

Quieter or faster?



Preference-based
cycle routing with
OpenStreetMap
data



Stacy Rendall
22 August 2018

Insightful solutions.
Empowering advice.

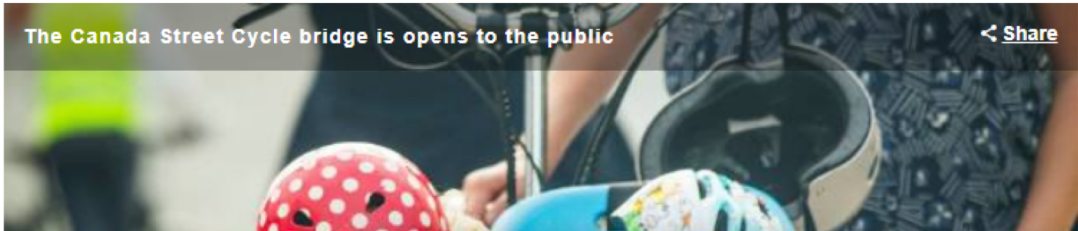
59% of people indicate safety concerns are a barrier to cycling more

<https://at.govt.nz/media/251370/AT-Cycling-Research-2013.pdf>

Sample 1,048 people (305 of which use bicycles at least a few times a year)

Auckland's bright pink cycleway opens

12:19, Dec 03 2015



The Canada Street Cycle bridge links the central motorway junction.

