Disclaimer

The Region’s position on cycling is contained in Commissioners Reports 2012-J-18 and 2012-J-37 and the resolution of Regional Council on November 21, 2012.

For ease of reference, a working consolidation has been prepared drawing from the two Commissioners Reports and the resolution of Regional Council. Any interpretation of the policies and directions contained within this consolidation should be undertaken in consultation with Regional staff.
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Regional Cycling Plan 2012 (Working Consolidation) 3
1. Establishing the Plan

In October 2008, Regional Council approved its first Regional Cycling Plan (RCP) and related policies. The Plan, identified key Regional Roads where cycling facilities should be implemented, and integrated with area municipal cycling initiatives, to provide a region-wide network serving both urban and rural areas.

In November 2011, Regional Council initiated a review of the RCP. The review of the Cycling Plan focused on two main components: the development of a region-wide cycling network; and, an implementation strategy, including an examination of network phasing, costs, funding strategies, and principles for reducing the Region’s exposure to risks and liabilities.

To complement the development of the network, directions for a communication strategy were also developed that outlined education, promotion and enforcement practices necessary to build a well informed and safe cycling community.

In May 2012, a report addressing the RCP review (2012-J-18) was presented to a joint meeting of the Planning & Economic Development, Works, Finance & Administration, and Health & Social Services committees. The report proposed a Primary Cycling Network, implementation framework and funding principles, and recommended that stakeholders be consulted.

Stakeholder consultation on the review of the RCP took place from June 2012 to September 30, 2012.

On November 21, 2012 Regional Council received report 2012-J-37 and resolved:

a) THAT the Primary Cycling Network illustrated in Attachment #6 of Joint Report #2012-J-37 be endorsed, which includes the following facilities to be included on Regional Roads:

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Extent of Proposed New Facility (km)</th>
<th>2012 Previously Approved (km)</th>
<th>2013-2016 (km)</th>
<th>2017-2032 (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Use Blvd. Path</td>
<td>129.5</td>
<td>4.4</td>
<td>12.7</td>
<td>112.4</td>
</tr>
<tr>
<td>Paved Shoulder</td>
<td>37</td>
<td>1.3</td>
<td>8.7</td>
<td>27.2</td>
</tr>
<tr>
<td>On Road Cycling Lanes</td>
<td>32.6</td>
<td>0.0</td>
<td>21.3</td>
<td>11.4</td>
</tr>
<tr>
<td>Buffered Cycling Lanes</td>
<td>19.3</td>
<td>0.0</td>
<td>2.6</td>
<td>16.7</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>218.6</strong></td>
<td><strong>5.7</strong></td>
<td><strong>45.2</strong></td>
<td><strong>167.7</strong></td>
</tr>
</tbody>
</table>

Notes: Only Regional Road portions of the Primary Cycling Network have been included in this table
b) THAT the following financing policies be adopted:

i) THAT the Region continue its practice of being 100% responsible for providing the platform for multi use paths within Regional Road rights-of-way contained in the proposed Primary Cycling Network at its sole expense;

ii) THAT the Region continue its practice of being 100% responsible for maintenance of all on road cycling facilities and paved shoulders on Regional Roads that form part of the Primary Cycling Network;

iii) THAT the Area Municipalities continue to be 100% responsible for the maintenance and repair of multi use paths on Regional Roads that form part of the Primary Cycling Network, by the area municipality in which the multi use path is located; and

iv) THAT the Region's funding policy for paved shoulders on Regional Roads on the Primary Cycling Network, be changed from the former 50%/50% cost sharing arrangement with the Area Municipalities, to the Region now being 100% responsible for the capital construction costs for all on road cycling facilities and paved shoulders;

c) THAT a cycling communication strategy be developed for the Region that outlines education, promotion, outreach, and enforcement methods to ensure a well informed and safe cycling community;

d) THAT the Regional Cycling Plan include a policy that considers constructing facilities outside of the Region's road construction program for the sole purpose of establishing connections or closing gaps within the Primary Cycling Network; and

e) THAT in recognition of the Lake Ontario Waterfront Trail and Lake Scugog Waterfront Trail as critical components of the Regional Trails Network, the Regional Cycling Plan include a policy indicating that the Region will consider partnering with other funding agencies with local municipalities to eliminate gaps in the Waterfront Trail and that staff report back in 2013 with a status update."

The resolution of Regional Council establishes the framework of the Regional Cycling Plan. The following sections outline the basis for the plan and provide detailed direction for the implementation of the Primary Cycling Network and a complimentary Communications Strategy.
2. Developing a Region-Wide Cycling Network

In planning for cycling facilities for the Region, a hierarchy of networks was examined as defined in the following table:

<table>
<thead>
<tr>
<th>Cycling Network Hierarchy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Element</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>Primary Cycling Network (Spines)</td>
</tr>
<tr>
<td>Regional Trail Network (Trails)</td>
</tr>
<tr>
<td>Secondary Cycling Network (Local Routes)</td>
</tr>
</tbody>
</table>

The three network elements (i.e. Primary Cycling Network, Regional Trail System, and Secondary Cycling Network) collectively form the broader regional cycling network. These networks are planned to be connected and provide routes for a variety of users and trip types.

