A GUIDE TO USING THE CRASH ANALYSIS SYSTEM

5 March 2024

Version 3

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More information

Waka Kotahi NZ Transport Agency
Published August 2023

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1. Introduction

What is the Crash Analysis System

The Crash Analysis System (CAS) is a system for processing storing and presenting data about crashes that have been reported to New Zealand Police since 1 January 1980.

What this guide covers

This guide shows you how to use to the CAS Reporting Application, so it is only useful if you have access to the CAS Reporting Application.

How does the Crash Analysis System work?

New Zealand Police send data relating to crashes to Waka Kotahi. This data is collected in two ways:

- On a handheld device by a Police officer attending a crash; or
- On a form (paper or electronic) filled in at the front counter of a Police station (watch house).

The data is stored in a database. Waka Kotahi staff members add codes to the data to aid analysis. The processed data is then stored in a data warehouse. The CAS Reporting Application sends queries to and receives data from the data warehouse and then presents crash information in the form of a map or various reports and extracts.

2. Getting Started

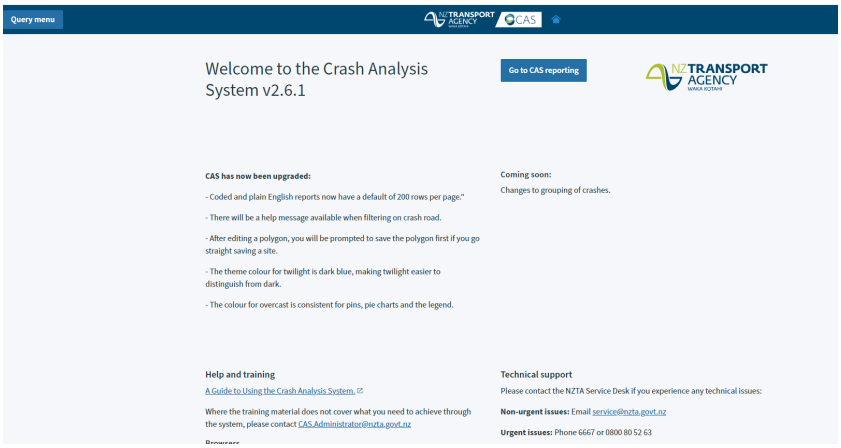
Screens in CAS reporting application

The landing page

This is the “login screen.” From time-to-time it will contain special messages such as notices of outages.

To log in, click on the ‘Go to login’ button. (Waka Kotahi staff may be logged in automatically). What is the Crash Analysis System

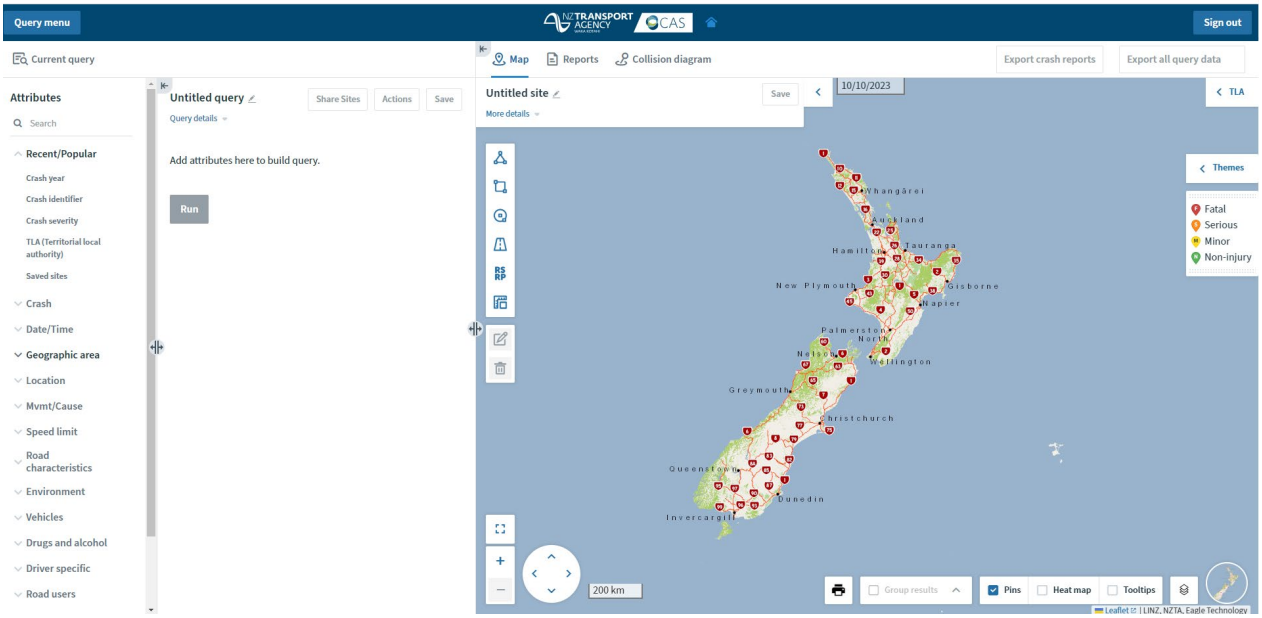
The dashboard



This is the “welcome screen”. It contains information about recently introduced changes and upcoming changes as well as where to get help. From time-to-time it will contain special messages such as notices of outages.

To start using the CAS Reporting Application, click ‘Go to CAS Reporting’.

The main screen – the query builder screen



This screen is where the “action happens.” It is really four screens in one, each different screen being activated by clicking on the ‘Current query,’ ‘Map’, ’Reports’ or ‘Collision diagram’ tabs.

The main steps in using the CAS reporting application.

1. Create a query. (This may involve creating a site on the map).
2. Run the query.
3. Look at the results using the map, reports and/or collision diagram.

3. Creating and Using Queries

What this chapter covers

This chapter covers:

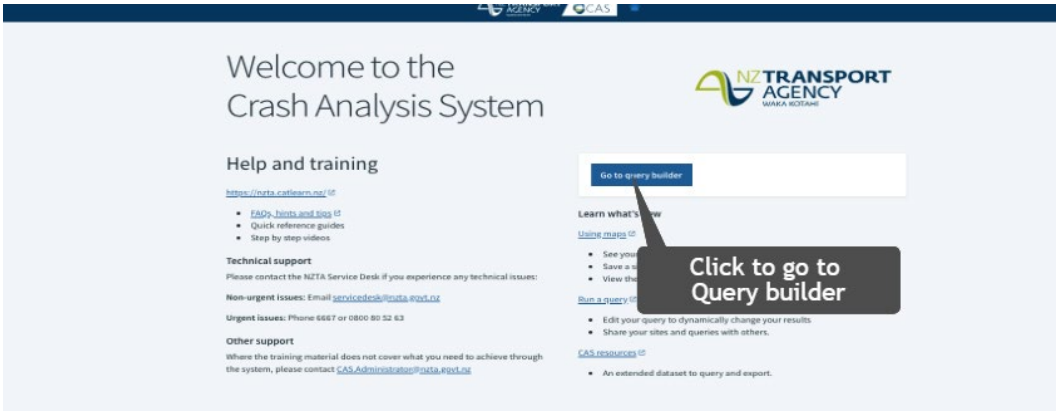
- How to create and run a query
- Viewing results
- Finding and changing existing queries

How to create and run a query

What follows are the steps to create a query about serious crashes that happened in the dark during June 2017.

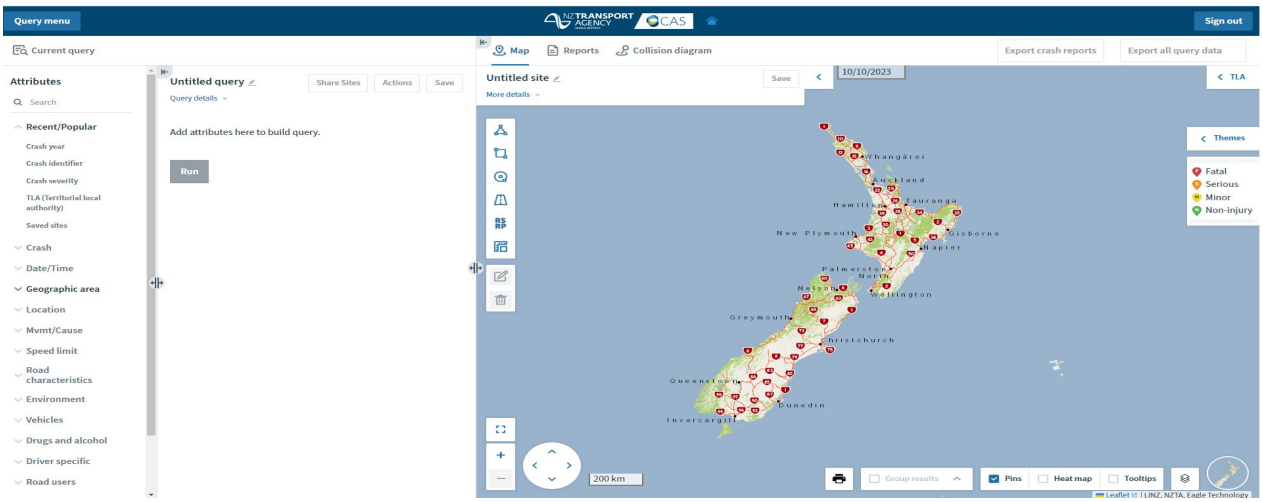
1. Log in to CAS.

2. The dashboard appears:

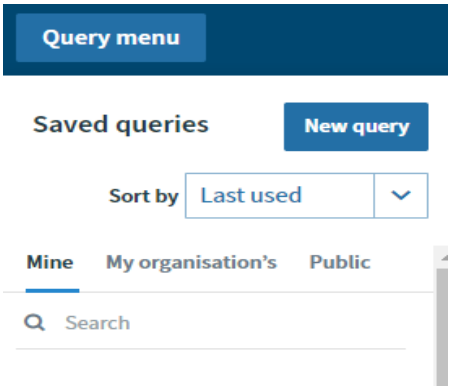


3. Click on ‘Go to query builder.

4. The main (query) screen appears:

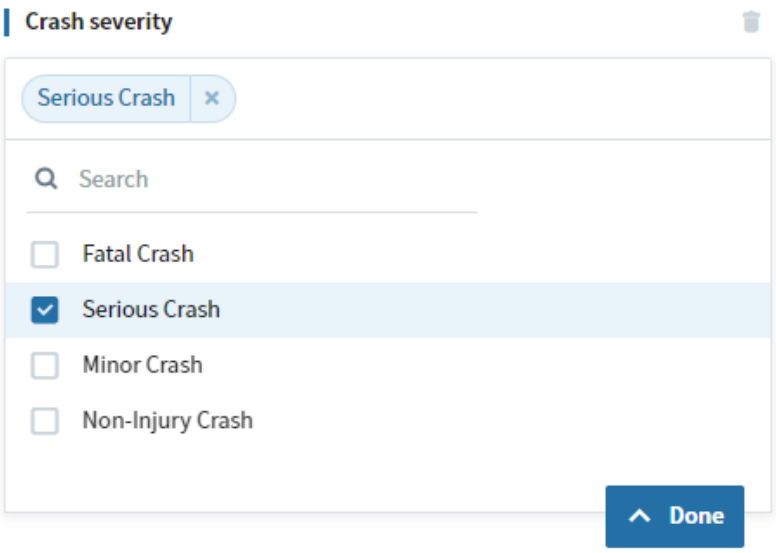


5. On the Left top corner, you have Query menu:

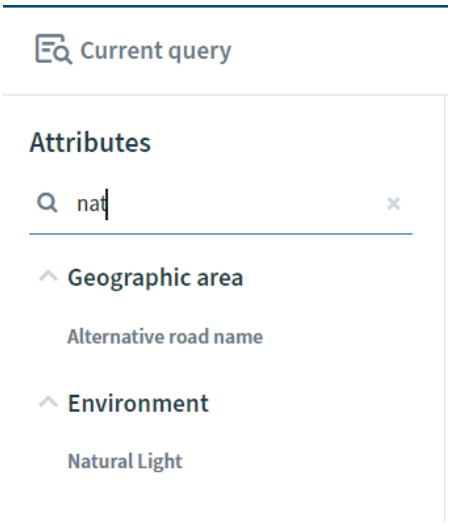


6. Click on 'New query' (if you don't already have a query you don't have to do this).
7. In the column under Current query click on Crash and then Crash severity. Note that some of the attributes that you use often may appear under the Recent/popular heading.
8. Crash severity now appears on the middle panel:

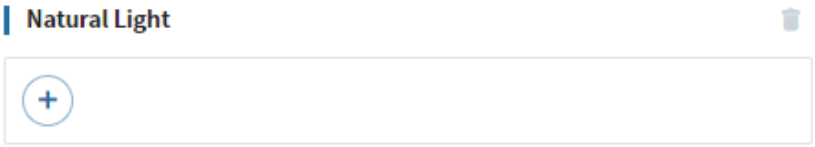
9. To specify the value(s) of severity you want, click on '+'.
10. Select the value you want (Serious crash):



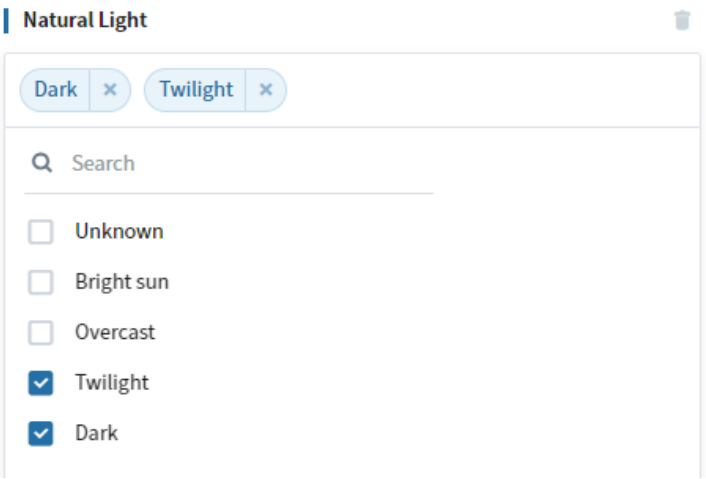
11. Having selected Serious Crash and needing no other crash severity, click Done.
12. Under Environment, select Natural light. If you can't easily find it just start typing it in the search space under Attributes:



13. Click on Natural light. The attribute appears in the middle panel:

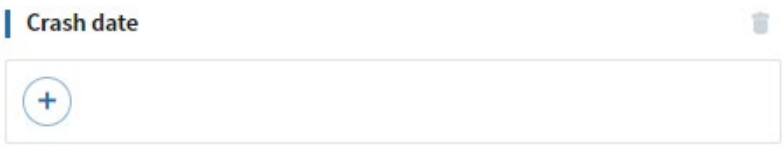


14. Click on '+'
15. Click on the values you want (Twilight and Dark):



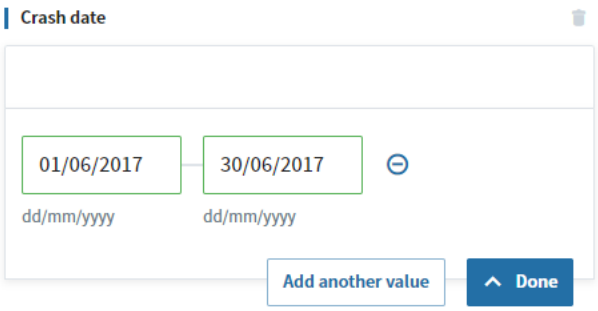
Click Done

16. Select the Crash date attribute under Date/Time or by searching for it. It will appear in the middle panel:



17. Click on '+'

18. Enter the time period you want:

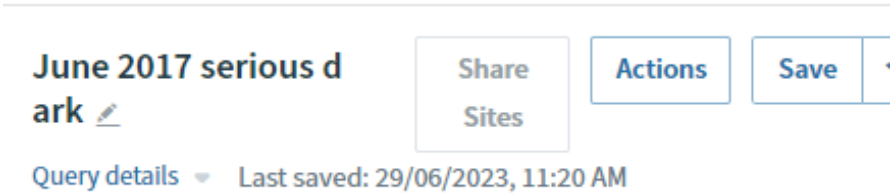


19. Click on Done.

Note that:

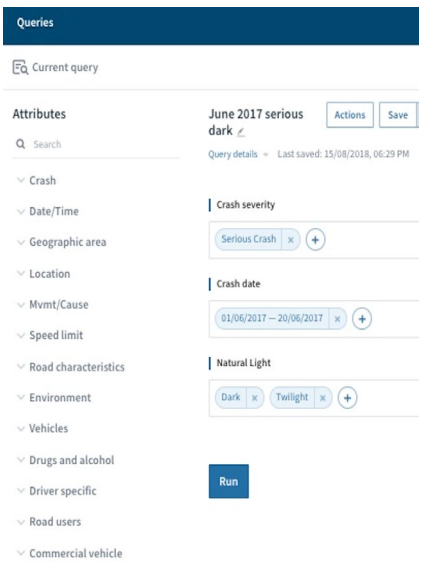
- you could also specify this period by picking Crash year and adding 2017 and then picking Crash month and adding June; and
- you can also select all the attributes you want first and then populate them with the values on which you want query.

20. You may wish to save your query. Suppose you want to call the query, ‘June serious 2017’. Click on the pen icon above the query and type, ‘June serious 2017’:



21. Click on Save.

22. Your query is ready to run. Click Run:



Viewing results

You may view results of your query by:

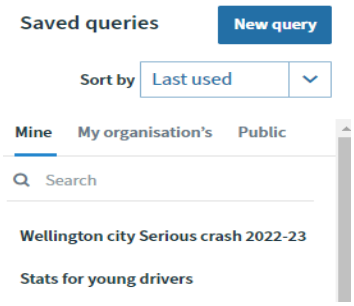
- Using the map (Chapter 4);
- Viewing reports (Chapter 6); or
- If your query complies with certain rules, view a collision diagram (Chapter 7).