Auckland's brand new "adventure" has opened

New pedalling route powers on in Christchurch

Chris Barclay · 18:36, Aug 28 2015



WELLINGTON > BUSINESS

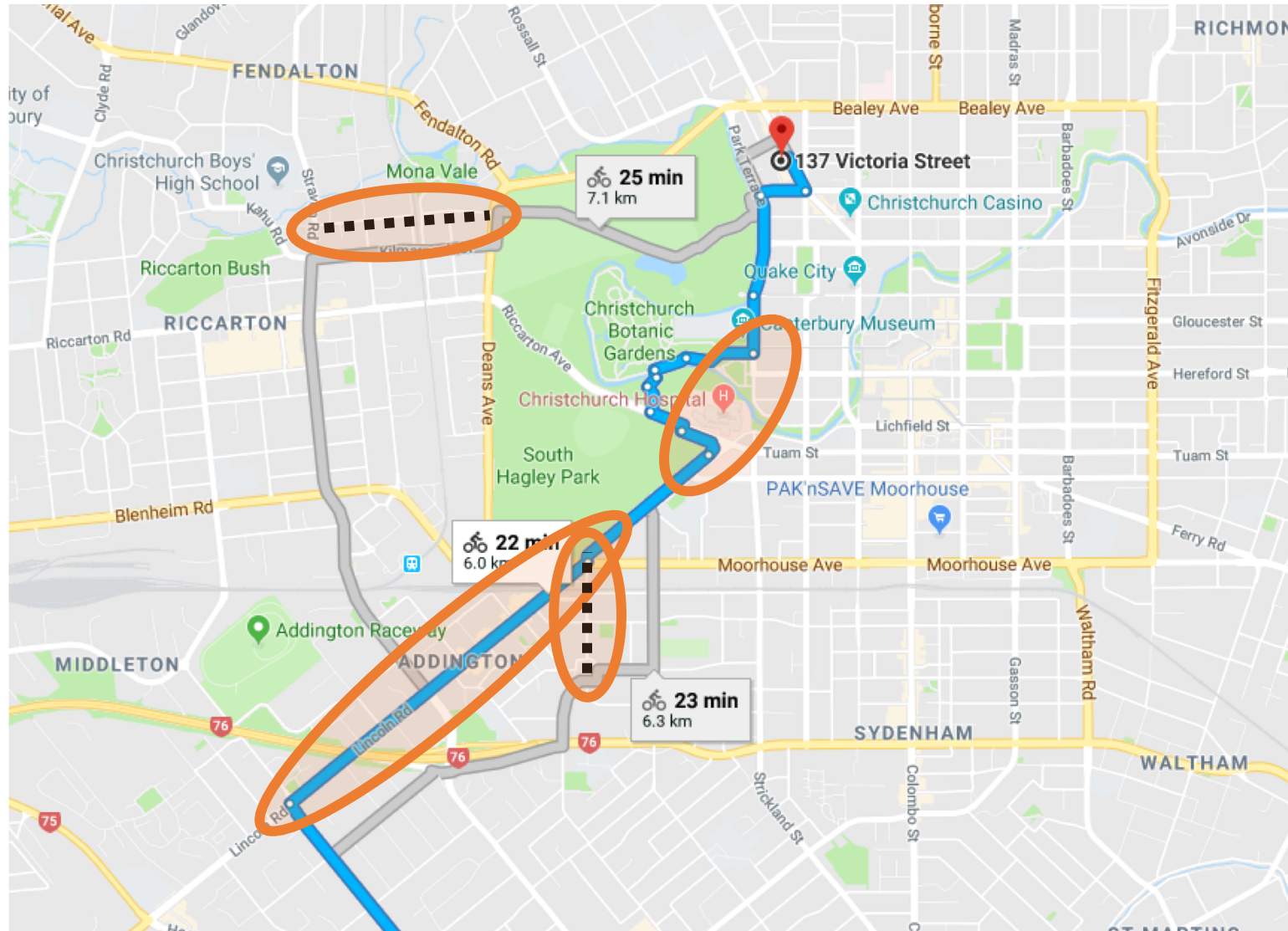


New cycle lane in Victoria Street to be blessed and monitored for safety

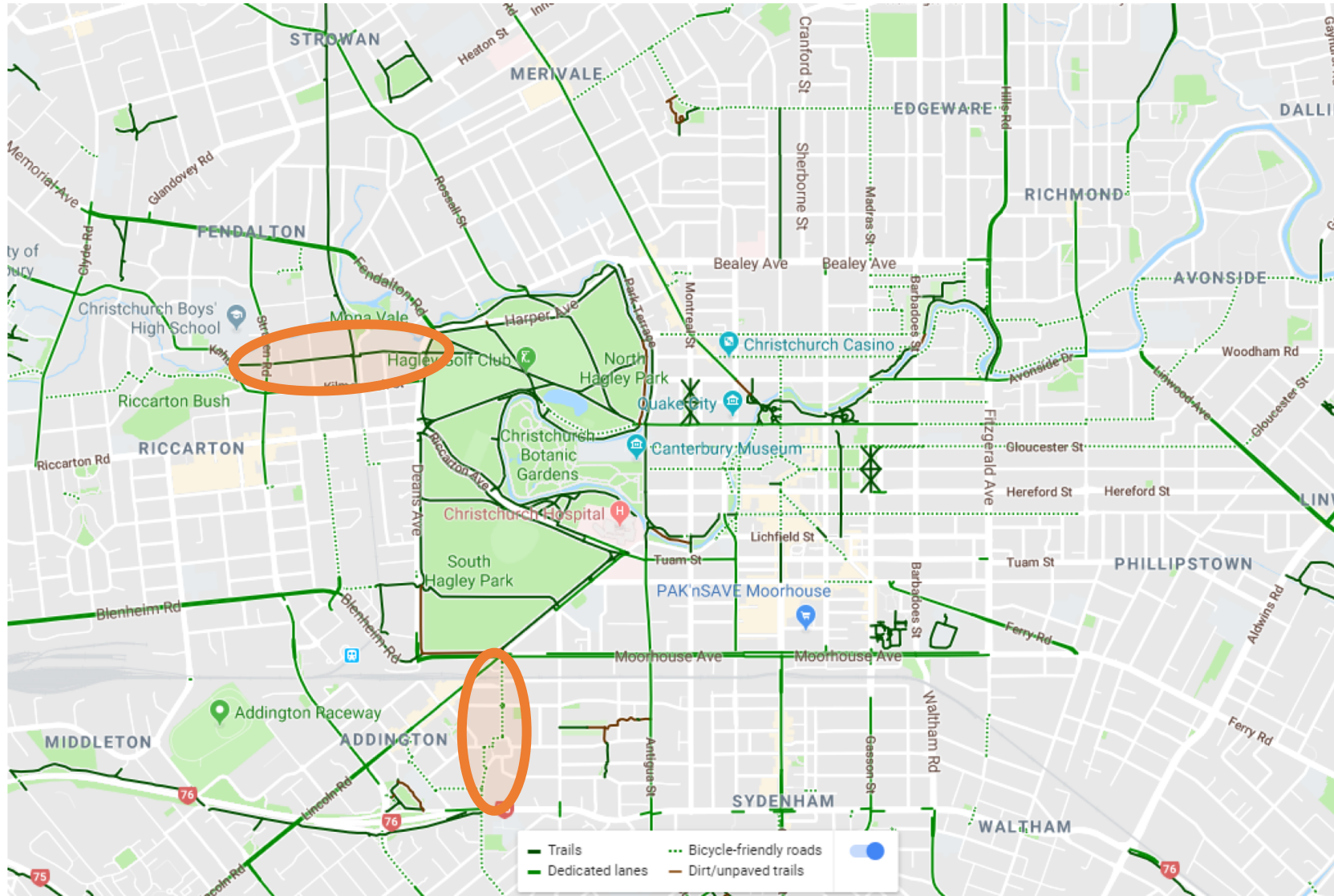
August 3, 2015 2 comments



Current tools



Current tools



GraphHopper

The screenshot shows the GraphHopper maps interface. At the top left, there are navigation icons for car, pedestrian, bicycle, wheelchair, and motorcycle. Below these are two input fields for coordinates: a green dot for the start point (-43.557723, 172.605557) and a red dot for the end point (-43.523286, 172.629375). A search bar is located below the coordinates. The main map area shows a green route starting from Christchurch and ending at Lyttelton. The route is highlighted in green and follows a path through Addington, Spreydon, and Lyttelton. The map includes street names, landmarks, and a scale bar. The interface is powered by the GraphHopper API.

GraphHopper maps

Powered by GraphHopper API

5.2km will take 19min
722m \24m

	km	mi
Continue onto Domain Terrace	865m	3min
Turn right onto Barrington Street	107m	0min
Turn left onto Coronation Street	737m	2min