This Regional Cycling Plan review focused on the planning, design and implementation of the Primary Cycling Network which included roads under Regional and area municipal jurisdiction. It is important to note that the cycling networks referenced in the above table are defined by their function rather than by jurisdiction.

*The Primary Cycling Network*

In identifying and designating a Primary Cycling Network, a stepped approach was employed. This approach was based on the practice of a number of progressive cycling nations (i.e. Denmark,
Netherlands, England, New Zealand, Australia and Germany). The approach included an assessment of appropriate treatment types (i.e. cycling lanes, buffered cycling lanes, cycle tracks, multi use paths, paved shoulders – as illustrated in Table 1 – Facility Treatment Types).

As such, the following steps were taken in evaluating potential routes for the Primary Cycling Network, and planning and implementing particular facility treatments:

i) A collection of candidate routes, including suggested routes by the area municipalities and other cycling stakeholders, were evaluated given the needs of cyclists and a set of network principles discussed in Appendix A.

ii) Once the preferred Primary Cycling Network was identified, potential treatment types were selected based on future motor vehicle operating speeds and traffic volumes using the following graph.

![Facility Selection Graph](image)


iii) A more detailed examination was undertaken to establish preferred treatment types on a corridor-by-corridor basis having consideration for corridor specific characteristics, such as higher commercial vehicle volumes, multiple driveways, on-street parking, and right-of-way constraints (see Appendix B for details). Through future Environmental Assessments and other design studies, treatment types will be confirmed and designed in accordance with recognized standards and guidelines.
Map 1 illustrates the Primary Cycling Network and Map 2 illustrates the Facility Treatment Types for the Primary Cycling Network which has been used for determining the cost of the network.

In implementing the Primary Cycling Network, the Region of Durham will continue to rely on a set of accepted design practices. Principally, the Region relies on guidelines and standards developed by the Ontario Traffic Council and the Transportation Association of Canada. These organizations have developed recommended standards for a variety of design parameters (e.g. gradients, design speeds, sight distances, horizontal and vertical alignments, cross slope), design elements (e.g. pavement markings, intersection treatments, crossing treatments, structure treatments), cycling amenities (e.g. parking, catch basin covers, end trip facilities), signage and maintenance.

**Network Phasing**

In order to estimate the phasing of the construction of the recommended network, two general timeframes were identified; short term (5 year), longer term (6 – 20 year). The short term (first 5 year) phasing is based on the Regional 2012 Capital Road Program and Four Year Forecast. The balance of all other construction has been identified in the 6 – 20 year implementation phase. The phasing of the plan is illustrated on Map 3.

In order to achieve economies of scale, construction of paved shoulders or on-road cycling lanes which do not require additional road width on Regional Roads will take place in conjunction with planned road rehabilitation. The pavement condition index has been used as an indicator to determine if rehabilitation of a Regional Road segment is anticipated in the short term (5 year) or longer term (6 – 20 year) timeframe.

In instances where planned expansion work has been identified on portions of the Primary Cycling Network within in the Region's annual Capital Road Program and Four Year Forecast, construction of all planned cycling facilities will occur in conjunction with the planned road expansion work. Implementation phasing has been aligned with these planning documents.

For portions of the Primary Cycling Network where there is no future Regional Road expansion planned, implementation phasing of multi-use paths will be dependent on two possible scenarios. If there is currently a sidewalk in place, implementation will be dependant on the area municipality’s planned sidewalk replacement program, where the opportunity to replace the sidewalk with a multi-use path presents itself. In cases where there is no existing sidewalk in place, the area municipality will have the opportunity to proceed with the installation of a multi-use path in lieu of sidewalk. Given that implementation phasing for boulevard multi-use paths where there is no future regional road expansion planned will be dependent on the area municipality’s planned sidewalk replacement/implementation program no estimated phasing for these locations has been included in this Plan. Area municipalities will
be required to notify the Region of these planned works in advance so that appropriate funding can be identified and presented in annual business plans for consideration by Regional Council.

As part of the annual Regional business planning and budget process, the Works Department seeks input from the area municipalities for road-related projects. This includes road rehabilitation and road expansion projects that would comprise cycling facilities if they are on the Regional Cycling Network. Consideration will be given to constructing facilities outside of the Region's road construction program for the sole purpose of establishing connections or closing gaps within the Primary Cycling Network.

In addition, the Lake Ontario Waterfront Trail and Lake Scugog Waterfront Trail are recognized as critical components of the Regional Trails Network, and the Region will consider partnering with other funding agencies with area municipalities to eliminate gaps in the Waterfront Trail.

**Funding**

The following cost sharing and funding formula will be applied in implementing the Primary Cycling Network:

- For all paved shoulders and on road cycling lanes, including buffered cycling lanes on Regional Roads that form part of the Primary Cycling Network, the Region will be 100% responsible for all capital construction cost of providing the cycling facility (including land acquisition and utility relocation, signage and markings), customized bridge structures, and ongoing regular maintenance and repair costs for those on Regional Roads.