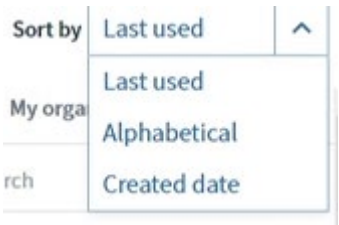
Find and edit a query

Instructions to find a query and change or delete attributes.

- Find the list of your saved queries using the drop-down Queries menu at the top left.

Select the query you want to change from the list.





Note that you can sort your list of queries by Last used, alphabetical order or created date.

To change existing values, click '+' to add more values to anattribute in the middle column and then click on Done.

To delete a value from an attribute, click on 'X' next to the value and then click on Done.

To delete an existing attribute, click on the trash can icon to the right of the attribute.

Once you have changed your query click on Save to keep your changes.

How to delete a saved query

- Open the query
- Click on Actions
- Click on Delete query
- Click on Permanently delete

4. Using the Map

CAS map

You can use map tools without having run a query

Use the map tools to manipulate the map view to create and save a site

Additional Resources
1. Quick Reference Guide Polygons
2. Quick Reference Guide Collision Diagrams

Hint:
Zoom in or out using your mouse scroll bar or keyboard CTL - + buttons

Untitled site
Name & Save polygon/s that have been created. Collapse using <

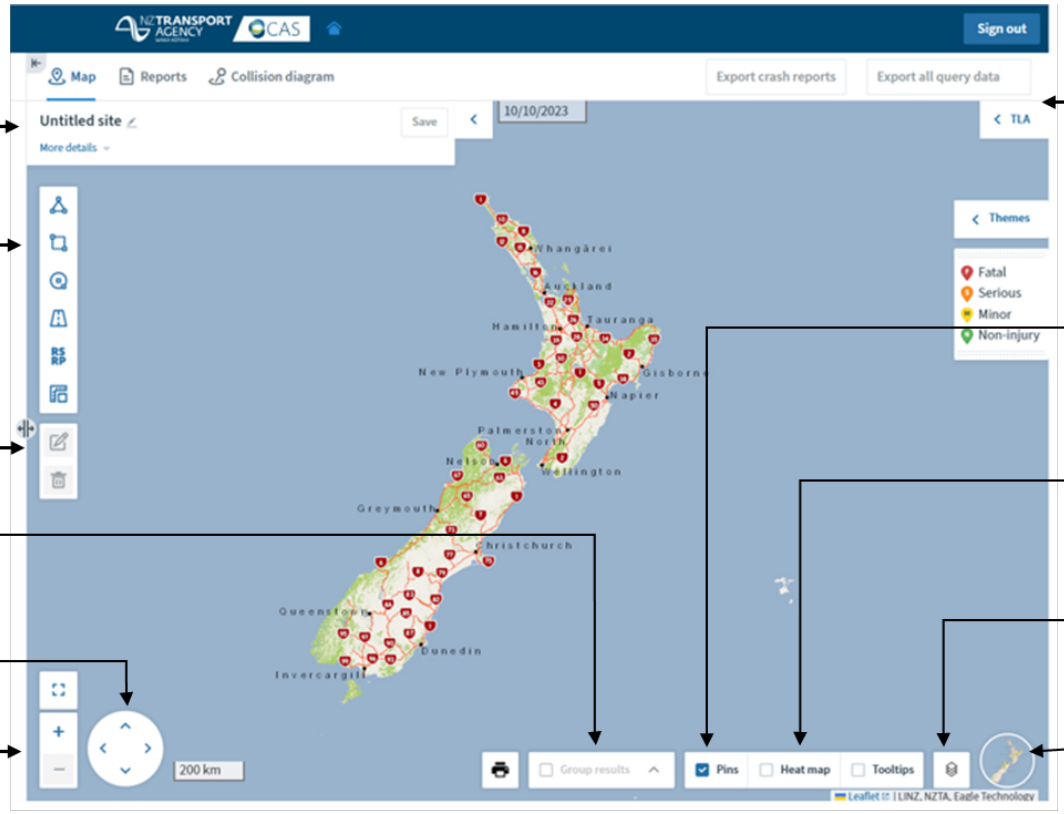
Polygon tools
Use different shapes to draw your site

Edit or Delete
Functions to manage polygon drawing tools

Group results
Group crashes within a user controlled radius

Pan
Move the map view left/right/up/down

Zoom
Zoom in + or out − of the map



TLA
Search for a Territorial Local Authority. When you select a TLA the map zooms to that area

Pins
Displays locations of crashes - both individual and clusters

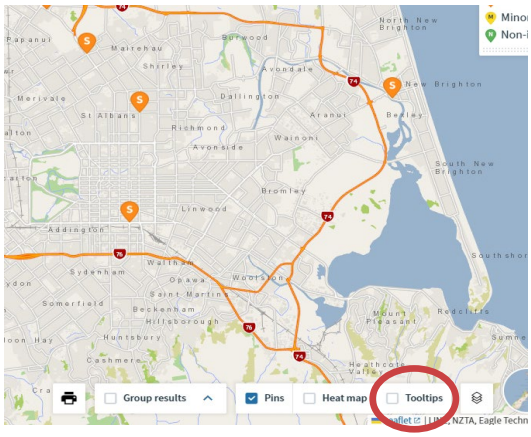
Heat map
A visual representation of crash density

Layers
Select to view different geospatial boundaries

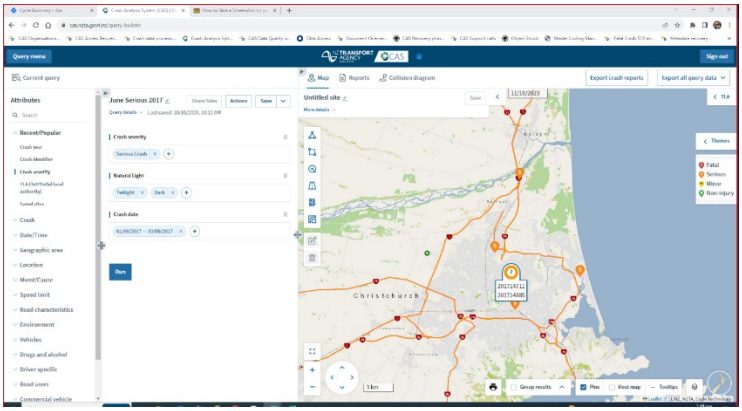
Base map
Customise the base map

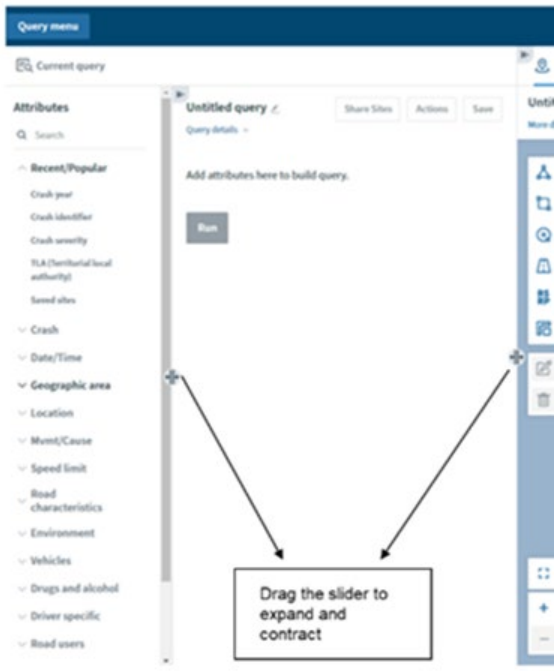
Tooltips

Crash ID’s are visible on hover



When you click tooltips:



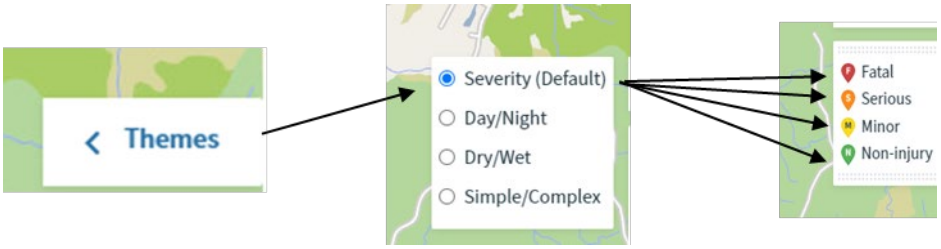


Themes

The pins and pie charts are coloured to show one of four themes:

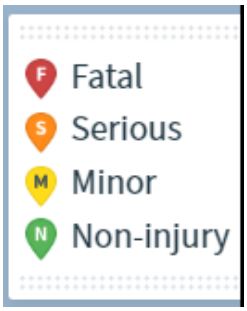
- Crash severity
- Natural light; (Day/Night)
- Primary surface condition (Dry/Wet)
- Crash type (Simple/Complex)

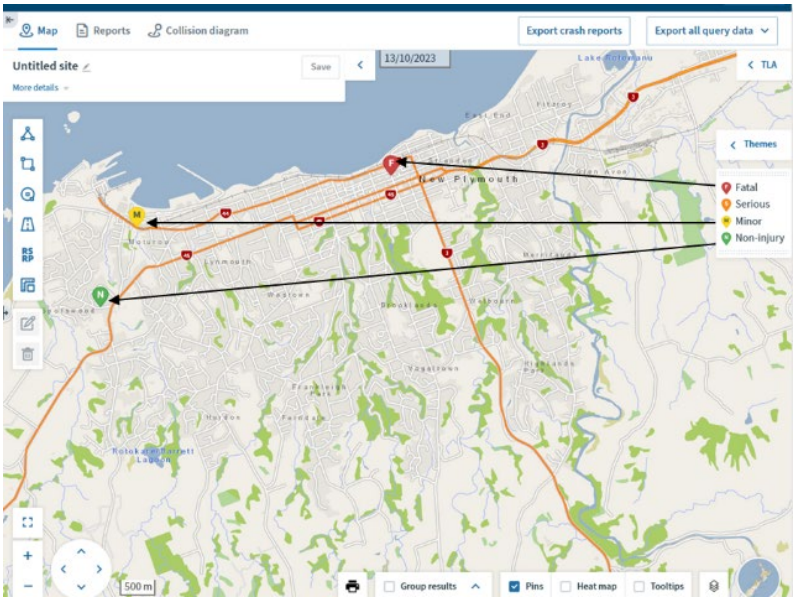
You can select the theme you want by clicking the Themes button on the right-hand side of the map.



Severity

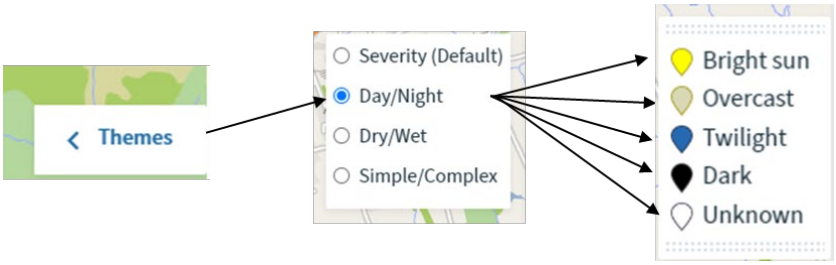
The default theme is crash severity, which is indicated by colour and by label:

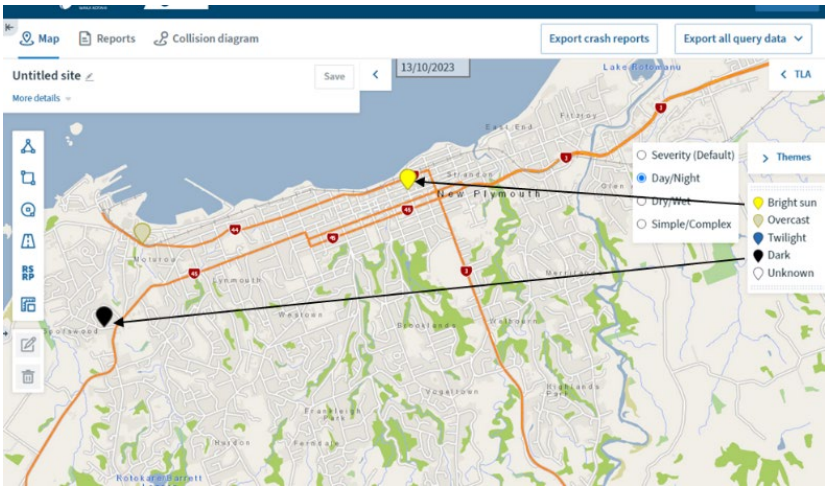




Natural light

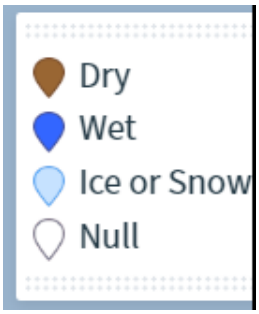
Natural light colours are:

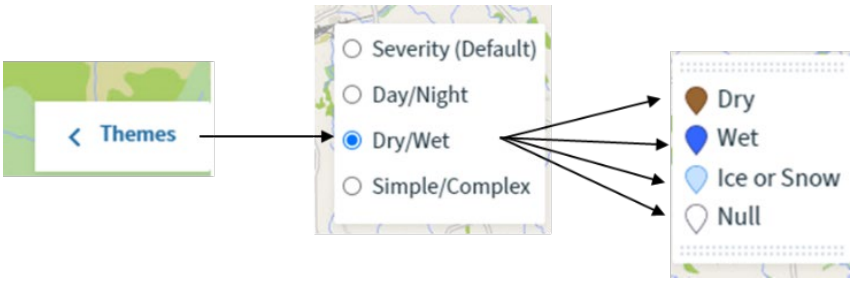


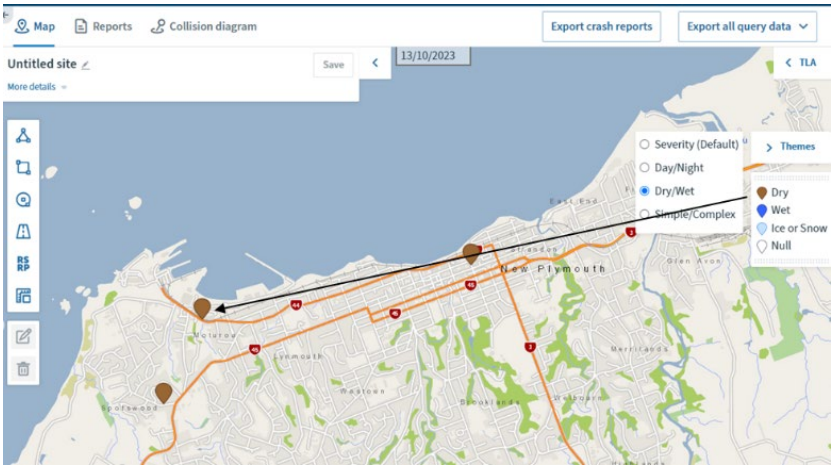


Primary surface condition (wet/dry)

Primary surface condition colours are:

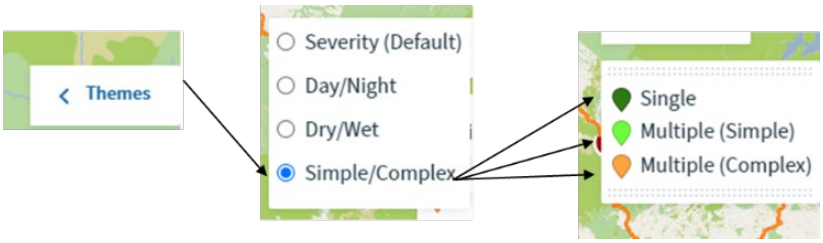


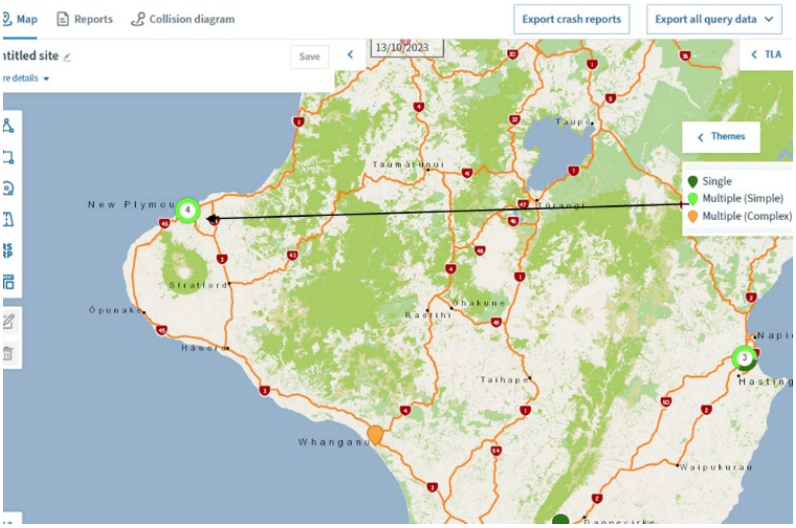




Crash type (simple/complex)

Crash type colours are:





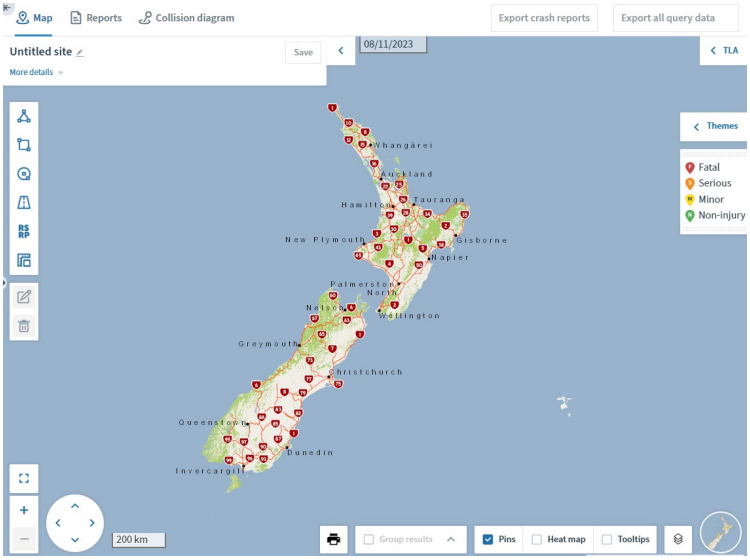
Base maps

There are 5 Base Maps

1. NZTA Generic
2. Dark Grey
3. NZTA Imagery
4. NZTA Grey Basemap
5. NZTA Terrain

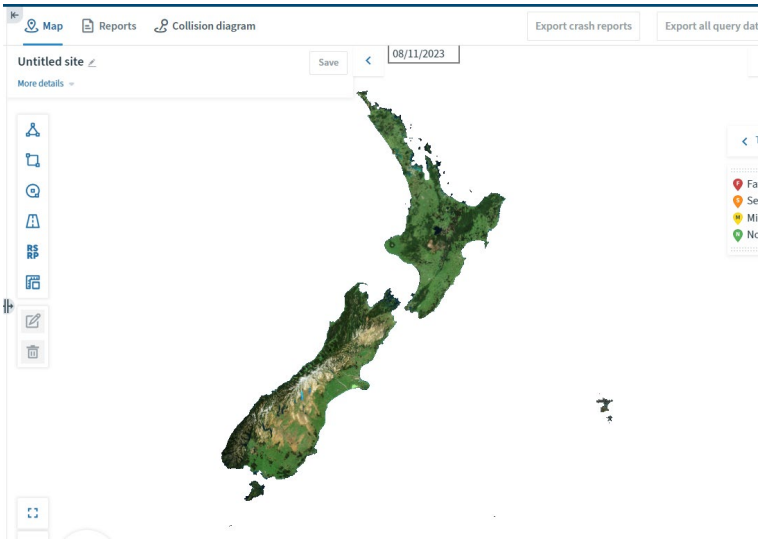
Note: Default map is NZTA Generic

NZTA generic

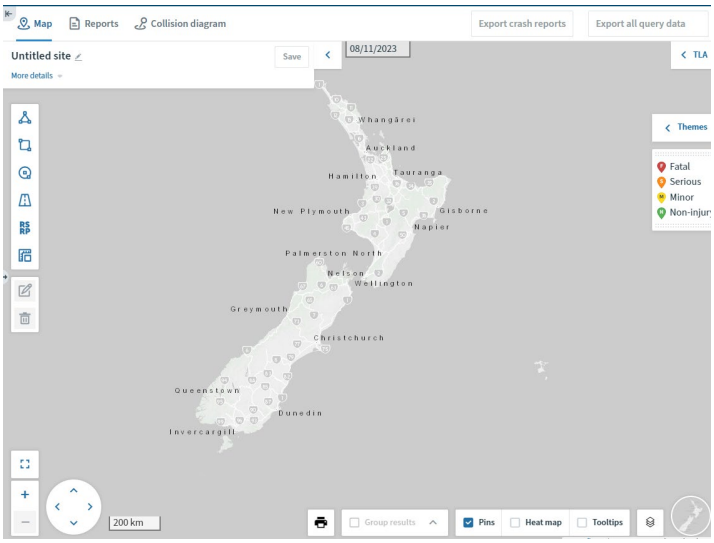


Dark grey

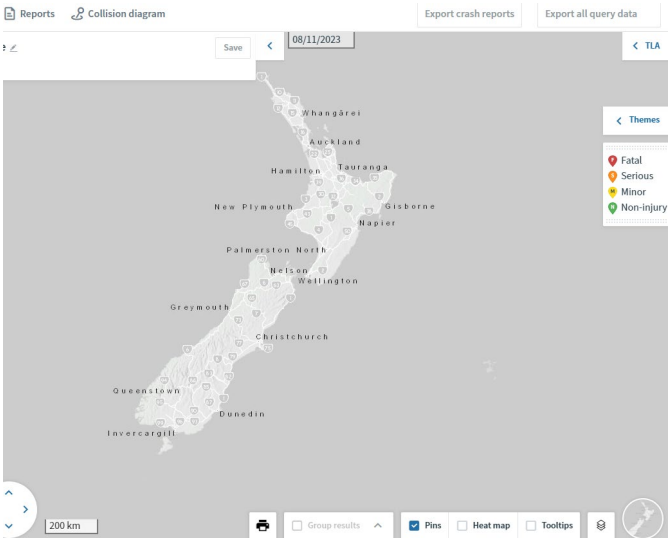
NZTA imagery



NZTA grey base map



NZTA terrain



Map symbols

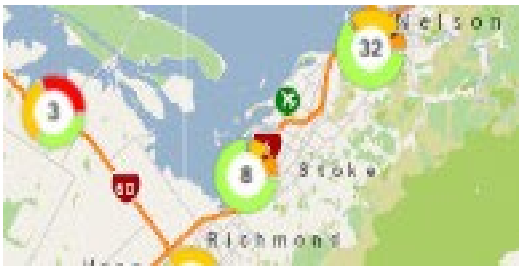
Clusters and crash pins

When a query is run results show on the map. Pins are selected bydefault.

Clusters and Crash pins show the crash locations on the map.

Clusters

The circle with a number in the middle shows a cluster of crashes.



Number = number of crashes

Colours show severity % Fatal = Red

Serious = Orange

Minor = Yellow Non injury = Green

Hint: zoom in or click the cluster to see the individual pins that makeup a cluster of crashes.

Crash pin

The single pin shows one crash. The map pin colour andletter indicate severity.

Fatal = (F) Red

Serious = (S) Orange Minor = (M) Yellow

Non injury = (N) Green

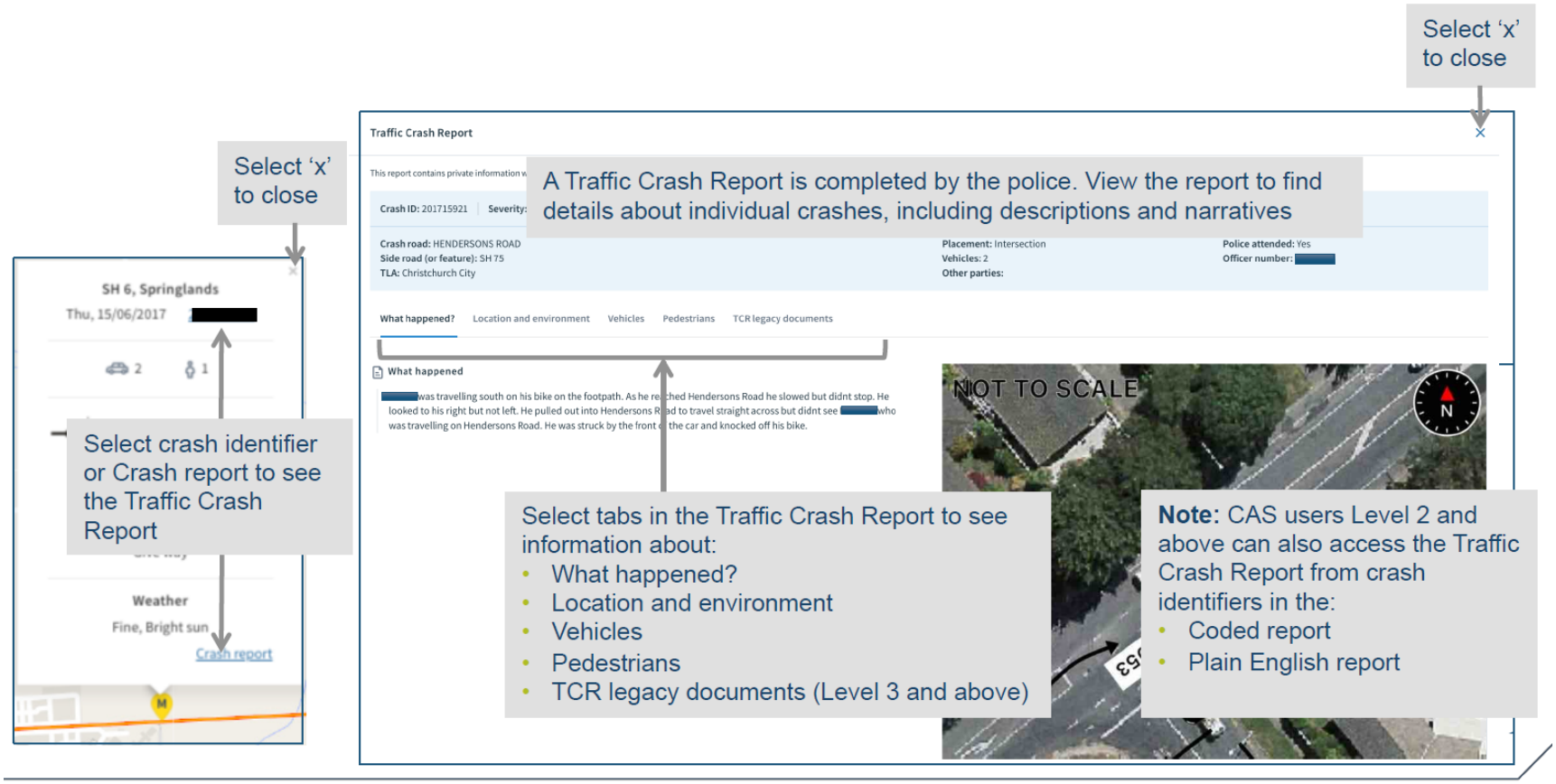
Select an individual pin to see a crash summary.

- CAS users Level 2 and above can select the crash identifier or Crashreport to see the Traffic Crash Report
- Including traffic control and junction type under Environment

Map crash pins and traffic crash report

CAS users Level 2 and above can access the Traffic Crash Report

Select crash identifieror Crash report to see the Traffic Crash Report



Select tabs in the Traffic Crash Report to see information about:

- What happened?
- Location and environment
- Vehicles
- Pedestrians
- TCR legacy documents (Level 3 and above)

Note: CAS users Level 2 and above can also access the Traffic Crash Report from crash identifiers in the:

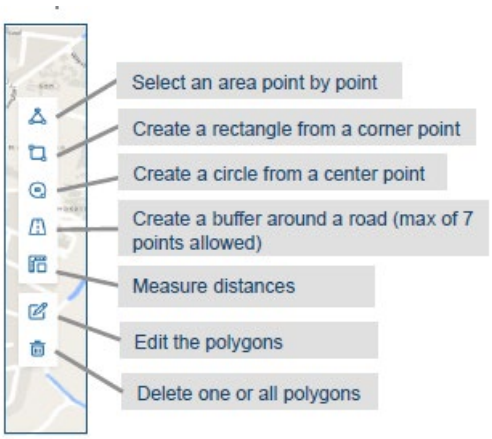
- Coded Report
- Plain English Report

5. Polygons

Create polygons to save as a site

Use CAS polygons

Use polygon drawing tools to create shapes to outline a site of interest on the map. Polygon tools provide hints on hover and mouse click.



Point by point polygon
- Select the point by point polygon
- Click around the area you want to select
- Click the first point to close the shape

Rectangle
- Select the rectangle
- Click where you want a corner to be
- Drag to the size you want and release to finish the rectangle

Measurement
- Select the measurement tool
- Click where you want the first point to be
- Click one or many points along the route you want to measure
- Double click to finish
- Distance shows in the white box

Circle
- Select the circle
- Click where you want the center to be
- Drag to the size you want
- Release mouse to finish drawing

or
- Enter you radius in the pop up box – default is 30m
- Single click where you want the circle centre to be

Buffer
- Select the buffer
- Enter the buffer width you want in the pop up box – default is 5
- Click on first point of the route you want
- Max of 7 points can be used. Double click for the last point
- The points will snap to the road/s selected

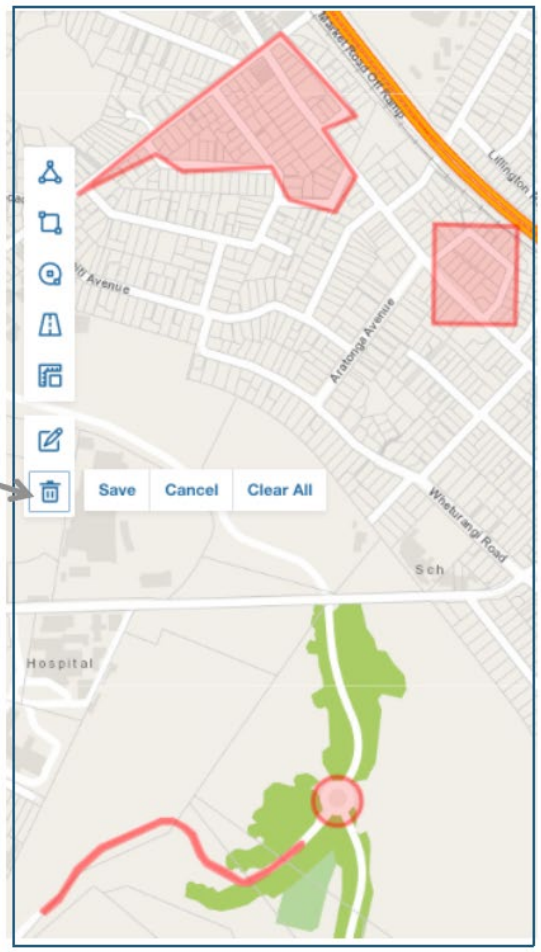
Hint: zoom in to check your buffer is exactly where you want it to be

How to delete polygons

To delete one or many polygon/s
- Select the delete icon

Visible polygon/s will show in red
- click on a polygon to delete
- click on one or many polygons
- Select 'save' to save deletions

Hint: zoom in to click on smaller polygons



Additional Resouces
1. Maps Guide
2. Using RSRP Map search tool to make a buffer on a State Highway

Polygon hints:

Use combinations of polygon tools to outline a complex shaped site or use multiple of the same tool. e.g. use multiple buffers to outline a route. Overlap polygons if required.

It can take time to place polygons if you have a complex site. Use the pan tool on the map if you want to place a polygon point outside your map view.

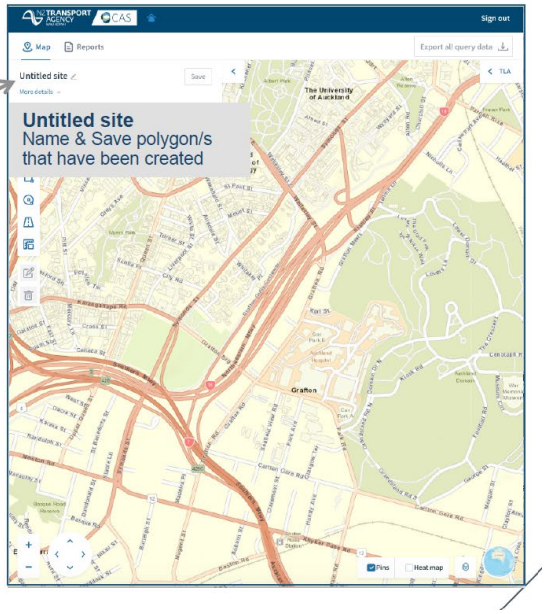
After saving the deletions to the polygons you need to also save at the site level.

Save a site

How to save a site & add to a query

Use polygon drawing tools to identify an area/s on the map that you cansave as a site. Add a saved site to a query to see the crash results.

To save a site
- Define the area using a polygon/s
- Select Untitled site to add a name > type name
- Select More details to describe the site > type details
- Select Save - a 'pop up message' will confirm the saved site



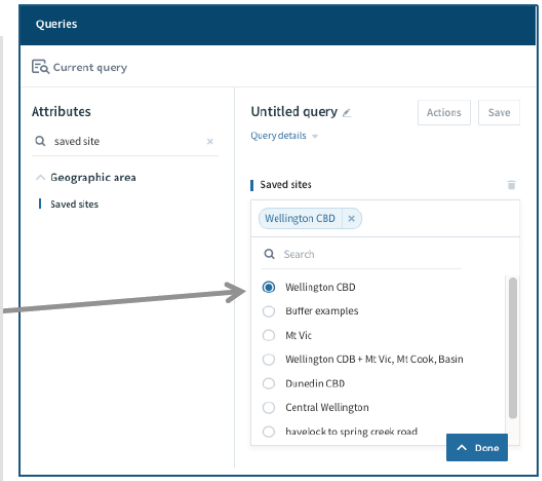
Hint: You can edit a saved site the same way as you edit a polygon. Remember to save the changes to your polygons before you save the changes to the site.

To add a saved site to a query
- Select Go to query builder on the CAS dashboard

or
- Select Queries > New
- Select Geographic area > Saved sites

The Saved sites will show in the query builder
- Expand the Saved site by clicking on the +
- Select a site
- Select Done
- Name and Save the Untitled query
- Select Run

or
- Add more attributes and Run the query



6. CAS Reports

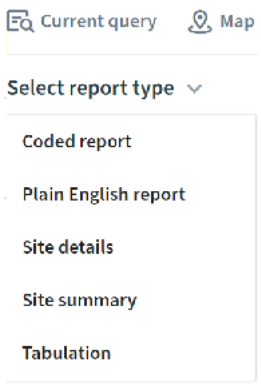
How to access CAS reports and an overview of reports available in CAS

Log into CAS, select Go to query builder on the CAS dashboard.