Turn left onto Selwyn Street	1.3km	4min
Turn right onto Hagley Avenue	243m	1min
Turn left, cycleway, unpaved	22m	0min
Turn right, cycleway	141m	1min
Keep right, cycleway	66m	0min

- Better routing
- OpenStreetMap based
- Inconsistent...

CycleStreets

Routes for **Polworth Crescent to west Mill Lane** Journey no. #62,986,235

Choose route: **Fastest route** Balanced route Quietest route

Fastest route option

If you decide to follow the suggested journey below please take extra care on unfamiliar sections; proceed at your own risk (route quality cannot be guaranteed).

- Turn-by-turn directions below
- Give feedback on route problems
- Journey time: 9 minutes
- Distance: 1½ miles
- Calories: 35 kcal [?]
- CO₂ avoided: 0.44 kg [?]
- Quietness: Quite busy
- Route has very busy sections
- Traffic lights: 4
- Crossing delays: 1
- Walking: <1% distance, 2% time

- OpenStreetMap +
- Preferences
- UK only

We are cyclists

HOME MY JOURNEY PLAN PARKINGWHIZ CONTACT



TravelWhiz

Our Workplace Travel Plan

Walk

Cycle

Public Transport

Car



I am looking for an easy, cheap and safe way of getting around



I am looking for a healthy, affordable and fun way of getting around



I am looking for a relaxing way of getting around



This is my only feasible option

Why TravelWhiz?

