



## TABLE OF CONTENTS

	Page No.
<b>EXECUTIVE SUMMARY .....</b>	i - xii
<b>1.0 INTRODUCTION.....</b>	1-1
1.1 Trail and Cycling Planning Background.....	1-1
1.2 Cycling Master Plan – Planning and Design Guideline Considerations.....	1-2
1.3 Project Work Plan .....	1-3
1.4 Analysis .....	1-3
1.4.1 Destinations.....	1-3
1.4.2 Barriers, Challenges and Opportunities .....	1-5
1.4.3 Opportunities.....	1-13
1.5 User Groups .....	1-13
1.5.1 Types of Cyclists.....	1-13
1.5.2 Age .....	1-14
1.5.3 Skill Level.....	1-14
1.5.4 Trip Purpose.....	1-15
1.6 Trends .....	1-15
<b>2.0 VISION, GOALS, OBJECTIVES AND PRINCIPLES .....</b>	2-1
2.1 Education .....	2-1
2.2 Enforcement .....	2-2
2.3 Encouragement .....	2-3
2.4 Engineering .....	2-4
2.5 Principles .....	2-5
<b>3.0 THE ROUTE – Overview of the Hub Trail, Spokes and Cycling Master Plan .....</b>	3-1
3.1 The Hub Trail .....	3-2
3.1.1 Hub Trail Destinations and Route Description .....	3-2
3.2 Spokes .....	3-3
3.2.1 Spoke Route Destinations .....	3-3
3.2.2 Spoke Route Description – Outside Hub Perimeter Loop .....	3-5
3.2.3 Spoke Route Description – Inside Hub Perimeter Loop .....	3-27
3.3 Connecting Cycling Links .....	3-41
3.3.1 Connecting Cycling Links – Outside Hub Perimeter Loop .....	3-41
3.3.2 Connecting Cycling Links – Inside Hub Perimeter Loop .....	3-53



<b>4.0 DESIGN GUIDELINES - Development .....</b>	4-1
4.1 Route Considerations .....	4-1
4.1.1 Cycling Facility Types .....	4-1
4.1.2 Spoke Routes and Connecting Links .....	4-1
4.2 Design Parameters .....	4-2
4.2.1 General Considerations .....	4-2
4.2.2 Alignment Elements.....	4-10
4.3 Network Facility Types.....	4-13
4.3.1 Bike Lanes .....	4-15
4.3.2 Paved Shoulders.....	4-19
4.3.3 Shared Roadway Facilities.....	4-23
4.3.4 Multi-Use Pathways.....	4-26
4.3.5 Retrofitting of Roadways.....	4-30
4.4 Network Design Features.....	4-33
4.4.1 Intersection Treatments.....	4-33
4.4.2 Bike Lanes Between Two Motor Vehicle Travel Lanes.....	4-47
4.4.3 On-Road Cycling Facilities on Bridge Structures and Highway Interchanges .....	4-48
4.4.4 Accommodating Cyclists in Construction Zones .....	4-51
4.4.5 Railway Crossings .....	4-52
4.4.6 Shared Parking / Bike Lanes.....	4-53
4.4.7 Transition from One Facility Type to Another .....	4-54
4.4.8 Multi-Use Trail Treatments .....	4-56
4.4.9 Traffic Calming Measures .....	4-67
4.5 Bicycle Parking .....	4-68
4.5.1 Bicycle Parking Facilities .....	4-68
4.5.2 The Bicycle Rack Element.....	4-69
4.5.3 The Bicycle Rack .....	4-70
4.5.4 The Bicycle Rack Area .....	4-71
4.5.5 The Rack Area Site .....	4-72
4.6 Network Amenities .....	4-73
4.6.1 Bicycle Friendly Catchbasin Covers.....	4-73
4.6.2 Rest and Staging Areas .....	4-73
4.6.3 Gateways.....	4-74
4.6.4 Cycling and Transit.....	4-74
<b>5.0 SIGNAGE GUIDELINES .....</b>	5-1
5.1 Signing Function.....	5-1
5.2 Signing Formats .....	5-4
<b>6.0 MAINTENANCE GUIDELINES.....</b>	6-1
6.1 Maintenances Issues Affecting On and Off-Road Cycling Routes .....	6-1
6.2 Snow Clearing.....	6-3