- For multi-use paths located within Regional Road rights-of-way that form part of the Primary Cycling Network, the Region will be responsible for providing, at its expense, a platform for the construction of a multi-use path. The cost of providing a platform will include land acquisition, utility relocation, grading and customized bridge structures. The cost of granular, asphalt, signage, markings, the provision of other amenities and path maintenance and repair, is the sole responsibility of the area municipality in which the multi-use path is located.
3. Communicating the Plan

The Regional Cycling Plan has been prepared to guide the development of a comprehensive, long term, commuter and recreational bicycle network. Infrastructure alone, however, is not sufficient to promote and encourage safe and viable cycling in Durham. Promotional programming is equally important and constitutes a separate, yet critical component of Durham’s cycling initiative.

In order for cycling supportive programming to be effective, it is necessary to develop a comprehensive communication strategy that outlines the recommended education, promotion and enforcement methods necessary to build a well informed and safe cycling community.

The core purpose of the communication strategy is to provide support to current cyclists, encourage people to consider cycling, and to educate motor vehicle drivers about how to safely share the road with cyclists. Educational and promotional information and materials will be developed to encourage cycling in Durham. The communication strategy will include the following themes:

- *Share the Road* – Road safety information for drivers and cyclists;
- *Health Benefits* - Promote an active lifestyle;
- *Education* - Answer frequently asked questions and reduce psychological barriers;
- *Environment* – Address air quality concerns;
- *Enforcement* – Work closely with Durham Regional Police Services (DRPS);
- *Planning* – Include consideration for bicycles in the planning process;
- *Tourism* - Increase the economic and social vitality within the Region; and
- *Transportation* – Work to reduce roadway congestion.

Existing Communication Resources

Multiple cycling related programs already exist within the Regional Health, Planning and Economic Development and Police departments. The communication strategy will help support these departments in their efforts to promote cycling by encouraging collaboration and the production of shared documents.

Existing communication resources include:

- Local media relations
- Durham Region publications (newsletters, posters, pamphlets and mapping)
- Community events
  - Bike Fun and Safety Day for children
  - Bike to Work Day for commuters
  - Take your Kid Mountain Biking Day
Ride 4 United Way

Regional website

Existing departmental programming includes:

- Schools programming (Helmet Safety, Kids Safety Village and support the Active and Safe Route to School program)
- Workplace programming (Smart Commute)
- Chronic Disease Prevention (Physical Activity promotion)
- Smog Alerts (Air Quality Health Index)

**Target Audiences**

Across the Region, preferences, behaviours and attitudes towards cycling vary greatly. Communication efforts will be focused towards targeted groups in order to develop the material effectively. The following groups will be targeted:

- **Utility Cyclists** think of their bike as another commuter vehicle. They are comfortable riding in a variety of weather conditions and in mixed traffic. This group is generally well informed of the risks involved and take the necessary precautions to minimize them.
- **Leisure Cyclists** can be made up of any age, gender or experience level. These cyclists prefer quieter, low volume roads or multi use trails. Adults in this group will be targeted as potential commuter cyclists because they are already actively using their bike and may have simply never tried using it as a commuter tool. Cycling clubs fall within this category but should be treated differently from the average recreational cyclist.
- **Potential Cyclists** are people who would like to bike more often but do not do so because of perceived barriers (physical or psychological).
- **Children** often do not understand their role in the transportation system and the risks associated with riding on the sidewalk, riding in the opposite direction of traffic or wearing their equipment incorrectly.
- **Motor Vehicle Drivers** may have a limited understanding about cyclists' behaviour and the rights they have on the road.

**Objectives**

This communication strategy is intended to influence behaviour at the individual, network, organizational and societal levels. The following describes the objectives for each level of change:
Individual

Influencing behavioral change at the individual level involves making a personal behavioral change. This could be influenced by highlighting:

- The convenience, cost savings and health benefits of cycling;
- Regional trails and tourist destinations accessible through the cycling network;
- How enjoyable cycling is;
- Where to get additional information about cycling (i.e. rules of the road, bike maintenance, safety information); and
- Tips for motor-vehicle drivers about sharing the road with cyclists.

Network

This level targets social networks to try and influence change internally. Often these changes are seen when a leader within a network is recruited to help create influence. The network level objectives are:

- Target groups with similar interests (e.g. school communities, workplace employees, recreational groups and sports teams) to take up cycling together;
- Encourage employees to cycle to work;
- Encourage groups of students or families to cycle to school or for short trips; and
- Encourage local community groups to promote the Regional trail network for recreational purposes and commuting.

Organizational

Organizational level objectives target the travel options programming within a specific business or organization. One example of a program for workplaces is Smart Commute. The organizational level objectives are:

- Encourage internal champions to lead the way by example;
- Encourage workplaces and schools to promote cycling to their employees and students;
- Encourage businesses, workplaces and schools to provide secure bicycle storage or parking for cyclists (e.g. bicycle racks or shelters) in prominent locations; and
- Encourage organizations to provide facilities for people to change their clothes, rest, or shower after cycling.

