

Transportation solutions for small northern communities

Cycle Commuters' Satisfaction with the Built and Social Cycling Environments

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Masters of Arts
NATURAL RESOURCES AND ENVIRONMENTAL STUDIES





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INTRODUCTION

**RESEARCH
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**METHODS &
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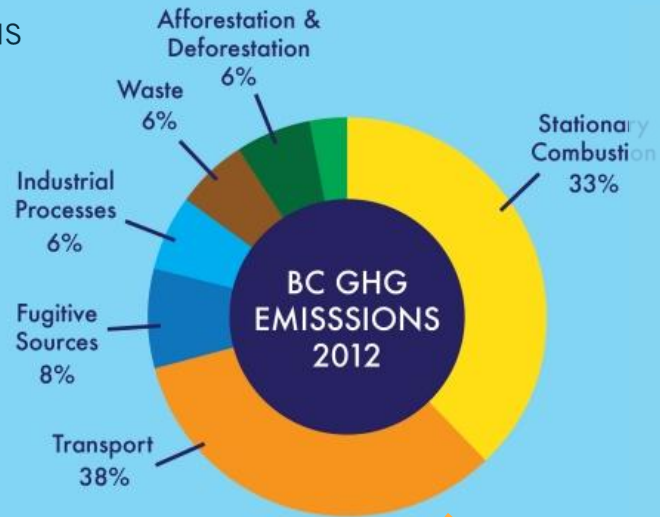
Corbis Images



7.5 million registered vehicles on the roads of Bangkok

Bernard Spragg

CONTEXT



**Transportation
in BC = 38%**



ENERGY EFFICIENCY
IN THE BUILT
ENVIRONMENT



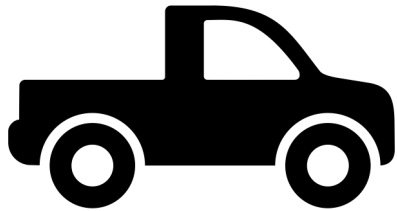
TRANSPORTATION
FUTURES

CONTEXT

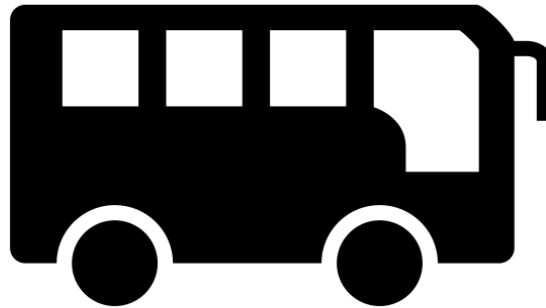
AL GAS
MENT

LOW-CARBON
PATHWAYS TO 2060

How BC Commutes



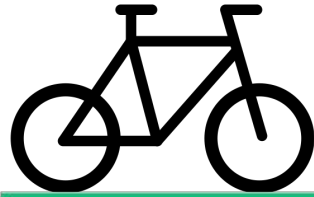
**74% personal
vehicle** ^[1]



**12% public
transit** ^[1]

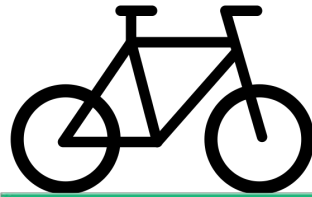


**6% bicycle
or walk** ^[1]



PART OF THE SOLUTION

Shifting **5% of vehicle kilometres to cycling** would reduce vehicle travel by approximately 223 million kilometres each year, saving about **22 million litres of fuel** and transport-related greenhouse **emissions would reduce by 0.4%** (Lindsay, et al. 2011).



PART OF THE SOLUTION

tonnes of carbon emissions per capita

Victoria	1.8
Metro Vancouver	2.0
Peace River	4.4
Stikine	4.2
Cariboo, Bulkley-Nechako	4.0
East Kootenay	3.9
Fraser-Fort George	3.8



**PART OF
THE SOLUTION**

Improving **winter maintenance service on cyclist routes could increase winter bicycle use by as much as 18%**, while decreasing the number of car trips by 6%.



**PART OF
THE SOLUTION**

Zero emission +

physical and mental health

economic

social equality

local air quality

affordable infrastructure

Table 1: Canadian Small and Large Cities that are Cycling

Small Canadian Cities	Cycling as main mode of transportation to work	Cyclist growth from 2006 to 2016
Revelstoke, BC	15%	174%
Golden, BC	10%	137%
Squamish, BC	4%	128%
Pemberton, BC	4%	95%
Stewart, BC	11%	88%
Whistler, BC	10%	65%
Terrace, BC	3%	63%
Nelson, BC	5%	50%
Fernie, BC	9%	29%
Jasper, AB	23%	28%
Banff, AB	10%	22%
Smithers, BC	5%	10%
Whitehorse, BC	3%	7%
Prince George, BC	1%	-17%

Note: From “Commuting Destination (5)” by Government of Canada, S. C. (2017d).

WHITEHORSE, YT



SMITHERS, BC



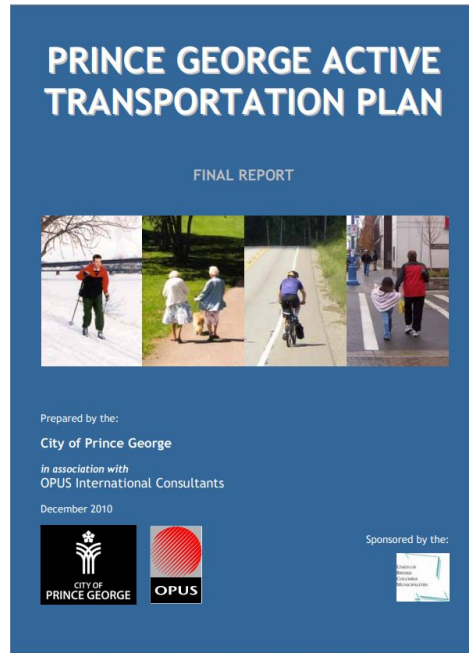
PRINCE GEORGE, BC



CASE STUDY

Q. 1.

What are the policies and plans associated with summer and winter cycling in small northern Canadian cities?



RESEARCH QUESTIONS

Q. 2.

How do cyclists reflect on the interactions they have with the built, social, and natural environments of their communities?



