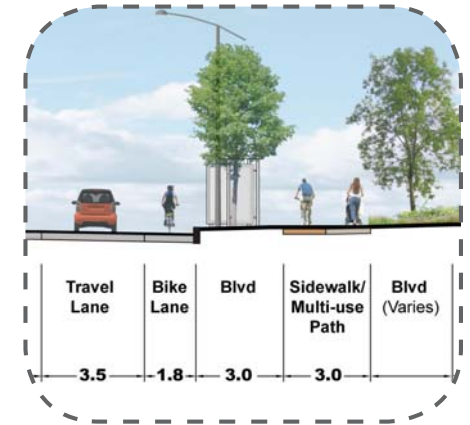


Detail 1



# C(5) Urban

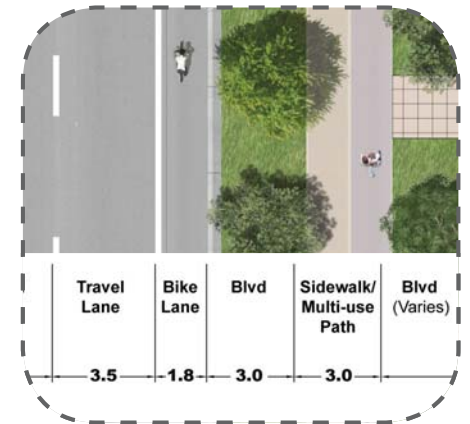
Detail 2



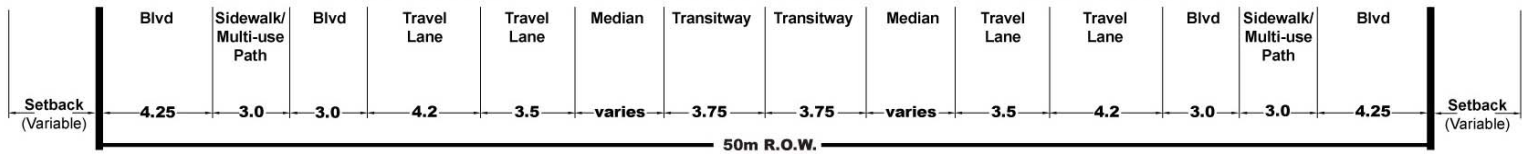


# C(5) Urban

Detail 2



Detail 1



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## 5.3 Node Guidelines

### General Node (N) Guidelines

On Node (N) roads, it shall be a general policy of the Region to:

1. Set an inside lane width of 3.5 metres.
2. Provide pedestrian and bicycle facilities on both sides of the street according to either Detail 1 or Detail 2:
  - a. Detail 1 sets a curb lane width of 4.2 metres and provides a shared pedestrian-bicycle multi-use path at a minimum width of 3.0 metres.
  - b. Detail 2 sets a curb lane width of 3.5 metres, an on-road bike lane of 1.8 metres, and a sidewalk/multi-use path at a minimum width of 3.0 metres.
3. Plant a row of trees on both sides of the sidewalk/multi-use path; for N(1), the second row of trees is dependent on sufficient width in the setback.
4. Provide transit stops / stations with sheltered seating in the medians and / or boulevards, as applicable.
5. Provide standardized, pedestrian scale street lights at regular intervals in the medians such that they illuminate both the transitway and the travel lanes.
6. Provide standardized, pedestrian scale street lights at regular intervals on the boulevards.
7. Encourage building setbacks to be minimized.
8. Consider on-street parking on Regional Roads in N(1) during off-peak hours.