Societal

Community or Societal level objectives focus on enhancing the importance that the community places on active transportation and cycling in Durham Region. This could be done by:

- Holding bike fairs in prominent locations within the community;
• Building a safe and visible cycling network;
• Increase media coverage and visibility of marketing materials that profile the many benefits of cycling;
• Utilize social media outlets to reach younger audiences;
• Ensure Region owned buildings include visible, secure and convenient bike parking for visitors and employees (where appropriate); and
• Define activity centres in area municipalities where information is to be made available, events are held and marketing material is displayed.

**Programming**

Current programming such as Smart Commute supports the Regional Cycling Network. Further programming to support the full implementation of the Regional Cycling Plan will need be needed in the following areas:

**Promotion & Encouragement**

Efforts will be undertaken to advocate, guide or reinforce desired behaviour and outcomes, such as: safe cycling and share the road, through focused campaigns and programs that would include:

• Promoting the local cycling clubs to encourage more inexperienced riders to get assisted experience on the road;
• Producing a Cycling Tourism map that highlights cyclist friendly (Welcome Cyclist certified) destinations in Durham and suggested routes to get there;
• Establishing “Cycling Ambassadors” (currently done in the City of Toronto), summer students, who visit camps and recreation centres to teach youth about the rules of the road, safe riding techniques and the necessary equipment they need; and
• Rewarding businesses that participate in active commuter programs by administering “Bicycle Friendly Business” and/or “Healthy Workplace” awards annually and prominently announcing them in local media.

**Education**

Training and skills development will be offered to increase confidence and knowledge levels. Methods would include:

• Providing access to CANBIKE training courses through municipal recreation centres (similar to swimming lessons);
• Developing a motor vehicle driver focused training package to teach drivers to share the road safely;
• Producing instructional videos and post them on the Region’s website (e.g. how to change a tire, proper turning signals or emergency stopping techniques); and
• Making the Ministry of Transportation cycling guides, “Young Cyclists Guide” and “Cycling Skills” widely available.

**Enforcement**

Durham Region Police Services (DRPS) will work to increase enforcement levels directed at cyclists, pedestrians and motorists to ensure a safer environment.
• DRPS analyzes cyclist injuries and fatalities resulting from a collision with a vehicle. This will continue to provide valuable information to program managers.
• Encourage cyclists to report accidents involving vehicles so that regular collision analysis can be done. These submissions should be made to DRPS;
• Establish targeted enforcement areas for cyclists and motorists and reward correct behaviour as well as discipline wrong/illegal behaviour;
• Support DRPS cycling events (e.g. Community Day); and
• Review current by-laws pertaining to cycling to ensure that they are consistent with pro-cycling philosophies.

**Outreach**

Events will be planned, organized and hosted which support or re-emphasize promotional and educational efforts, such as:
• Bike to Work Day;
• Bike Fairs and Community events; and
• Information gathering workshops.

**Education and Information**

Each of the target audiences will be affected differently by the development of the cycling infrastructure network, so specific messages need to be created for each of them. Here are some examples of the various types of information and training that should be made available:

**Commuter Cyclists**
• Rules of the Road
• Correct signalization methods
• Information on the equipment required by law
• Clothing recommendations to reduce perspiration
• Information on how to change a flat tire and do other basic bike maintenance
• How to use the bike racks on Durham Region Transit buses

Recreational Cyclists
• Where to go (tourism mapping)
• How to get to their destination (where infrastructure or trails exist)
• Information on how to change a flat tire and do other basic bike maintenance
• Information on the equipment required by law
• Information for cycling clubs about riding in single file and the proper passing techniques when riding in a large group

Children
• Health benefits
• Helmet safety (including information on the proper type and fit)
• Information on the equipment required by law
• Bike size/fit information
• Rules and restrictions on sidewalks, paths and trails

Potential Cyclists
• Rules of the Road (including proper signalization)
• General information about bike repair and maintenance
• Where to go and what to wear

Motor vehicle drivers
• How to safely interact with cyclists on the road and in intersections
• Information about cyclists and their rights as vehicles under the Highway Traffic Act

Communication Methods

Communication information will be made readily available through a combination of promotion, outreach and education opportunities. The communication pieces will be developed strategically to address the unique information needs of each target audience. A key goal is to understand the barriers they face when considering cycling and to provide tips to overcome perceived barriers. The message needs to be clear, simple, attractive and seasonally appropriate.

In order to create a unified approach among Regional Departments, a common brand should be applied. The Cycle Durham brand is recommended for this purpose.
The following communication pieces will support cycling initiatives and will include the Cycle Durham brand:

- **Print Materials** - Brochures, posters, letters and mapping will provide a variety of information that is portable and easy to distribute.
- **Online Resources** - Have a new page added to the Regional website to provide easily accessible information about cycling.
- **Outreach Opportunities** - Presentations and lunch 'n' learn sessions will be made available for local employers and other interested stakeholders.
- **Promote and Reward** – Encourage cycling through a promotion and reward based approach to continually build interest in cycling.
- **Education** - Courses and workshops will be made available Region wide, to increase confidence levels and produce safer conditions for all concerned (drivers and cyclists).
Appendix A – Network Principles

Understanding the Needs of Cyclists

Satisfying cyclists’ needs and providing a high level of service for cyclists are vital to fostering a cycling culture. These needs vary according to: cyclists’ skill levels; and their trip purposes. One type of cycling provision may not suit all cyclists using a particular part of the cycling network. Understanding cyclists’ needs is the first step in planning an appropriate cycling network and supporting programs in Durham Region.

