Chapter 3 – DESIGN SPECIFICATIONS

3.1 CLASS 1 – MULTI-USE PATH

Off-road multi-use trails are the backbone of the Brampton PathWays Network. They are typically incorporated into parkland and valleyland, or within the boulevards of road rights-of-way. Design criteria for these facilities are described below.

Chinguacousy Trail – Brampton, Ontario

3.1.1 Existing Brampton Standards, Guidelines & Principles

The existing City of Brampton standard indicates that multi-use recreational trails are typically incorporated into parkland/valleylands or within the boulevards of road rights-of-way.

> *The design of the parkland/valleyland trail system is typically a 2.4 metre wide asphalt path allowing for two way recreational cycling.*
>
> *The typical road right-of-way trail incorporates either a 2.4 metre two-way directional path or a 1.5 metre wide one-way directional path within the boulevard between the curb and the property line. The 2.4 metre wide path is located adjacent to the sidewalk or is installed in lieu of a sidewalk. On smaller roads, the 1.5 metre wide path occurs on each side of the road and is constructed adjacent to a 1.0 metre wide asphalt killstrip.*[1]

Multi-use trails within the road right-of-way are currently limited to Parkway road standards and some sections of Bovaird Drive.

3.1.2 Review of Current Industry Guidelines and Policies

Multi use trails should be designed to accommodate a variety of user groups. A review of various bikeway and trail design guidelines from throughout North America indicates that standards vary depending upon the trail's location, the anticipated number of users and the permitted uses. The minimum width is typically 3.0 m, which allows for bi-directional flow. On popular, heavily travelled multi-use

[1] City of Brampton, Landscape Development Guidelines, April 2000.

trails, widths of up to 3.5 m are recommended to allow for a wider variety and greater number of users.

3.1.3 Trail Surface Types


Professor's Lake Trail – Brampton, Ontario

Recommended multi-use trail surfaces include stonedust or asphalt. Recently, some municipalities have been experimenting with concrete and also asphalt mixes that use materials such as recycled asphalt, plastics, rubber and ground glass. Certain types of granular surfaces limit trail access for other wheeled uses such as in-line skaters, strollers and wheelchairs, so intended uses should be considered prior to the specification of surface materials. In high volume or tourist areas, it may be desirable to separate slower users from faster ones by providing separated trails.

Compacted stonedust is a common surface treatment for multi-use paths with fewer than 500 users per weekend day. This surfacing is less expensive than other alternatives, but requires periodic maintenance. Asphalt is widely used for trails with more than 500 users per weekend day. Poured-in-place concrete may be appropriate for trail use, but is a much more expensive alternative. In addition, concrete expansion joints can create a bumpy surface due to differential settling of the slabs over time. Concrete pavers and bare earth are not recommended for cyclists or in-line skaters, and are difficult for disabled users. Bare earth becomes rutted when wet. Wood chips are unacceptable for multi-use trails because they can cause flat tires. Asphalt is recommended for in-line skaters and trail users with disabilities. Boardwalks and metal bridges are not recommended for in-line skaters.

A new product has been introduced for use on steep sections of stonedust trails. It is a stabilizer that binds the stone chips and reduces erosion of the path. A synthetic or plant compound is incorporated within the limestone screenings and set with water. The additional cost of the stabilizer increases the cost of a stonedust trail to an amount similar to that of an asphalt surface. In some cases, stabilized stonedust may be preferable to asphalt because it is repairable and also is easier to install in confined or remote areas.

3.1.4 Recommended City of Brampton Standard

The recommended guideline for the City of Brampton Class 1 Boulevard Multi-Use Trail is summarized in Table 3.1. A schematic illustration is provided in Figure 3.1.

Table 3.1 – Recommended Guideline: Boulevard Multi-Use Trail

Class 1 – Boulevard Multi-Use Trail	
Travel Width	3.0 m preferred
Travel Surface	Asphalt preferred
Clearing Width	6.0 m preferred
Clearing Height	3.0 m preferred
Desirable Grades	< 3%