Sources:
Smithers Interior News
CBC

RESEARCH QUESTIONS



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INTRODUCTION

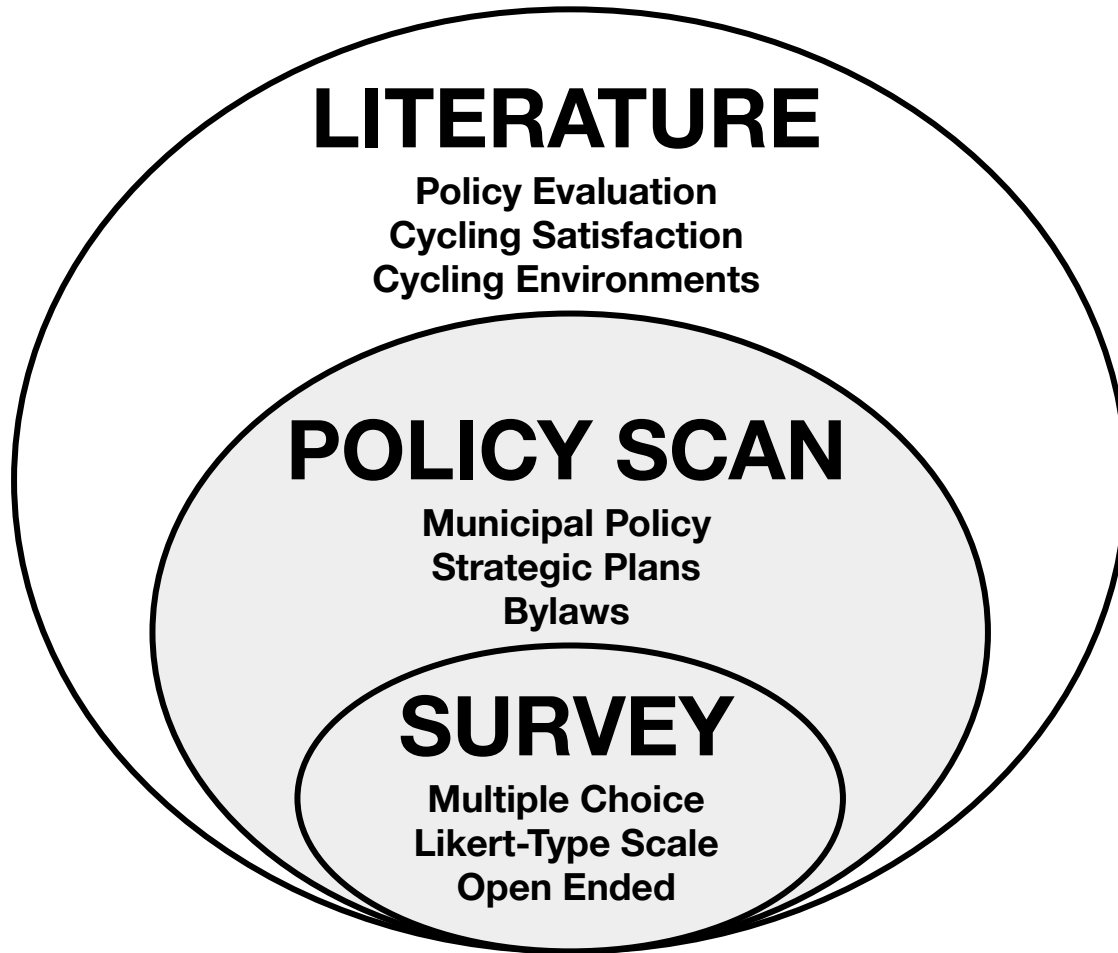
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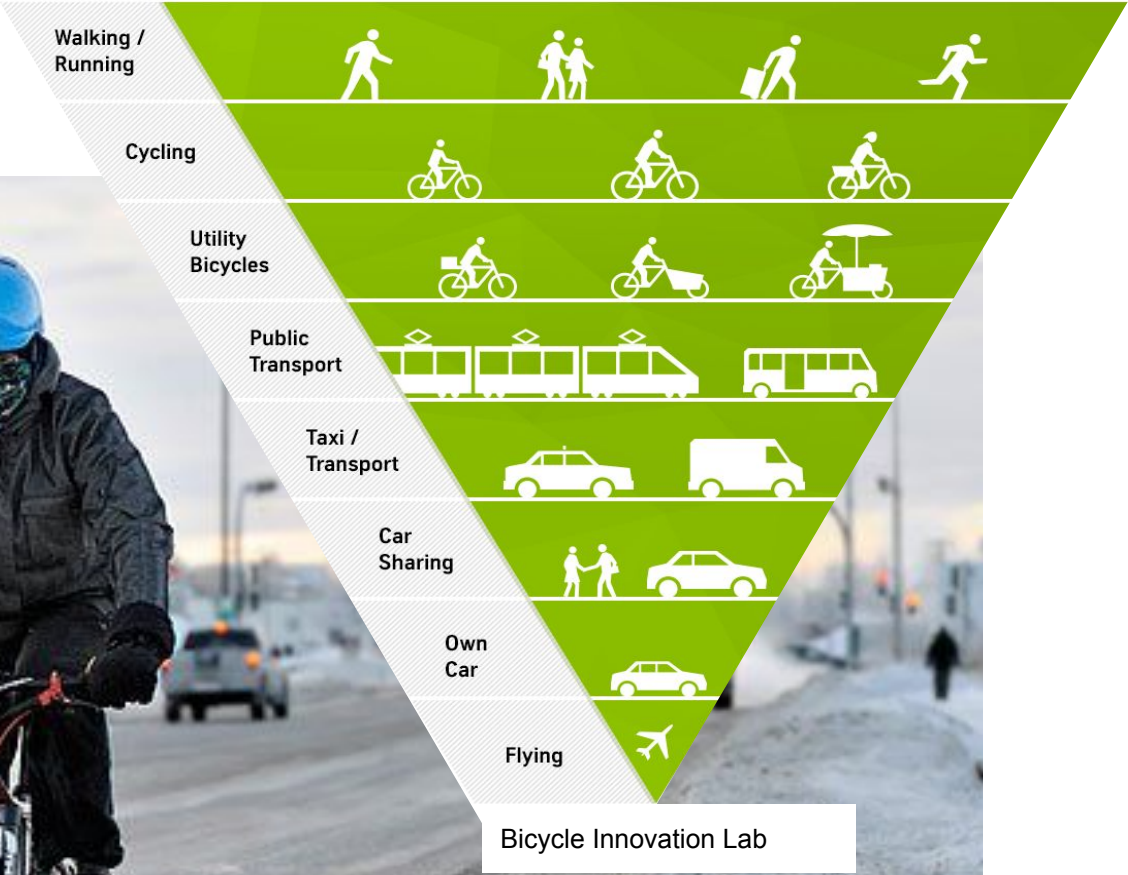
RECOMMENDATIONS



LITERATURE REVIEW: Land Use & Urban Form



LITERATURE REVIEW: Cycling & Climate Emissions & Health



POLICY EVALUATION: Cycling Policy & Policy Evaluation

<i>Title</i>	<i>Author</i>	<i>Year</i>	<i>Data Collection</i>	<i>Cycling</i>	<i>Winter</i>	<i>Canadian</i>	<i>Small City</i>	<i>Planning</i>	<i>Policy</i>	<i>Health</i>	<i>Built Environment</i>	<i>Cyclist's Attitudes</i>
Cycling in Winter: Exploring innovative design principles and practices to support all season bicycle commuting for Winnipeg and Winter Cities worldwide.	Fisher	2012	Case Study	X	X	X	<input type="checkbox"/>	X	X		X	<input type="checkbox"/>
Local government Success Stories, Active Transportation Planning in BC	Fisher	2010	Case Study	X	X	X	X			X	X	<input type="checkbox"/>
Mainstreaming Bicycling In Winter Cities	Pratte	2011	Interviews	X	X	X		X	X		X	
Exploring User Perspectives to Increase Winter Bicycling Mode Share in Edmonton, Canada.	Shirgaokar, Gillespie	2016	Interviews	X							X	X
Winter Bike Lane Maintenance: A Review of National and International Best Practices. Portland: Perspectives in Planning, Alta Planning and Design	Cebe	2014	Case Study	X	X	X	<input type="checkbox"/>	X	X		X	<input type="checkbox"/>
At the frontiers of cycling: policy innovations in the Netherlands, Denmark, and Germany	Pucher, Buehler	2007	Case Study	X	X		<input type="checkbox"/>	X	X	X	X	<input type="checkbox"/>

LITERATURE REVIEW: Cycling Policy & Policy Evaluation

WHAT IS POLICY EVALUATION?

Active Transit Plans

Age Friendly Action Plans

Bicycle Bylaws or Subdivision and Development Policies

Community Economic Development Plans

Community Energy and Greenhouse Gas Emissions Plans

Cycle Network Maps

Cycle Network Plans

Downtown Parking Plans

Official Community Plans

Park Strategies

Smart Growth or Downtown Concept Plans

Snow & Ice Control Policies

Sustainable Resiliency Plans

Trails Plans

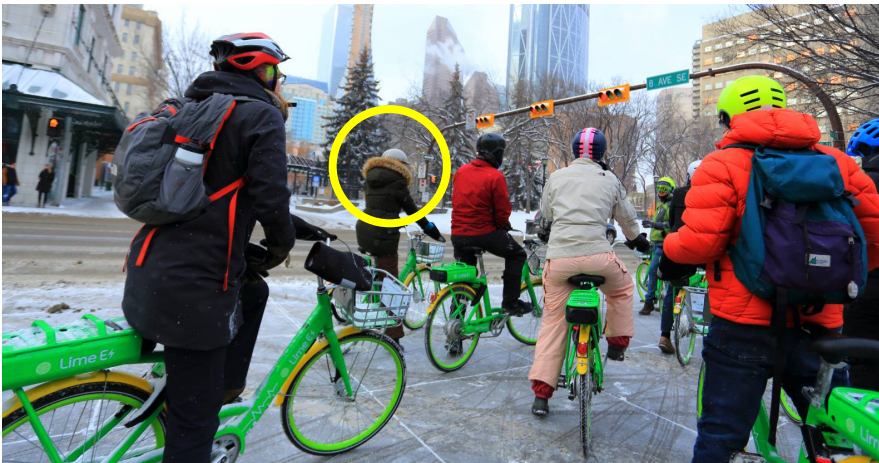
Transit Future Plans

Table 22. Case Study Policy & Literature Review on Cycling Themes

Community Plans, Policies and Bylaws	Maintenance	Infrastructure	Parking	Education & Awareness	Data Collection	Safety	Winter	All Ages & Abilities
Age Friendly Plan	-	PS	-	-	P	PS	-	PS
Active Transit Plan ¹	P	PW	P	PW	P	PW	P	PW
Trails Plan	P	-	-	PW	-	PW	W	PW
Park Strategy	-	-	-	-	-	-	-	-
Subdivision and Development Bylaws	-	S	P	-	-	-	-	-
Transit Master Plan	PW	W	PW	W	PW	PW	W	PW
Community Economic Development Plan	-	W	-	-	-	-	-	-
Community Energy and GHG Emissions Plan	-	S	S	PS	-	S	-	SP
Cycle Map	-	PSW	W	PSW	-	PW	W	-
Winter Cycle Map	W	W	-	-	-	-	W	-
Cycle Network Plan		PW	P	P		PW		W
Downtown Parking Plan	-	-	W	-	W	-	-	-
Official Community Plan	-	PSW	PW	W	-	S	-	-
Snow & Ice Control Policy	W	W	-	-	-	-	W	W
Sustainable Resiliency Plan	W	PSW	-	PS	-	-	-	PSW
Smart Growth Plan	-	PW	PSW	-	-	PW	P	-
Urban Transit Report	W	W	W	W	W	W	W	W
Coverage count	8	24	14	15	6	17	8	14