- Select an existing query or create a new one
- Select 'Run'

Hint: To view a report you need to have run a query. Your query resultsautomatically show on the map.

- Select Reports
- Select report type
- The menu of available reports will show



- Select a report
- Reports available under report type are:

Coded Report

View crash information in code format to understand details about the crash e.g. the location of the crash, the road and environmental conditions at the time of thecrash, movement and the identified contributing factors. The codes represent the attribute values.

Plain English Report

View crash information in plain English to understand details about the crash e.g., the location of the crash, the road and environmental conditions at the time of the crash,movement and the identified contributing factors.

Site Details

View amalgamated data about your crash results.

Site Summary

View a summary of crashes occurring within a group of crashes.

Note: You must group the crashes (See Chapter 7 Grouping) before running this report.

Tabulation

View query results in a tabulated format. Allows the user totabulate data to look for insights.

(See Using Tabulation Quick Reference Guide)

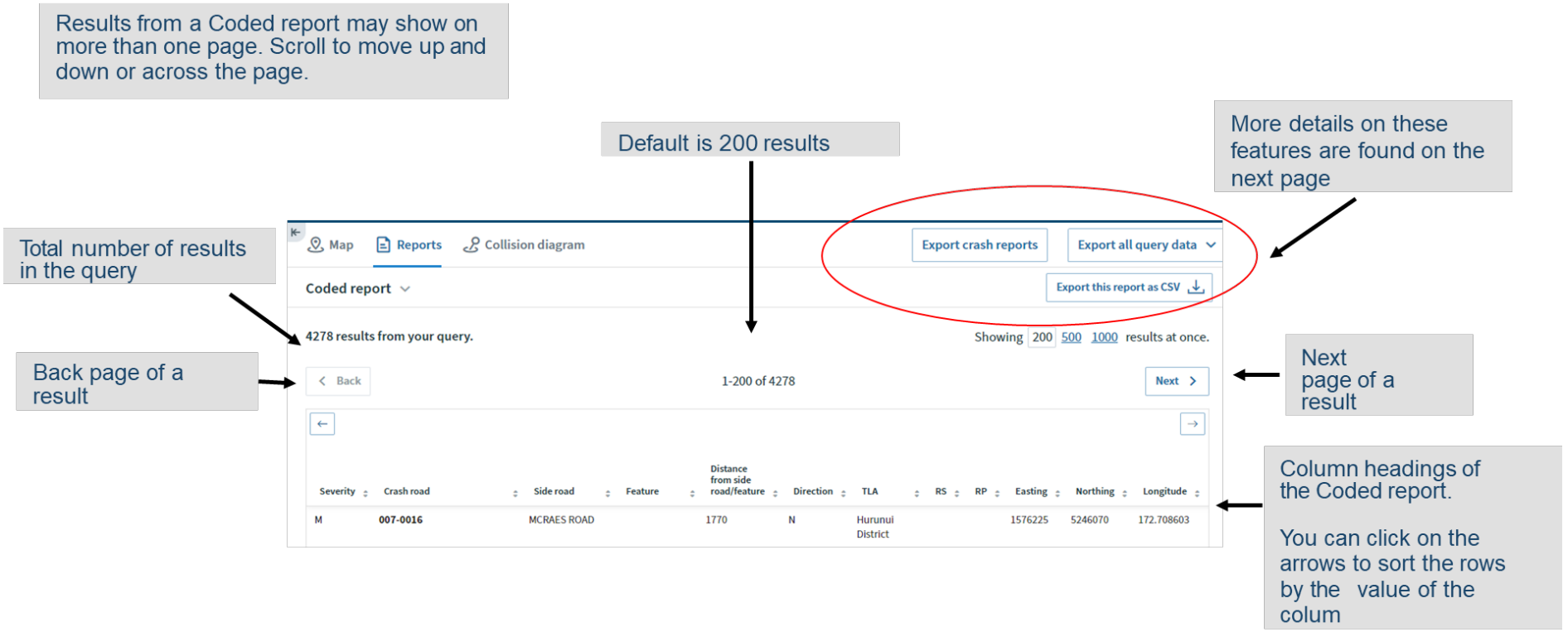
Traffic Crash Report

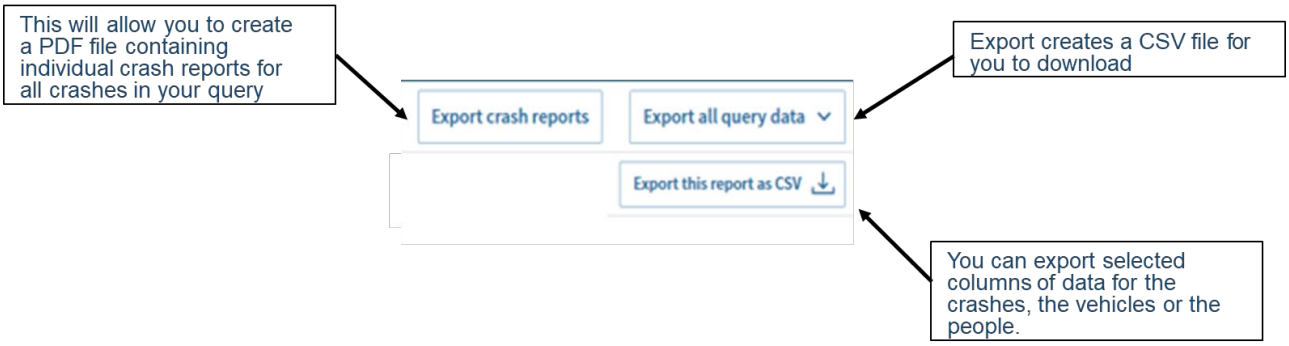
View details about an individual crash: what happenedinformation, location, environment, vehicles & people.

This report is available to CAS users with access Level 2 and above. To access select the crash identifier in a CodedPlain English or Tabulation report or a Collision diagram. It is also accessible from the Map using a Crash pin.

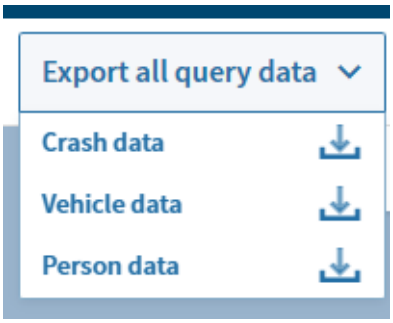
Coded reports

Navigate, export and copy:



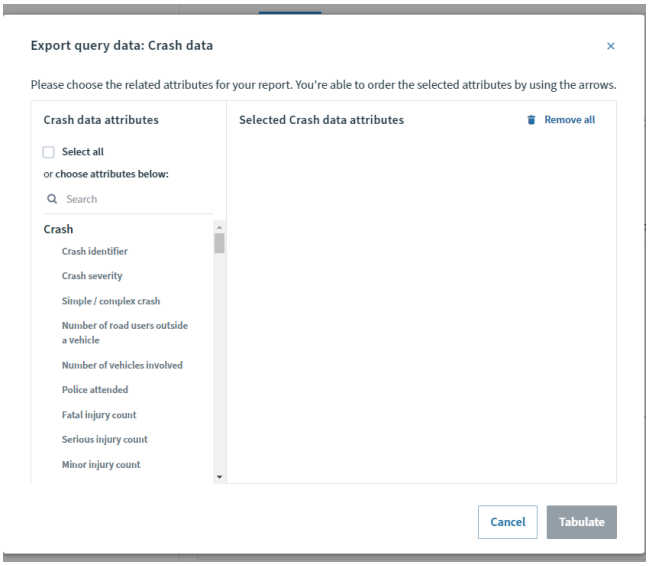


Export all query data



Crash data

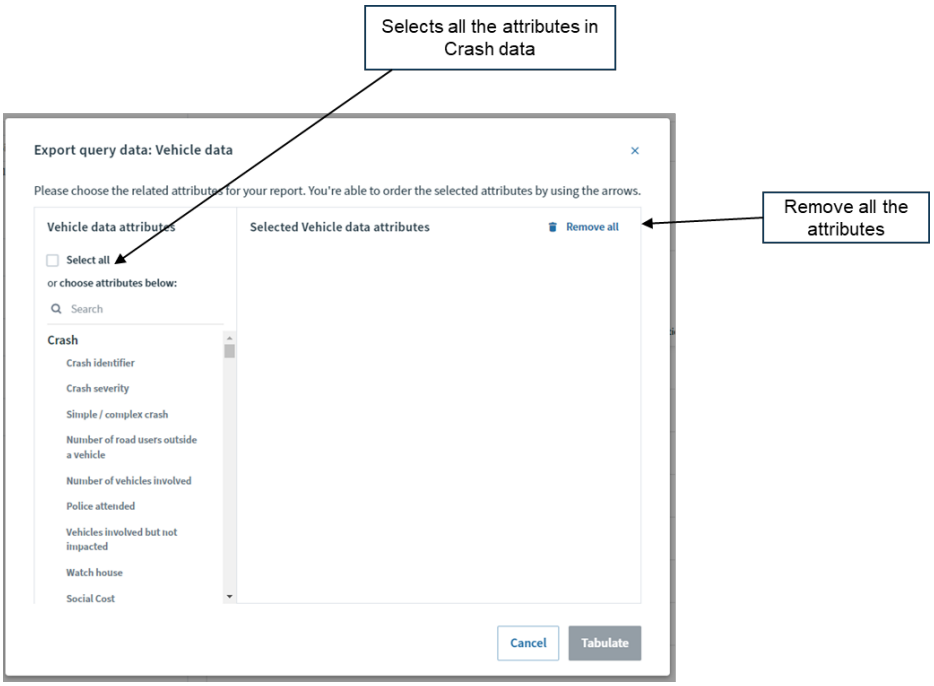
We you click Crash data, the following page will display

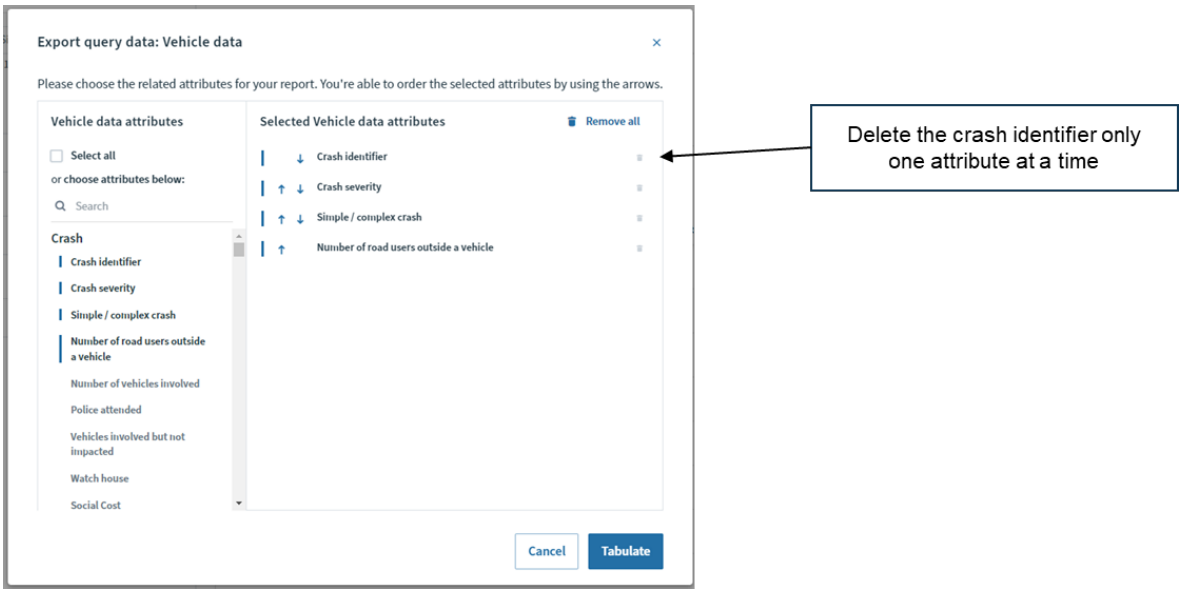


In this page choose the attributes

Click Tabulate, it downloads in excel spreadsheet.

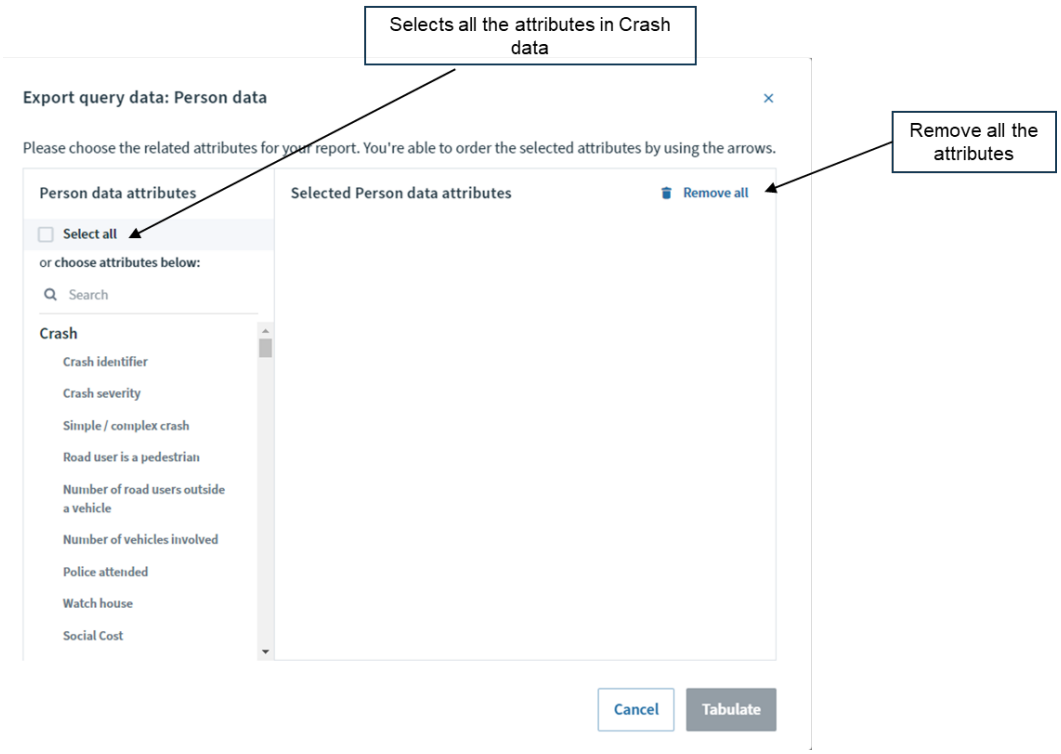
Export query data : vehicle data

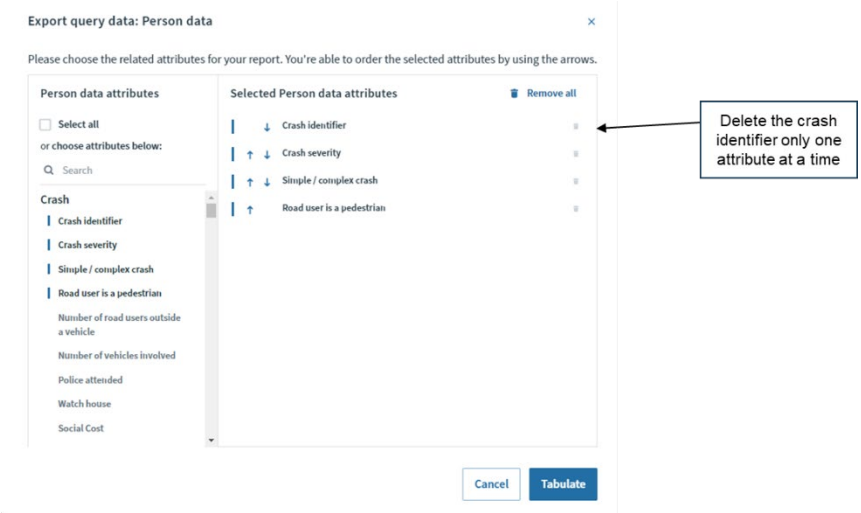




Click Tabulate, it downloads in excel spreadsheet.