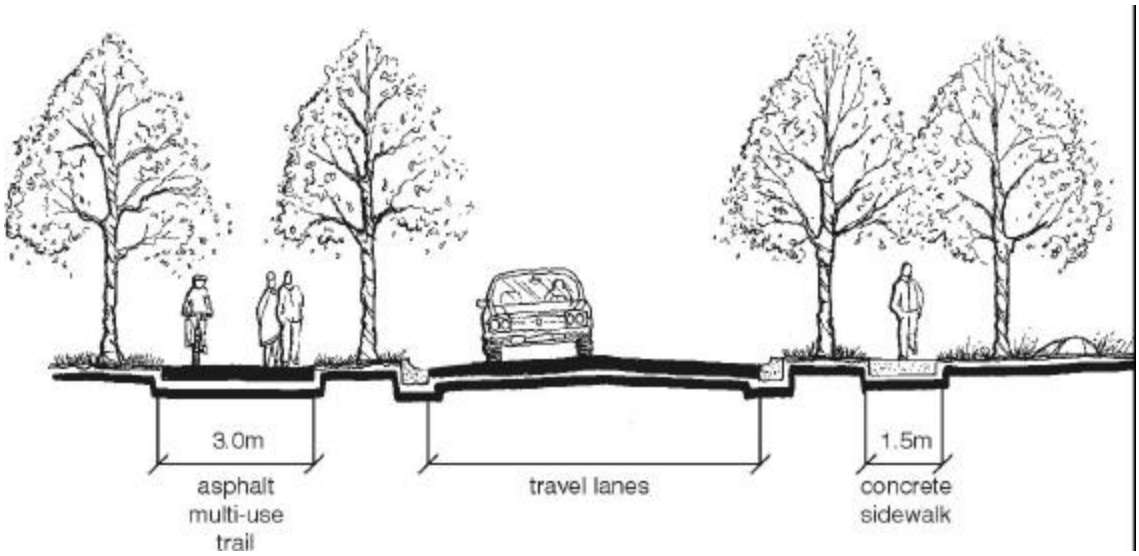

Figure 3.1 – Boulevard Multi-Use Trail, Typical Cross Section

Other potential configurations for implementing a boulevard multi-use trail within an unconstrained right-of-way may include:

- Boulevard trails on both sides of the road right-of-way. These could be implemented where Class 1 trails are used to connect Class 2 or Class 3 bike facilities where cyclists normally use both sides of the roadway.

- Boulevard trails on both sides of the road right-of-way combined with parallel sidewalks on one or both sides of the street.

The recommended guideline for the City of Brampton Class 1 Off-Road Multi-Use Path is summarized in Table 3.2. A schematic illustration is provided in Figure 3.2.

Table 3.2 – Recommended Guideline: Off-Road Multi-Use Path

Class 1 – Off-Road Multi-Use Path	
Travel Width	3.0 m preferred 3.5 m in areas of high trail use
Travel Surface	Asphalt preferred
Clearing Width	6.0 m preferred
Clearing Height	3.0 m preferred
Desirable Grades	< 3%

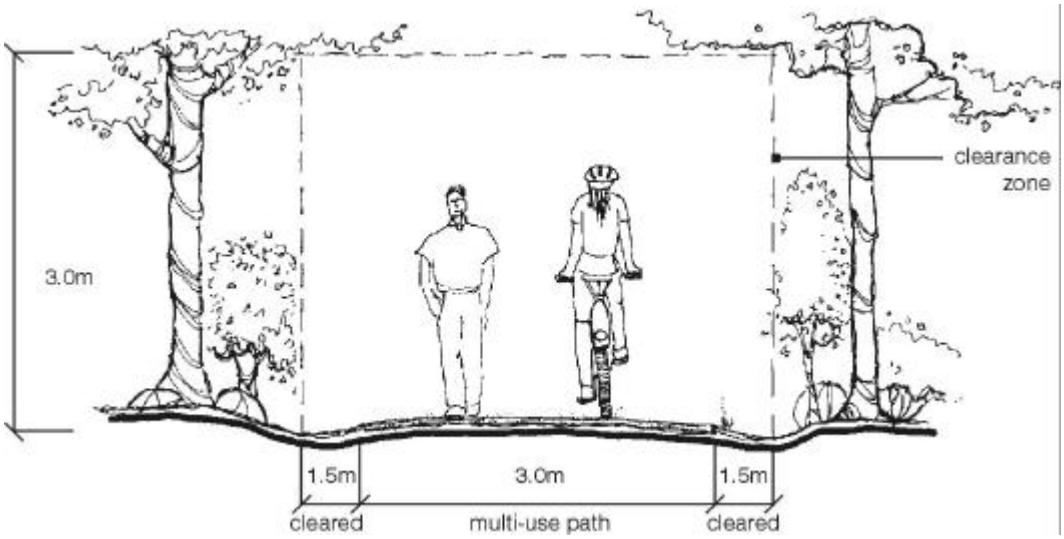

Figure 3.2 – Off-Road Multi-Use Path, Typical Cross Section

3.1.5 Implementation and Trade-Offs

For new roadways, it is recommended that the guideline be followed for the highest form of continuity across the network. For road reconstruction, it may not be feasible to follow the guideline exactly, and some leeway is available. This section outlines some of the implementation and trade-off options for Class 1 Multi-Use Paths.

The proposed guideline for a Boulevard Multi-Use Trail includes a single bi-directional asphalt trail on one side of the road right-of-way, with no provision for sidewalks on either side. The option of designing a parallel sidewalk should be based on the expected pedestrian demand and adjacent land uses. If an exclusive pedestrian facility is not provided, extra width along the multi-use boulevard trail should be provided to accommodate the additional pedestrian traffic. The construction and maintenance costs of a single system versus

parallel facilities are considerably lower, and would lead to a more unified feel of the trail system.

In areas where right-of-way is limited and anticipated demand is low, a minimum trail width of 2.4 m can be assumed. In this case, however, consideration should be given to the future widening of the trail to the design standard of 3.0 m to better accommodate all users.

3.2 CLASS 2 – BIKE LANES

Where off-road routes are not feasible or desirable, bike lanes should be considered to establish key connections between adjacent systems and to facilitate utilitarian use. The on-road facility design criteria is based on the class of roadway on which the facility will be constructed, as well as anticipated demand and right-of-way availability.