To support our Christchurch team moving back into the central city in 2017 we developed and implemented a workplace travel plan, branded TravelWhiz. TravelWhiz includes a suite of initiatives that support our staff to make informed choices on how they travel. The transition from Sydenham to the central city was an optimal opportunity to influence travel behaviour and set up healthy and sustainable travel habits going forward.

Benefits of the travel plan include:



abley

Portland study

- Revealed preference
- Deviation from shortest
- Applied to NZ
- BUT...

Facility	Facility description
	Traffic signal*
	Stop sign
Bike lane	No signal, Right turn
No bike lane	No signal, Right turn
No bike lane	No signal, Left turn
No bike lane	No signal, cross street
Bike path	No signal, cross street

* excluding Left turn

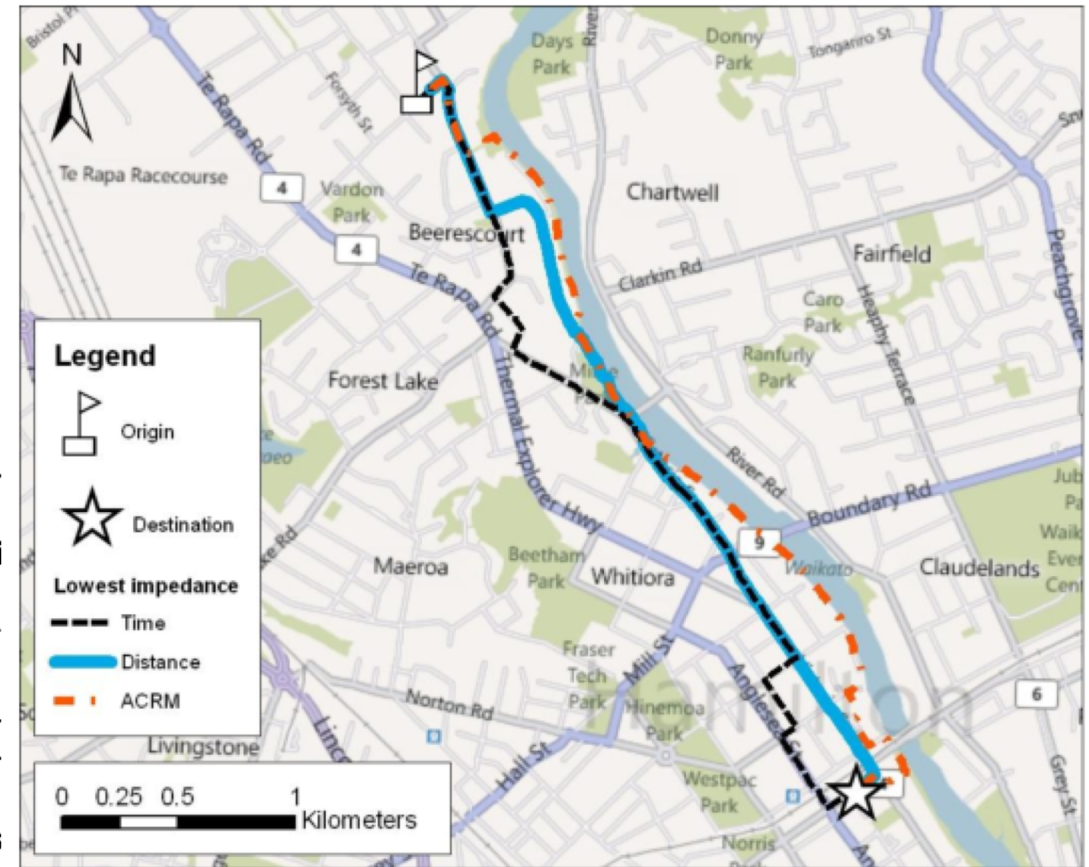


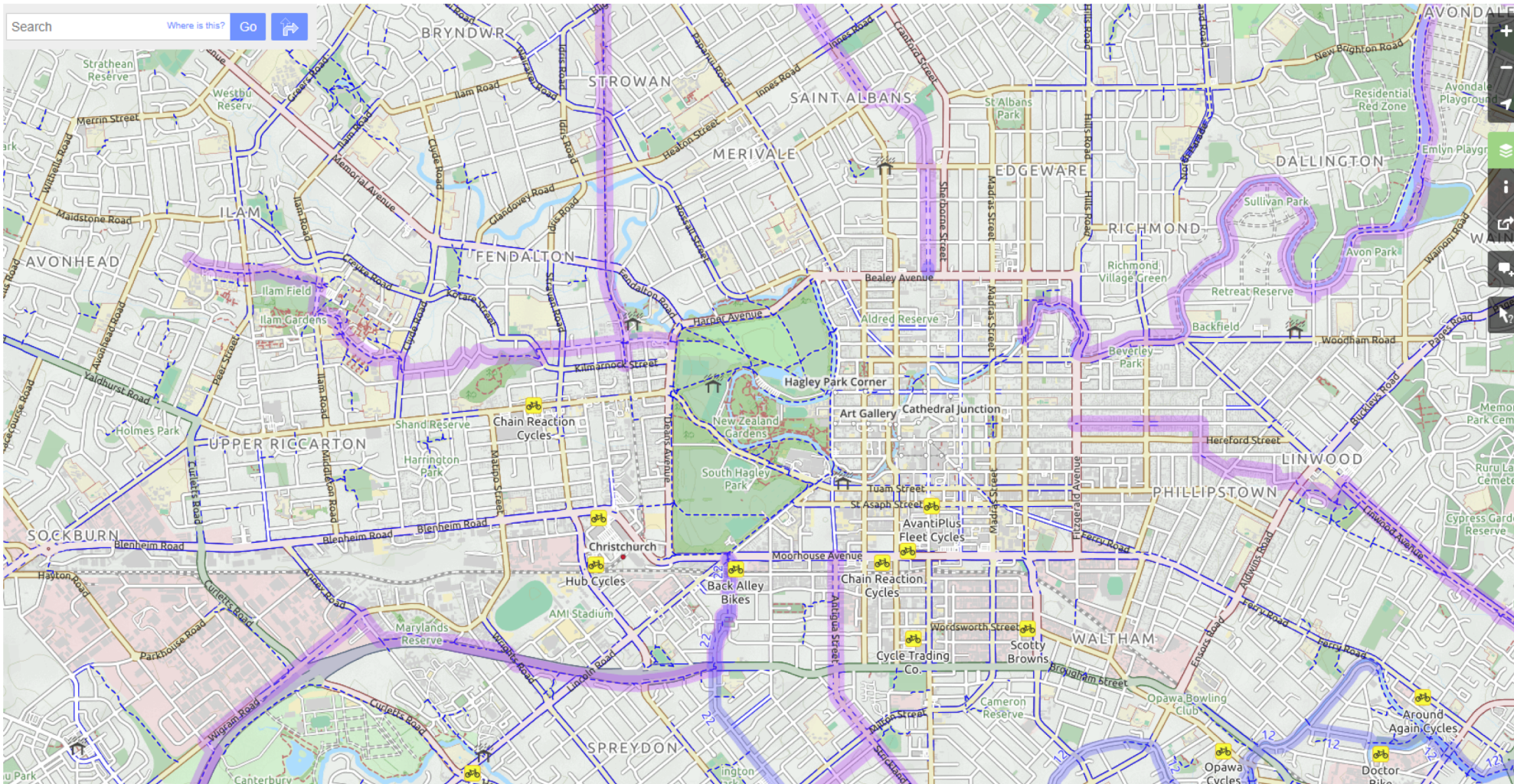
Figure 5. Comparison of shortest distance, shortest time (with intersection delays) and Abley Cyclist Route-Choice Metric (ACRM) cyclist routes.

Broach, Dill, & Gliebe (2011). *Where do cyclists ride? A route choice model developed with revealed preference GPS data*





OpenStreetMap

OpenStreetMap [Edit](#) [History](#) [Export](#)

[GPS Traces](#) [User Diaries](#) [Copyright](#) [Help](#) [About](#) [Log In](#) [Sign Up](#)



Map Layers ✕

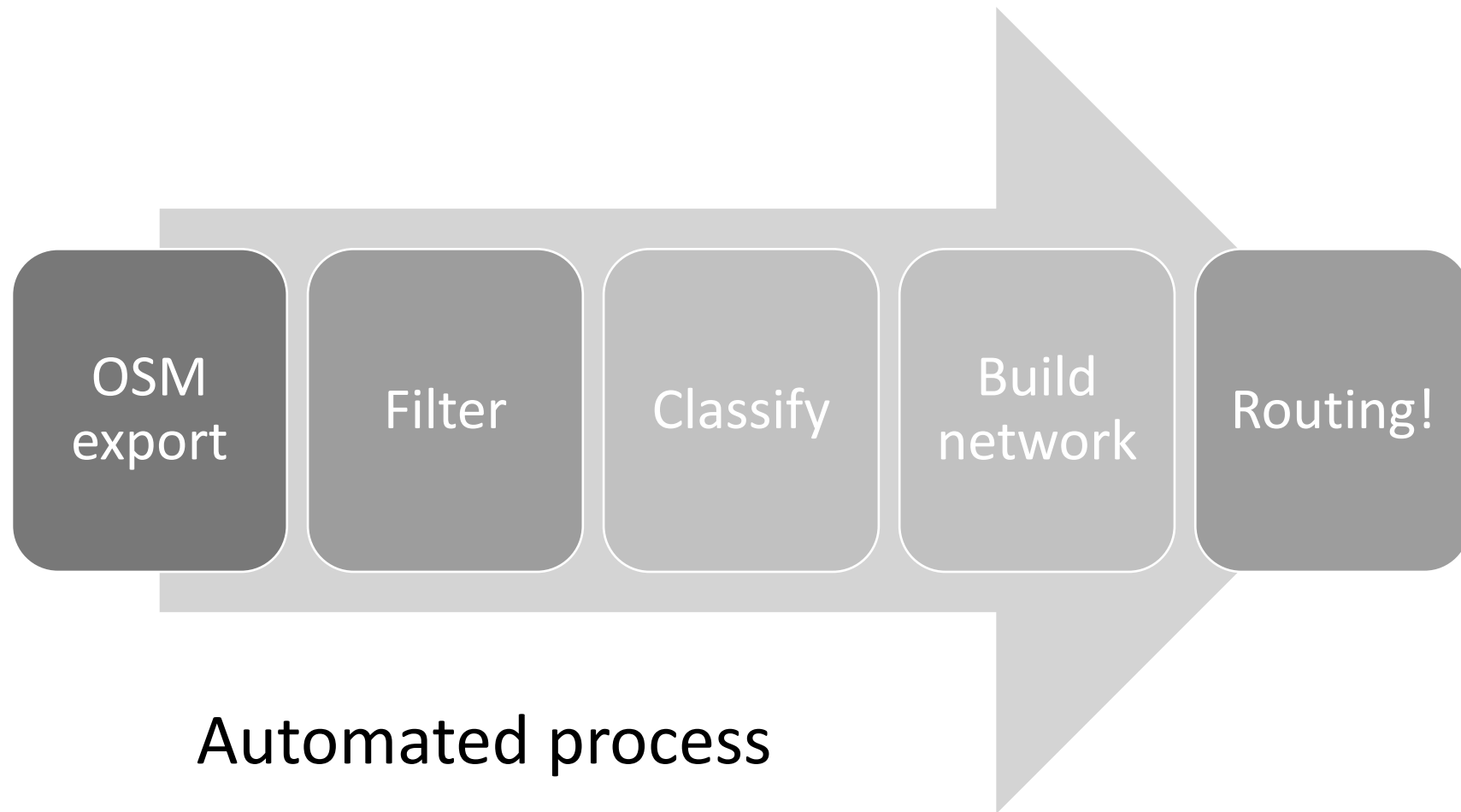
- Standard  Christchurch
- Cycle Map  CHRISTCHURCH
- Transport Map  CHRISTCHURCH
- Humanitarian  Christchurch