What type of abilities do cyclists have?

The following sections provide an overview of the three basic cycling skill levels: novice, intermediate, and advanced cyclist.

Novice

These are children and beginner adults. Depending on their age, children have serious knowledge, perceptual and cognitive limitations in relation to roads. They can be unpredictable, do not have a good appreciation of road hazards and are generally unfamiliar with road rules. However, children as young as eight do not pose as high a risk as adolescents as they have a reduced tendency for deliberate risk taking behaviours.

Novice cyclists most commonly ride to school and shops and for recreation near their homes. This local environment should be safe for them. They cannot safely interact with traffic apart from traffic-calmed neighbourhood roads. They prefer full separation from other traffic particularly along busier roads.

The Canadian Cycling Association has developed a cycling safety program called CAN-BIKE. Beginner courses have been designed for children 8-13, and adults and children greater than 14 year of age, and are offered by certified CAN-BIKE instructors.

Intermediate

Young cyclists can achieve a basic level of competence with appropriate training. Their utility trips generally extend further, to intermediate and high schools and other centres of activity. These cyclists can ride on quiet two-lane roads, maneuver past parked cars, and merge across and turn right from beside the centreline. They can cope with simple traffic signals. On busier roads they prefer cycle lanes
and facilities at junctions. They are not equipped to interact with faster traffic and multi-lane roads. They usually lack the confidence to claim a lane in narrow situations.

Cycling plans should consider whether it is practical to design all local facilities so they are suitable for cyclists of basic competence. If not, more advanced training could be beneficial. CAN-BIKE offers a series of advanced courses for cyclists greater than 14 years of age.

**Advanced**

These cyclists have usually learned by long experience how best to interact assertively with traffic. They typically make longer commuting trips, sports training rides and cycle touring journeys. They do not require specific cycling facilities, just enough room for faster/busier situations. They will defend a lane where there is not enough room, judge the merge across faster multi-lane traffic, and will not usually divert to a multi-use path.

**Why and where are people cycling?**

Cycling generally has two main purposes: utility, and leisure. Utility cycling involves making a journey for the main purpose of doing an activity at the journey’s end, such as work, education or shopping. Time is often an important consideration. Leisure cycling is done for the journey itself. Leisure cyclists include sports training cyclists, recreation riders and cycle tourists. They also include children playing on their bikes near their homes.

More specifically, the following trip purposes have been defined to assist in developing this plan:

- neighbourhood cycling;
- commuter cycling;
- sports cycling;
- recreation cycling; and
- tour cycling.

**Neighbourhood Cycling**

Most neighbourhood cycling involves trips to local schools and shops, and children playing on their bikes. Cyclist provision should therefore be based mostly around the needs of novices.

Trips are usually restricted to lower volume lower speed routes, such as local and collector roads. However, busy roads and short lengths of the primary cycle network may still need to be crossed to get to local destinations, and many potential destinations are along arterial roads with higher volumes of traffic.
The highest priority is ensuring a safe environment for children and novices in their local streets and around shops and schools.

These cyclists prefer:

- the highest degree of safety;
- comfort and personal security;
- low traffic speeds and traffic volumes;
- a good separation from traffic when local destinations require them to travel busy roads;
- minimal gradients;
- facilities for crossing busy roads, such as traffic signals;
- secure parking at destinations;
- good lighting for evening trips; and
- screening from weather and wind integrated with the surrounding landscape design.

Commuter Cycling

Most commuter trips are done by high school students or adults commuting to work. However, for the purpose of this guide they include any longer-distance utility trip. For most of their length these trips are on arterial roads or other primary cycle routes. Regular commuters generally ride at speeds of 20 to 30 kilometres per hour and their median trip length is typically about five kilometres. Most will choose a faster route at the expense of higher perceived safety, comfort and attractiveness.

It is important to note that designs based on ensuring the repeat business of current, more experienced commuters may not attract new users with less confidence. As far as practical, cycle facilities should cater for cyclists of basic competence, while maintaining the qualities valued by more experienced commuters. These cyclists prefer:

- high-quality road surfaces;
- direct and coherent routes;
- minimal delays;
- facilities that give them their own space;
- intersections that minimize conflicts with other traffic;
- good lighting for evening trips;
- secure parking at or very close to destinations; and
- facilities for changing clothes, lockers and showers.
Sports Cycling

Sports cyclists often travel at speeds higher than 30 km/h. They are confident cyclists and prepared to defend their road space. They generally cycle over long distances, mainly along urban arterial or rural roads, and may seek challenging terrain. They often travel in groups of two or more and like to ride two abreast. These cyclists prefer:

- high-quality road surfaces;
- minimal delays;
- physically challenging routes and demanding gradients; and
- generous road widths.