Bike Lane on St. George Street, Toronto, Ontario

For routes which are served by bike lanes, it is expected that pedestrians and in-line skaters will be accommodated on the sidewalk. However, it must be recognized that in-line skaters may prefer to use the bike lane.

3.2.1 Existing Brampton Standards, Guidelines & Principles

The current City of Brampton standard for on-street bike lanes is as follows:

> *A bicycle lane is a specific lane for bicycles on the roadway. This type of lane is identified by a separation line from the vehicular travelled portion of the road and shall have signage and/or bicycle symbols painted on the road surface. The bicycle lane could, in areas, be combined with bus transit traffic due to space limitations such as the proposed Queen Street corridor route from Centre Street east to Highway No. 50.*[2]

This standard currently only applies to the Queen Street corridor, and has not yet been implemented.

3.2.2 Review of Current Industry Guidelines and Policies

Bike lanes have several advantages over wide shared lanes. Some of these include exclusive space, a higher level of safety

[2] City of Brampton, Landscape Development Guidelines, April 2000.

and an increased compliance with traffic control devices. In a study comparing streets with bike lanes and those without, it was observed that on streets with bike lanes, 81% of cyclists obeyed stop signs, compared to only 55% on streets without.[3]

Bike lanes are therefore attractive to less skilled cyclists and may encourage more people to cycle. The optimum recommended bike lane width is 1.5 m (1.2 m minimum to 1.8 m maximum), enabling cyclists to travel in single file. Lane widths greater than 1.8 m are not recommended since they may encourage use by motor vehicle drivers for passing other vehicles on the right, or for stopping and parking.

3.2.3 Recommended City of Brampton Standard

The recommended width of an on-road bike lane in the City of Brampton is summarized in Table 3.3. A schematic illustration is provided in Figure 3.3. This type of lane should be separated from the vehicular travelled portion of the road using pavement markings, and should be clearly identified through signage and symbolic pavement markings.

Table 3.3 – Recommended Guideline: On-Road Bicycle Lane

On-Road Bicycle Lane	
Travel Width	1.5 m preferred

3.2.4 Bike Lanes with On-Street Parking

Bike lanes on roads with on-street parking are located to the left of and adjacent to parked vehicles along the curb. Designing this type of bikeway facility must take into consideration the potential hazard to cyclists of car doors opening into the travelled portion of the bikeway. In order to allow clearance for vehicle doors, and to minimize collisions with cyclists, the combined bicycle/parking lane should be a minimum of 4.0 m wide. This width allows for a 1.8 m bike lane and a 2.2 m wide curbside parking stall. The extra distance added to the typical 2.0 m wide parking stall provides space for the opening of car doors, and encourages cyclists to travel a safe distance from the parked vehicles. As an alternative, the width of the bike lane may be reduced if the parking aisle is greater than 2.4 m wide.

[3] *Bicycle Lanes versus Wide Curb Lanes: Operational and Safety Findings*, Federal Highway Administration, May 1998.