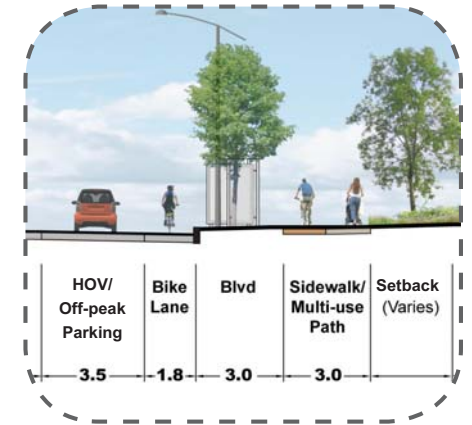
Node (N)	Right-of-Way Width	No. of Shared Travel Lanes	Priority Lanes
N(1)	50m	4	HOV (2); Transitway (2)
N(2)	50m	4	HOV / RBL (2)

Figure 7: Node (N) Classification Codes

# N(1) Urban

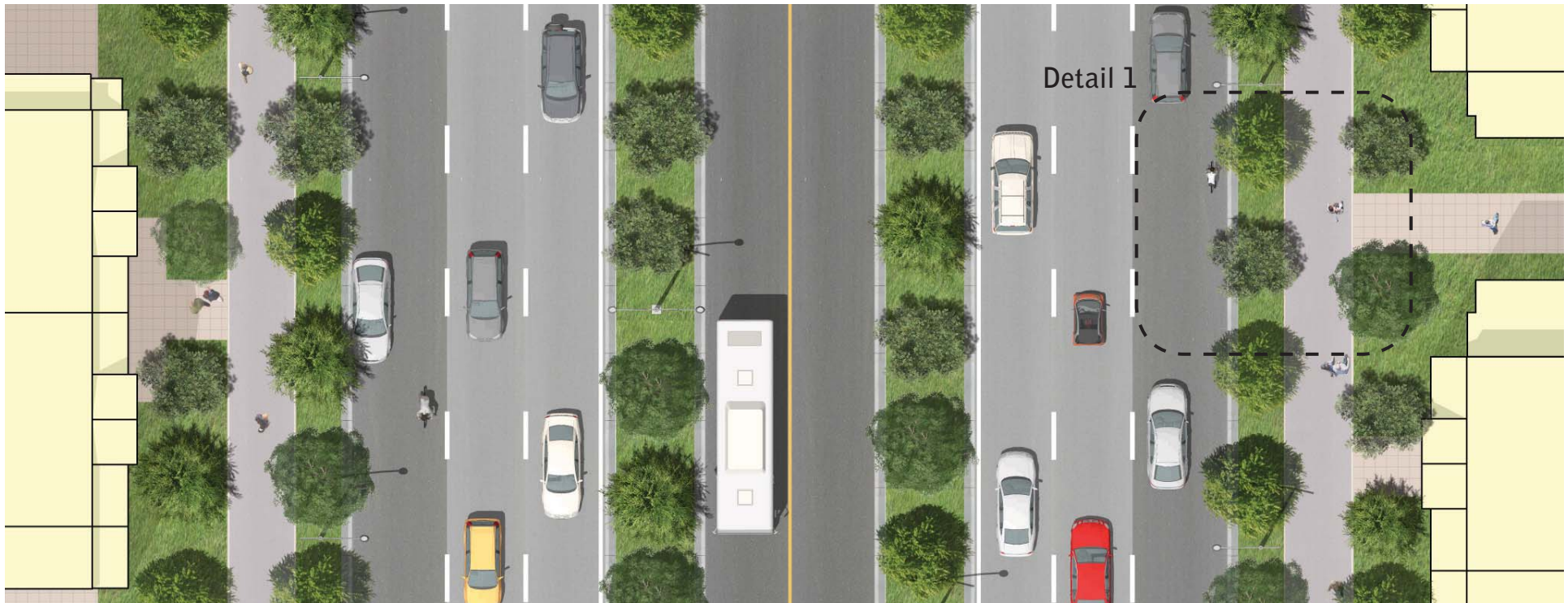
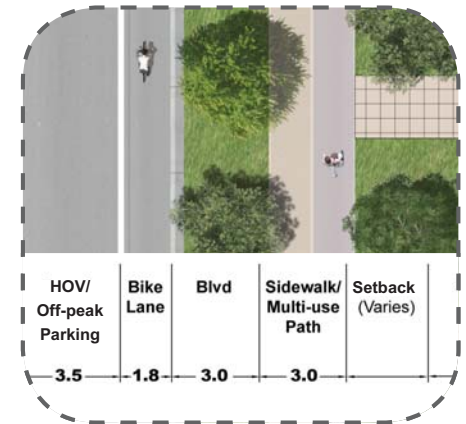
1. Provide one transitway lane per direction in the centre of the roadway at a width of 3.75 metres per lane.
2. Provide a permanent, raised, tree-lined median on both sides of the transitway.