Recreation Cycling

Recreation cyclists ride mainly for leisure and place a high value on enjoying the experience. They are usually less constrained by time and vary widely in skill and experience. Popular recreation cycling destinations include routes within valleys, waterfronts and parklands, as well as attractive routes with low traffic volume and speed. These cyclists prefer:

- comfort;
- good surfaces;
- minimal gradients;
- a high degree of safety and personal security;
- routes that are pleasant, attractive and interesting;
- screening from weather and wind; and
- parking facilities where they dismount to use facilities or visit attractions on the journey.

Tour Cycling

Touring cyclists travel long distances carrying camping gear and provisions. They are often experienced and travel in pairs or groups. These cyclists prefer:

- routes that are, or lead to, pleasant, attractive and interesting locations;
- generous roadside shoulders;
- high-quality road surfaces, although some may seek journeys on lightly trafficked back roads; and
- rest areas — water, toilets, shelter.
Establishing Network Principles

To encourage cycling across the Region, a comprehensive cycling network will be developed. This network will be implemented through partnerships between various levels of government and other stakeholders. This network is intended to meet the needs of cyclists, and has been planned with regard to the principles of: safety, comfort, directness, coherence and attractiveness.

Safety

Cycle routes should be safe, provide personal security, and limit conflict between cyclists and others. For example, traffic speed and volume affect cyclists’ safety. As speed and volume increase, it may be more desirable to separate cyclists from motorists. In addition, public lighting and other features that improve personal safety are also crucial. Cyclists should always have available a convenient route that provides a high level of personal safety. Appropriate infrastructure standards and design will help cyclists feel more secure.

Comfort

Cycling routes should be smooth, non-slip, well maintained and free of debris, have gentle slopes, and be designed to avoid complicated maneuvers. Measures to reduce negative effects and make cycling more enjoyable include: considering walls, embankments or suitable hedges next to paths, but being aware of maintaining public surveillance; paying attention to exposed paths near the edge of waterways or along steep ridges; and providing shelter at critical destinations.

Directness

Cycle routes should be direct, based on desire lines, and result in minimal delays door to door. Indirect cycle routes or excessive delays may lead cyclists to choose more direct routes with greater risk. Some cyclists are unlikely to divert to safer routes, if those routes are significantly longer (e.g. greater than 10 percent extra in length).

Coherence

Cycle routes should be continuous and recognizable, link all potential origins and destinations, and offer a consistent standard of protection throughout. To be recognizable, cycling routes should use consistent standards and design.
**Attractiveness**

Cycle routes should integrate with and complement their surroundings, enhance public security, look attractive and contribute in a positive way to a pleasant cycling experience.

The following table illustrates the relative importance of each of the system principles in relation to the cyclist groups discussed previously. The table also indicates the resulting route preferences and locations by trip type.
<table>
<thead>
<tr>
<th>Cyclist Groups</th>
<th>Neighbourhood</th>
<th>Commuting</th>
<th>Sports</th>
<th>Recreation</th>
<th>Touring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycling objectives</td>
<td>To shops, school, or riding near home</td>
<td>To get to their destination efficiently</td>
<td>To exercise and be physically challenged</td>
<td>To enjoy the outdoors and interact with the community</td>
<td>To see and enjoy places and experiences</td>
</tr>
</tbody>
</table>

### NETWORK PRINCIPLES

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Safety</th>
<th>Comfort</th>
<th>Directness</th>
<th>Coherence</th>
<th>Attractiveness</th>
<th>ROUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Security (good lighting)</td>
<td>******</td>
<td>****</td>
<td>*****</td>
<td>******</td>
<td>******</td>
<td>Low volume, low speed, secure</td>
</tr>
<tr>
<td>High Degree of Safety</td>
<td>******</td>
<td>***</td>
<td>*</td>
<td>******</td>
<td>***</td>
<td>Direct routes, minimal delays</td>
</tr>
<tr>
<td>Separated from busier/faster urban traffic</td>
<td>******</td>
<td>***</td>
<td>*</td>
<td>******</td>
<td>****</td>
<td>Physically challenging routes</td>
</tr>
<tr>
<td>Rural road shoulders or paths</td>
<td>******</td>
<td>***</td>
<td>*****</td>
<td>******</td>
<td>*****</td>
<td>Leisure, attractive routes</td>
</tr>
<tr>
<td>Screening from weather and wind</td>
<td>***</td>
<td>****</td>
<td>***</td>
<td>*</td>
<td>**</td>
<td>Lead to interesting destinations</td>
</tr>
<tr>
<td>High-quality riding surfaces</td>
<td>**</td>
<td>*****</td>
<td>*****</td>
<td>***</td>
<td>***</td>
<td>Local roads, Trails</td>
</tr>
<tr>
<td>Direct routes</td>
<td>*****</td>
<td>**</td>
<td>***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimal delays</td>
<td>***</td>
<td>*****</td>
<td>*****</td>
<td>*</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Continuity</td>
<td>******</td>
<td>****</td>
<td>*****</td>
<td>***</td>
<td>******</td>
<td></td>
</tr>
<tr>
<td>Sign-posted; recognizable</td>
<td>*</td>
<td>***</td>
<td>****</td>
<td>******</td>
<td>******</td>
<td></td>
</tr>
<tr>
<td>Pleasant and interesting routes or destinations</td>
<td>***</td>
<td>**</td>
<td>*****</td>
<td>******</td>
<td>*****</td>
<td></td>
</tr>
<tr>
<td>Physically challenging routes or grades</td>
<td></td>
<td></td>
<td></td>
<td>*****</td>
<td>**</td>
<td></td>
</tr>
</tbody>
</table>

