Toitū Te Whenua
Land Information New Zealand

Starting soon...

Aotearoa Property Data Network

hosted by Toitū Te Whenua LINZ

Third Meeting - 1-3pm, Tuesday 6th December 2022

Facilitator: Ben Reilly
Customer Relationship Manager – Property Data

Toitū Te Whenua
Land Information New Zealand

Te Kāwanatanga o Aotearoa
New Zealand Government

Karakia: Toitū Te Whenua

Whāia te mātauranga kia mārama, kia tupu, kia tiaki ngā whenua, ngā moana, ngā arawai	Pursue knowledge for understanding, developing and caring for the lands, bodies of water and waterways
Kia whai take ngā mahi katoa	Seek purpose in all that we do
Aroha atu aroha mai, tātou i a tātou	Let us show respect for each other
Toi te kupu	Hold fast to our language
Toi te mana	Hold fast to our spiritual strength
Toitū te whenua	Sustain the land
Haumi ē, hui ē, tāiki ē!	Gather and go forward together

Agenda

Proposed discussion items	
1pm-1:10	Welcome & opening remarks
1:10-1:35	LINZ News & Updates
1:35-1:55	LINZ LiDAR
1:55-2:15	Wellington City Council: Data Strategy update & XML Working Group
2:15-2:35	Lynker Analytics: Data not pixels
2:35-2:55	Critchlow Geospatial: NZ Satellite Imagery Marketplace
2:55-3pm	Closing remarks

LINZ News & Product Updates

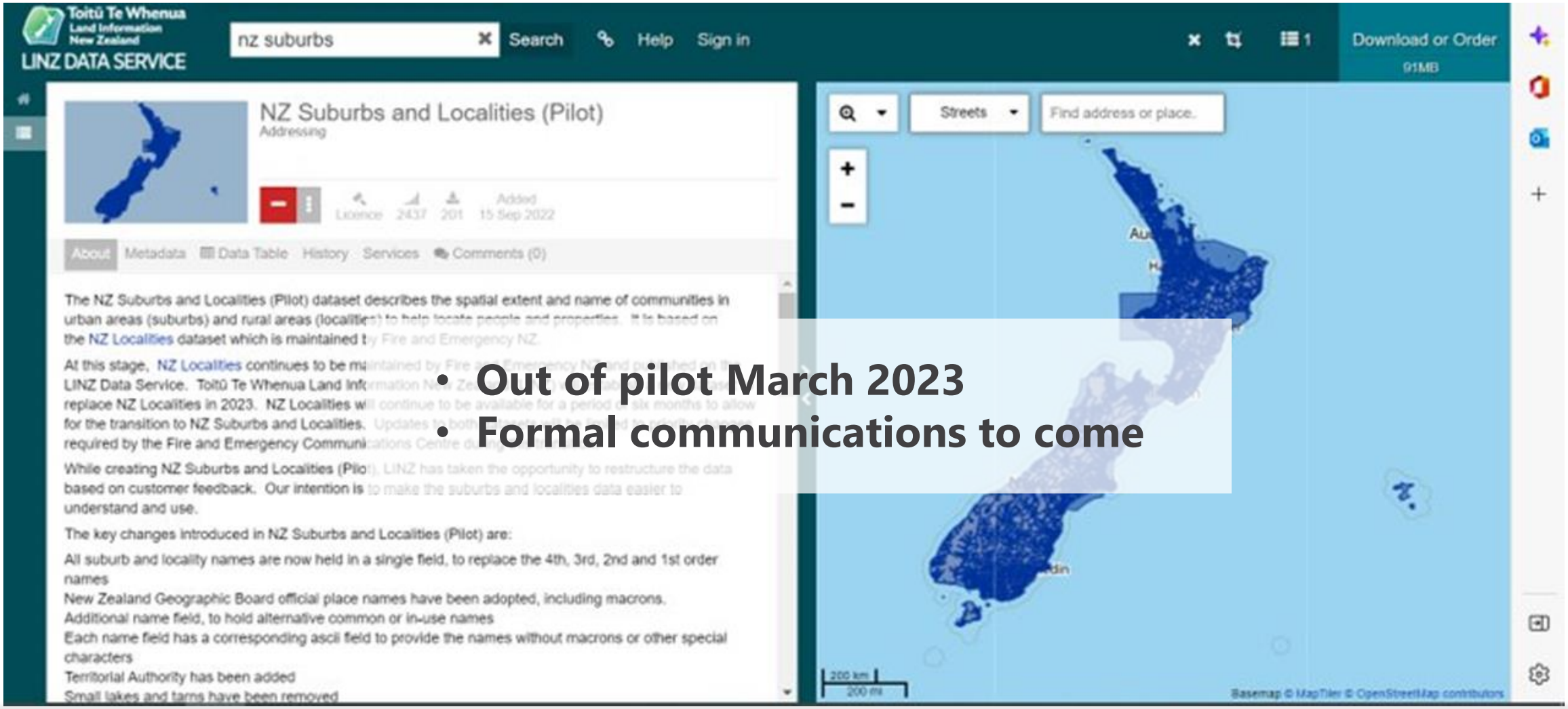
Toitū Te Whenua
Land Information New Zealand

