City of Sarnia

ACTIVE TRANSPORTATION PLANNING AND DESIGN GUIDELINES

APPENDIX E

MAY 2013

IBI GROUP

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1. REFERENCES FOR THE PLANNING AND DESIGN OF ACTIVE TRANSPORTATION FACILITIES

Active transportation infrastructure includes a number of different types of facilities to accommodate the wide range of abilities, skills and experience of pedestrians, in-line skaters, cyclists, pedestrians with mobility devices, visual, hearing or cognitive impairments, skateboarders, etc. The basic facilities on which they travel consist of: sidewalks for pedestrians, child cyclists and small-wheeled users like in-line skaters and skate-boarders; multi-use trails that essentially accommodate all active transportation modes; and bikeways such as bike lanes for cyclists only. General design guidance is provided below and is based on current design guidelines available in North America. Every corridor is unique and the design for each corridor should be custom-made to fit the context of the social, environmental and economic conditions.

Highly recommended guidelines are marked with a star: ★

Guidelines that are free are marked with a smiley face: ☺

1.1 Pedestrians and Cyclists

★ ***PLANNING AND DESIGN FOR PEDESTRIANS AND CYCLISTS: A TECHNICAL GUIDE*, VÉLO QUÉBEC ASSOCIATION (2010)**

This is the 3rd edition of Vélo Québec's design handbook expanded to include pedestrian design issues. As the most recently published guidelines in North America, it is a primary source for cycling and pedestrian planning and design guidance in the Canadian context. This manual summarizes the main characteristics of active transportation, discusses the design characteristics of pedestrians and cyclists, presents ideas on creating walkable and bikable environments, and has a section on planning for active transportation. The design sections cover paths and trails, walkways and bikeways in roadway corridors, ancillary elements such as lighting, signs and pavement markings, street furniture and parking, integration with transit, and maintenance and operation of pedestrian facilities and bikeways. Order on-line at http://www.velo.qc.ca/velo_quebec/amenagements.php?page=guide (January 2011).

☺★ ***DESIGNING WALKABLE URBAN THOROUGHFARES: A CONTEXT SENSITIVE APPROACH*, INSTITUTE OF TRANSPORTATION ENGINEERS (ITE), 2010**

This recommended design practice of the Institute of Transportation Engineers (Washington DC) is a comprehensive guide to the planning and design of major streets in urban areas. It is comprehensive in that it includes all elements of the roadway, whether they are for motorists, pedestrians or cyclists, as they interact to influence the walkability of the corridor. Chapters in the design section include: design controls, and street-side, travel way, and intersection design guidance. Available on-line at http://www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=RP-036A-E (January 2011).

***PROMOTING SUSTAINABLE TRANSPORTATION THROUGH SITE DESIGN: AN ITE RECOMMENDED PRACTICE*, INSTITUTE OF TRANSPORTATION ENGINEERS (ITE), 2010**

This report recommends site design practices that can be applied through the site development process to promote the use of more sustainable modes of transportation, such as walking, cycling and transit. Its primary purpose is to assist policymakers and professionals involved in the preparation, review and approval of non-residential or mixed-use development proposals to identify and incorporate features that make sites more accessible to travel modes other than the single-occupant vehicle (SOV). Order on-line at http://www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=RP-035A (February 2011)

***CANADIAN GUIDE TO NEIGHBOURHOOD TRAFFIC CALMING*, TRANSPORTATION ASSOCIATION OF CANADA (TAC), 1998**

A common reference for guidance on traffic calming elements such as curb extensions, refuge islands, and other devices that slow traffic and advantage pedestrians and cyclists. Although generally not applicable to arterial raodways, some of the design ideas such as curb extensions and median refuge islands have broader applciations in moderate speed environments. Order on-line at https://vws3.primus.ca/dev.tac-atc.ca/english/bookstore/products.cfm?catid=12&subcatid=21&prodid=64 (January 2011).