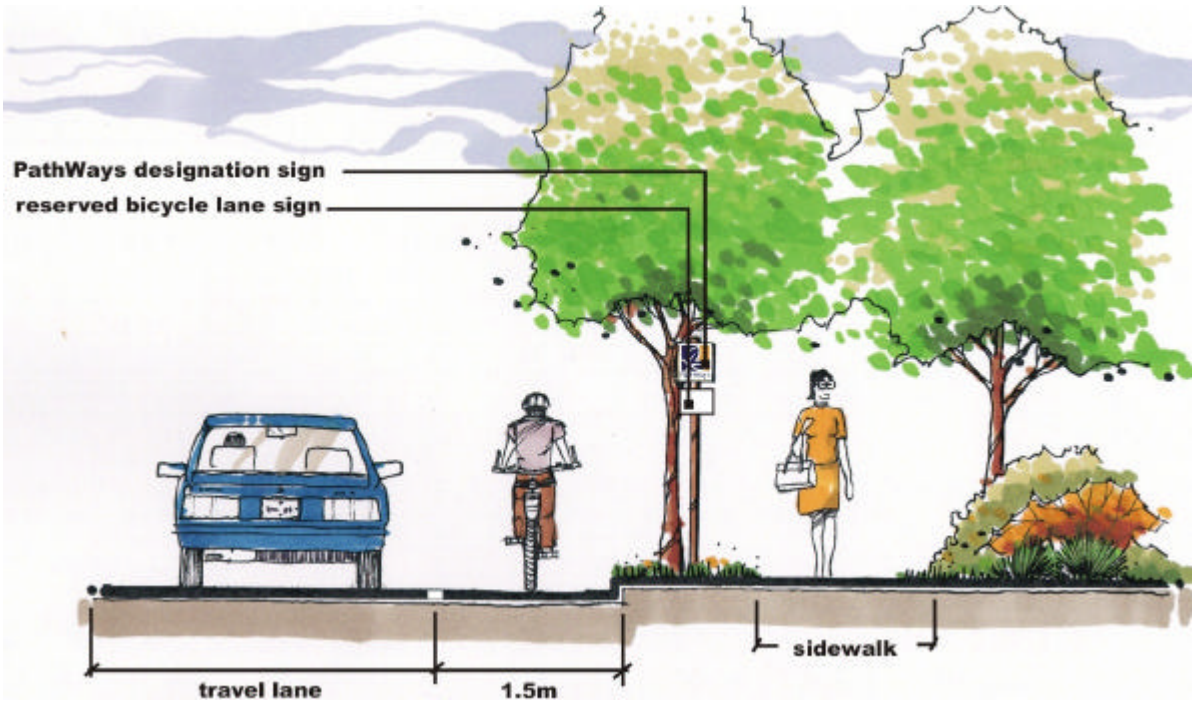

Figure 3.3 – Typical Bike Lane Cross Section

Bike lanes on roads with on-street parking should be considered in commercial and residential areas where the demand for and turnover of parking is high, and where commercial and residential property owners may not accept the reduction or prohibition of on-street parking.

The recommended guideline for City of Brampton Bike Lanes with On-Street Parking is summarized in Table 3.4. A schematic illustration is provided in Figure 3.4.

Table 3.4 – Recommended Guideline: Bicycle Lane with On-Street Parking

Bicycle Lane with On-Street Parking	
Travel Width	1.8 m Bike Lane + 2.2 m Parking Stall

3.2.5 Implementation and Trade-Offs

Where it is not feasible to install dedicated bike lanes, the applicability of a signed route or a multi-use boulevard trail should be evaluated. Other route alignments may also need to be considered.

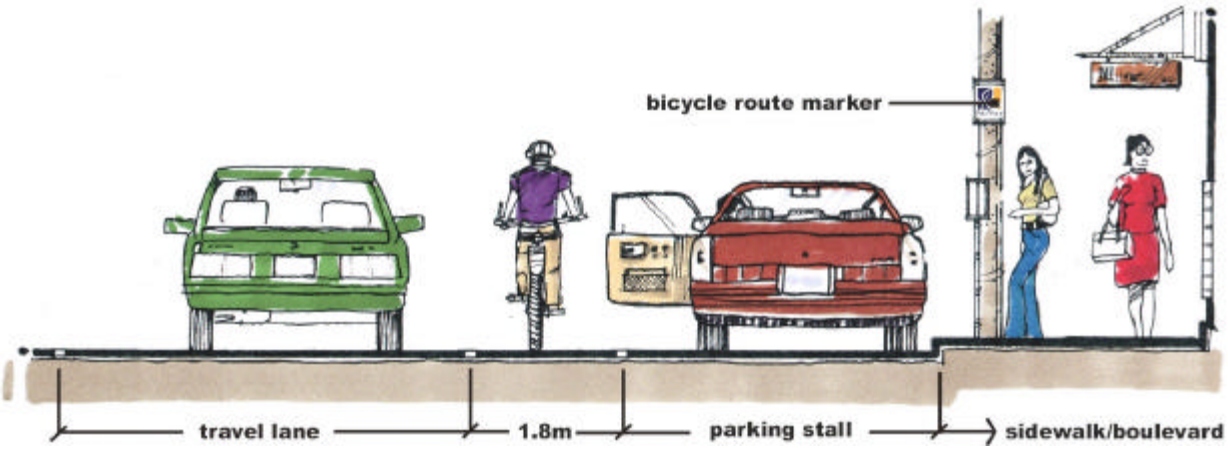

Figure 3.4 – Bike Lane with On-Street Parking Cross Section

3.3 CLASS 3 – SIGNED ROUTES

3.3.1 Existing Brampton Standards, Guidelines & Principles

There is currently no Brampton standard for the design of on-street signed routes.

3.3.2 Review of Current Industry Guidelines and Policies

On-street signed routes are typically implemented on local and collector roads to form a connection or link in a trail network. On-street signed routes should only be implemented where wide curb lanes exist or can be provided, or where traffic volumes are low, such as is typically found on a local or collector road. An on-street signed route can also form part of a trail network when the addition of bike lanes is not possible in the short term due to limited pavement or right-of-way widths and/or because of on-street parking.

In addition to trail route marker signs for on-street signed routes, consideration should be given to shared-use pavement markings and/or "share the road" signs.

3.3.3 Recommended City of Brampton Standard

The recommended guideline for City of Brampton On-Street Signed Routes is summarized in Table 3.5. A schematic illustration is provided in Figure 3.5.