Te Kāwanatanga o Aotearoa
New Zealand Government

Section Contents

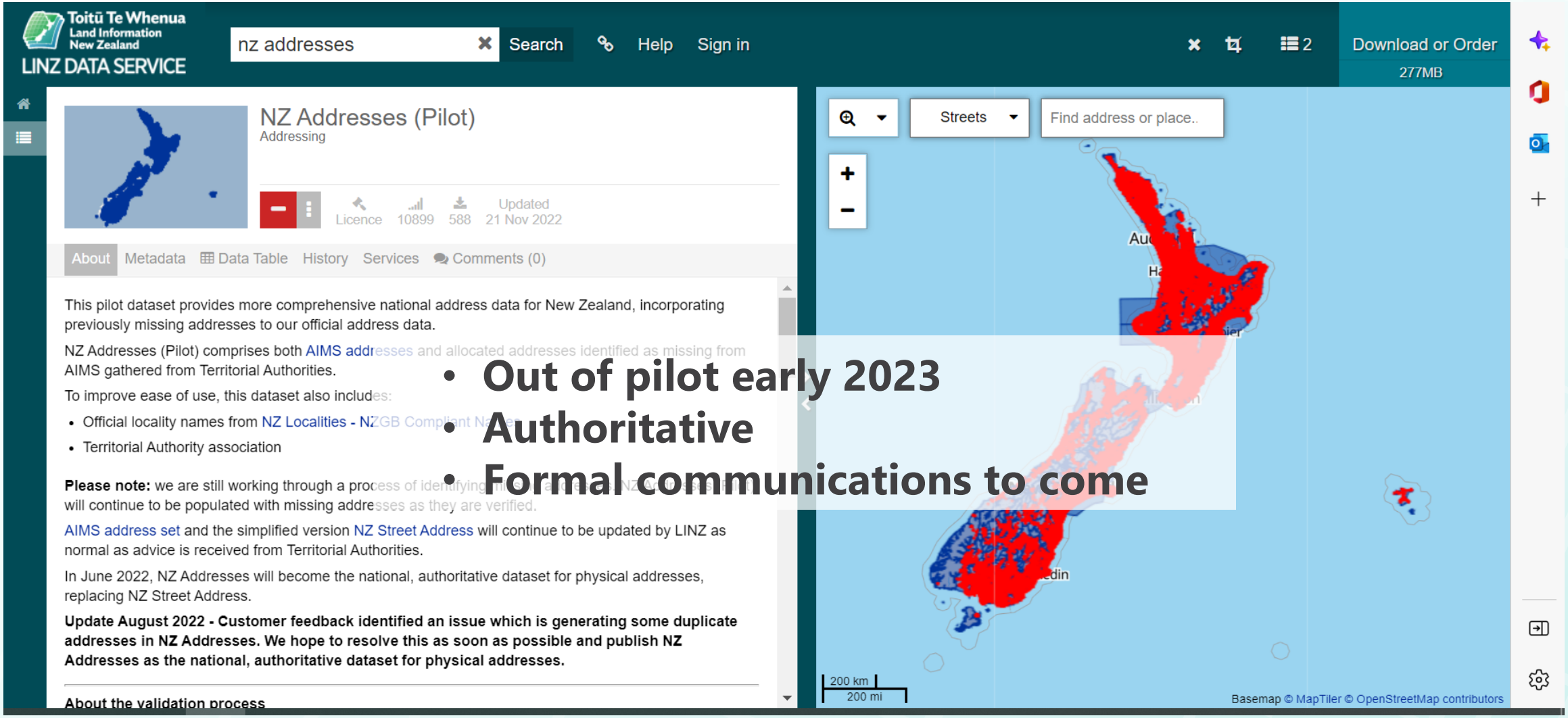
- **NZ Localities & Suburbs** - Trent Gulliver, Manager Addressing
- **NZ Addressing** – Trent cont.
- **NZ Properties Hybrid** – Trent cont.
- **Notice of Change** – Mike Webster, CRM Local Government
- **Rating Valuation & DVR Rules Review –** Kerry McGall, Principal Advisor, Operational Policy