*Note: This table uses the following abbreviations,
 Prince George (P)
 Smithers (S)
 Whitehorse (W)

POLICY EVALUATION: Cycling Policy & Practice Innovators



And yes, there were a couple winter biking conferences too...

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INTRODUCTION

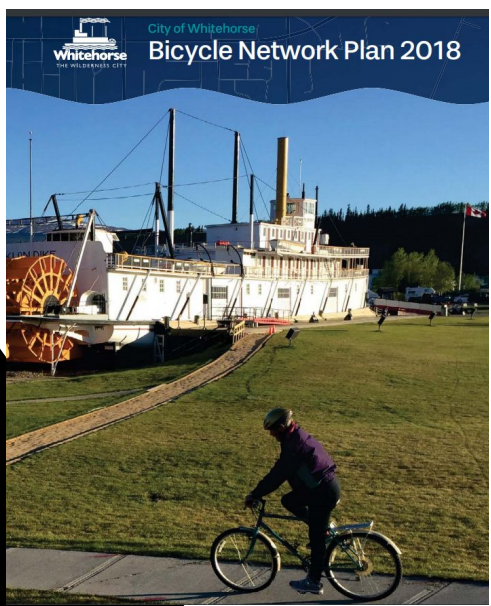
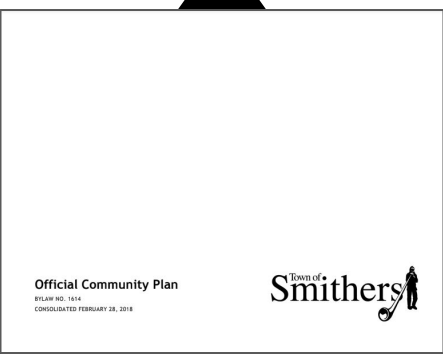
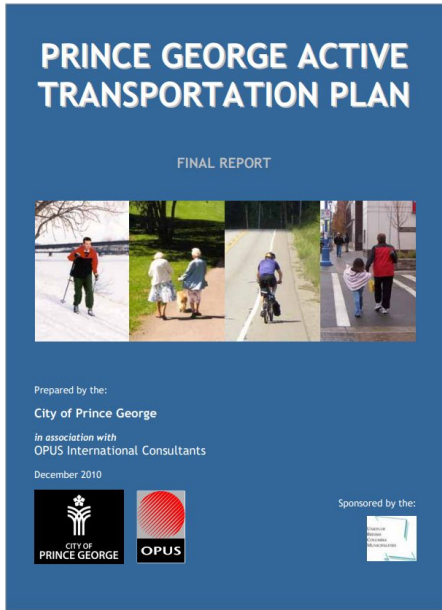
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Policy Evaluation

CASE STUDY

Qualitative

Quantitative

"To get where I need to go. No car or bus."

METHOD

22

What impact would/do the following personal/social factors have on your satisfaction with winter cycle commuting?

	Very negative	Negative	Somewhat negative	No impact	Somewhat positive	Positive	Very positive
Ride groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cyclist and driver education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Repair services and education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk of bike theft	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Driver behaviors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Arriving at destination in an unpleasant condition (ie. sweaty, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk of receiving unwanted attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Whitehorse Urban Cycling Coalition [WUCC]



METHOD



Q. 2.

How do cyclists reflect on the **interactions had with the built, social, and natural environments** of their communities? **Are the cycle transportation policies, plans, programs and infrastructure reflective of the users preferred experiences with these elements** (a.) during the summer months? And (b.) during the winter months?

		Natural Env.			Built Env.			Social Env.		
		N	NS	NW	B	BS	BW	S	SS	SW
Summer	Please draw your typical SUMMER cycle commute route(s) to work, home, friends, or errands on the map		NS			BS				
	What impact would/do the following infrastructure factors have on your satisfaction with SUMMER cycle commuting?					BS				
	How comfortable are you cycle commuting in the SUMMER?		NS			BS			SS	
	How would your satisfaction alter by the following personal/social factors? Would would/do the following personal/social factors have on your satisfaction with SUMMER cycle commuting?								SS	
Year-Round	What months did you cycle commute last year? (check all that apply)		NS	NW		BS	BW		SS	SW
	What environmental factors are most likely stop you from bicycle commuting? (check all that apply)		NS	NW		BS	BW			
	How familiar are you with cycle commuting in your community? (eg., Bike lane routes, multi-use trails,					BS	BW		SS	SW
Winter	What impact would/do the following infrastructure factors have on your satisfaction with WINTER cycle commuting?						BW			
	How comfortable are you cycle commuting in the WINTER?			NW			BW			SW
	How much snow is too much snow to WINTER cycle commute?			NW			BW			
	Please draw your typical WINTER cycle commute route(s) to work, home, friends, or errands on the map			NW			BW			
	How cold is too cold to WINTER cycle commute?			NW						SW
	To what extent do you agree with the following statement: "My city is supportive of a positive WINTER attitude and outdoor pastime or recreation."									

How old are you?

What is your gender identity?

What is the highest degree, certificate, diploma you have obtained or are obtaining?

What is your individual income category?

What is your home postal code?

What is your work / school postal code?










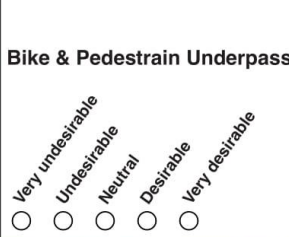





Do you have children under the age of 18?

For what purpose(s) do you cycle?

SURVEY DESIGN: WHO?

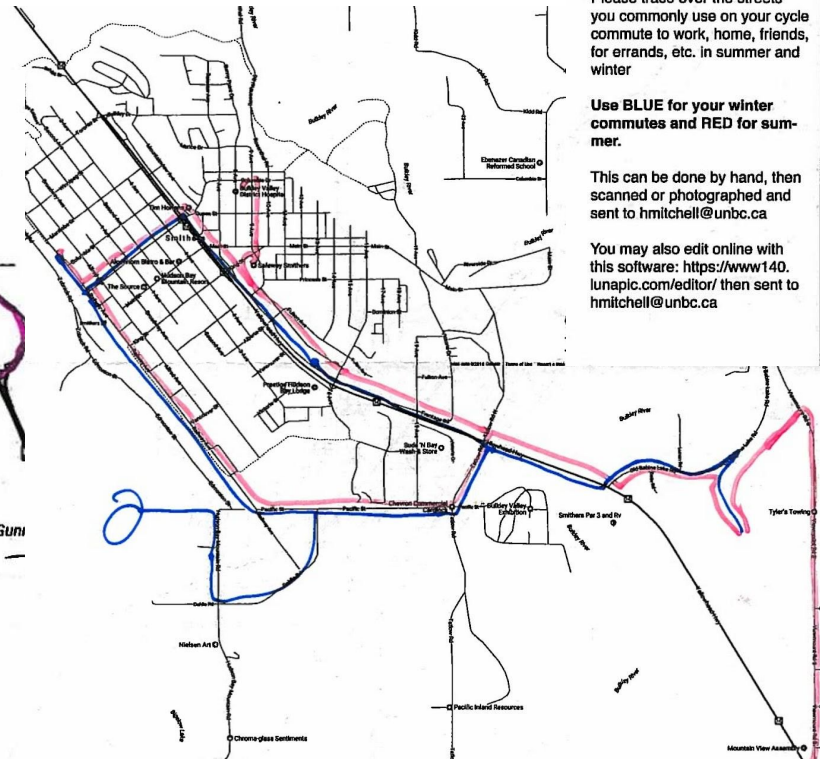


Indicate your desirability of the various bike infrastructure

<p>Protected Bicycle Lane</p> <p>Very undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Neutral <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Very desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> 	<p>Cycle Track</p> <p>Very undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Neutral <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Very desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> 	<p>Raised Cycle Track</p> <p>Very undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Neutral <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Very desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> 	<p>Multi-use Bike Lane</p> <p>Very undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Neutral <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Very desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> 	<p>Bike & Pedestrian Overpass</p> <p>Very undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Neutral <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Very desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> 
				<p>Bike & Pedestrian Underpass</p> <p>Very undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Undesirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Neutral <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> <p>Very desirable <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/></p> 
				

SURVEY DESIGN: PREFERENCES?