Table 3.5 – Recommended Guideline: On-Street Signed Route

On-Street Signed Route	
Travel Width	4.0 m – 4.5 m wide curb lane recommended

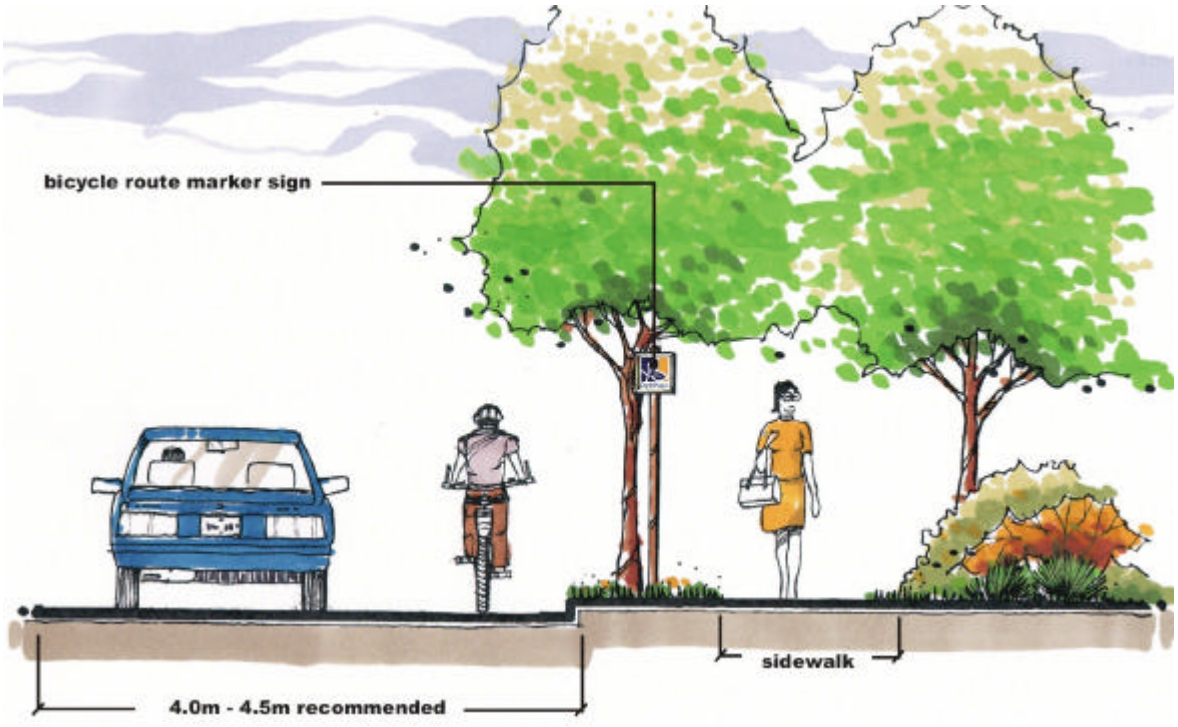

Figure 3.5 – On-Street Signed Route, Typical Cross Section

3.3.4 Implementation and Trade-Offs

Streets should typically only be signed as on-road bike routes if there is adequate pavement width to safely accommodate both motor vehicles and cyclists. Otherwise, alternative routes should be investigated. In some locations, narrow roadways may be appropriate or preferred if traffic volumes are very low and little to no truck traffic exists.

3.4 BICYCLE FRIENDLY STREETS

In terms of public policy, it is important to recognize that the bicycle is formally recognized as a vehicle by the Province of Ontario, as outlined in the Highway Traffic Act, R.S.O., 1990. Bicycles, therefore, have the right to share all classes of roadways, including arterials, collectors and local streets, with the exception of controlled access and 400 series highways.

The fact that bicycles have a right to use municipal, regional and provincial roadways leads to an important principle of roadway design, that "every road is a cycling road". Municipalities, therefore, should adopt bicycle friendly design guidelines for all streets, whether a road is designated as part of a bikeway network or not. Bicycle friendly roadway features typically include, among other things, wide curb lanes plus drainage grates that are bicycle friendly and ideally located out of the desired path for cycling. Other features include traffic control devices that are programmed with bicycles in mind, particularly detector loops that have their sensitivity adjusted to allow bicycles to actuate a traffic signal.

It is imperative that the City of Brampton recognize that providing a multi-use trail system to serve a community does not release it from an obligation to ensure that all roadways in a community are designed, updated and maintained in a way that provides a safe environment for pedestrian and bicycle use. No matter how extensive the on or off-road trail facilities, some cyclists, especially commuters, will choose to ride on the road with traffic. They have that right and, accordingly, should feel safe and comfortable in doing so.

3.4.1 Wide Curb Lanes

Wide curb lanes should have sufficient width to allow motorists to pass cyclists without encroaching on an adjacent travel lane. Wide curb lanes should be encouraged for all road classifications to provide bicycle friendly streets, whether there is a designated bikeway or not. The preferred width for a wide curb lane is 4.5 m, with an acceptable range from 4.0 m to 5.0 m.

3.4.2 Paved Shoulders

A relatively easy way to provide for cyclists on roads with granular shoulders is to pave a 1.5 m wide section of the shoulder. Paved shoulders can be considered for on-road routes along rural sections with no curb or gutter edge and a speed limit at or below 80 km/h. Paved shoulders offer other advantages: they reduce maintenance costs associated with grading of gravel shoulders,

extend the life of the vehicle lanes, and reduce run-off-the-road collisions. However, it should be noted that paved shoulders are not ideal for year round cycling since they often are used, whether intentionally or not, for snow storage during winter months. A schematic illustration is provided in Figure 3.6.