### ROUTE PREMISES

- **Types/Locations**
  - Local roads, Trails
  - Arterial roads
  - Off road routes, trails, low volume arterials
  - Trails
  - Local rural roads and arterials

Source: Cycle Network and Route Planning Guidelines, Land Transport Safety Authority, 2004
Appendix B - Roadway Characteristics

The factors that affect bikeway selection and design are discussed below.

Traffic Volume

Average daily traffic volume is the most readily available measure of motor vehicle traffic volume. Peak-hour volume is another commonly reported measure. These are reported from observed counts, automated counts or computer modeling. Higher motor vehicle traffic volume increases risk for cyclists and increases the required width and separation of the bikeway.

Motor Vehicle Speed

Higher motor vehicle speed has a negative impact on cyclist risk and comfort unless mitigated by design treatments. Operating speed is recommended as the motor vehicle speed to use when selecting a bikeway design treatment, but consideration may be given to the posted speed and design speed where they are known. Posted speed is the maximum legal operating speed. Actual operating speed is measured by observation of traffic and is generally reported as the speed at which 85% of vehicular traffic is travelling. Design speed is a selected speed used to determine the various geometric design features of the roadway.

Roadway Cross Section

The two basic types of roadway cross section for selecting a bikeway design are urban (curb and gutter) cross section and rural (shoulder and ditch) cross section. The rural and urban cross section terms are based on the presence or absence of curbing. The roadway cross section, in general, includes travel lanes, turn lanes, bikeways, sidewalks, shared-use paths, drainage features, medians, traffic barriers, frontage roads and other features.

Road Functional Classifications

The two major considerations in classifying the functions of highway and street networks are mobility and access. Mobility refers to the ability to travel at higher speeds over longer distances, while access refers to connections between the transportation system and adjacent land uses. The Region's Official Plan defines several functional classes, including three arterial road classifications: Type A, B and C arterials. The functional classifications are based on a variety of criteria including traffic volume, speed, traffic composition and access.
On-Street Parking

The presence of on-street parking increases the width needed in an adjacent bike lane for cyclists to maneuver around motorists entering and exiting cars in the bicycle travel path, thus bike lane width should be increased. This is primarily a concern on streets and highways with an urban (curb and gutter) cross section.

Intersections and Driveways

Intersections and driveways are roadway features that require extra consideration and care as they relate to bikeways, and provide opportunities as well as potential difficulties for designers of bikeways. Since cyclists generally want to reach the same destinations as motorists, these features provide access to those destinations. They also present potential locations for conflicts between motor vehicles and bicycles. Most bicycle crashes with motor vehicles occur at intersections.

Right-of-Way Constraints

Right-of-way needs and constraints related to bikeways should be considered throughout project planning and design. Where limited right-of-way does not accommodate a standard bikeway treatment, creative bikeway design solutions may be considered. On alignments where bicycles cannot be safely accommodated due to right-of-way constraints, the project may need to include funding of a bikeway on a parallel road or other alignment in order to meet the project purpose and need pertaining to the bicycle transportation mode.

Vehicle Turn Lane Configuration

Since cyclists typically operate to the right of motorized traffic, vehicle right turn lanes are roadway features that require extra consideration and care as they relate to bikeways. Traffic flow and safety can be improved by signing and striping bike lanes as well as providing informational signs for motorists stating the rules of interaction at points where vehicle right-turn lanes cross bike lanes.

Number of Traffic Lanes

Intersection design treatment may depend on the number of lanes that a cyclist or pedestrian must cross.

Topography, Grades, Sight Distance and Sight Lines

Additional bikeway width or separation from the roadway is needed on roads with hills or curves, as determined through a case-by-case analysis. A higher level of bicycle accommodation than indicated in
the facility treatment graph is necessary in most cases in rough terrain, and should be considered in
rolling terrain. Adequate sight distance is required when a motorist overtaking a bicycle needs to either
change lane positions or slow to the cyclist's speed. Motorists tend to encroach on the shoulder on the
inside of curves where the curve advisory speed is less than the main route speed. Inadequate sight
distance and obstructed sight lines may be due to restrictive roadway geometry and/or visual obstructions
such as vegetation. Cyclist speed is strongly influenced by topography and grades. On long, steep
downhills, cyclists may approach motor vehicle speeds and may have reduced ability to stop. On uphill
sections, cyclists may need to stand up to pedal, leading to a wider bicycle track in the bikeway.