Show us your typical summer & winter commute



BRITISH COLUMBIA CYCLING COALITION  UNIVERSITY OF NORTHWESTERN BRITISH COLUMBIA

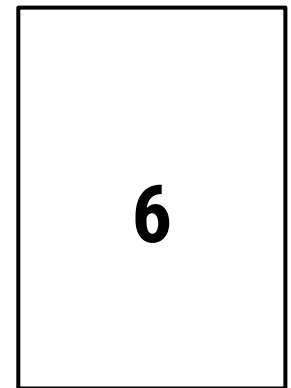
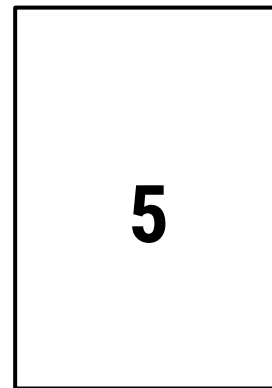
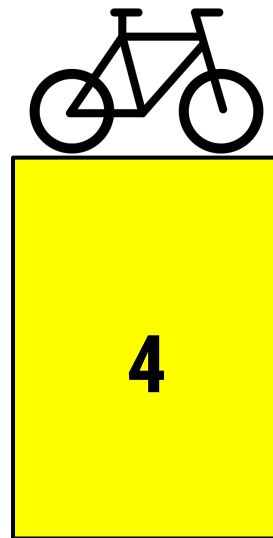
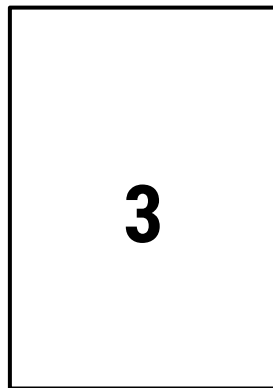
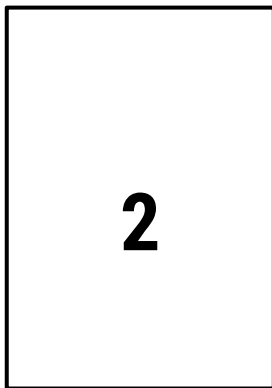
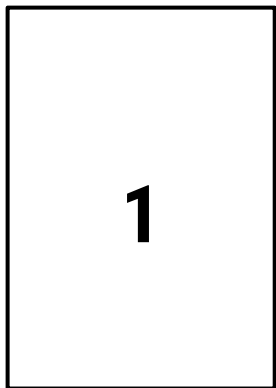
Instructions:
Please trace over the streets you commonly use on your cycle commute to work, home, friends, for errands, etc. in summer and winter

Use BLUE for your winter commutes and RED for summer.

This can be done by hand, then scanned or photographed and sent to hmitchell@unbc.ca

You may also edit online with this software: <https://www.140.lunapic.com/editor/> then sent to hmitchell@unbc.ca

SURVEY DESIGN: WHERE?



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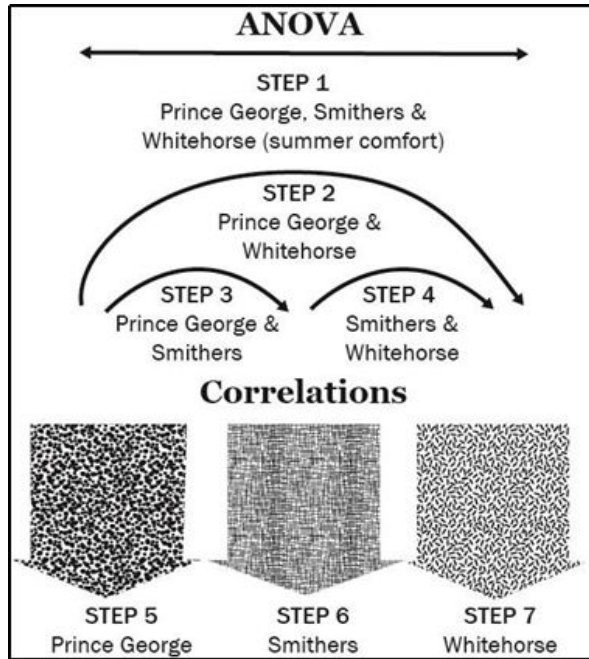
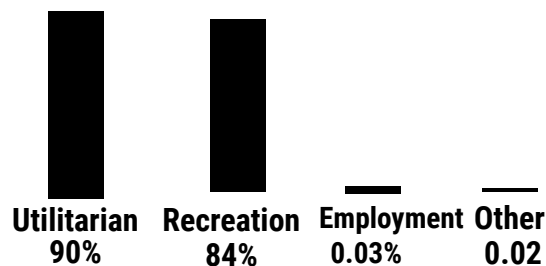
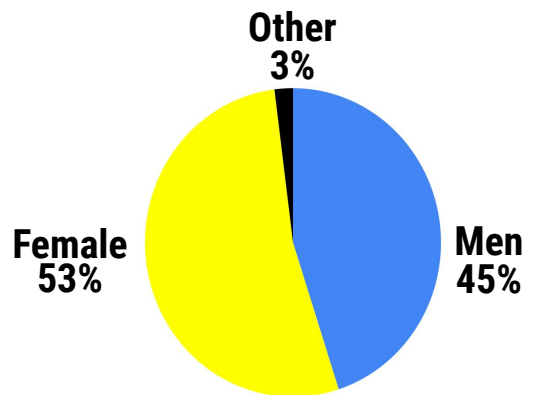


Table 9. Independent Variable ANOVA and ad hoc tests, Summer Comfort

Scale comparison	ANOVA		Post-hoc tests / Mann Whitney U					
	N	df	F-value Chi-squar e	Sig.	t-value	Sig.	Z	MU
Group								
P&S&W	156	2	17.862	0.000	0.03			
Group P&S					0.03	**0.264	-1.116	1862.500
Group P&W					0.03	**0.000	-4.269	446.500
Group S&W					0.03	**0.001	-3.432	526.500