Export query data : Person data

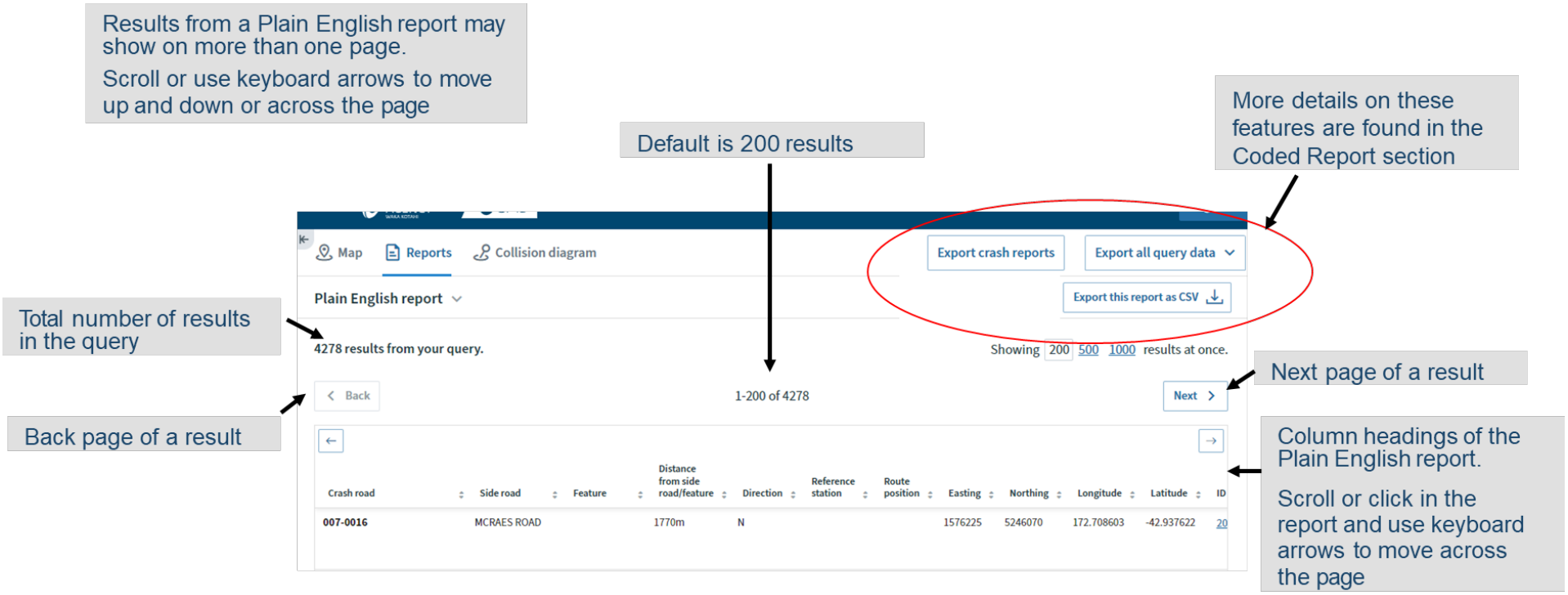


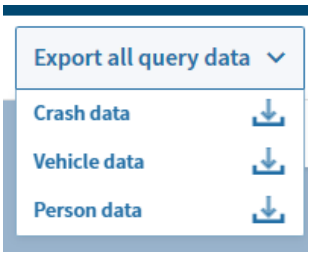


Click Tabulate, it downloads in excel spreadsheet.

Plain English report

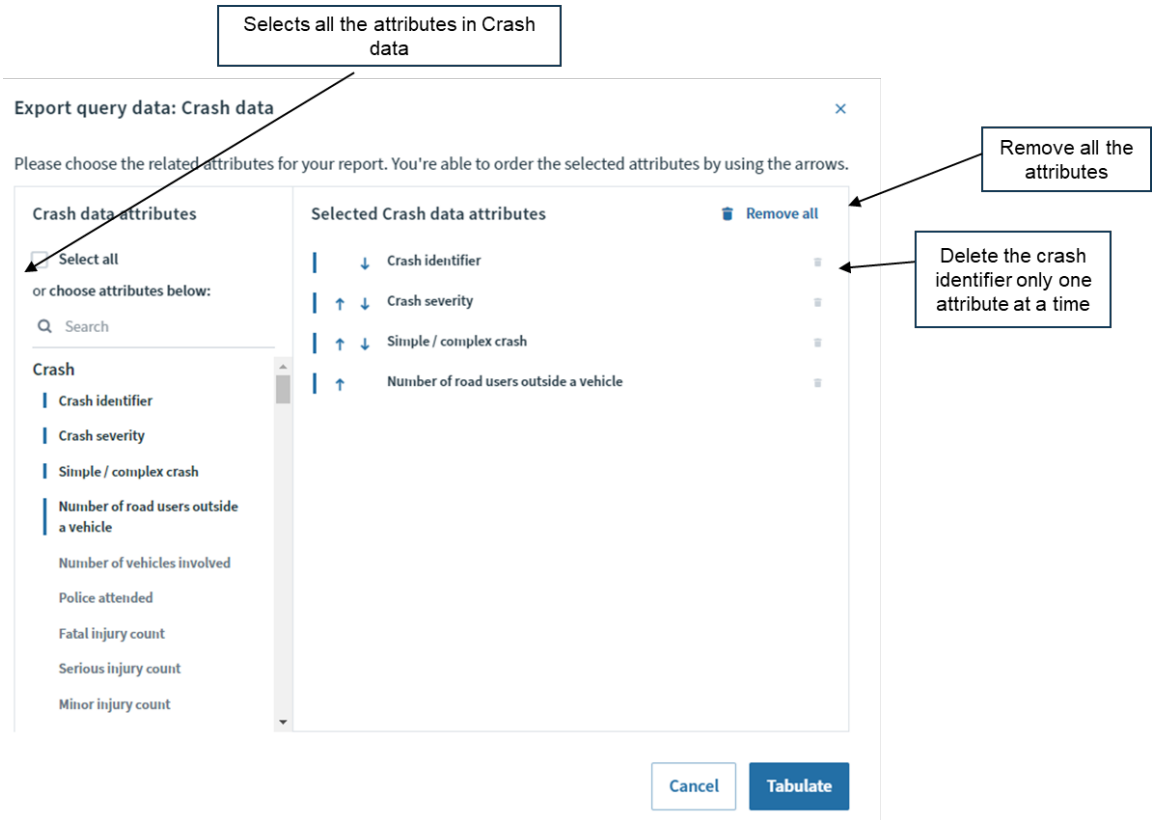
Navigate, export and copy:



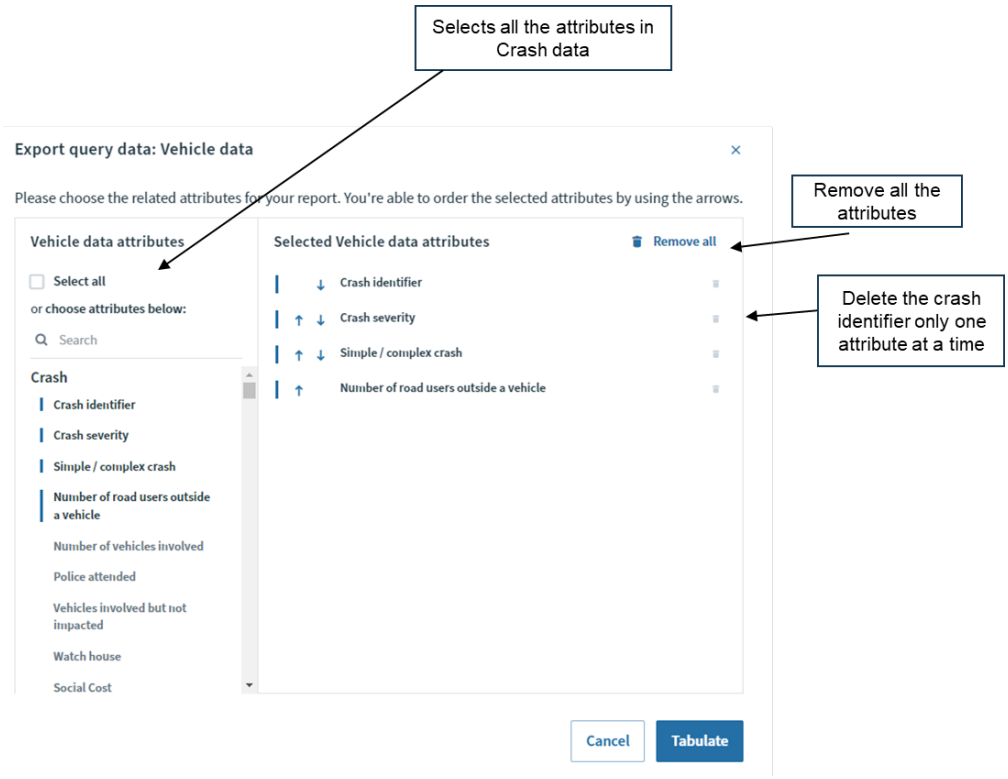


Crash data

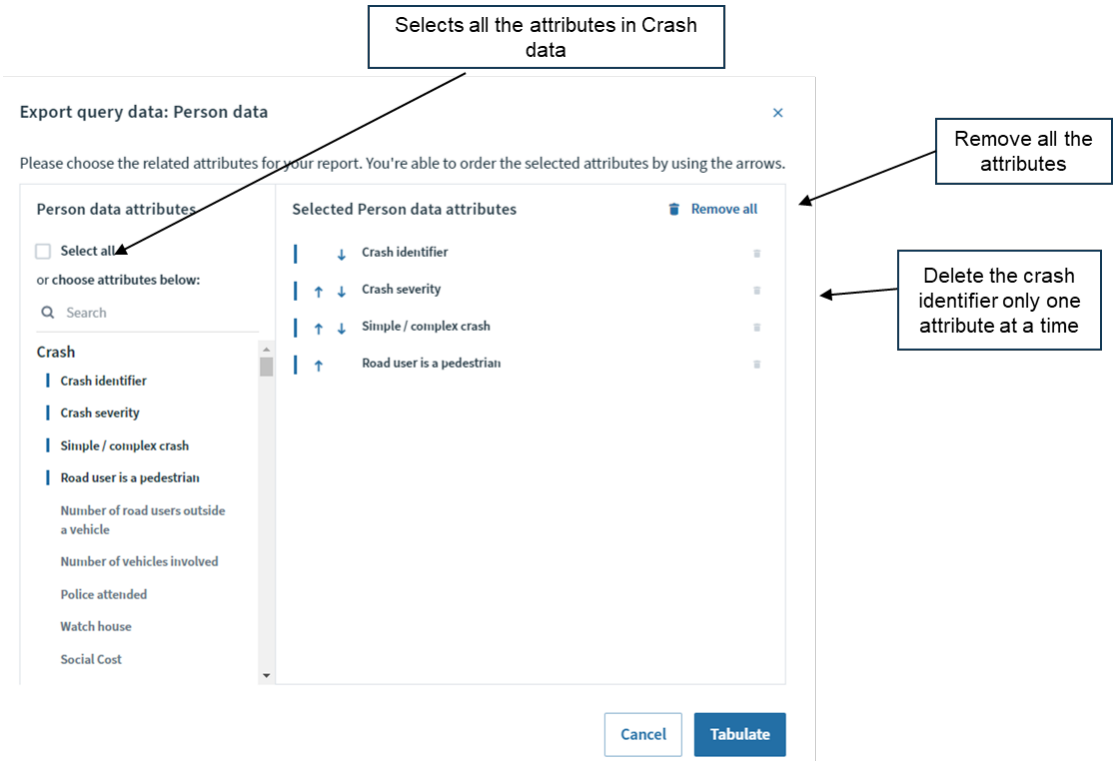
We you click Crash data, the following page will display



Click Tabulate, it downloads in excel spreadsheet.



Click Tabulate, it downloads in excel spreadsheet.



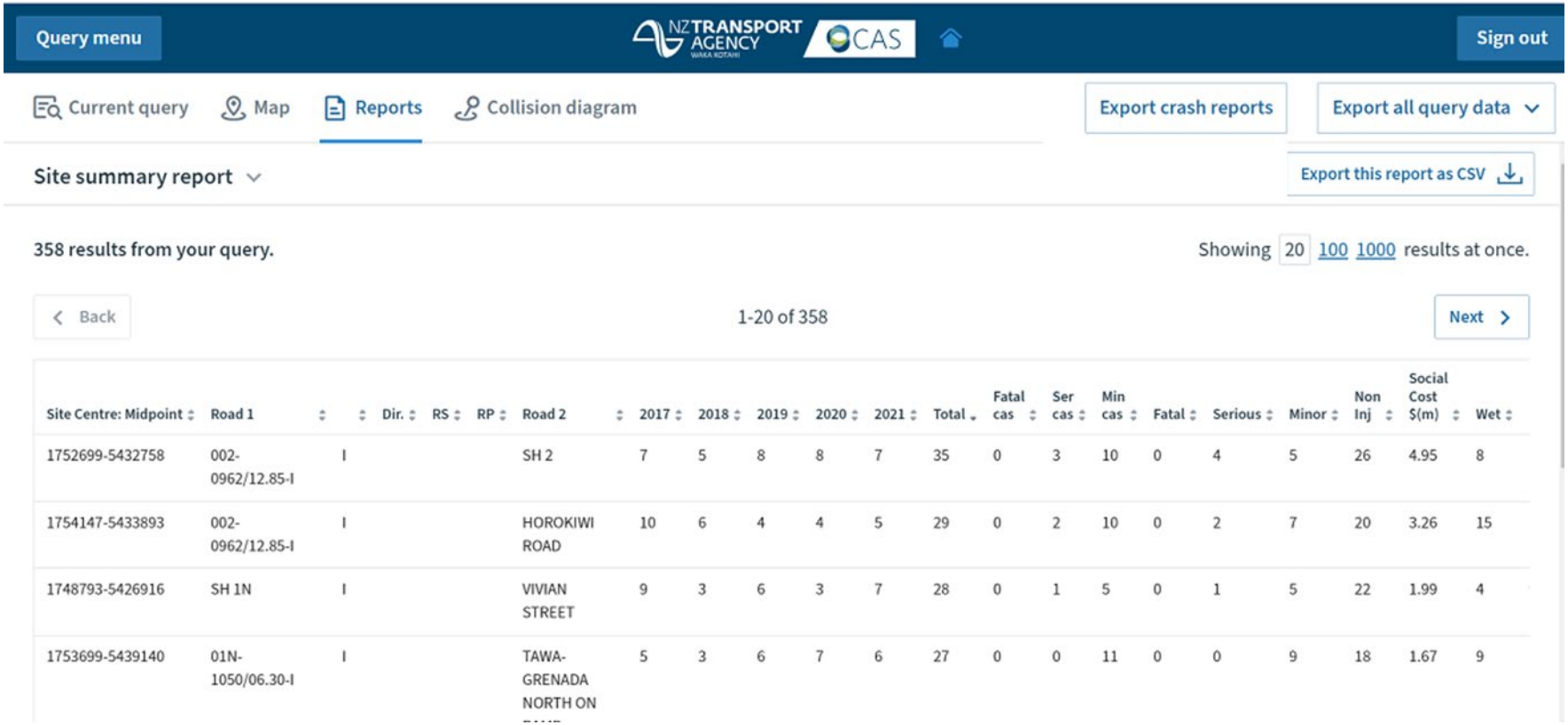
Click Tabulate, it downloads in excel spreadsheet

Site summary

Note: You must group the crashes (See Chapter 7 Grouping) before running this report.

Navigate, export and copy:

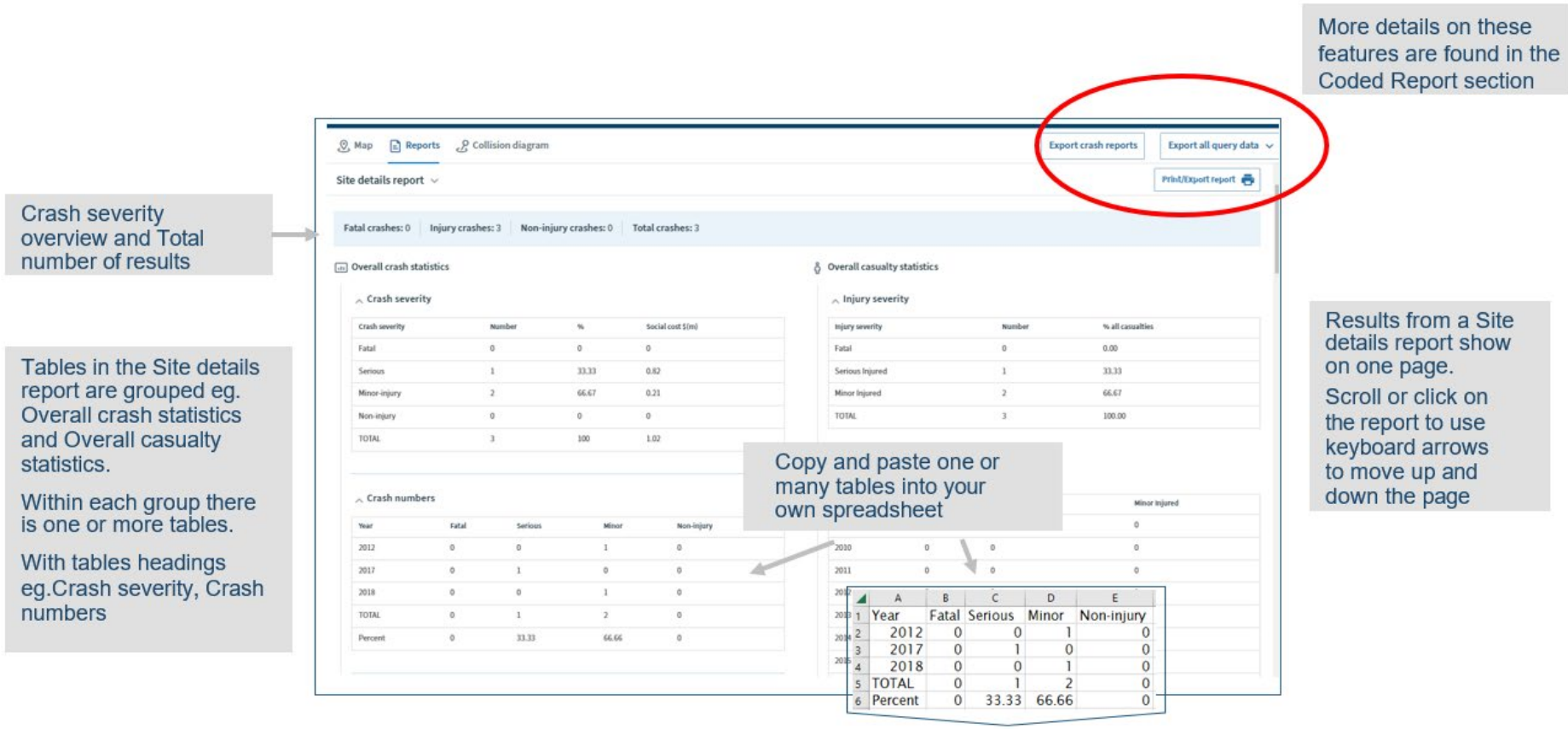
The control features are similar to the plain English report:



Site Centre: Midpoint	Road 1		Dir.	RS	RP	Road 2	2017	2018	2019	2020	2021	Total	Fatal cas	Ser cas	Min cas	Fatal	Serious	Minor	Non Inj	Social Cost $(m)	Wet
1752699-5432758	002-0962/12.85-I	I				SH 2	7	5	8	8	7	35	0	3	10	0	4	5	26	4.95	8
1754147-5433893	002-0962/12.85-I	I				HOROKIWI ROAD	10	6	4	4	5	29	0	2	10	0	2	7	20	3.26	15
1748793-5426916	SH 1N	I				VIVIAN STREET	9	3	6	3	7	28	0	1	5	0	1	5	22	1.99	4
1753699-5439140	01N-1050/06.30-I	I				TAWA-GRENADA NORTH ON	5	3	6	7	6	27	0	0	11	0	0	9	18	1.67	9

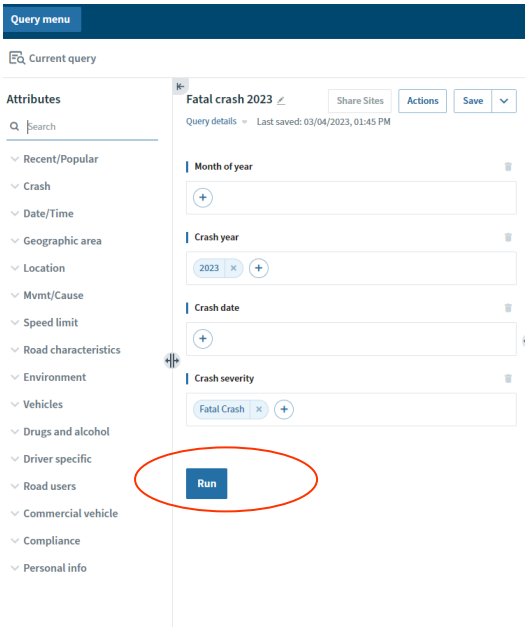
Site details report

Navigate, print, export and copy

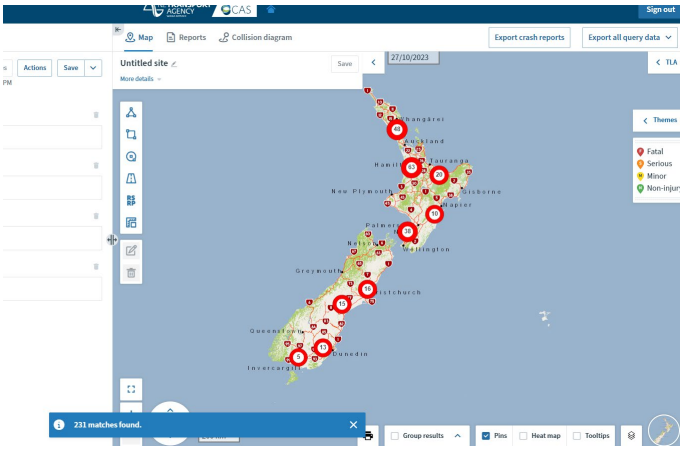


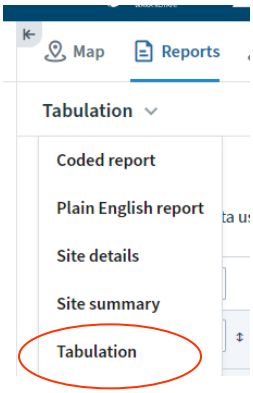
Tabulations

Run a Query



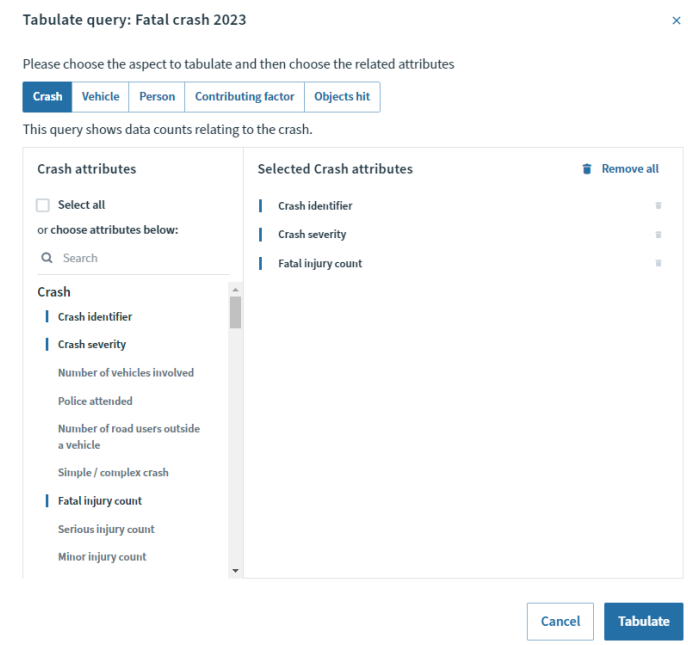
Click RUN

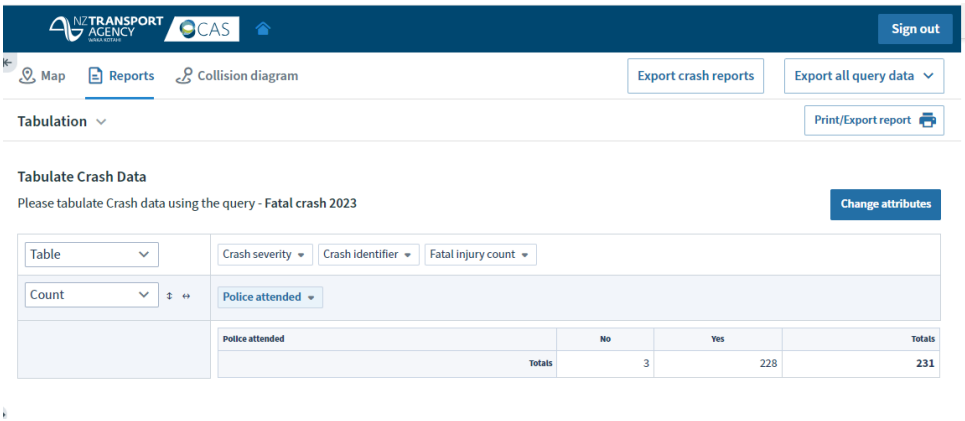




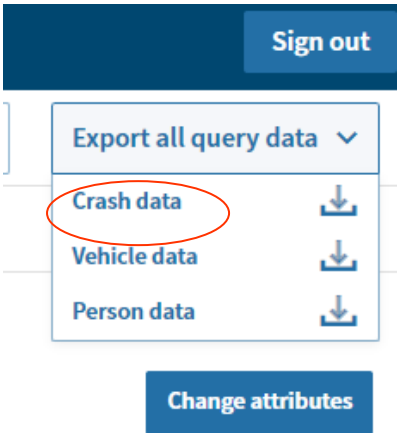
Click tabulations.

Tabulate query: Fatal crash 2023



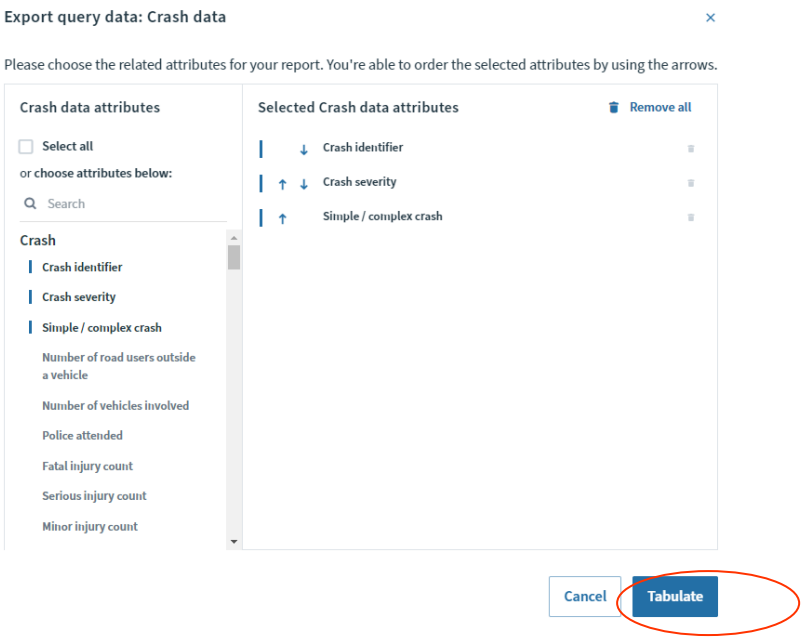


Click crash data



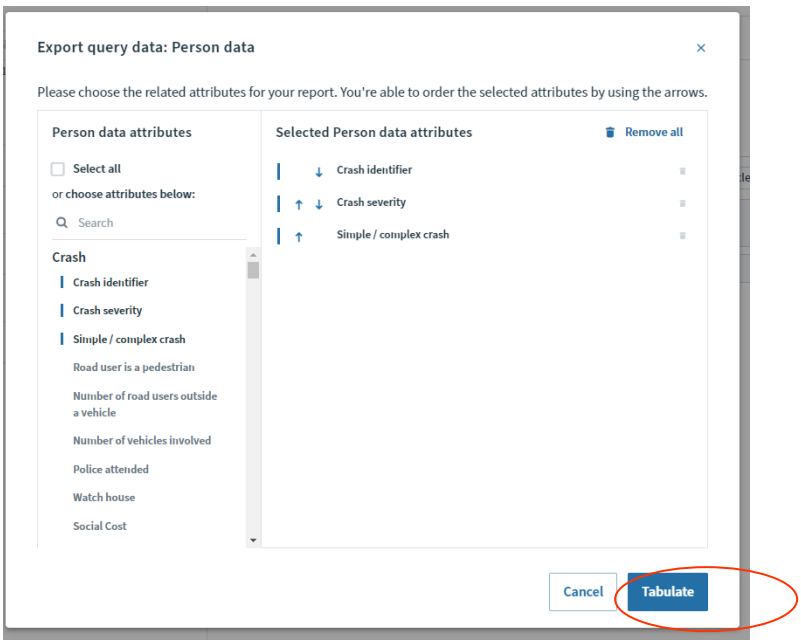
Click tabulate.

It downloads .csv files.



Click tabulate.

It downloads .csv files.



7. Grouping

Grouping allows you to cluster crashes that are near each other. This allows you to identify geographical areas (or sites) where crashes may occur more frequently.

During the grouping procedure crashes within a grouping radius are clustered together.

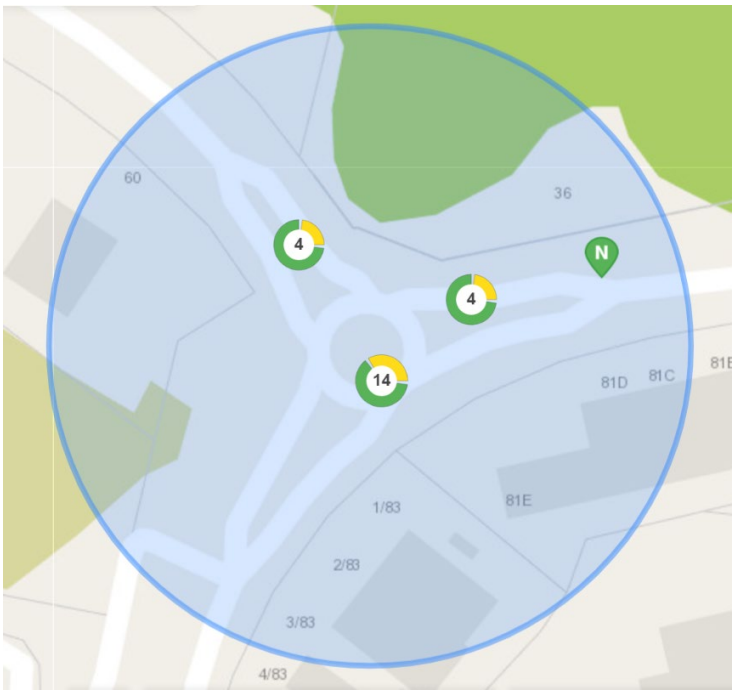
Note: If you want to make a collision diagram you must group the crashes first.

Different ways you can group crashes

There are three methods of grouping:

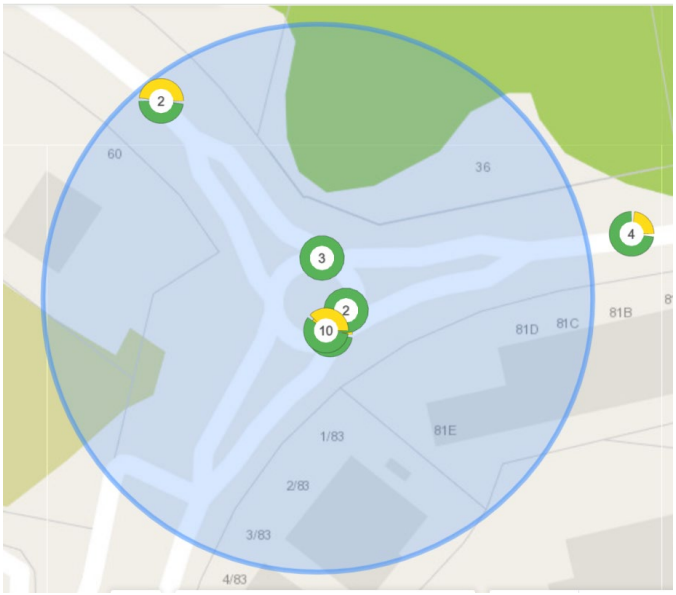
- by intersection;
- by proximity; or
- by selection.

In the explanation below we will use an example of crashes occurring around the junction of Kenepuru and Rahia Roads, Kenepuru from 2014 to 2023 inclusive (a roundabout was installed around 2020). The map of the crashes prior to grouping looks like this.



Grouping by intersection

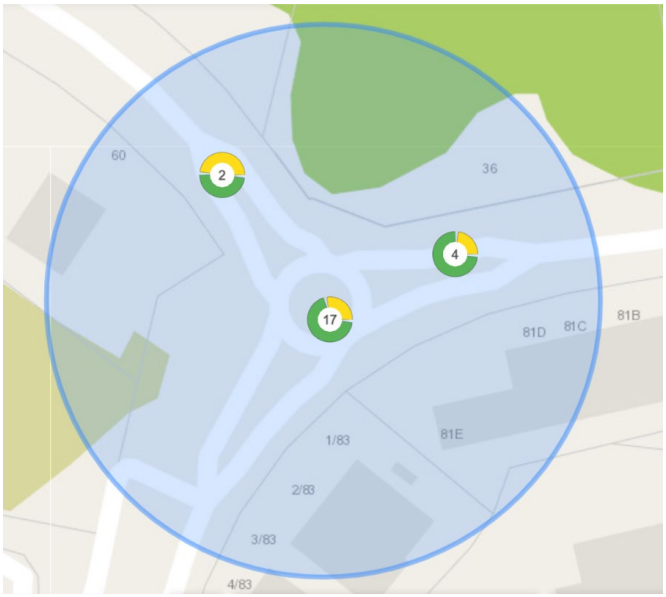
Firstly, crashes within the grouping radius of an intersection will be grouped around that intersection (an intersection is a point at which the centre lines of two or more sections of road meet). Any crashes not grouped around intersections but within the grouping radius of each other will be grouped together. In our example the grouping of crashes by intersection looks like this.



In this case all the groups are at intersection points.

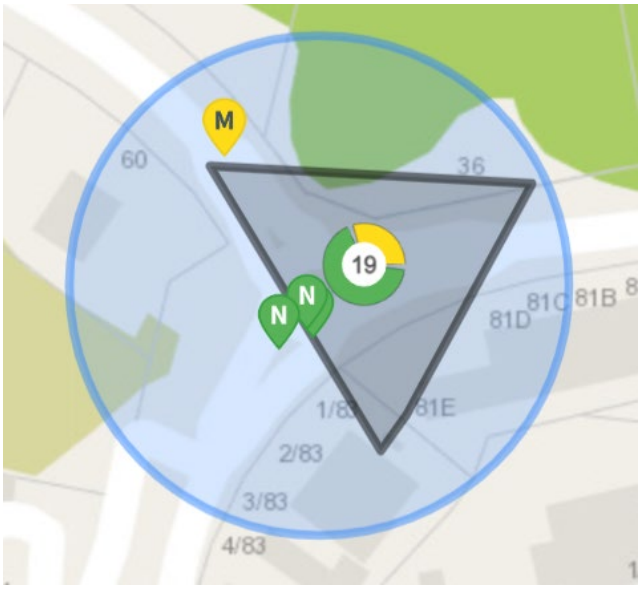
Grouping by proximity

Crashes within the grouping radius are grouped together to the point corresponding to the centroid of the crashes in the group. In example grouping by proximity looks like this:



Grouping by selection

Grouping by selection allows you to draw a polygon around crashes of interest and group those crashes to a point at the centroid of all the crashes in the selected polygon. The crashes outside the drawn polygon will be displayed but not grouped. In our example, if we draw a triangle around some of the crashes and group by selection we get this:



How to group crashes

At the foot of the map screen there is a grouping dialogue.

To use this dialogue, click on the arrow circled in blue. When you open the dialogue, you will see:

Features of this dialogue are:

- If you click on the ‘i’ icon next to each item in the dialogue, you will find out what that item means.
- Grouping method is where you select the method of grouping (by intersection, by proximity or by selection).
- You can select the grouping radius you want to use for sections of road where the speed limit is above 70 km/hr by changing the number in the box under Open size.
- You can select the grouping radius you want to use for sections of road where the speed limit is less than or equal to 70 km/hr by changing the number in the box under Urban size.
- The threshold box allows you to set the minimum number of crashes in a group for that group to be displayed. Any groups with fewer crashes will not be displayed on the map and will not appear in a Site Summary Report.