<b>7.0</b>	<b>IMPLEMENTATION .....</b>	7-1
7.1	Partners .....	7-1
7.1.1	City of Sault Ste. Marie .....	7-1
7.1.2	Cycling Committee .....	7-1
7.1.3	YMCA.....	7-1
7.1.4	Algoma District Health Unit.....	7-1
7.1.5	Services Clubs .....	7-1
7.1.6	Police.....	7-2
7.1.7	School Boards .....	7-2
7.1.8	Sault and Algoma Colleges.....	7-2
7.1.9	Sault Ste. Marie Region Conservation Authority .....	7-2
7.1.10	Batchewana First Nation.....	7-2
7.1.11	Provincial Government – Ontario Ministry of Northern Development and Mines .....	7-2
7.1.12	Federal Government.....	7-2
7.1.13	Sault Ste. Marie Economic Development Corporation.....	7-2
7.1.14	Media .....	7-3
7.1.15	Land Development Companies.....	7-3
7.2	Education .....	7-3
7.2.1	Can-Bike .....	7-3
7.2.2	School Programs .....	7-3
7.2.3	Driver's Education Schools .....	7-4
7.2.4	Recreation Programs .....	7-4
7.2.5	Police Education .....	7-4
7.2.6	Consulting Engineer Education .....	7-4
7.3	Enforcement.....	7-4
7.3.1	Review Official Plan.....	7-5
7.3.2	Site Plan Requirements .....	7-5
7.3.3	Highway Traffic Act.....	7-5
7.3.4	Signage.....	7-5
7.4	Encouragement .....	7-5
7.4.1	Marketing Campaign .....	7-5
7.4.2	Media and Outreach.....	7-6
7.4.3	Conferences.....	7-6
7.5	Engineering .....	7-6
7.5.1	Establish Engineering Standards.....	7-6
7.5.2	Educate Staff and Partners .....	7-6
7.5.3	Construction of Priority Projects .....	7-6
7.6	Prioritization .....	7-7
7.6.1	Education .....	7-7
7.6.2	Enforcement.....	7-7
7.6.3	Encouragement .....	7-7
7.6.4	Engineering .....	7-7
<b>8.0</b>	<b>REFERENCES.....</b>	8.1