** 2-tailed
 Prince George = P
 Smithers = S
 Whitehorse = W



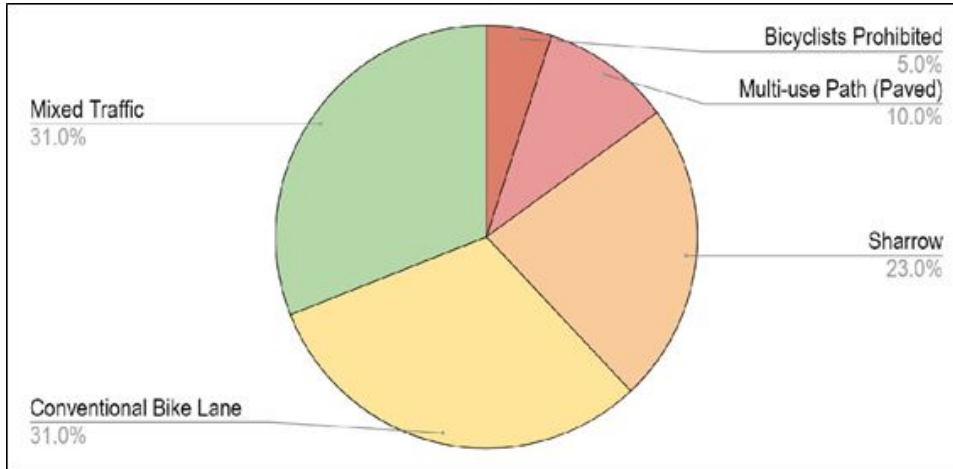
RESULTS: CYCLIST TYPES

Table 8. Case Study and Canadian Demographics

	Prince George	Stats Canada Population centre	Smithers	Stats Canada Population centre	Whitehorse	Stats Canada Population centre
Female (%)	46%	50.3%	59%	51.3%	46%	50.8%
Age	n = 73	n = 65510	n = 69	n = 5351	n = 28	n = 21732
18–24 (20-24*)	6.7%	7.7%*	5.5%	6.5%*	0.0%	5.9%*
25–29	18.3%	7.8%	5.5%	6.4%	14.3%	8.1%
30–39	33.3%	13.4%	21.8%	13.1%	25.0%	16.4%
40–49	16.7%	13%	32.7%	13.3%	42.9%	14.1%
50–59	16.7%	14.2%	16.4%	14.1%	14.3%	14.4%
60–69	8.3%	11.2%	16.4%	4.9%	3.6%	10.3%
70 & older	0.0%	9.3%	1.8%	4.8%	0.0%	5.7%
Education	n = 73	n = 52920	n = 69	n = 4320	n = 28	n = 17,375
No educational certificate	1.5%	19.5%	1.5%	18.9%	0.0%	14.6%
Secondary (high) school diploma or certificate	8.8%	32.7%	7.7%	28.6%	0.0%	25.0%
Registered apprenticeship or trades certificate or diploma	14.7%	11.2%	3.1%	12.2%	0.0%	9.0%
College, CEGEP or other non-university certificate or diploma	11.8%	18.5%	15.4%	19.7%	3.6%	20.5%
University certificate or diploma below bachelor level	19.1%	2.3%	13.9%	3.2%	3.6%	2.7%
University certificate or diploma or degree at bachelor's level	29.4%	11.1%	38.5%	17.4%	60.7%	18.6%
University certificate or diploma or degree above bachelor's level (e.g. Master's or PhD)	14.7%	4.8%	16.9%	5.2%	32.1%	4.2%
Household Income	n = 73	n = 52830	n = 69	n = 4160	n = 28	n = 17305
< 10,000	7.4%	11.9%	1.7%	11.5%	0.0%	8.8%
10 - 29,999	11.8%	28.4%	18.6%	29.0%	8.0%	22.0%
30 - 59,999	25.0%	29.2%	30.5%	22.8%	8.0%	27.2%
60 - 79,999	34.2%	11.9%	20.3%	13.9%	24.0%	16.6%
80 - 99,999	7.4%	7.5%	15.3%	7.1%	32.0%	11.4%
> 100,000	11.8%	7.5%	13.6%	7.0%	28.0%	11.0%
Parents with children under 16	71.0%	-	80.6%	-	32.0%	-
Winter cyclists	46.3%	-	71.0%	-	88.9%	-

Source: Statistics Canada, 2016 Census of Population.

Prince George Policy



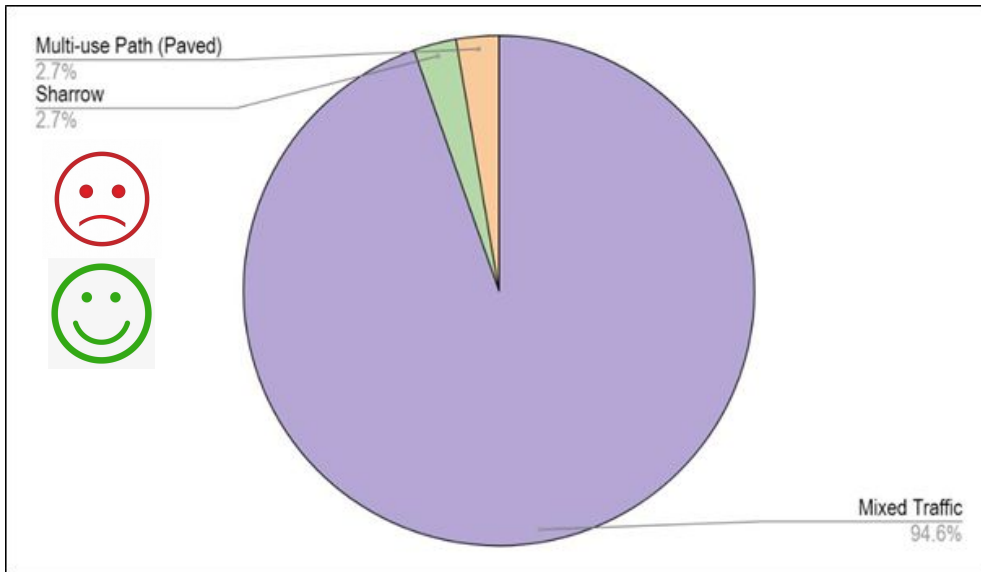
Summer Cyclists' Responses

Table 10. Case Study Descriptive Summer Cyclists

Item	Prince George n = 73		Smithers n = 69		Whitehorse n = 28	
	M	SD	M	SD	M	SD
Built Environment (1= very negatively or small impact, 6= very positive or large impact)						
Conventional bike lanes	4.3	1.0	4.1	0.9	4.0	1.0
Bicycle Boulevards	3.9	1.3	3.8	1.1	4.1	1.0
Painted intersections	4.0	1.1	4.0	1.2	4.0	0.8
Solid painted bike lanes	3.9	1.1	4.0	1.2	4.0	0.8
Cyclist-overpasses	4.1	1.1	4.0	1.0	3.0	1.1
Cyclist-underpasses	3.7	1.2	4.0	0.8	3.0	1.0
Protected bike lanes	4.4	1.0	4.5	1.0	5.0	1.0
Buffered bike lanes	4.3	0.9	4.0	1.1	5.0	1.0
Raised cycle tracks	3.6	1.1	3.2	1.2	4.1	1.1
Cycle tracks	4.3	0.9	4.1	1.0	4.4	1.0
Multi-use paths	4.0	1.0	4.2	1.0	3.8	1.1
Social Environment (1= very negatively or small impact, 6= very positive or large impact)						
Support for summer ride groups	4.0	1.7	4.6	1.0	4.3	0.6
Support for cyclist and driver education	6.0	2.1	5.4	1.3	4.5	1.6
Support for bicycle repair education	5.0	1.8	5.1	1.2	5.0	1.0
Attitudes towards aggressive driving	1.0	1.5	2.3	1.5	1.6	0.8
Arriving in unpleasant conditions	3.0	1.4	3.5	0.8	3.5	0.7
Unwanted attention	4.0	1.3	3.7	0.8	3.5	0.8
Bike Theft	2.0	1.8	3.3	1.2	3.1	1.0
Lack of time	4.0	1.1	3.2	1.4	1.6	0.8
Natural Environment (1= very negatively or small impact, 6= very positive or large impact)						
Debris removal	5.5	2.0	5.8	1.6	4.6	2.0