Once you have made all the settings you can group the crashes by either clicking on the Group button or the Group results tick box.

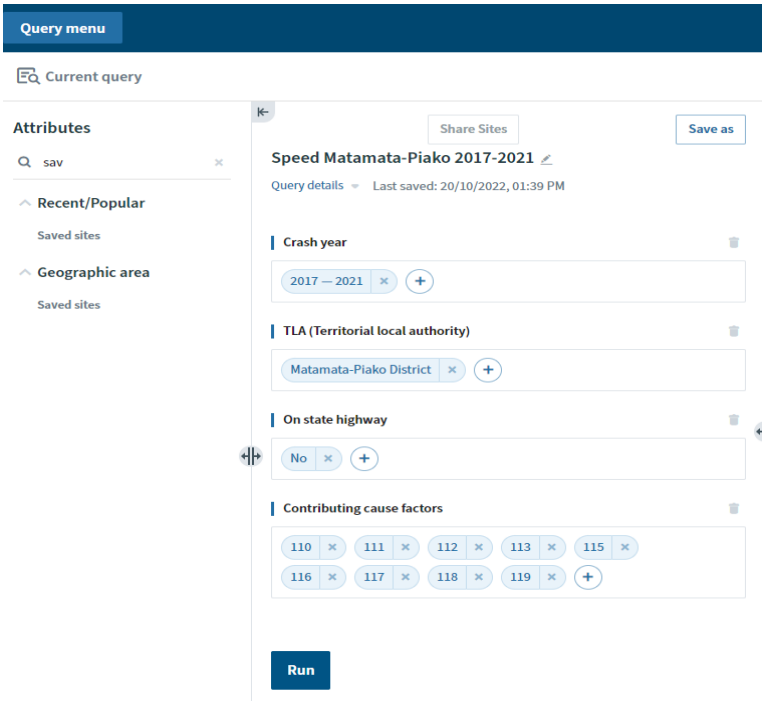
Note: If you click on the Group results tick box without opening the dialogue, the crashes will be grouped using the default settings.

Example

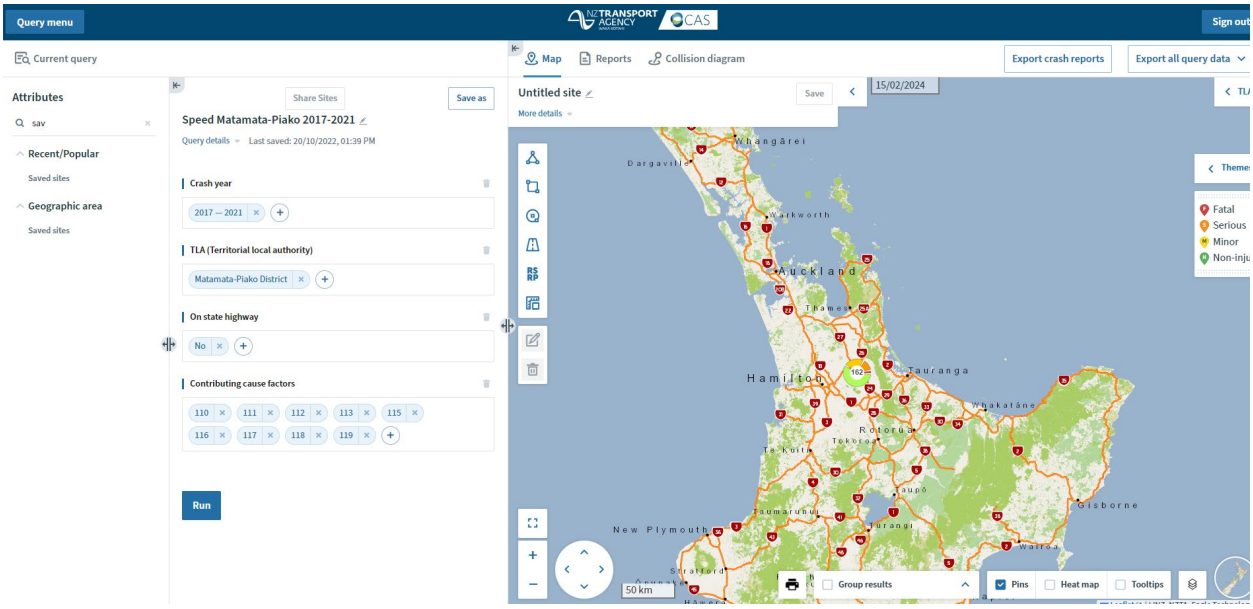
As an example, here is how to group speed-relating crashes reported in Matamata-Piako District from 2017 to 2021.

Run a Query:

Add required attributes.

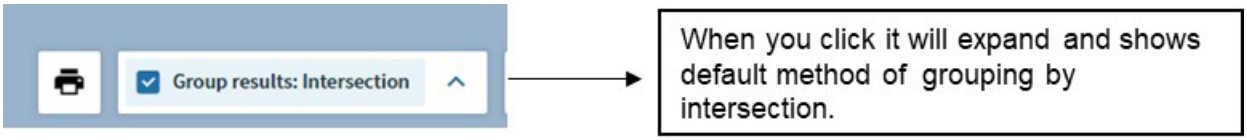


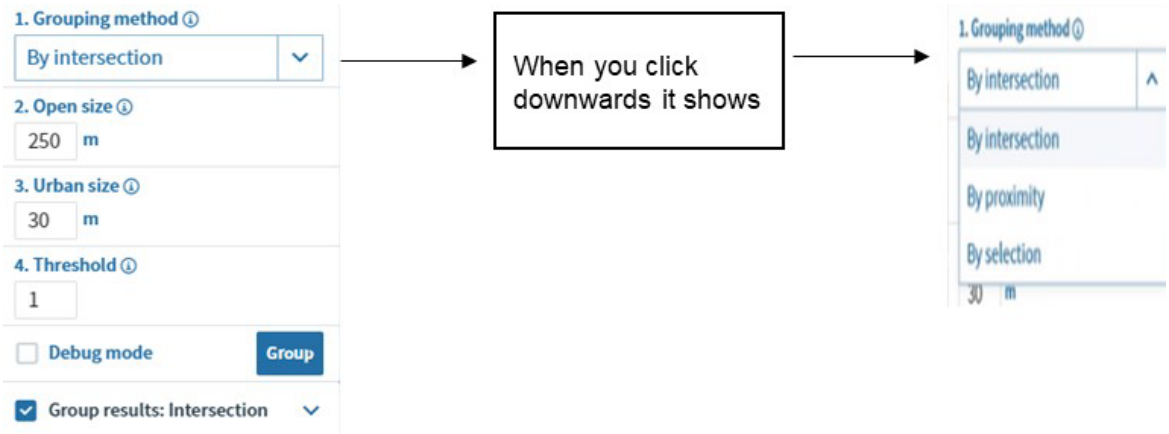
Click Run



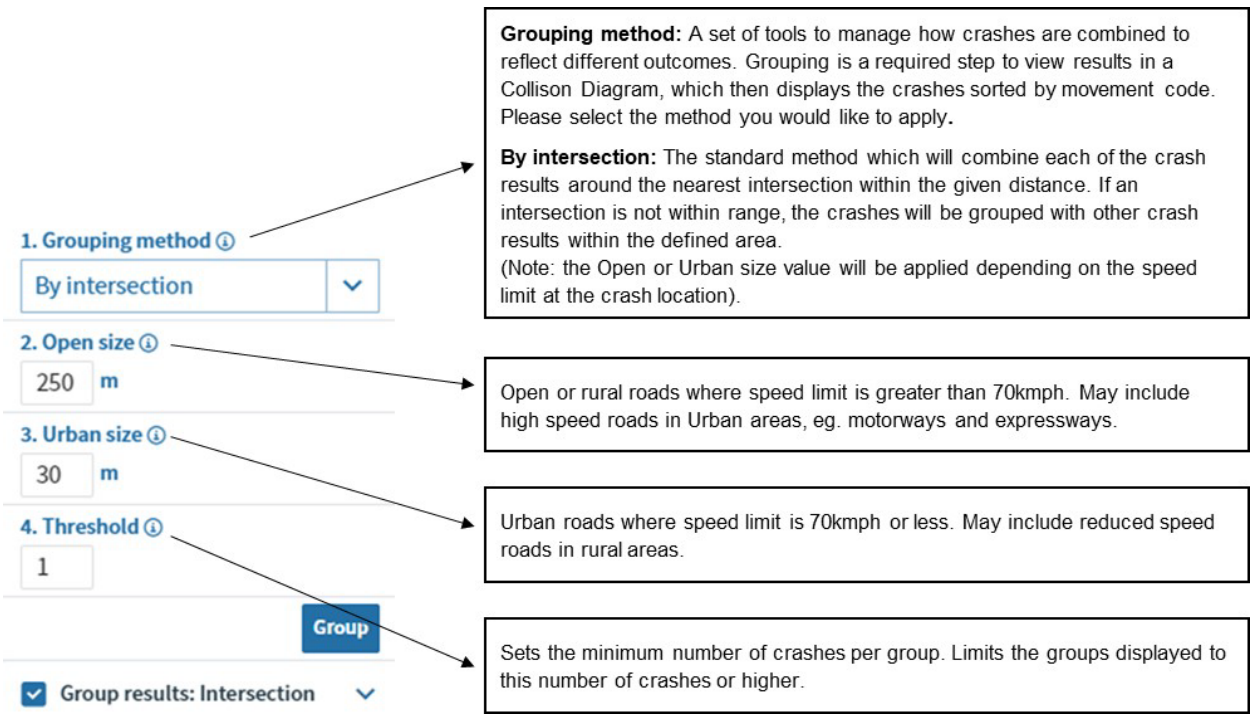
When you run the report, it shows 162 crashes.