1.2 Pedestrians

***DRAFT AMENDMENT TO ONTARIO REGULATION 191/11: INTEGRATED ACCESSIBILITY STANDARDS* MADE UNDER THE ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT, 2005.**

The draft amendement to this Ontario Regulation under the AODA includes **Design of Public Spaces Standards (Accessibility Standards for the Built Environment)**. The goal of the Accessibility Standards for the Built Environment is to remove barriers in public spaces and buildings. The standards for public spaces will only apply to new construction and planned redevelopment. The built environment includes Recreational Trails and Beach Access Routes, Outdoor Public Use Eating Areas, Outdoor Play Spaces, Exterior Paths of Travel (outdoor sidewalks or walkways), Accessible Parking, Obtaining Services, and Maintenance. The regulation will come into force no later than January 1, 2013. Available on-line at http://www.mcss.gov.on.ca/en/mcss/programs/accessibility/regulations/reg_191/index_reg.aspx (August 2012).

***GUIDE FOR THE PLANNING, DESIGN AND OPERATION OF PEDESTRIAN FACILITIES*, AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO), 2004**

This particular AASHTO guide covers characteristics of pedestrians, planning strategies, and facility design, operation, and maintenance. It is a reputable source, with a broad discussion of both planning and design issues around streets and street crossings. Order on-line at https://bookstore.transportation.org/item_details.aspx?id=119 (January 2011).

***ACCESSIBLE SIDEWALKS AND STREET CROSSINGS—AN INFORMATIONAL GUIDE*, FEDERAL HIGHWAY ADMINISTRATION (FHWA), 2003**

The design details for U.S. accessibility legislation are contained in the Public Rights-of-Way Accessibility Guidelines (PROWAG) and this FHWA manual acts as an abridged version. Until such time that Ontario publishes thier own standrads, this guide provides a succinct summary on making sidewalk and street crossings accessible. It covers understanding users, sidewalk corridors, sidewalk grades and cross slopes, sidewalk surfaces, protruding objects, driveway crossings, curb

ramps, providing information to pedestrians, accessible pedestrian signals, and pedestrian crossings. A checklist is also provided. Available on-line at http://www.bikewalk.org/pdfs/sopada_fhwa.pdf (January 2011).

ALTERNATIVE TREATMENTS FOR AT-GRADE PEDESTRIAN CROSSINGS, INSTITUTE OF TRANSPORTATION ENGINEERS (ITE), 2001

The report summarizes studies on pedestrian crossings and assembles in a single document the various treatments currently in use by local agencies in the U.S., Canada, Europe, New Zealand and Australia to improve crossing safety for pedestrians at locations where at-grade, marked crosswalks are provided. The report also summarizes the results of various studies conducted by public agencies on pedestrian-related collisions, including those documenting the results of removing crosswalk markings at uncontrolled locations. The appendix includes policies of specific agencies on where crosswalks are provided as well as typical crosswalk signing and striping plans. Order on-line at http://www.ite.org/emodules/scriptcontent/Orders/ProductDetail.cfm?pc=LP-629 (January 2011).

1.3 Bikeways

CHAPTER 3.4—BIKEWAYS, GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS, TRANSPORTATION ASSOCIATION OF CANADA (TAC), SEPTEMBER 1999

The TAC *Geometric Design Guide* provides guidance for the planning and design of roads in Canadian; however, the chapter on bikeways has not changed significantly since initial publication in 1995. Vélo Québec's *Planning and Design for Pedestrians and Cyclists,* noted in Section 1.1, page 1, is the preferred guideline since it is more recently updated and comprehensive. Order on-line at https://vws3.primus.ca/dev.tac-atc.ca/english/bookstore/products.cfm?catid=9&subcatid=18&prodid=54 (February 2011)

GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES, AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO), 1999

This AASHTO guide spans planning, design, operation and maintenance of bikeways for the US. Sections include guidance for shared roadways, signed routes, bike lanes, and shared-use paths. A third edition is expected in 2011 and will be much more comprehensive, covering such topics as analysis tools, a discussion of crashes, and road retro-fitting strategies. The basic bikeway types will remain similar, with the addition of bicycle boulevards and the cautionary use of wide outside lanes due to the higher speeds they induce. Available on-line at http://safety.fhwa.dot.gov/ped_bike/docs/b_aashtobik.pdf (January 2011).