RESULTS: SATISFACTION

Smithers Policy



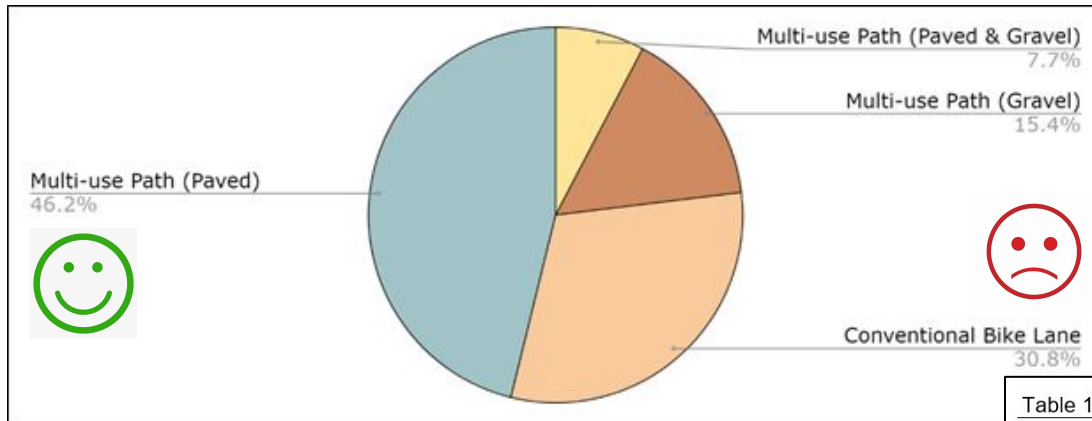
Summer Cyclists' Responses

Table 10. Case Study Descriptive Summer Cyclists

Item	Prince George n = 73		Smithers n = 69		Whitehorse n = 28	
	M	SD	M	SD	M	SD
Built Environment (1= very negatively or small impact, 6= very positive or large impact)						
Conventional bike lanes	4.3	1.0	4.1	0.9	4.0	1.0
Bicycle Boulevards	3.9	1.3	3.8	1.1	4.1	1.0
Painted intersections	4.0	1.1	4.0	1.2	4.0	0.8
Solid painted bike lanes	3.9	1.1	4.0	1.2	4.0	0.8
Cyclist-overpasses	4.1	1.1	4.0	1.0	3.0	1.1
Cyclist-underpasses	3.7	1.2	4.0	0.8	3.0	1.0
Protected bike lanes	4.4	1.0	4.5	1.0	5.0	1.0
Buffered bike lanes	4.3	0.9	4.0	1.1	5.0	1.0
Raised cycle tracks	3.6	1.1	3.2	1.2	4.1	1.1
Cycle tracks	4.3	0.9	4.1	1.0	4.4	1.0
Multi-use paths	4.0	1.0	4.2	1.0	3.8	1.1
Social Environment (1= very negatively or small impact, 6= very positive or large impact)						
Support for summer ride groups	4.0	1.7	4.6	1.0	4.3	0.6
Support for cyclist and driver education	6.0	2.1	5.4	1.3	4.5	1.6
Support for bicycle repair education	5.0	1.8	5.1	1.2	5.0	1.0
Attitudes towards aggressive driving	1.0	1.5	2.3	1.5	1.6	0.8
Arriving in unpleasant conditions	3.0	1.4	3.5	0.8	3.5	0.7
Unwanted attention	4.0	1.3	3.7	0.8	3.5	0.8
Bike Theft	2.0	1.8	3.3	1.2	3.1	1.0
Lack of time	4.0	1.1	3.2	1.4	1.6	0.8
Natural Environment (1= very negatively or small impact, 6= very positive or large impact)						
Debris removal	5.5	2.0	5.8	1.6	4.6	2.0

RESULTS: SATISFACTION

Whitehorse Policy



Summer Cyclists' Responses

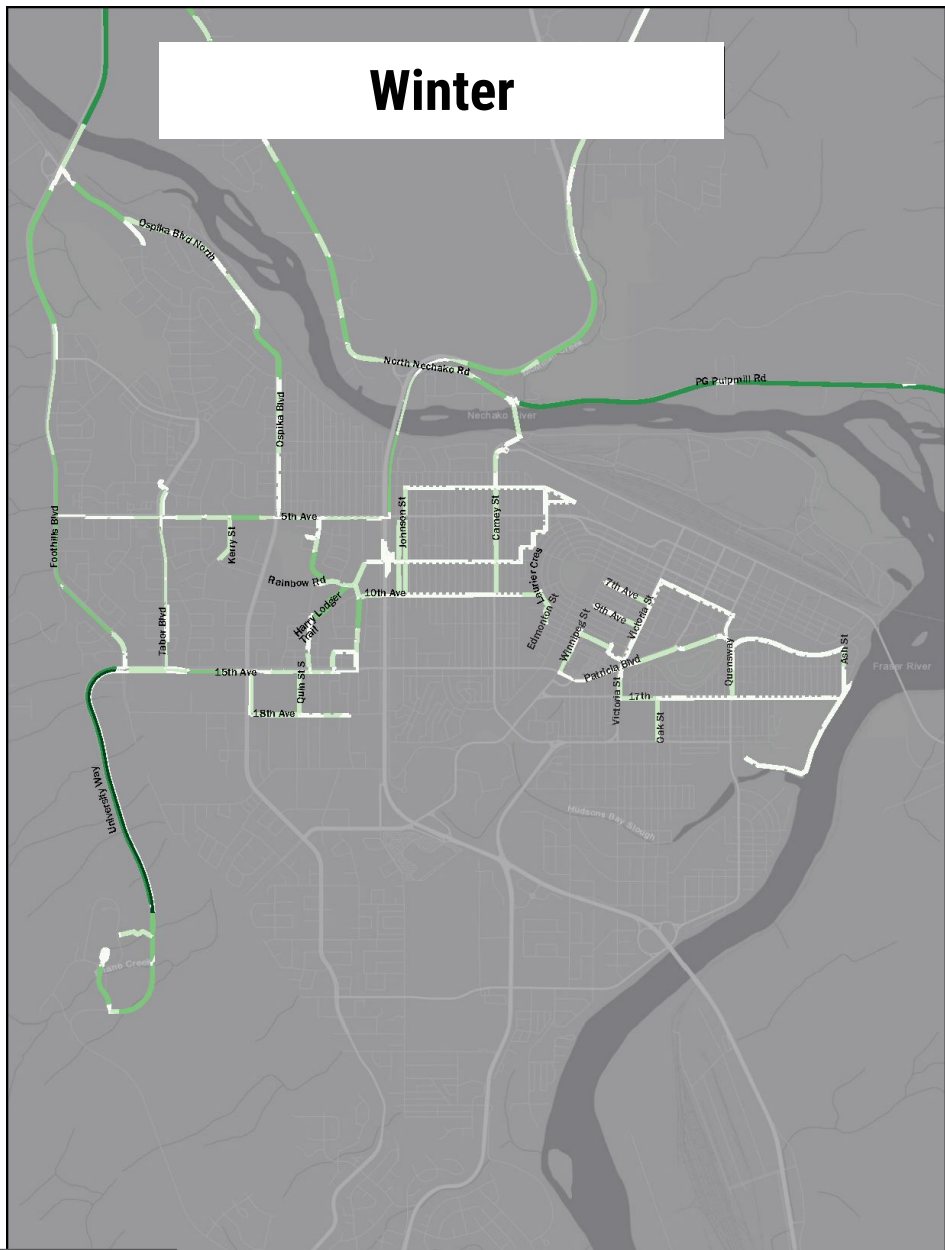
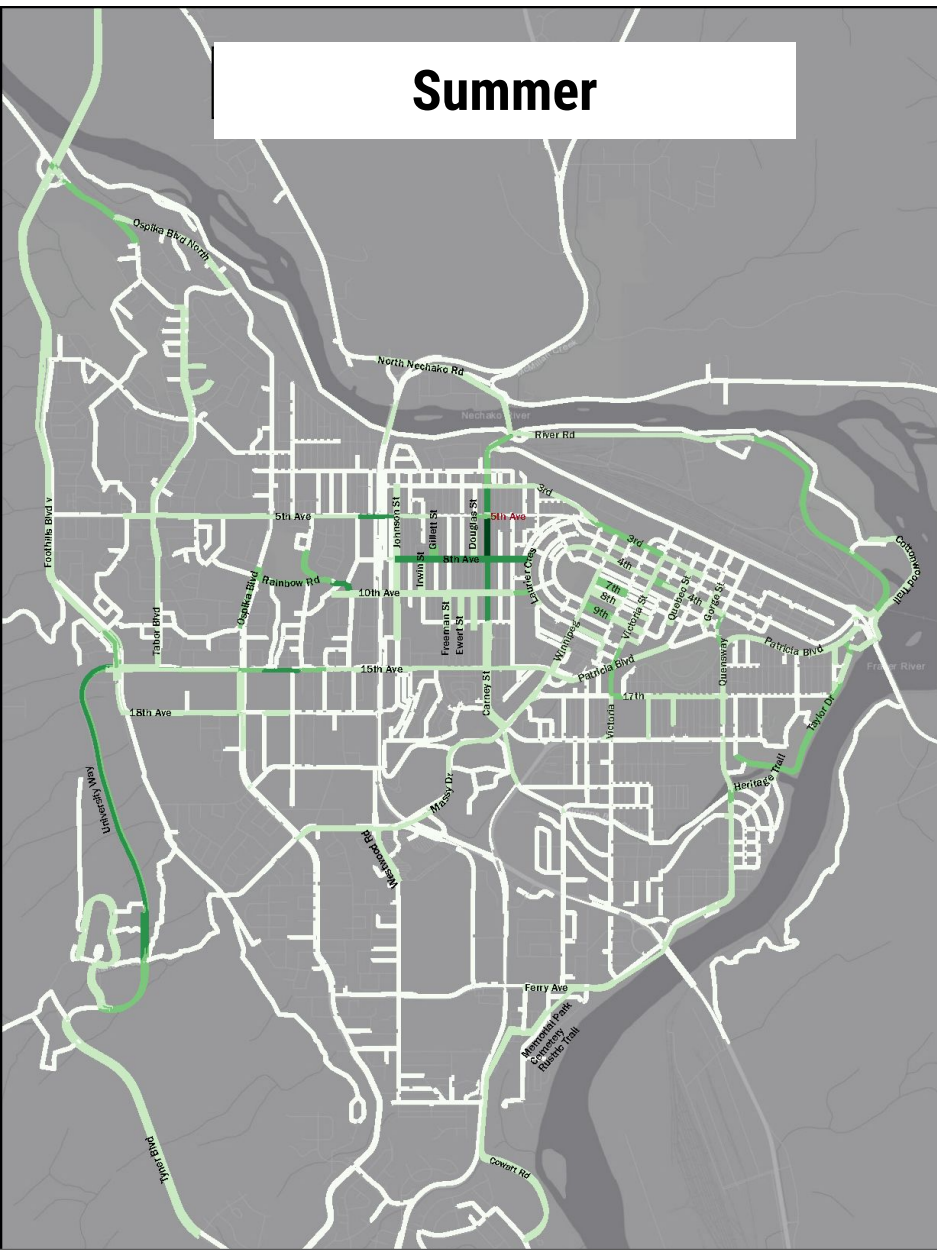
Table 10. Case Study Descriptive Summer Cyclists