Detail 2



# N(1) Urban

Detail 2



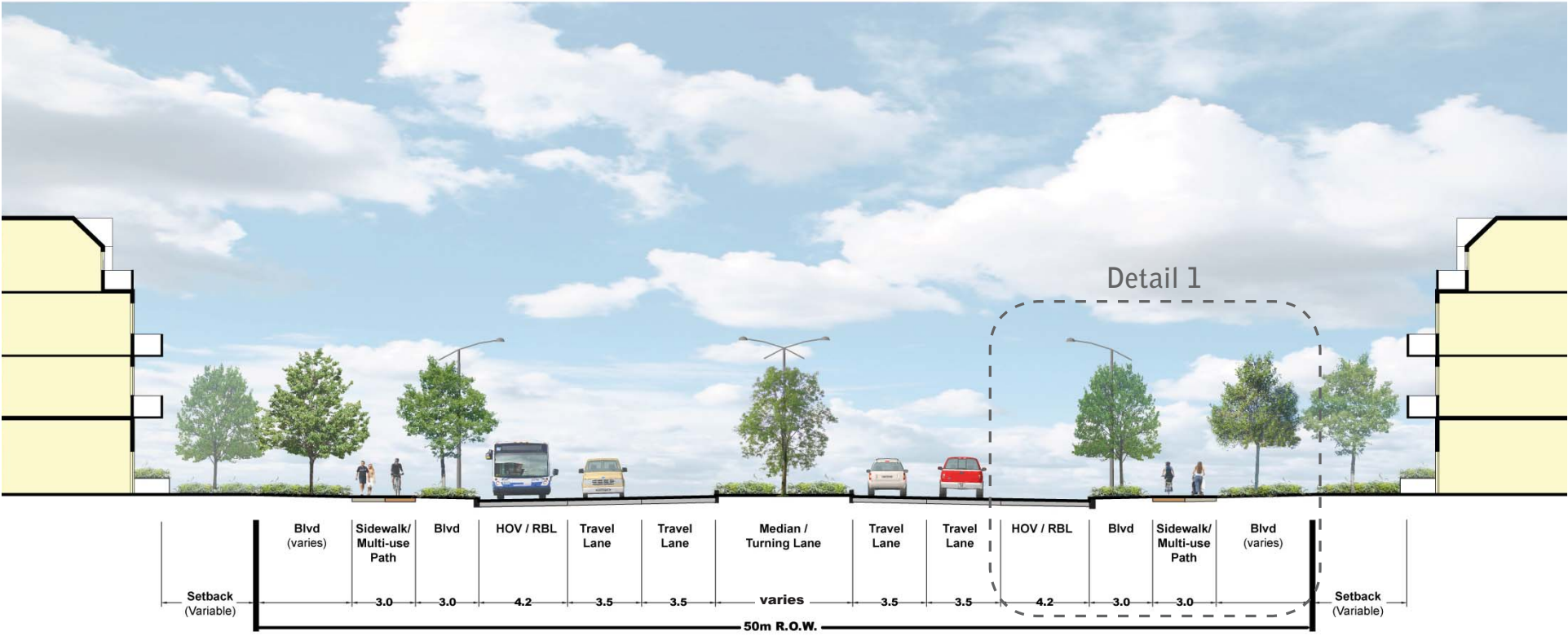
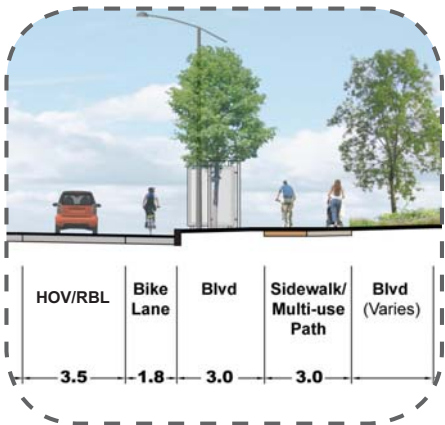
Detail 1

Minimized Setback (Variable)	Sidewalk/ Multi-use Path	Bldv (varies)	HOV/ Off-peak Parking	Travel Lane	Travel Lane	Median	Transitway	Transitway	Median	Travel Lane	Travel Lane	HOV/ Off-peak Parking	Bldv (varies)	Sidewalk/ Multi-use Path	Minimized Setback (Variable)
	3.0		4.2	3.5	3.5	varies	3.75	3.75	varies	3.5	3.5	4.2		3.0	
50m R.O.W.															