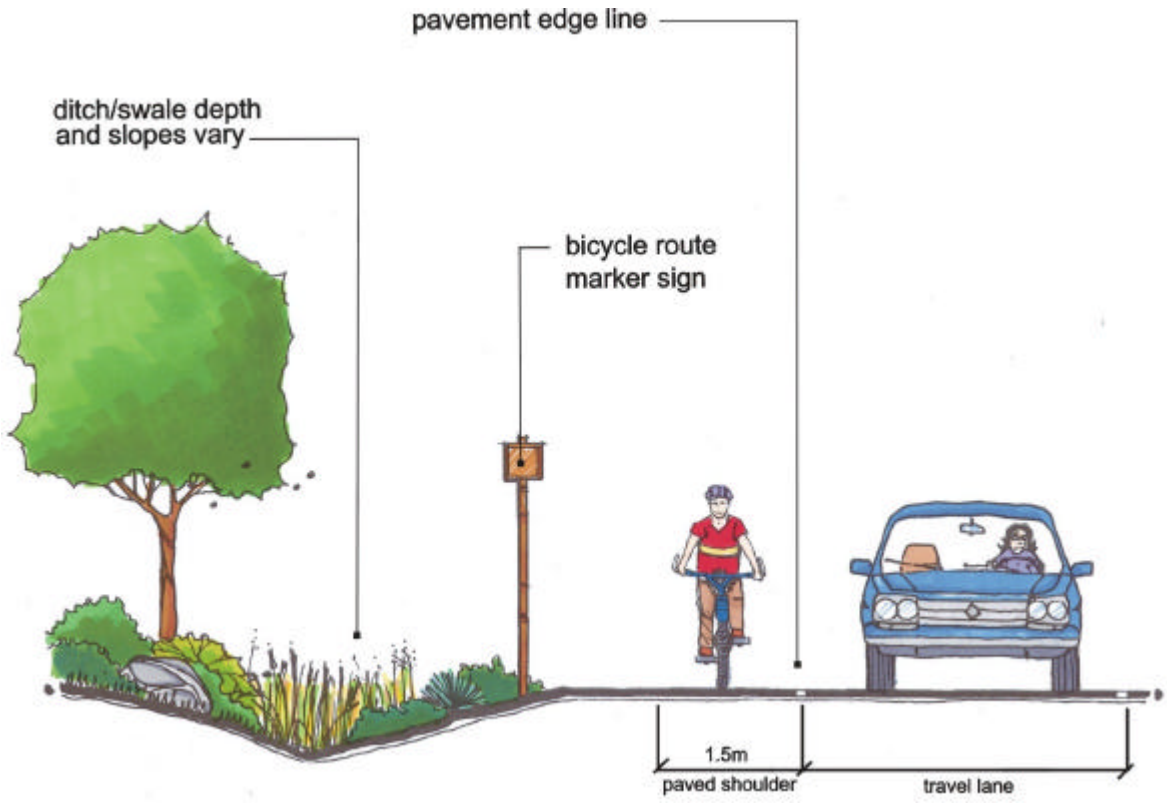

Figure 3.6 – Paved Shoulder: Rural Section

3.5 SUMMARY OF DESIGN STANDARDS

Table 3.6 provides a summary of recommended design standards described in this chapter.

Table 3.6 – Summary of Design Standards

Trail Type	Existing Brampton Standard	Proposed Brampton Standard
	TRAVEL WIDTH	
Class 1 – Multi-Use Path	2.4 m	3.0 m
Class 2 – Bike Lane • No On-Street Parking • On-Street Parking	1.5 m N/A	1.5 m 1.8 m + 2.2 m parking aisle
Class 3 – Signed Route	N/A	4.0 m – 4.5 m wide curb lane

An example of alternative road cross sections incorporating the above guidelines is included in Appendix A for information purposes. It is recommended that the City of Brampton develop a set of alternative road cross sections to account for on-road bike lanes or boulevard multi-use trails. These should be developed as soon as possible so they can serve as input to roadway construction projects where PathWays facilities have been shown within the road right-of-way.