URBAN BIKEWAY DESIGN GUIDE, 2ND EDITION NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS (NACTO), 2012

NACTO developed this guide as part of their Cities for Cycling initiative to provide cities with state-of-the-practice solutions to crate complete streets that are safe and enjoyable for cyclists. It includes descriptions, benefits, applications, design guidance, renderings, images and case studies for bike lanes, cycle tracks (segregated bike lanes), intersections, bicycle signals, and signing and marking. Most of the treatments are not directly referenced in the AASHTO guide or the US Manual for Uniform Traffic Control Devices. An on-line and downloadable version of the guide is available at: http://nacto.org/cities-for-cycling/design-guide/ (September 2011).

1.4 European Bikeways (includes Segregated Bike Lanes)

The following guidelines are referenced in particular for the planning and design of segregated bike lanes, or cycle tracks, including cross-sectional criteria, side street / driveway layouts, and strategies for intersections.

***DESIGN MANUAL FOR BICYCLE TRAFFIC*, RECORD 25, CENTRE FOR RESEARCH AND STANDARDISATION IN CIVIL AND TRAFFIC ENGINEERING (CROW), 2007**

Order on-line at http://www.crow.nl/shop/productDetail.aspx?id=889&category=90 (January 2011).

***LONDON CYCLING DESIGN STANDARDS*, TRANSPORT FOR LONDON (TFL), 2010**

Available on-line at http://www.tfl.gov.uk/businessandpartners/publications/2766.aspx (January 2011).

1.4.1 *COLLECTION OF CYCLE CONCEPTS*, DANISH ROAD DIRECTORATE, 2000

Available on-line at http://www.vejdirektoratet.dk/pdf/cykelrapport/999Complete.pdf (January 2011).

1.5 Traffic Control

***GUIDELINES FOR UNDERSTANDING USE AND IMPLEMENTATION OF ACCESSIBLE PEDESTRIAN SIGNALS*, TRANSPORTATION ASSOCIATION OF CANADA, 2008**

These national guidelines are intended to provide deploying agencies with practical information on public liaison, accessible pedestrian signals installation prioritization and design, installation, operations and maintenance. Order on-line at https://vws3.primus.ca/dev.tac-atc.ca/english/bookstore/products.cfm?catid=12&subcatid=21&prodid=213 (February 2011)

***ONTARIO TRAFFIC MANUAL BOOK 15: PEDESTRIAN CROSSING FACILITIES,* QUEEN'S PRINTER FOR ONTARIO, 2010**

The Ministry of Transportation, Ontario publishes a series of *Ontario Traffic Manuals* to provide information and guidance to transportation practitioners in the design, application and operation of traffic control systems in Ontario. Book 15 provides guidance on the planning, design and operation of pedestrian roadway crossings. It outlines the legal requirements, specifically the rules of the road that govern motorists' and pedestrians' movements at controlled and uncontrolled crossings, and presents the devices, physically separated facilities, and accessibility considerations. Available on-line at http://www.library.mto.gov.on.ca/webopac/zoomrecord.asp?recordkey=fa5caef1-9963-4786-b3c9-4b5e50e70321&TemplateGUID=26c8336a-34a4-4079-8514-5cf60c65e6eb&passport=87f6d2d0-c4f3-4b3d-951e-87f1526e37a3&data_dictionary=e874677c-f03d-4504-87f7-bc805da1e255&CommandQuery=+%28Title+%25+%27book+15%27+%29&SearchButton=Command&SearchTemplate=&page=1&RootTemplateGUID=f1273652-1c89-4feb-b4ed-aa5525c2792b&rpt_session_guid=&hpp=25&searchmode=basic&ParentTemplateGUID=&CurSortCol=&CurSort=0&LinkGUID=&mode=search&hide=1 (March 2012).