Item	Prince George n = 73		Smithers n = 69		Whitehorse n = 28	
	M	SD	M	SD	M	SD
Built Environment (1= very negatively or small impact, 6= very positive or large impact)						
Conventional bike lanes	4.3	1.0	4.1	0.9	4.0	1.0
Bicycle Boulevards	3.9	1.3	3.8	1.1	4.1	1.0
Painted intersections	4.0	1.1	4.0	1.2	4.0	0.8
Solid painted bike lanes	3.9	1.1	4.0	1.2	4.0	0.8
Cyclist-overpasses	4.1	1.1	4.0	1.0	3.0	1.1
Cyclist-underpasses	3.7	1.2	4.0	0.8	3.0	1.0
Protected bike lanes	4.4	1.0	4.5	1.0	5.0	1.0
Buffered bike lanes	4.3	0.9	4.0	1.1	5.0	1.0
Raised cycle tracks	3.6	1.1	3.2	1.2	4.1	1.1
Cycle tracks	4.3	0.9	4.1	1.0	4.4	1.0
Multi-use paths	4.0	1.0	4.2	1.0	3.8	1.1
Social Environment (1= very negatively or small impact, 6= very positive or large impact)						
Support for summer ride groups	4.0	1.7	4.6	1.0	4.3	0.6
Support for cyclist and driver education	6.0	2.1	5.4	1.3	4.5	1.6
Support for bicycle repair education	5.0	1.8	5.1	1.2	5.0	1.0
Attitudes towards aggressive driving	1.0	1.5	2.3	1.5	1.6	0.8
Arriving in unpleasant conditions	3.0	1.4	3.5	0.8	3.5	0.7
Unwanted attention	4.0	1.3	3.7	0.8	3.5	0.8
Bike Theft	2.0	1.8	3.3	1.2	3.1	1.0
Lack of time	4.0	1.1	3.2	1.4	1.6	0.8
Natural Environment (1= very negatively or small impact, 6= very positive or large impact)						
Debris removal	5.5	2.0	5.8	1.6	4.6	2.0

RESULTS: SATISFACTION

Summer

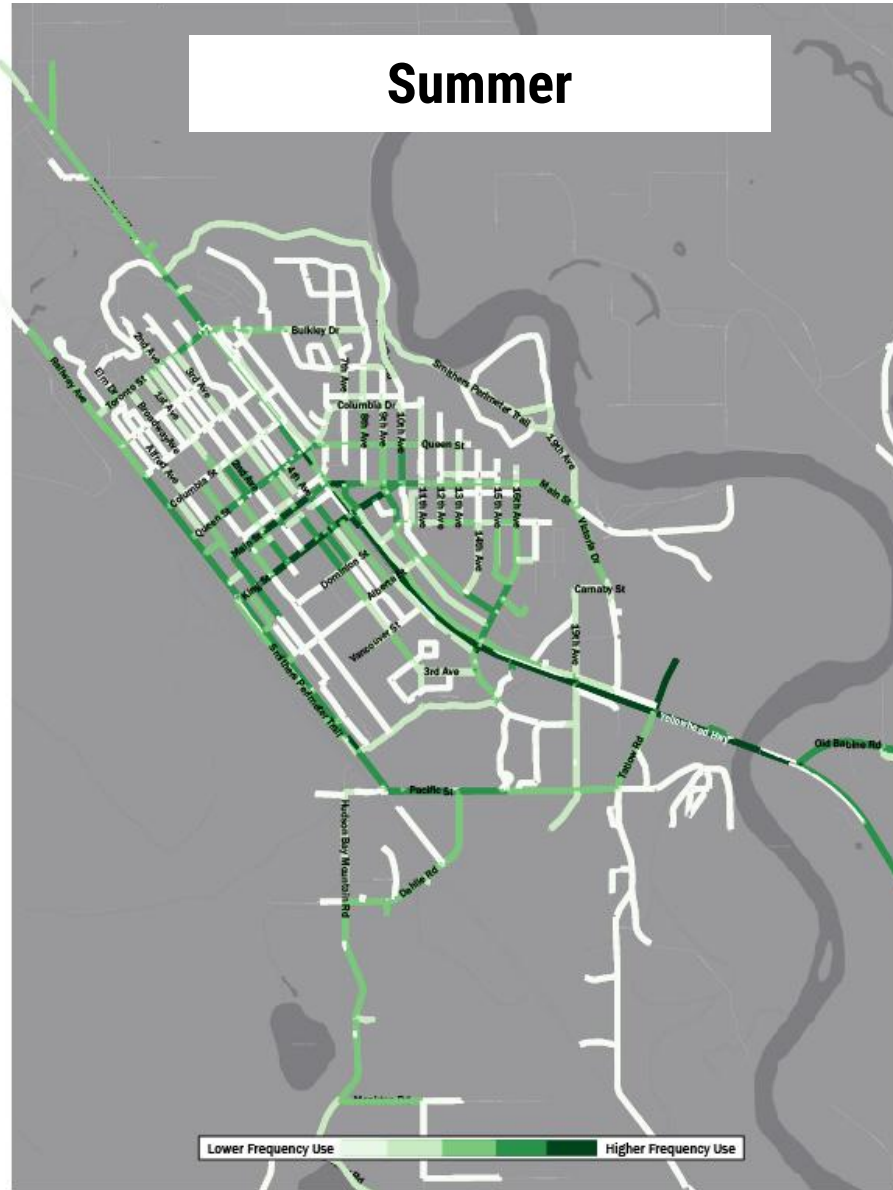
Winter



RESULTS: WHERE (Prince George)



Summer



Winter



RESULTS: WHERE (Smithers)