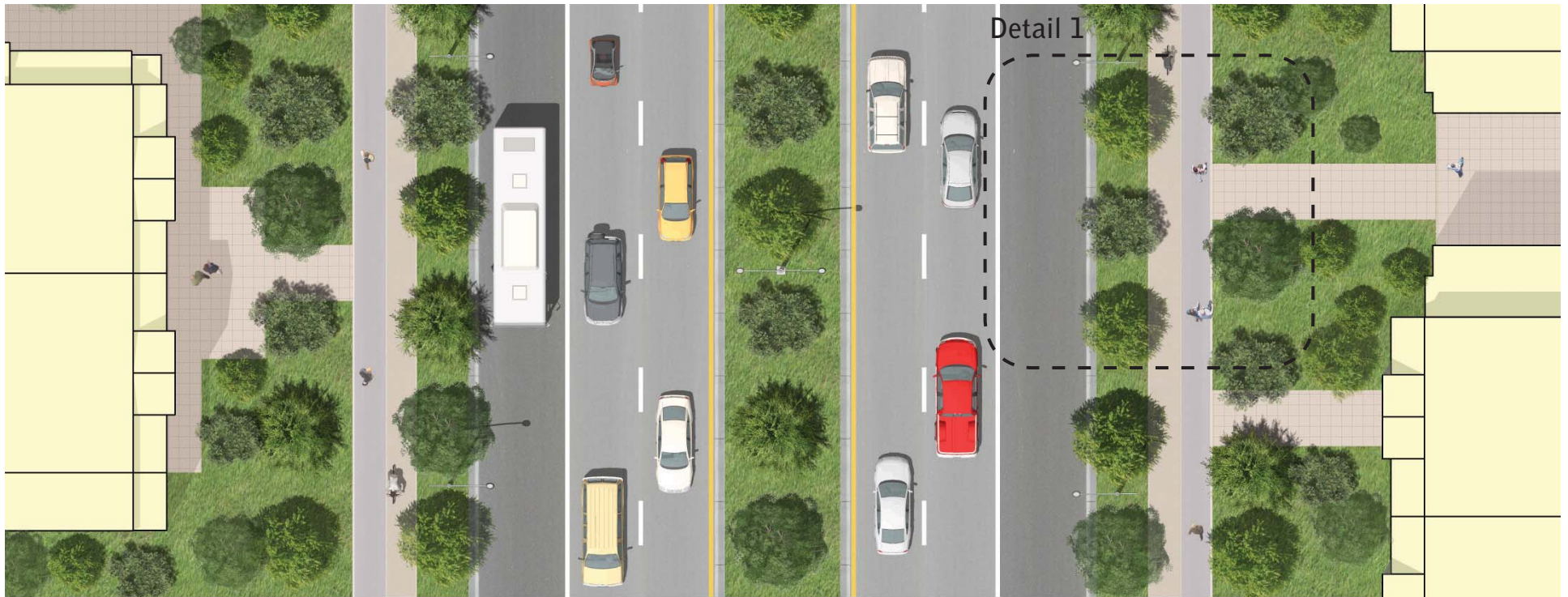
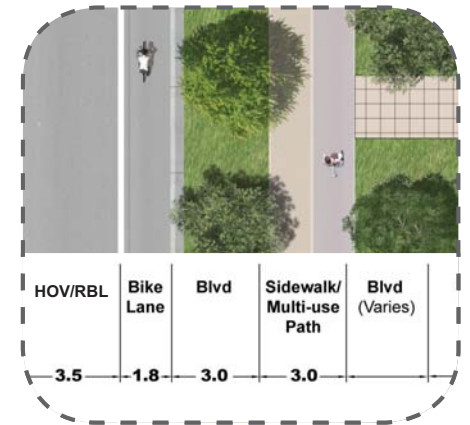
# N(2) Urban