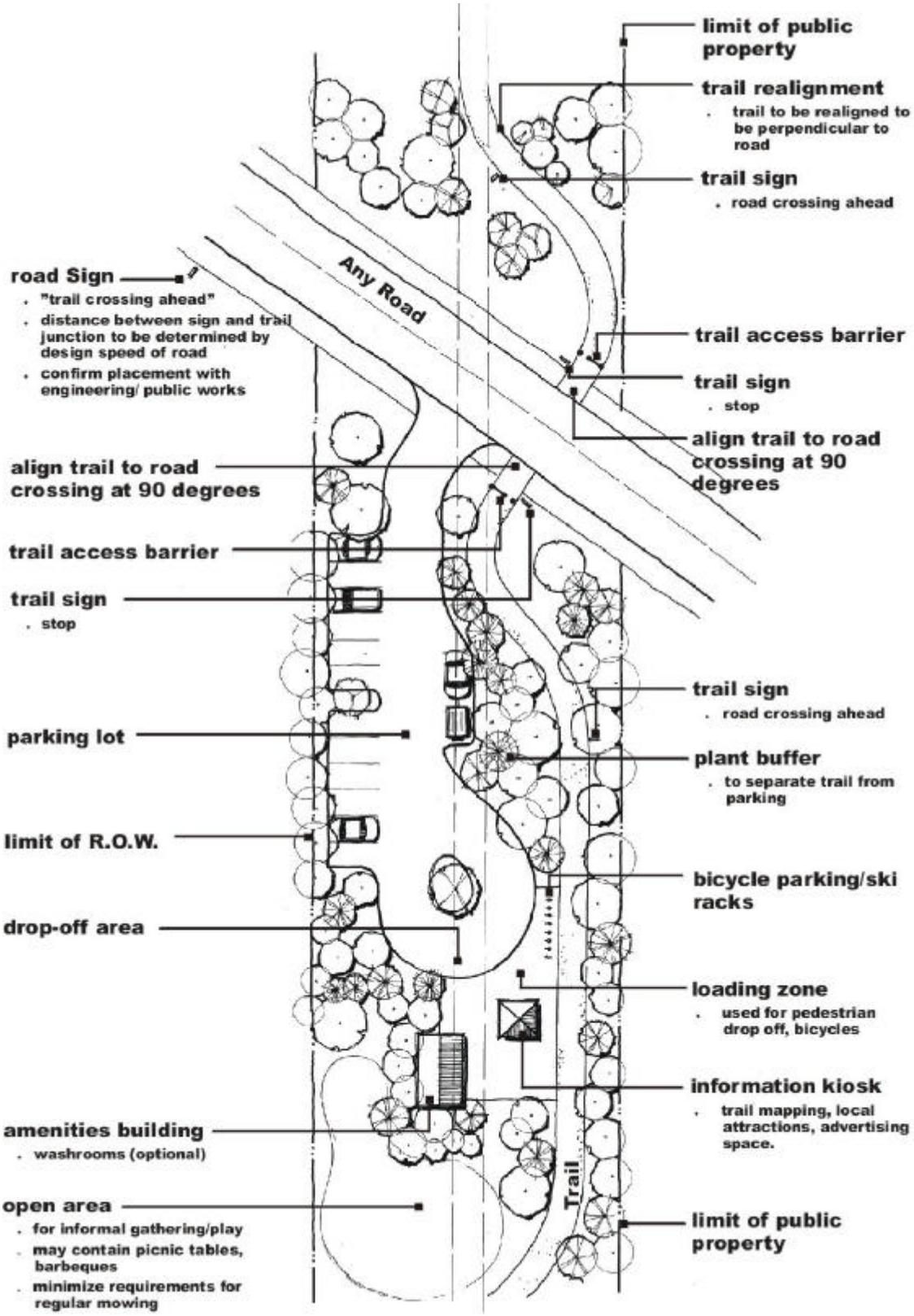

Figure 5.1 – Example of a Minor Rest and Staging Area

PathWays

Trail Amenities

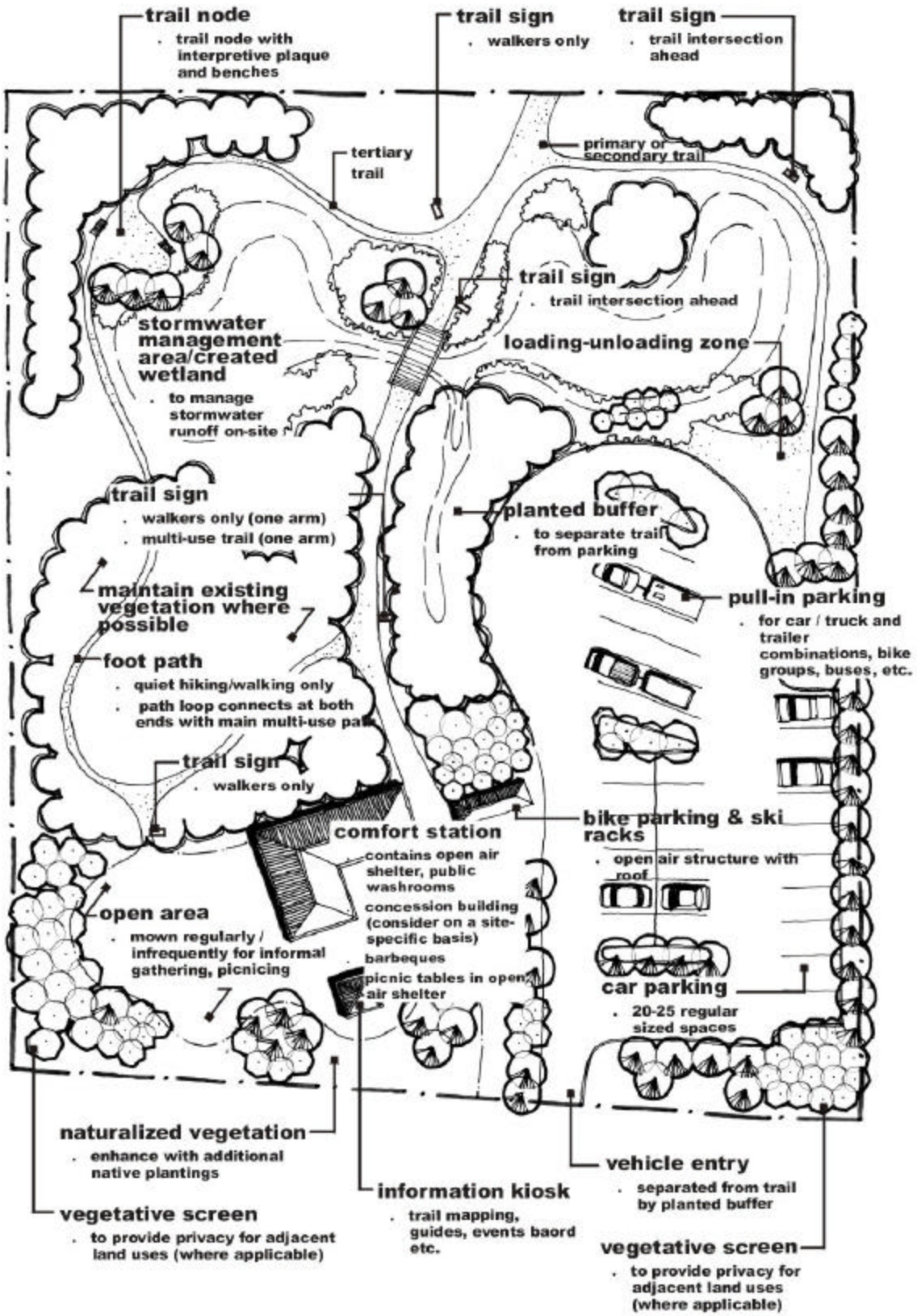