	Page No.
<b>LIST OF FIGURES .....</b>	<b>Page No.</b>
4.1 Operating Envelope for Cyclists.....	4-3
4.2 Example of On-Road Cycling Facilities on Steep Grades.....	4-4
4.3 No Passing Sign.....	4-5
4.4 “Share the Road” Signing .....	4-6
4.5 Bikeway Facility Types .....	4-14
4.6 Cycling Lanes .....	4-16
4.7 Typical Bike Lane with On-Street Parking.....	4-17
4.8 Example of a Raised Bike Lane.....	4-19
4.9 Typical Paved Shoulder .....	4-20
4.10 Shoulder Component of Typical Road Platform .....	4-21
4.11 Paved Shoulders.....	4-22
4.12 Signed-Only Cycling Route Along a Wide Curb Lane .....	4-25
4.13 Multi-Use Pathway .....	4-26
4.14 Multi-Use Boulevard Trail.....	4-28
4.15 Example of Adjacent Trail Intersection.....	4-29
4.16 Bicycle Lane Pavement Markings .....	4-34
4.17 Typical Pavement Marking for Bicycle Lane at Right Turning Roadway .....	4-36
4.18 Left Turn Vehicle Lane.....	4-37
4.19 Bicycle Lane Adjacent to Through / Right Turn Lane .....	4-37
4.20 Hatched Pavement at Intersections on Rural Roads .....	4-38
4.21 Signing Used in Conjunction with Coloured Pavement .....	4-40
4.22 Quadruple and Diagonal Quadruple Loop Detectors.....	4-41
4.23 Example of Detector Loop Pavement Markings.....	4-42
4.24 Example of Bicycle Signal Head Currently Under Assessment .....	4-43
4.25 “Bicycle Pocket” (Bicycle Lane Adjacent to Curb Lane Transition).....	4-46
4.26a Skewed Railroad Crossing Restricted Right-of-Way Width .....	4-52
4.26b Skewed Railroad Crossing Unrestricted Right-of-Way Width.....	4-52
4.26c Skewed Railroad Crossing Restricted Right-of-Way Width with Gate Control .....	4-53
4.26d Skewed Railroad Crossing Unrestricted Right-of-Way Width with Gate Control.....	4-53
4.27 Transition between On-Road Bike Lanes and Off-Road Trail .....	4-55
4.28 Elements of Multi-Use Trail Crossings of Roadways .....	4-57
4.29 Mid-Block Crossing .....	4-58
4.30 Minimum Sight Distance for Bike Path Crossing.....	4-59
4.31 Cross Alert System .....	4-60
4.32 WC-46 “Pedestrian and Bicycle Crossing Ahead” Sign.....	4-61
4.33 Typical Cross-Section of a Cycling Facility Adjacent to a Rail Corridor Separated by a Fence .....	4-62
4.34 Typical Cross Section of a Cycling Facility Adjacent to a Rail Corridor Separated by a Planted Berm .....	4-63
4.35 Safety Rub Rail .....	4-66
4.36 Speed Hump.....	4-66
4.37 Sample Bicycle Rack Designs .....	4-69
4.38 Bicycle Rack .....	4-71



5.1	Bicycle Route Marker Sign.....	5-1
5.2	Bicycle Route Sign RB-169/69.....	5-2
5.3	Reserved Bicycle Lane Sign RB-84 .....	5-2
5.4	Reserved Bicycle Lane Sign RB-84A.....	5-2
5.5	Reserved Lane ENDS Tab Sign Rb-85t.....	5-3
5.6	Reserved Lane BEGINS Tab Sign Rb-84t .....	5-3
5.7	Warning Signs.....	5-3

**LIST OF TABLES ..... Page No.**

4.1	Extra Cycling Facility Width Required on Grades .....	4-5
4.2	Minimum Motor Vehicle Stopping Sight Distance on Wet Pavement.....	4-8
4.3	Minimum Stopping Sight Distances for Cyclists.....	4-9
4.4	Minimum Radii for Paved Trails .....	4-11
4.5	Minimum Radii for Paved Trails .....	4-11
4.6	Crest Vertical Curve Lengths.....	4-12
4.7	Crest Vertical Curve Lengths.....	4-12
4.8	Typical Cross Slopes.....	4-13
4.9	Bike Lane Widths .....	4-15
4.10	Shoulder Width for Undivided King's Highways and Secondary Highways.....	4-21
4.11	Recommended Pathway Widths .....	4-27
4.12	Retrofitting Urban Roads for Cycling Facilities in the City of Sault Ste. Marie.....	4-31
4.13	Retrofitting Rural Roads for Cycling Facilities in the City of Sault Ste. Marie.....	4-32
4.14	Common Cycling / Motor Vehicle Collisions at Intersections .....	4-44
4.15	Minimum Side Clearances at Bridges.....	4-50
4.16	Minimum Sight Distance for Mid-Block Crossing (Bike Path Crossing) .....	4-59

**APPENDICES**

APPENDIX A: Maps 1 -5

APPENDIX B: Sault Ste. Marie Cycling Master Plan - Implementation Cost Estimate