Detail 2

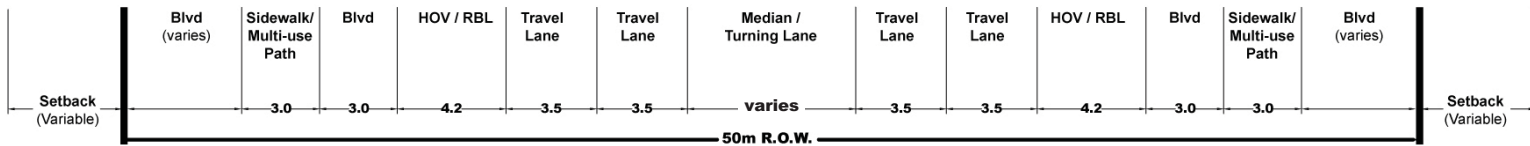


# N(2) Urban

Detail 2



Detail 1





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# Appendices

# Appendix A: Photo Renderings

## R(1) Rural



This image illustrates the R(1) road category.

# R(1) Rural



This image illustrates a typical rural road.



# C(1) Rural/Urban

The before and after images illustrate how an existing Regional Road could be transformed over time into a C(1) road category. In this example, the rural character is preserved on one side of the street.



Before



# C(1) Rural/Urban



After

# C(4) Urban

The before and after images illustrate how an existing Regional Road could be transformed over time into a C(4) road category.



Before



## C(4) Urban Detail 1 and Detail 2



After - Detail 1 Wide Curb Lane



After - Detail 2 Bicycle Lane

# C(4) Urban

The before and after images illustrate how a new Regional Road could be transformed over time into a C(4) road category.



Before



# C(4) Urban



After

# C(5) Urban)

The before and after images illustrate how an existing regional road could be transformed over time into a C(5) road category.



Before



# C(5) Urban



After

# N(1) Urban

The before and after images illustrate how an existing Regional Road could be transformed over time into a N(1) road category.



Before



# N(1) Urban



After

# N(2) Urban

The before and after images illustrate how an existing regional road could be transformed over time into a N(2) road category.



Before



# N(2) Urban



After

## Appendix B: Planting Trees Along Regional Roads

The following information is provided to assist the Region in growing healthy trees. Generally, there are three critical elements to healthy tree growth: high soil quality, adequate soil volume, and for the first three years after planting, a watering and maintenance program.

### Soil Quality

High soil quality is extremely important to the health of a tree. During construction, however, it is common for the nutrient-rich topsoil layer to be removed, resulting in the planting of trees in poor quality soil or rock substrate. This situation can be remediated by returning the topsoil layer prior to the planting of trees, or by replacing the original topsoil layer with high quality soil. In general, high quality soil is fertile, friable (a crumbly texture ideal for the root growth of plants), obtained from well drained, arable land, and free of calcium carbonate, subsoil, refuse, heavy clay, noxious weed seeds, large debris, and other deleterious substances. The recommended soil profile (Sandy Loam) is: 50-60% sand, 20-40% silt, 6-10% clay, and 2-5% organic. A pH of between 6.5 and 7 is also recommended. Compost can be used to increase soil organic matter and increase

water retention over the lifetime of a tree. Soils may also be tested for fertility and supplemented as required to ensure the desired tree growth (0.6 kg/m<sup>3</sup> of bonemeal is recommended for fertilizer).