Traffic Composition

The regular presence of heavy vehicles (trucks, buses, and/or recreation vehicles) may decrease safety
and comfort for cyclists unless special design treatments are provided. If the percentage of trucks or
other large vehicles is greater than 10 percent or greater than 250 per peak-hour, a higher level of
bikeway accommodation should be used on designated bike routes by increasing the bike lane width,
providing an off-road bikeway (shared-use path) or increasing the separation between the roadway and
bikeway.

At speeds greater than 75 km/h the windblast from large vehicles may create a serious risk for cyclists.
Even at lower operating speeds, they are not compatible with cyclists using a shared lane. All types of
cyclists prefer extra roadway width or separate facilities to allow greater separation from large vehicles.
Many cyclists will choose a different route or not ride at all where there is a regular presence of large-
vehicle traffic unless they are able to move several metres away from them.

Bus Routes

Bus routes may be compatible with bikeways, or they may present unsafe conditions for cyclists,
depending on bus operation and lane configuration. On streets where buses make frequent stops, they
may operate at a similar average speed as bicycles, but because the cyclist's speed is relatively constant
while the bus makes frequent stops at the curb, they may have to pass each other many times, creating a
potentially unsafe condition. Dedicated busways or transitways may provide good opportunities for
bikeways.

Peak-hour Traffic Volume

Peak-hour volume of motor vehicles should be considered in addition to average daily traffic, especially in
guard to high-volume turning movements and at intersections where queuing of vehicles may obstruct
bikeways.
Average Daily Bicycle Volume and Peak-Hour Bicycle Volume

These measures are not routinely reported, in part because they are difficult to obtain using automated equipment and because they are likely to be significantly higher after a bikeway is added to a street or road that does not currently have appropriate bicycle accommodations. In 2001, the Region incorporated cyclist counts into its Cordon Count Program. Estimates of bicycle traffic volume may be determined by video recording a road or intersection, or a facility that is similar to the one under design, observing the tape and manually logging the data. Qualitative data may be obtained by simply observing similar facilities.

Cyclist Characteristics

The types of cyclists expected to use the bikeway may be an important consideration in some cases. Most bikeways are designed to accommodate basic cyclists, but advanced cyclists and children cyclists may have additional needs. Advanced cyclists and bicycle commuters may have low tolerance for bikeways that require frequent stops or detours away from the road, and may choose to occupy a traffic lane instead of an inconvenient bikeway. Children cyclists are likely to have limited bicycling ability and limited understanding of traffic rules and drivers' perception, and they may need additional accommodation near schools and playgrounds, and at busy intersections or other locations.
**Table 1 – Facility Treatment Types**

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Purpose</th>
<th>Application</th>
<th>Description</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2. Cycle Tracks</strong></td>
<td>In urban areas where there is a high volume of bicycle and pedestrian traffic and separation is deemed appropriate.</td>
<td>In urban areas where there are higher volumes of bicycle and pedestrian traffic and separation is deemed appropriate.</td>
<td>Provides a network of space between the bike lane and the travel lane. The road marks are marked with an edge line and signage for one-way bicycle traffic.</td>
<td>1. TAC, Geometric Design Guide for Canadian Roads, Second Edition, 2012.</td>
</tr>
<tr>
<td><strong>5. Paved Shoulder</strong></td>
<td>A standard or wide travel lane for accommodating cyclists and motorists in a shared lane.</td>
<td>In rural or urban areas where operating speeds are 60 km/h or less and sufficient right sight lines are present.</td>
<td>In rural or urban areas where operating speeds are 60 km/h or less and sufficient right sight lines are present.</td>
<td>1. Deloitte MRC, Cycling Facility Selection Decision Support Tool &amp; User Guide, Issue 1.0, City of Ottawa. May 2011. 2. York Region, York Region Pedestrian and Cycling Master Plan Planning and Design Guidelines version 1.3. 3. TAC, Geometric Design Guide for Canadian Roads. Chapter 3, September 1999. 4. Ministry of Transportation Ontario, Pavement, Hazard and Deletion Markings, Ontario Traffic Manual Book 11. March 2000.</td>
</tr>
</tbody>
</table>
Map 1
Primary Cycling Network

Legend
Primary Cycling Network

- Existing GO Station
- Proposed GO Station
- Provincial
- Regional Centre
- GO Rail
- Highway 407 (Future)
- Urban Area Boundary
- Urban Area Boundary (Deferred)

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Legend

Treatment Type *
- Two-Way Cycle Track
- Multi-Use Path
- Buffered Cycle Lane
- Cycling Lane
- Paved Shoulder
- Shared Roadway
- Other Trail
- Pedestrian Bridge

Existing GO Station
Proposed GO Station
Regional Centre
Urban Area Boundary
Urban Area Boundary (Deferred)
GO Rail
Highway 407 (Future)

Provision for Cycling Facilities to be Considered with Future MTO Interchange/Bridge Projects

*Treatment types are to be confirmed through Environmental Assessments and other design studies.
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