Winter

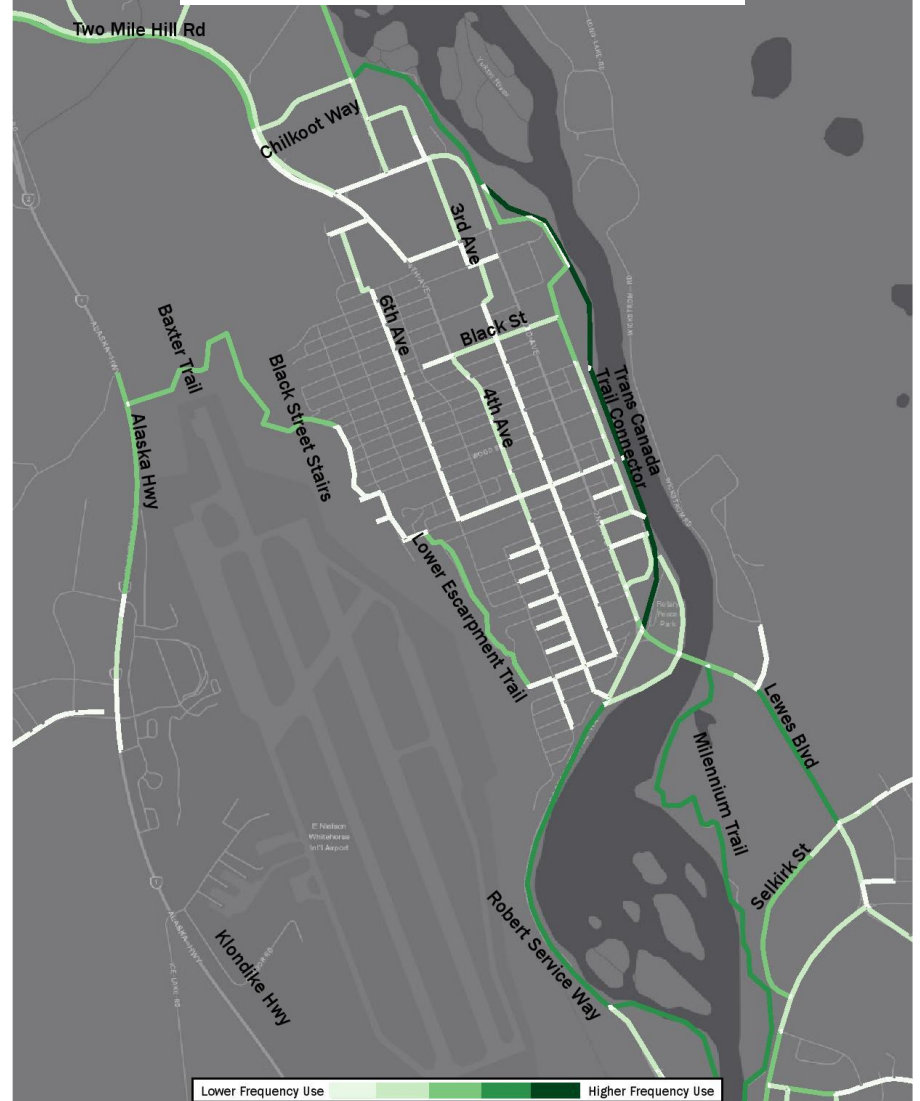


RESULTS: WHERE (Smithers)

Summer



Winter



RESULTS: WHERE

RESULTS: WHERE




1

2

3

4

5



6

INTRODUCTION

**RESEARCH
CONTEXT**

**METHODS &
METHODOLOGY**

FINDINGS

CONCLUSION

RECOMMENDATIONS

5

RECOMMENDATIONS

(for other small northern communities)



1

2

3

4

5

6

INTRODUCTION

RESEARCH
CONTEXT

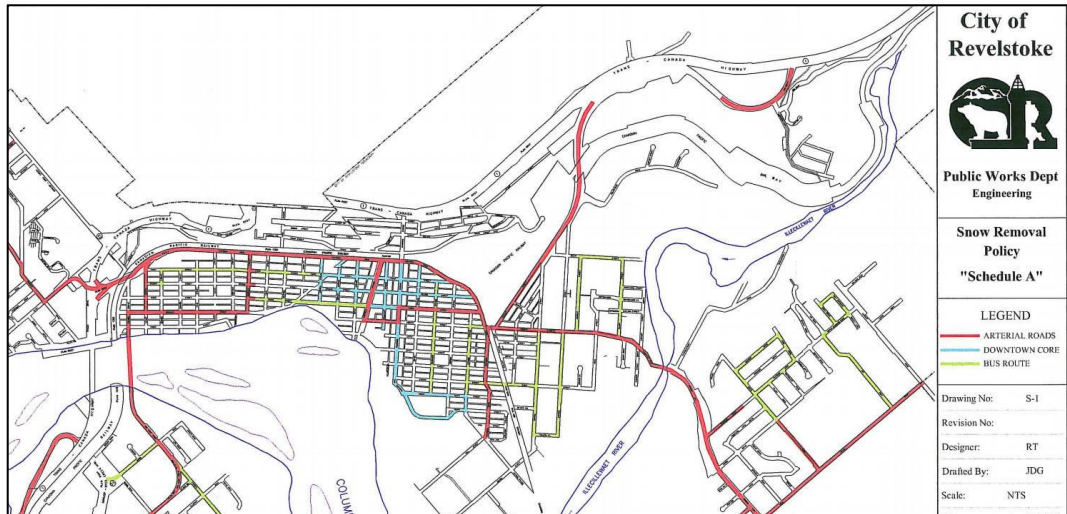
METHODS &
METHODOLOGY

FINDINGS

CONCLUSION

RECOMMENDATIONS

#1 Prioritization

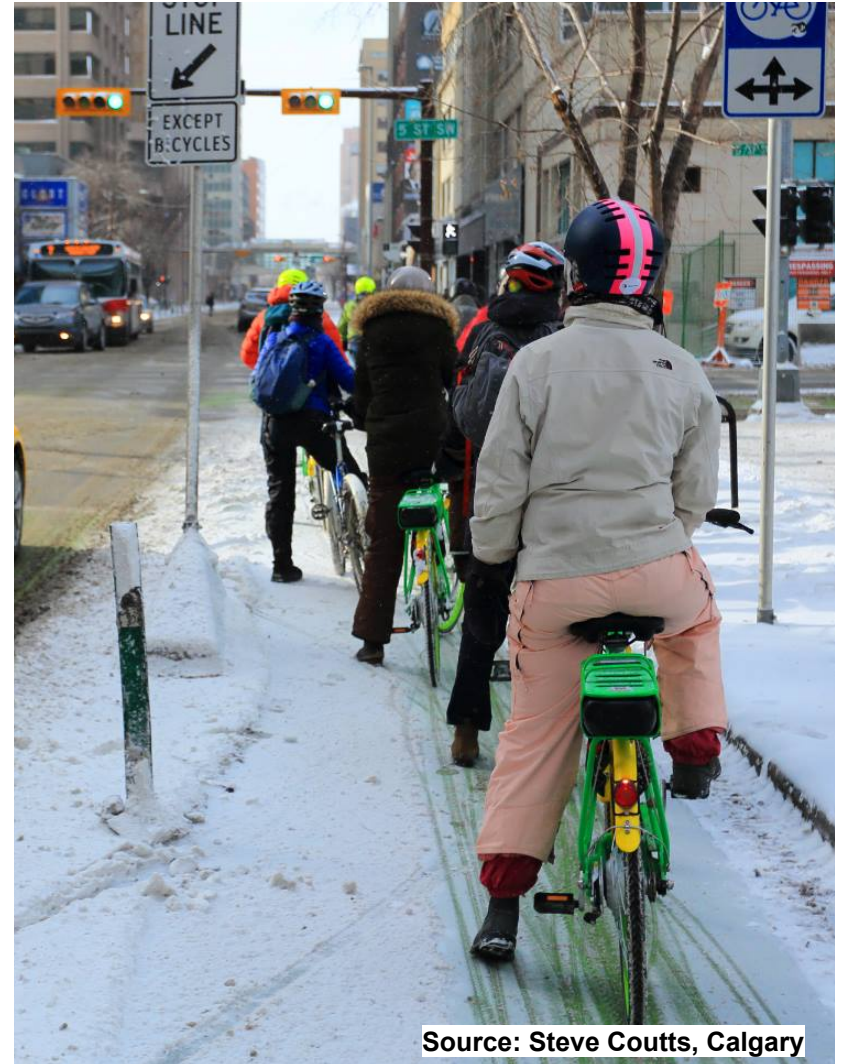


#2 Safety & Scenery



#3 Maintenance

Less than 3 inches
Above -15 C



Source: Steve Coutts, Calgary

#5

Partnerships



fraserhealth



island health



Interior Health



First Nations Health Authority
Health through wellness



northern health



Source: Nelson Star

Sincere gratitude: Darwin Horning

Special thanks!

SPA UNBC



Pacific Institute
for Climate Solutions
Knowledge. Insight. Action.



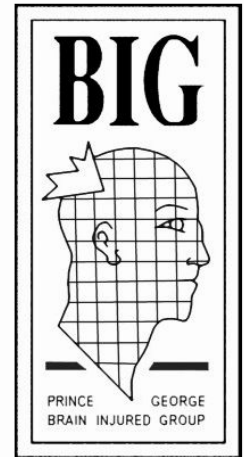
prince george
Cycling Club



**BRITISH
COLUMBIA
CYCLING
COALITION**



UNBC UNIVERSITY OF
NORTHERN BRITISH COLUMBIA



WINTER CYCLING FEDERATION

Whitehorse Urban Cycling Coalition [WUCC]



THANK YOU!

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Committee Members: **Kyrke Gaudreau, Gary Wilson, Taylor Bachrach**

Sincere gratitude: Darwin Horning

Masters of Arts
NATURAL RESOURCES AND ENVIRONMENTAL STUDIES



PICS

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