### Soil Volume

Tree roots generally grow to a depth of between 30-60cm, but grow horizontally from the trunk outwards at much greater distance. For this reason, trees should be planted at a distance of between 8 and 10 metres apart; providing tree roots with adequate surface area to grow horizontally is absolutely critical to attaining species maturity. Generally, it is recommended that a single tree, planted in hardscaping (e.g. sidewalks) or softscaping (e.g. planted medians), be provided with about 30m<sup>3</sup> of soil calculated at a depth of between 0.8 metres to 1.2 metres above a well drained sub soil or drainage layer. The higher the volume of soil per tree, the higher the instance of trees reaching species maturity. Groups of two or more trees may share soil volume when planted in a continuous soil planter/trench, or equivalent, provided that a minimum volume of 15m<sup>3</sup> is calculated per tree; however, trees that are planted at the minimum of 15m<sup>3</sup> per tree



are more likely to reach a reasonable growth size appropriate for an urban setting and less likely to reach species maturity. For example, a planting strip that is:

- 2.5m wide would yield approximately 30m<sup>3</sup> of soil per tree at a soil depth of 1.2 metres and a planting distance of 10 metres.
- 3.0m wide would yield approximately 30m<sup>3</sup> of soil per tree at a soil depth of 1.0 metres and a planting distance of 10 metres.

## Watering and Maintenance

The absorbing roots of a tree are responsible for water uptake. These roots generally extend beyond the dripline, and are located within the upper 20-30 cm of soil. In general, frequent short watering encourages shallow root growth, whereas less frequent (every 7-10 days) and long watering encourages deep root growth. The deeper tree roots grow, the more tolerant a tree will be to drought. Young trees and trees that have been recently transplanted have less established root systems and therefore require more frequent

watering than mature, established trees. For this reason, for the first three years young and/or transplanted trees should be placed on a regular watering schedule while the roots are established, whereas established trees generally only need to be watered during periods of little or no rain. In general, it is better to water trees in the morning, when evaporation levels are low.

## Appendix C: Glossary of Roadway Elements

### Bicycle facilities

- Portion of the right-of way for use by bicycles, including their exclusive use in bike lanes and cross bikes, and their shared use in HOV lanes, travel lanes, and on multi-use paths.

### Ditch / Swale

- Drainage system designed to remove silt and pollution from surface runoff water, consisting of a swaled drainage course with gently sloped sides and filled with vegetation, compost and/or gravel/rocks. The wide and shallow nature of a swale is designed to maximize the time water spends in it, which aids the trapping of pollutants and silt. Swale conditions occur only in Rural/Natural Heritage System areas.

### Boulevard

- Landscaped transition zone between the curb lane and the multi-use path and / or sidewalk; this is also the area where street furniture, transit stops and light standards are located.

### Building setback

- Distance between the front of the building and the public right-of-way.

### High Occupancy Vehicle (HOV)

- HOV lanes are located in the curb lane and reserved for vehicles with two or more people, including buses and taxis; bicycles may share the lane. HOV and RBL widths are interchangeable, allowing for the flexibility to accommodate either one at any given time.

### Median

- The area which separates opposing lanes of traffic. Medians can be flush with the roadway, raised, and/or landscaped with plantings and trees to beautify a street. Transit stops on transitways are located in the median. At intersections, medians may be converted into turning lanes.

### Multi-use path

- Allocated portion of the public roadway right-of-way for shared use by non-motorized transportation, such as walking, jogging, cycling, rollerblading and mobility devices (e.g. wheel chairs).

## Parking

Generally, Regional Roads do not accommodate on-street parking. However, in nodes and higher density areas, on-street parking may be contemplated (e.g. Trafalgar Road north of Dundas Street to Highway 407).

## Pedestrian facilities

- Portion of the public roadway right-of way for use by pedestrians, including their exclusive use on sidewalks and crosswalks and shared use on multi-use paths.

## Pedestrian scale lighting

- Refers to lighting at a height and level of illumination that encourages walking and increases the sense of comfort and safety at transit stops.

## Priority Lane

- Lane designated for High Occupancy Vehicles (HOV), Reserved Bus Lanes (RBL), and transitways.

## Reserved bus lane (RBL)

- Dedicated lane for exclusive use of transit, located in the curb lane. HOV and RBL widths are interchangeable, allowing for the flexibility to accommodate either one at any given time.

## Shared travel lane

- Lane of travel shared by all road users, without transportation priority measures.

## Shoulder

- Portion of the roadway located between the outside travel lane and the swale. Shoulder conditions occur only in Rural/NHS areas.

## Transitway

- High order transit located in 2 centre lanes.