***BIKEWAY TRAFFIC CONTROL GUIDELINES FOR CANADA*, TRANSPORTATION ASSOCIATION OF CANADA (TAC), 1998**

This guide covers regulatory, warning and information signage, and pavement markings for on-road bikeways and where trails intersection roadways. It will be updated in 2011 based on three TAC reports to include innovative pavement markings such as shared lane markings ("sharrows"), bicycle boxes and roundabouts. Order on-line at https://vws3.primus.ca/dev.tac-atc.ca/english/bookstore/products.cfm?catid=12&subcatid=21&prodid=63 (January 2011).

VOLUME V - TRAFFIC CONTROL DEVICES, MINISTÈRE DES TRANSPORTS QUÉBEC

The Province of Quebec's traffic control device manual includes Chapter 7 on bicycle facilities. Quebec allows the use of the bicycle traffic signals and also includes a section on bikeway way-finding destination / distance signage that is currently not included in the Ontario Traffic Books. Order on-line in English at http://www.publicationsduquebec.gouv.qc.ca/fre/products/38418 (April 2012).

***GREEN LIGHTS FOR BIKES: PROVIDING FOR BIKE RIDERS AT TRAFFIC SIGNALS*, SINCLAIR/KNIGHT/MERZ (2010)**

Prepared for the State of Victoria, Australia, this report deals with material directly related to traffic signals implemented in Australia and New Zealand. It is an excellent summary of innovative approaches to signals to accommodate cyclists, including detection; start, during and clearance phasing; and other techniques such as the "green wave" synchronization for cyclists. Each traffic signal technique is described along with potential applications, benefits and disadvantages. Available on-line at http://www.bv.com.au/general/bike-futures/41329/ (January 2011).

1.6 Bicycle Parking

***BICYCLE PARKING GUIDELINES*, 2ND EDITION, ASSOCIATION OF PEDESTRIAN AND BICYCLE PROFESSIONALS (APBP), 2010**

In the spring of 2002, the APBP published Bicycle Parking Guidelines, a basic guide to the selection and placement of bicycle racks specifically for short-term parking (available online at https://apbp.site-ym.com/?page=Publications (January 2011). This second edition updates the original guide and adds material on long-term and sheltered parking, as well as event parking, in-street bicycle parking, and bicycle transit centers. It includes sample site plans and diagrams to help avoid blunders in rack and locker placement, sample quantity requirements for bicycle parking to meet need by land use, and a worksheet for programming bicycle parking for a building or cluster of buildings. Order on-line at https://apbp.site-ym.com/store/view_product.asp?id=502098 (January 2011).

***BICYCLE END-OF-TRIP FACILITIES: A GUIDE FOR CANADIAN MUNICIPALITIES AND EMPLOYERS*, TRANSPORT CANADA, 2010**

This guide is intended to help municipalities create appropriate and attractive bicycle parking and related facilities that will encourage bicycle use; and determine where, how much, and what type of bicycle parking and related facilities to provide, and how to best design them; and create incentives and regulations that will encourage the provision of bicycle parking and related facilities in the private realm. For employers, it is a useful resource for designing attractive long-term bicycle parking facilities that will encourage employees to commute by bicycle; and designing accessible short-term bicycle parking facilities that will attract cyclist clients. Available on-line at http://www.tc.gc.ca/eng/programs/environment-urban-menu-eng-1887.htm (April 2012)

***GUIDELINES FOR THE DESIGN AND MANAGEMENT OF BICYCLE PARKING FACILITIES*, CITY OF TORONTO, 2008**

This is an excellent resource intended to improve the quality of bicycle parking that is secured through the development approval process. The guidelines provide planners, developers, and property managers with information to support the design, construction and management of high quality bicycle parking facilities. Although aimed at new developments, the Bicycle Parking Guidelines can also be applied to existing developments looking to improve bicycle parking facilities. Available on-line at www.toronto.ca/planning/bicycle_parking_guide.htm (January 2011).

***HOW-TO GUIDE: BICYCLE PARKING*, VÉLO QUÉBEC**

A concise four-page leaflet on bicycle parking including six good reasons to provide bicycle parking facilities; and five simple steps to set up parking facilities. Available on-line in English at www.velo.qc.ca/documents/OVB08_stationnement_e.pdf.