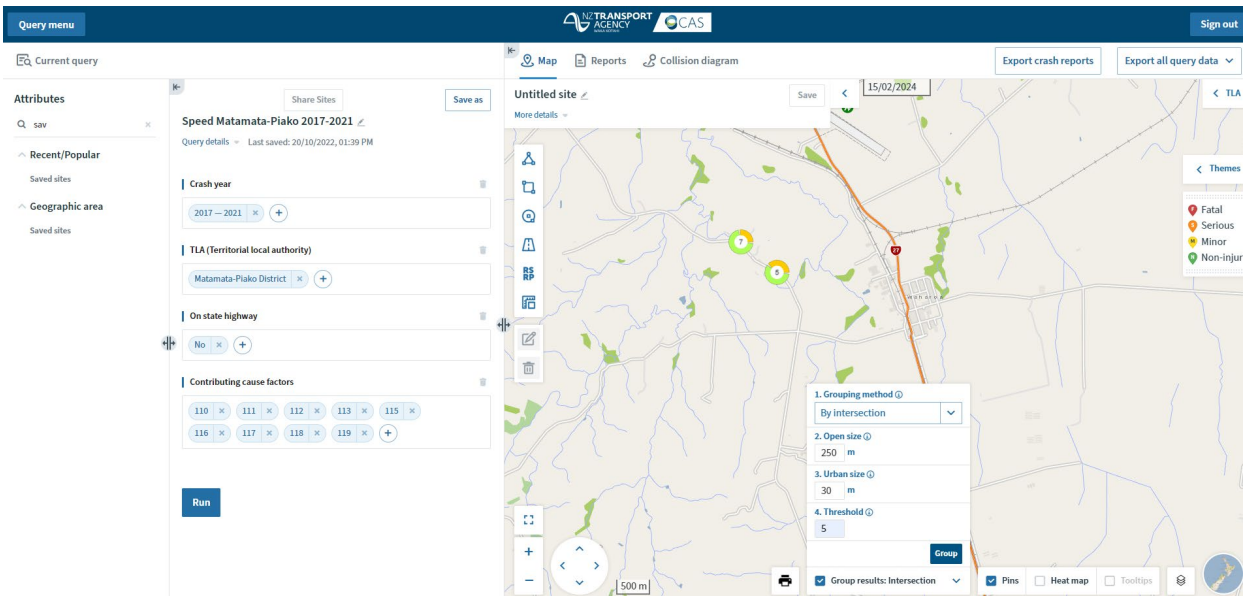
Click the arrow next to Group results



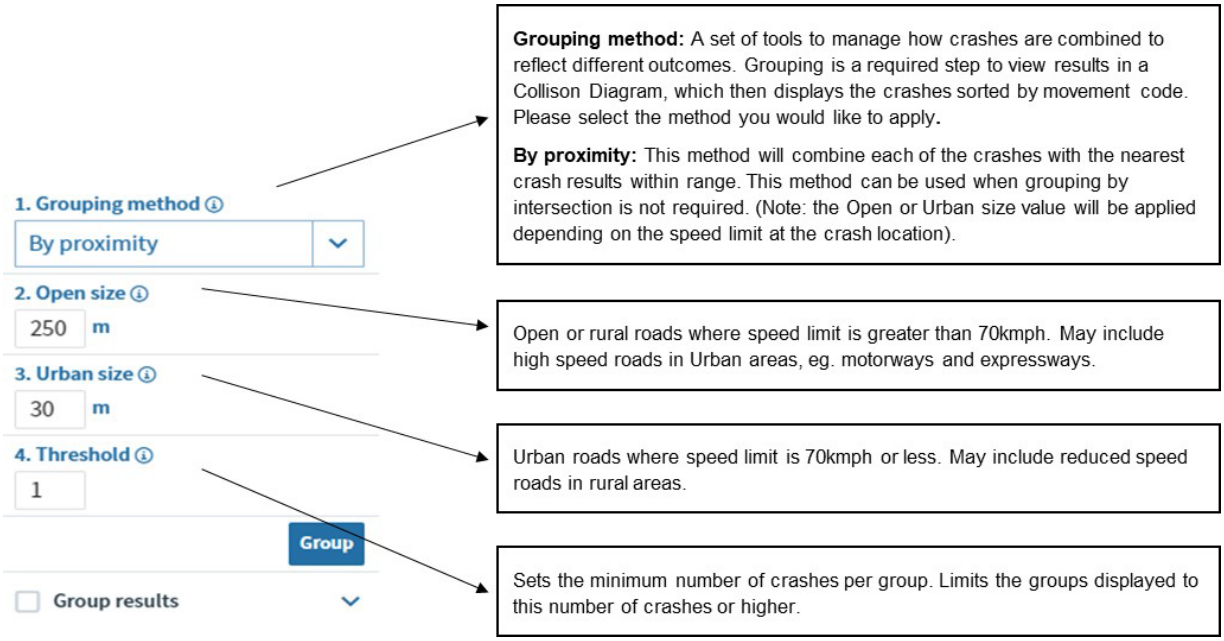


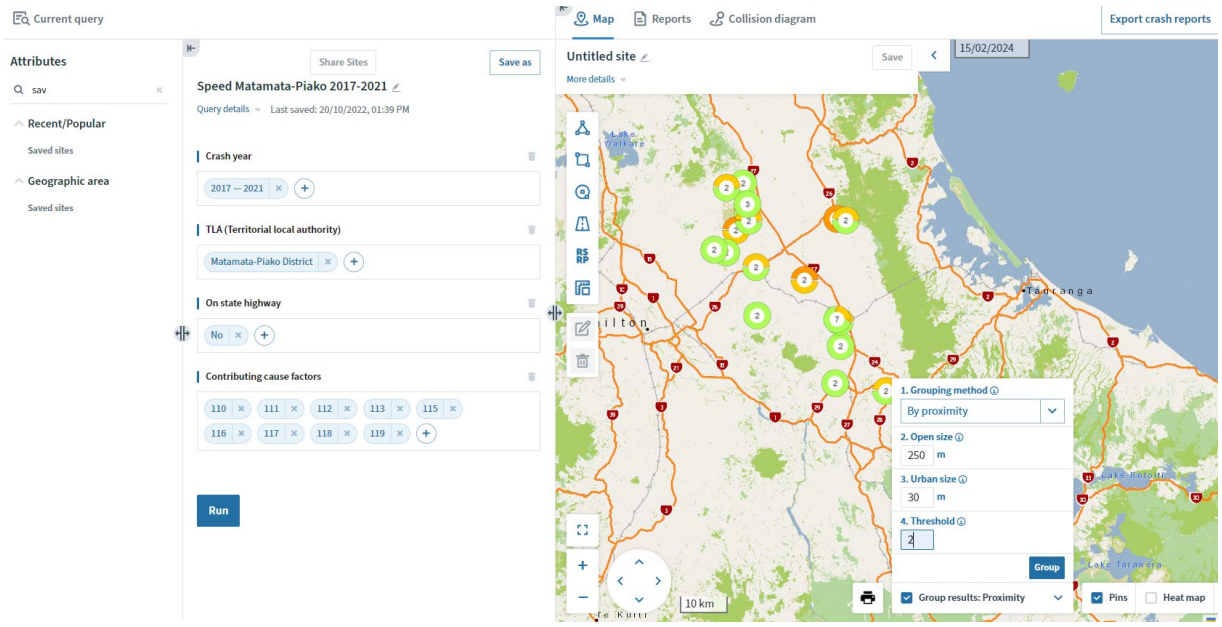
Grouping control – by intersection



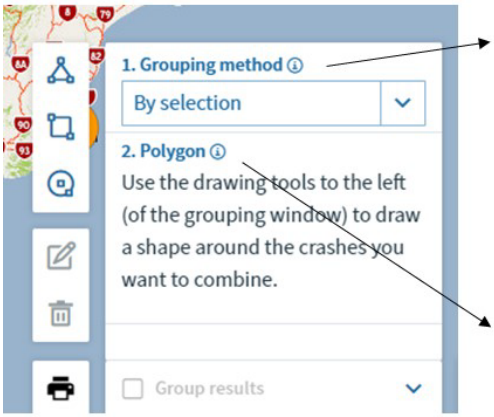


Grouping control – by proximity





Grouping method – by selection

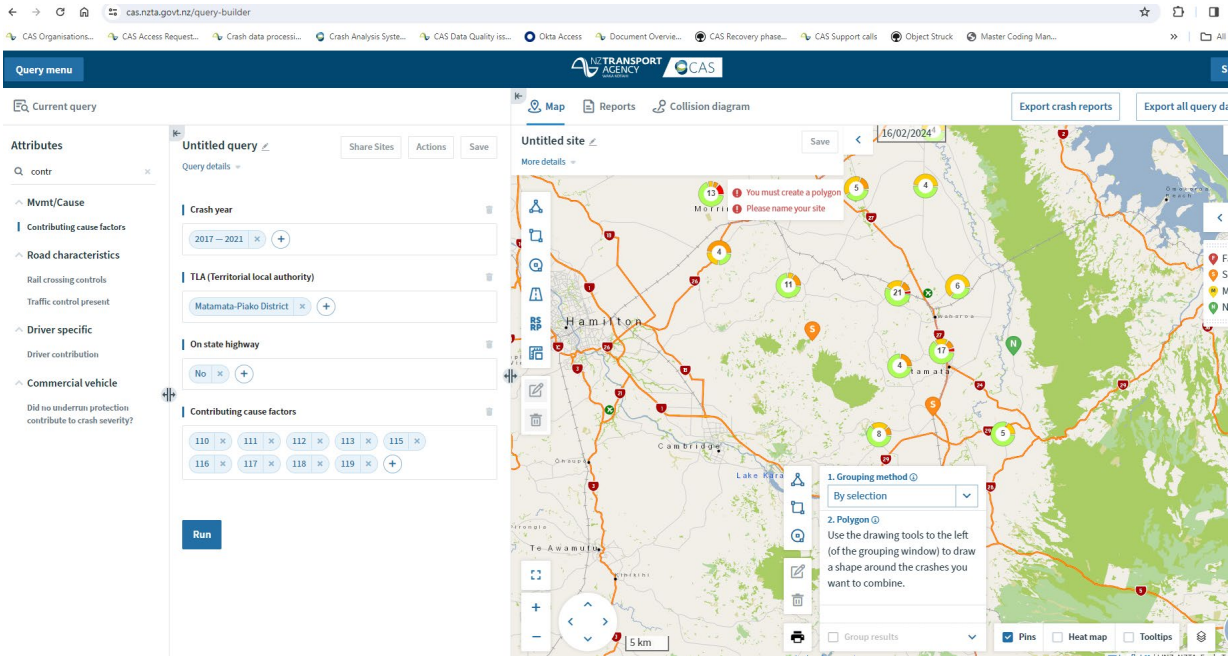


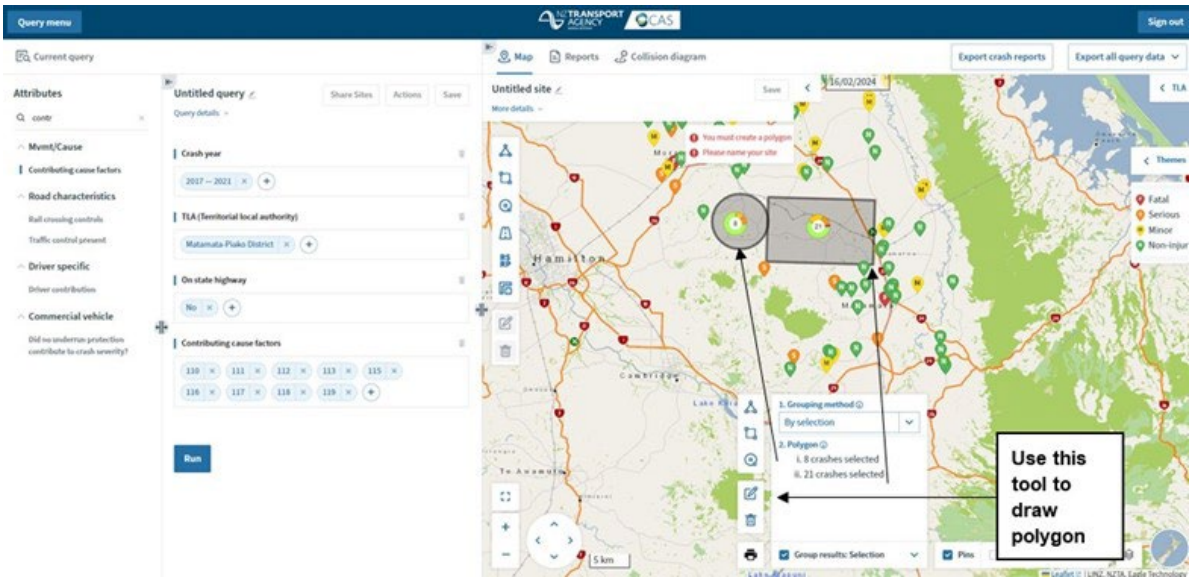
Grouping method: A set of tools to manage how crashes are combined to reflect different outcomes. Grouping is a required step to view results in a Collison Diagram, which then displays the crashes sorted by movement code. Please select the method you would like to apply.

By selection: This method will combine each of the crashes within a shape drawn by the user (using the drawing tools next to the grouping window). All crashes within the shape will be gathered in a single cluster. This method can be used to include or exclude crashes from the group depending on the shape that has been drawn.

Create:
Step 1 - Create a polygon using the shape tools.
Step 2 - Repeat step 1 to add another polygon. Multiple polygons can be added and are automatically grouped together.

Edit:
Step 1 - Select the polygon you want to edit.
Step 2 - Select the Edit icon and reshape your selected polygon by moving the points.
Step 3 - Select 'Save' from the slide-out tool to save the change.




Query menu
Sign out
Current query
Attributes
Untitled query
Crash year
2017 – 2021
TLA (Territorial local authority)
Matamata-Piako District
On state highway
No
Contributing cause factors
Run
Map
Reports
Collision diagram
Export crash reports
Export all query data
Untitled site
16/02/2024
Hamilton
Fatal
Serious
Minor
1. Grouping method
By selection
2. Polygon
i. 8 crashes selected
ii. 21 crashes selected
Use this tool to draw polygon
5 km
Group results: Selection
Pins

8. Collision Diagrams

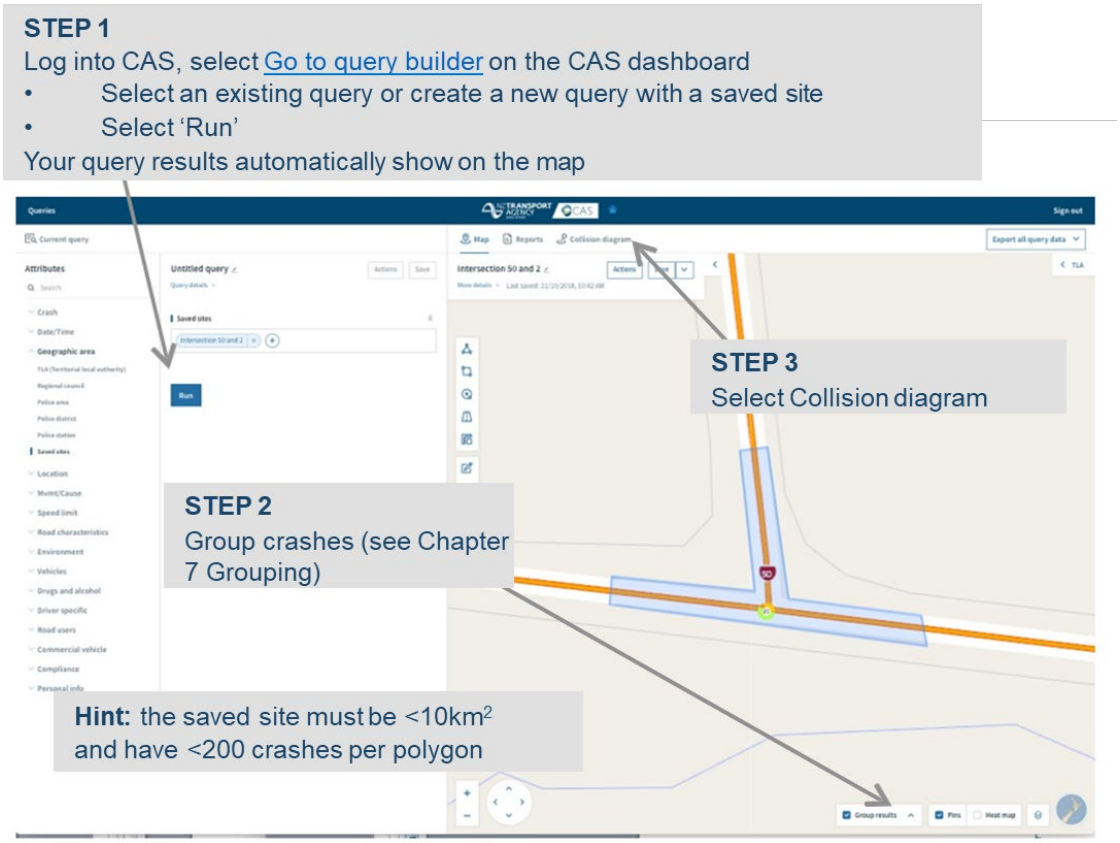
A collision diagram can only be created when **all** of the following criteria are met:

- The query involves the use of a saved site.
- The area of the saved site is less than or equal to 10 square kilometres.
- There are no more than 200 crashes in the query.
- There are no more than eight polygons in the saved site.

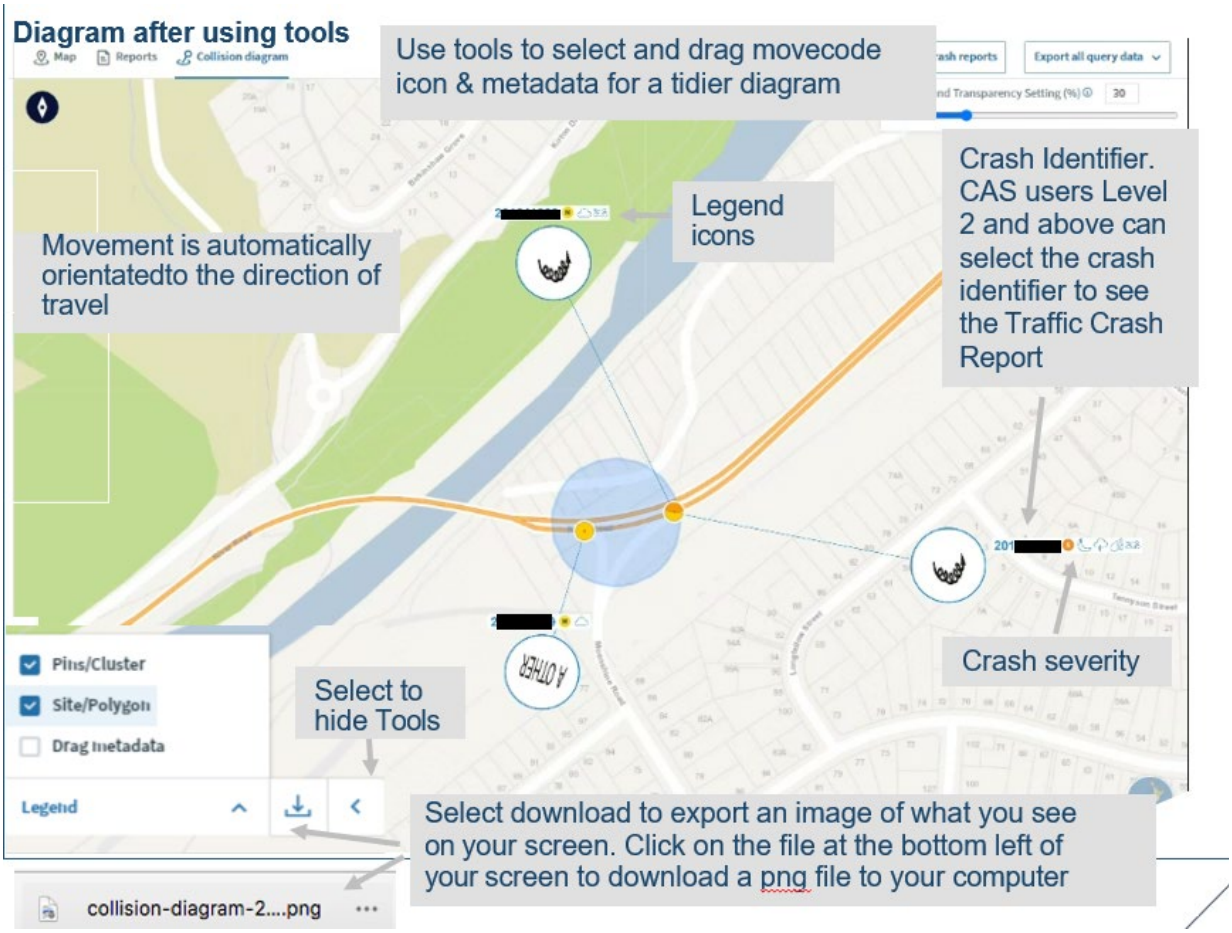
Five steps to create a collision diagram

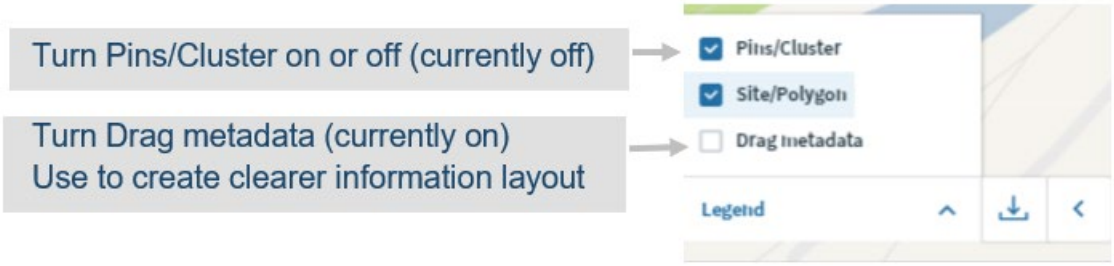
- Create a polygon
- Save the polygon as a site.
- Run a query using the saved site in the query.
- Group the crashes.
- Click on Collision Diagram.

Collision diagrams - shows movement code and some environmental conditions for each crash



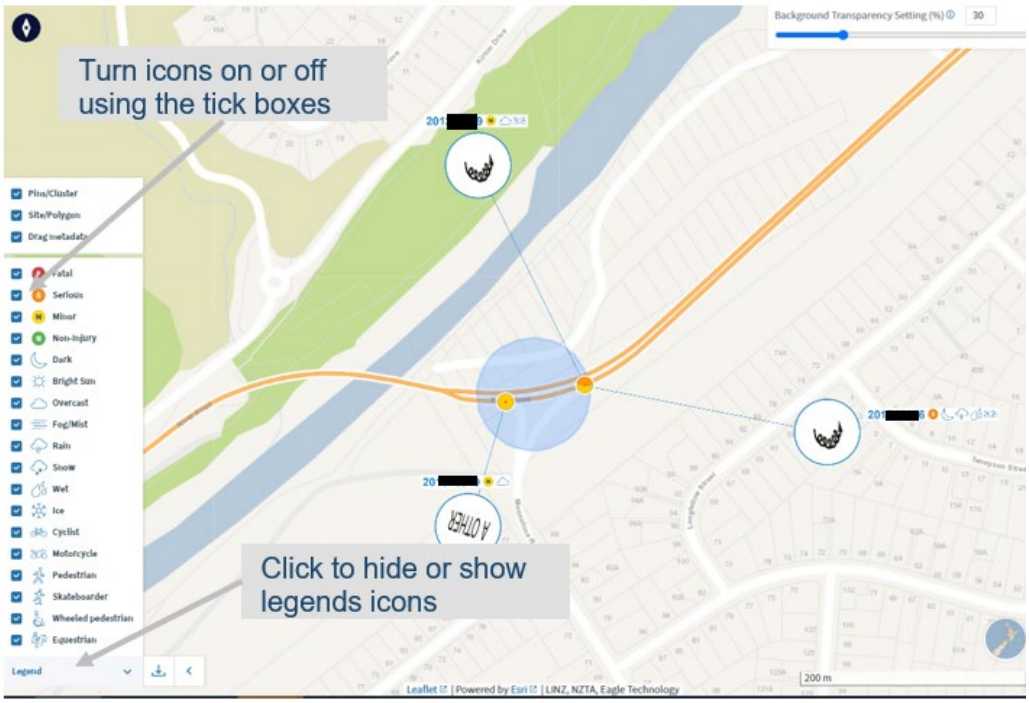
Collision diagrams – use collision diagram tools





Collision diagrams – use the legend to turn icons on or off

The legend gives an explanation of the icons



9. System Hints

To clear results from the map or the reports before creating a new query

- Select the 'Home icon' in the top blue navigation bar (this will take you to the CAS Dashboard)
- Select 'Go to Query builder'
- This will take you results.

Note: if you run a new query, it will overwrite all previous results.

To navigate between the query builder and map or reports view on a smaller screen

- Select the 'Current query', 'Map' or 'Reports' icons at the top left under the blue navigation bar.

Note: If your view of CAS is larger these icons will not all sit at the top left. Map and Reports will sit above the right-hand column which displays these items.

To see the attributes, query builder and map on one screen

To make the view smaller

- select control - on your keyboard!

To make the view larger

- select control + on your keyboard.

To zoom into a map or collision diagram

- Put two fingers on the laptop mouse pad and move apart or use the scroll wheel on your mouse.