Figure 5.2 –Example of a Major Rest and Staging Area

Trail Amenities

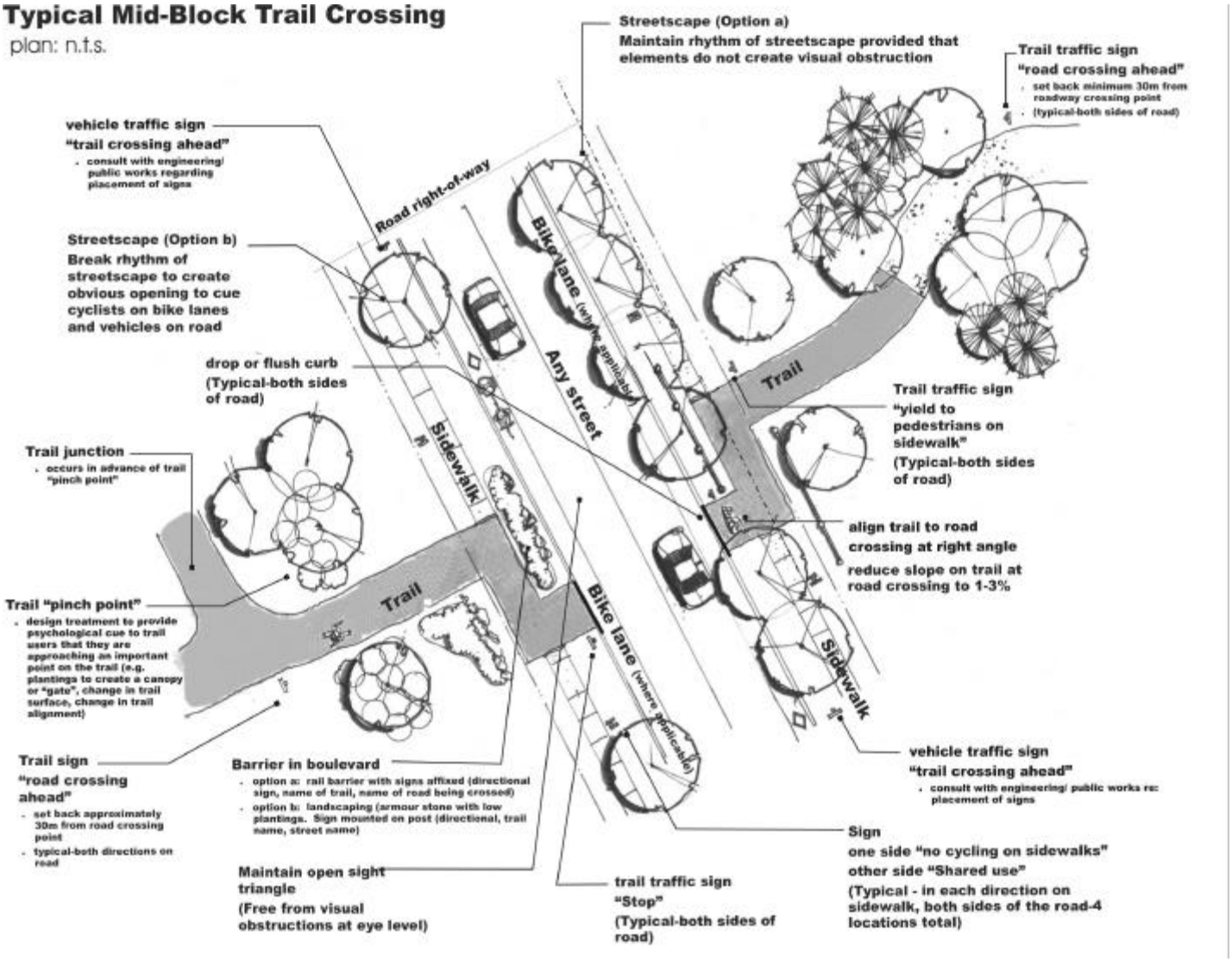

Figure 6.2 – Elements of Trail Crossings of Roadways