***"INSTALLING BICYCLE PARKING"*, CITY OF PORTLAND, 2011**

This web resource covers the basics of what is a good rack and a good location. The guide is intended to help property owners save money by installing bicycle parking facilities that work, whether they are required or volunteering to install bicycle parking. Note, the guide suggests that "if you see bicycles locked to trees, posts or other stationary objects nearby, you probably need bicycle parking. If you have bicycle parking that is rarely used it may be poorly located or of a type that offers little security." Available on-line at http://www.portlandonline.com/transportation/index.cfm?c=34813&a=58409 (January 2011).

1.7 Multi-Use Trails

***ONTARIO'S BEST TRAILS: GUIDELINES AND BEST PRACTICES FOR THE DESIGN, CONSTRUCTION AND MAINTENANCE OF SUSTAINABLE TRAILS FOR ALL ONTARIANS*, TRAILS FOR ALL ONTARIANS COLLABORATIVE (TAOC), 2006**

The objective of the TAOC guide is to provide design guidelines for trails that protect and preserve outdoor environments that are universally designed to include people of diverse abilities. The guide provides information about trail design, construction, user amenities, signage and maintenance. Available on-line at http://www.abilitiescentre.org/trails/ (February 2011)

***TRAIL PLANNING, DESIGN AND DEVELOPMENT GUIDELINES*, MINNESOTA DEPARTMENT OF NATURAL RESOURCES (MN DNR), 2006**

This manual contains guidelines for creating both motorized and non-motorized trails. It is a best practices guide for government agencies or private organizations and includes sections on planning, design principles, ecological sustainability, trail classifications, shared-use paved trails, and sustainable natural trails. Order on-line at http://www.comm.media.state.mn.us/bookstore/mnbookstore.asp?page=viewbook&BookID=69276&stocknum=323 (January 2011).

***TRAIL INTERSECTION DESIGN HANDBOOK*, UNIVERSITY OF NORTH CAROLINA'S HIGHWAY SAFETY RESEARCH CENTER (HSRC) FOR FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT)**

This handbook discusses design processes and principles of designing trail/roadway intersections. A discussion of risks at trail instersections is provided. It includes information on various crossing types, regulating traffic and site design. It also reviews some European trail crossing guidelines. Guidelines from the Netherlands and development of a bicycle crossing time equation are included in the appendices. Available on-line at http://www.dot.state.fl.us/safety/ped_bike/handbooks_and_research/TRAILINT.PDF (January 2011).

***TRAIL INTERSECTION DESIGN HANDBOOK*, UNIVERSITY OF NORTH CAROLINA'S HIGHWAY SAFETY RESEARCH CENTER (HSRC) FOR FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT)**

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***DESIGNING TRAIL TERMINI*, UNIVERSITY OF NORTH CAROLINA'S HIGHWAY SAFETY RESEARCH CENTER (HSRC) FOR FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT)**

When a trail ends at a roadway junction, trail users must be transitioned back onto the roadway and sidewalk system. This document discusses how to accomplish this transition and provide case studies. Available on-line at http://www.dot.state.fl.us/safety/ped_bike/handbooks_and_research/termini.pdf (January 2011).

1.8 Other References

There is a considerable body of pedestrian and bikeway design guidance in related literature such as neo-traditional development; transit-oriented development (TOD); traffic calming; roundabouts; streetscaping; urban design; and documentation on specific case studies such as road diets, or pedestrian crossings. Many of these can be found through the Pedestrian and Bicycle Information Center (PBIC), the US national clearinghouse for information about health and safety, engineering, advocacy, education, enforcement, access, and mobility for pedestrians (including transit users) and bicyclists; see www.pedbikeinfo.org, www.walkinginfo.org, www.bicyclinginfo.org and www.saferoutesinfo.org (information on safe routes to school policy and programs) (January 2011). Another good source for documents on worldwide cycling policy is Fietsberaad with a web site in Dutch, German, French, English and Spanish, see www.fietsberaad.nl (January 2011).