Enable overlays for troubleshooting the map

- Map Notes
- Map Data
- Public GPS Traces



**What if we could use
OpenStreetMap to develop our
own cycle routing system?**



Automated process

Repeatable, global

The process



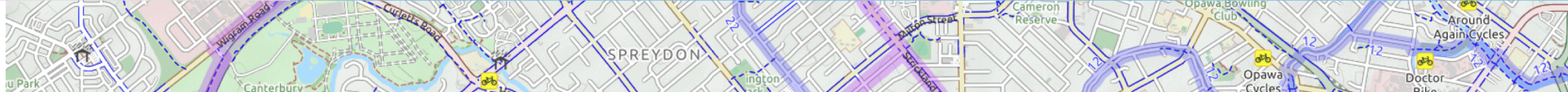
OpenStreetMap Edit History Export

GPS Traces User Diaries Copyright Help About Log In Sign Up

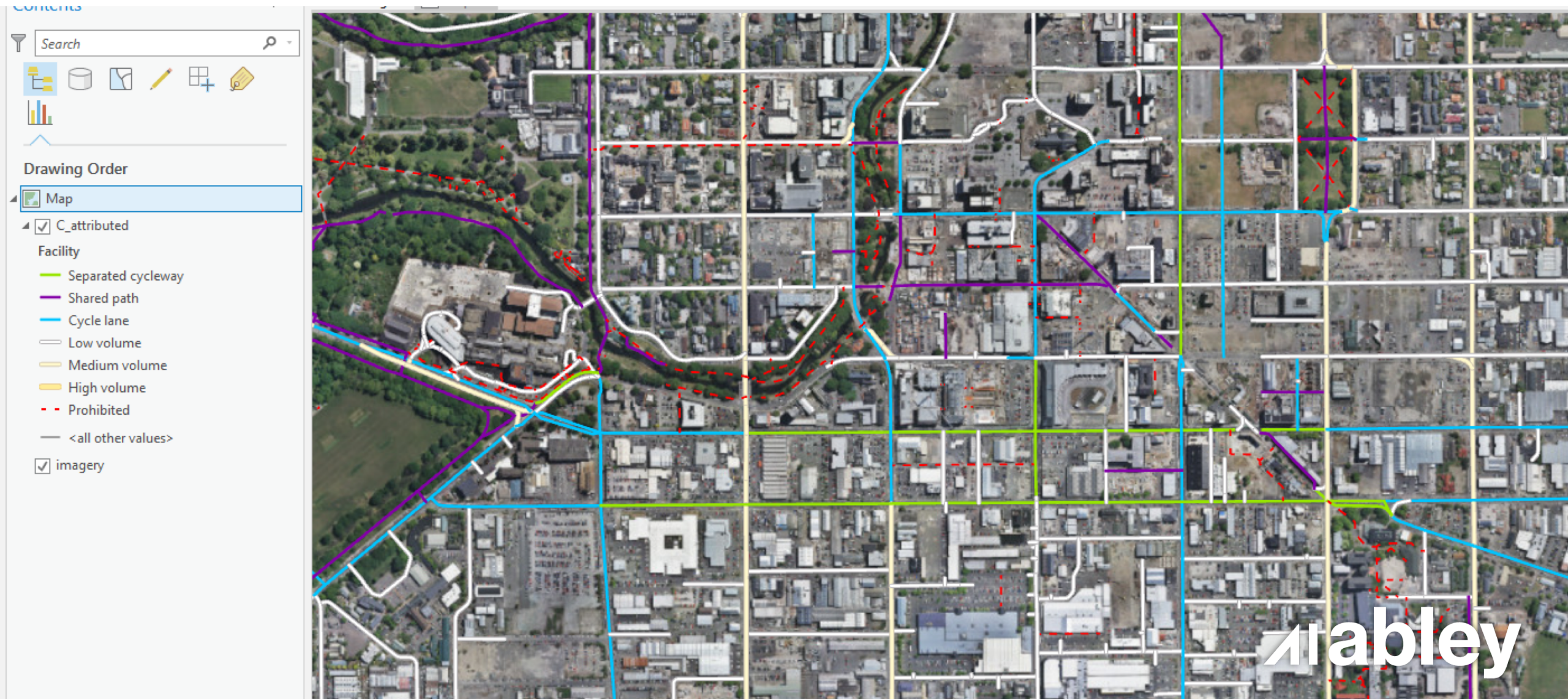
Search Where is this? Go

Map Layers Standard

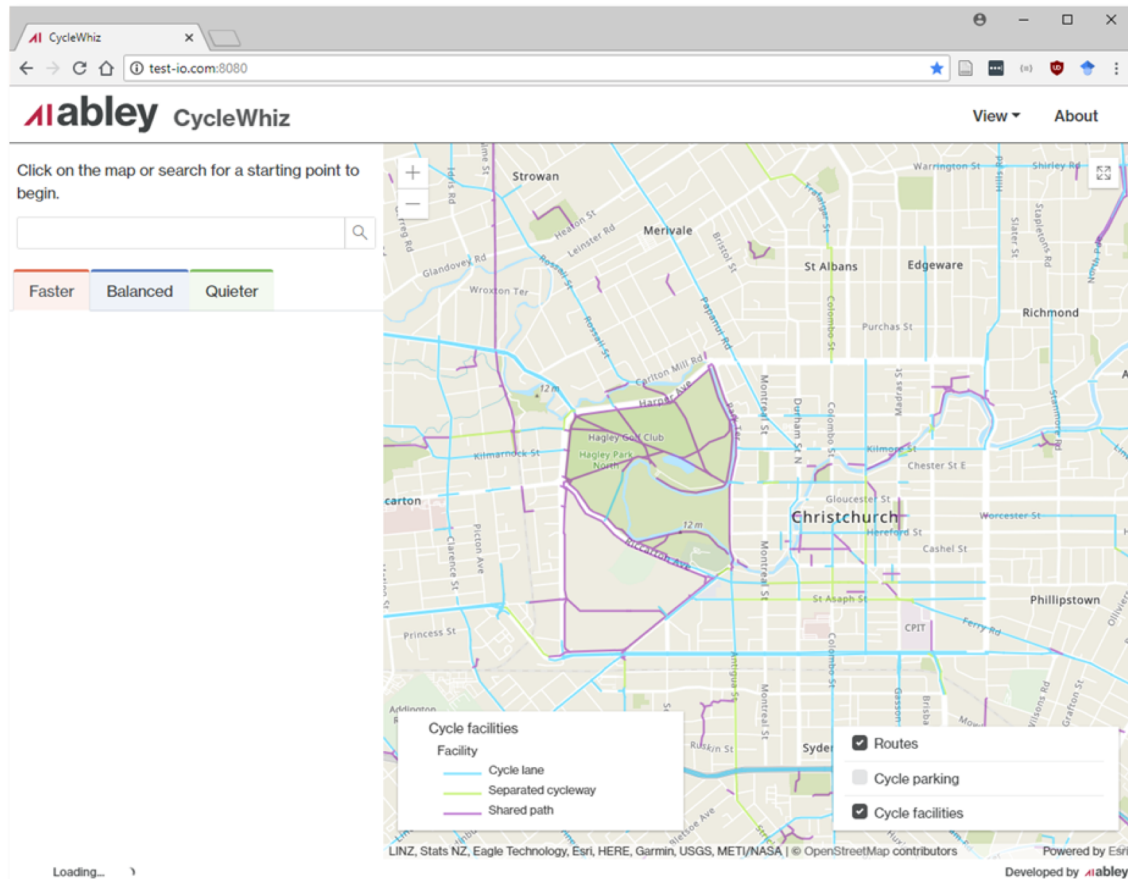
name	highway	waterway	aerialway	barrier	man_made	z_order	other_tags
Cross Street	unclassified					3	"name:ja"=>"クロスストリート","oneway"=>"yes"
Queen Street	secondary					11	"lanes"=>"4","oneway"=>"no","railway"=>"proposed","maxspeed"=>"50","proposed"=>"tram"
Customs Street East	secondary					6	"lanes"=>"7","maxspeed"=>"50"
Fort Street	living_street					0	"lit"=>"yes","oneway"=>"yes","surface"=>"paving_stones"
Shortland Street	tertiary					4	"name:ja"=>"ショートランド・ストリート"
Waterloo Quadrant	secondary					6	"lanes"=>"4"
Victoria Street East	secondary					6	"maxspeed"=>"50","name:ja"=>"ビクトリア・ストリート東","surface"=>"asphalt"
Lower Albert Street	secondary					6	"lanes"=>"4"
Albert Street	tertiary					4	"lanes"=>"2","maxspeed"=>"50","name:ja"=>"アルバート・ストリート","surface"=>"paved"
Wyndham Street	unclassified					3	"maxspeed"=>"50","oneway"=>"yes","source:maxspeed"=>"sign","surface"=>"asphalt"
Victoria Street West	secondary					6	"maxspeed"=>"50","name:ja"=>"ビクトリア・ストリート西"
Hobson Street	secondary					6	"maxspeed"=>"50","oneway"=>"yes","surface"=>"asphalt"
Nelson Street	secondary					6	"lanes"=>"4","maxspeed"=>"50","name:ja"=>"ネルソン・ストリート","oneway"=>"yes","surface"=>"asphalt"
Darby Street	living_street					0	"bicycle"=>"yes","foot"=>"yes","maxspeed"=>"10","oneway"=>"yes","surface"=>"asphalt"
Elliott Street	living_street					0	"bicycle"=>"yes","foot"=>"yes","maxspeed"=>"10","oneway"=>"yes","surface"=>"asphalt"



The process



The viewer



- Esri JS API
- Currently for testing

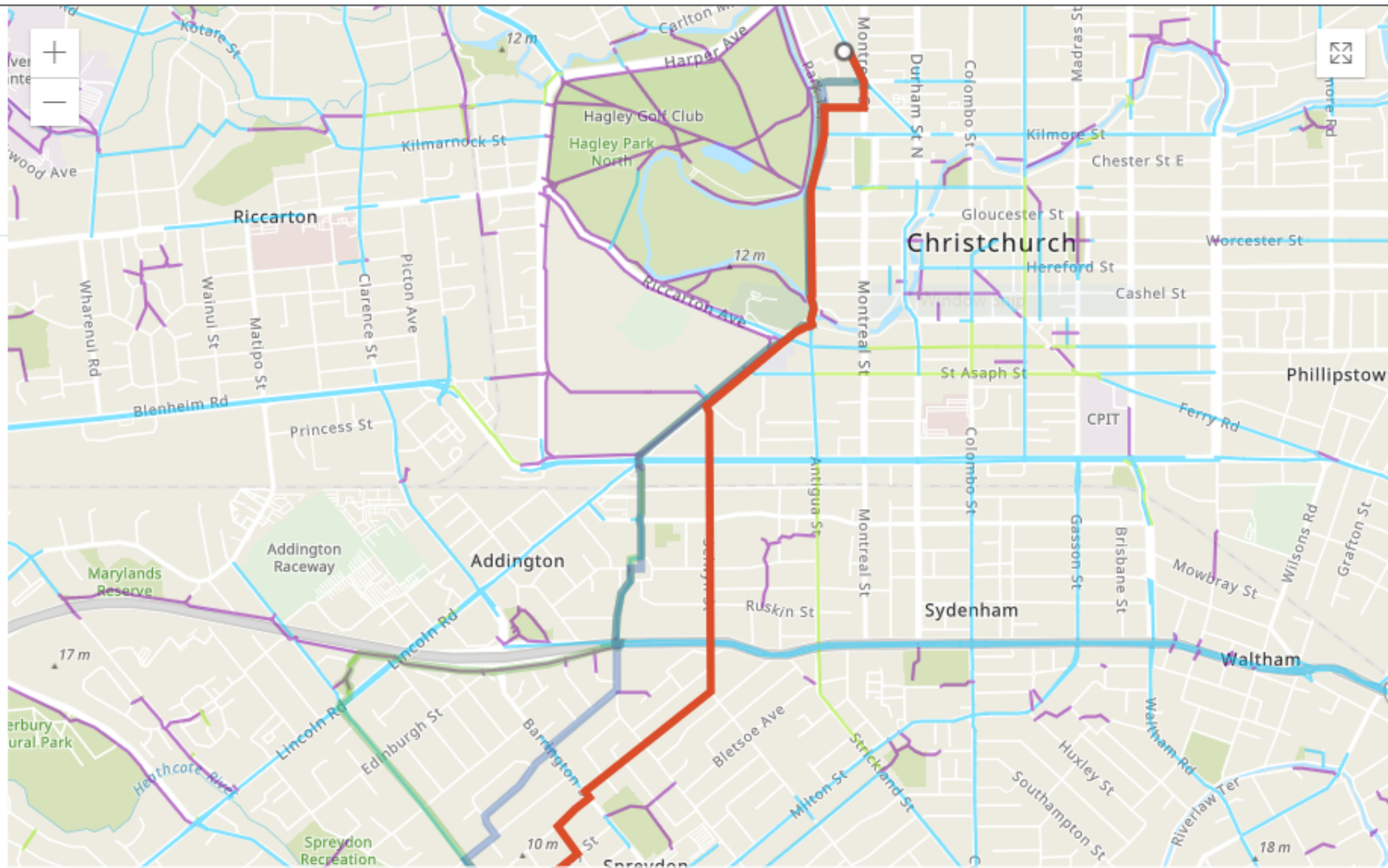
abley CycleWhiz

View About

Click on the map or search for a starting point to begin.

- Faster
- Balanced
- Quieter

- 20.3 minutes
- 7.0 kilometres



abley CycleWhiz

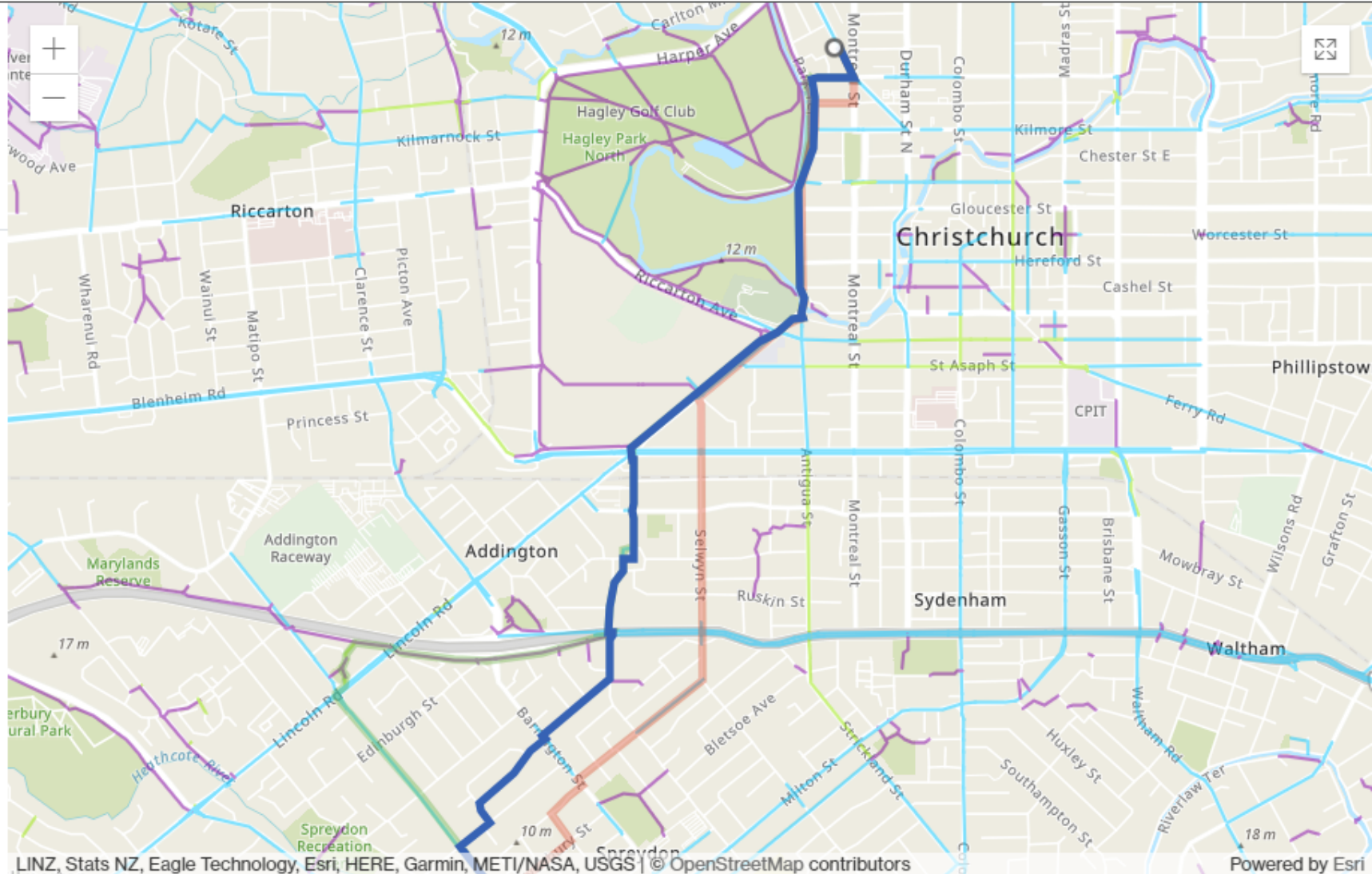
Click on the map or search for a starting point to begin.

Faster

Balanced

Quieter

- 20.6 minutes
- 7.1 kilometres



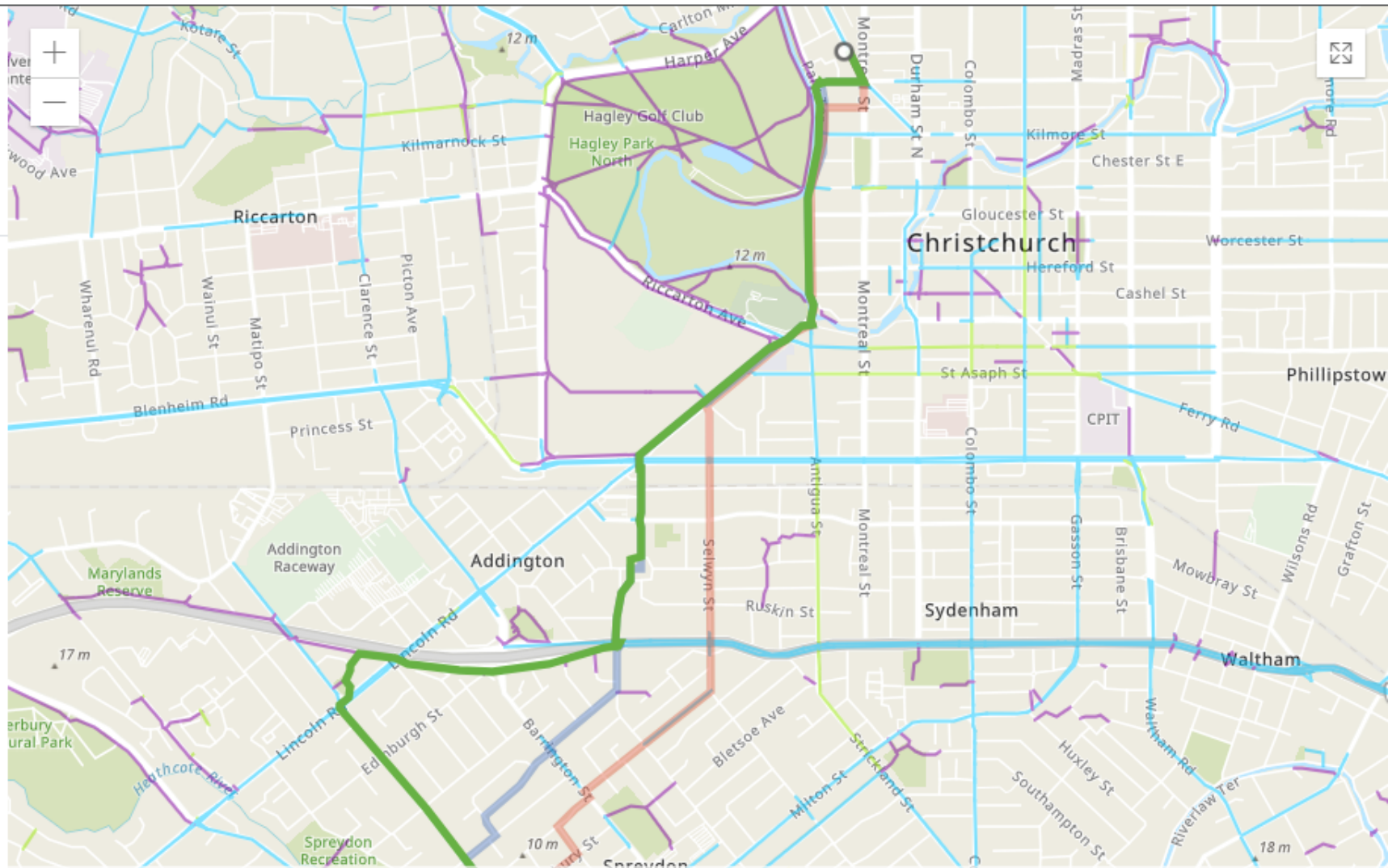
abley CycleWhiz

View About

Click on the map or search for a starting point to begin.

- Faster
- Balanced
- Quieter

- 24.8 minutes
- 8.6 kilometres



Where to next?

- Intersections
- TravelWhiz
- Cycle safety tools?
- Directions, elevation

Thank you!

Questions?

And for any more questions...

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