NZ Suburbs and Localities



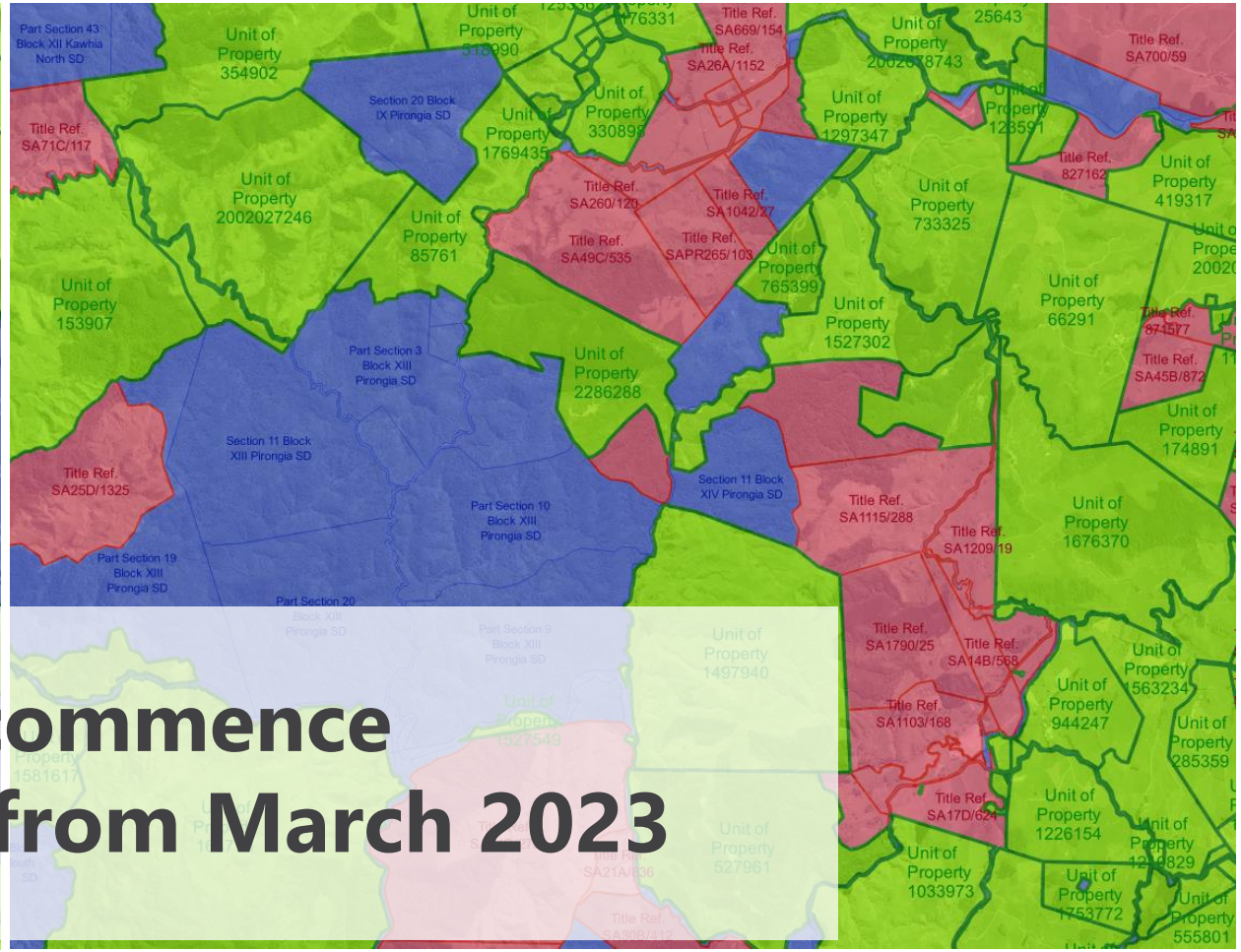
- Out of pilot March 2023
- Formal communications to come

NZ Addresses



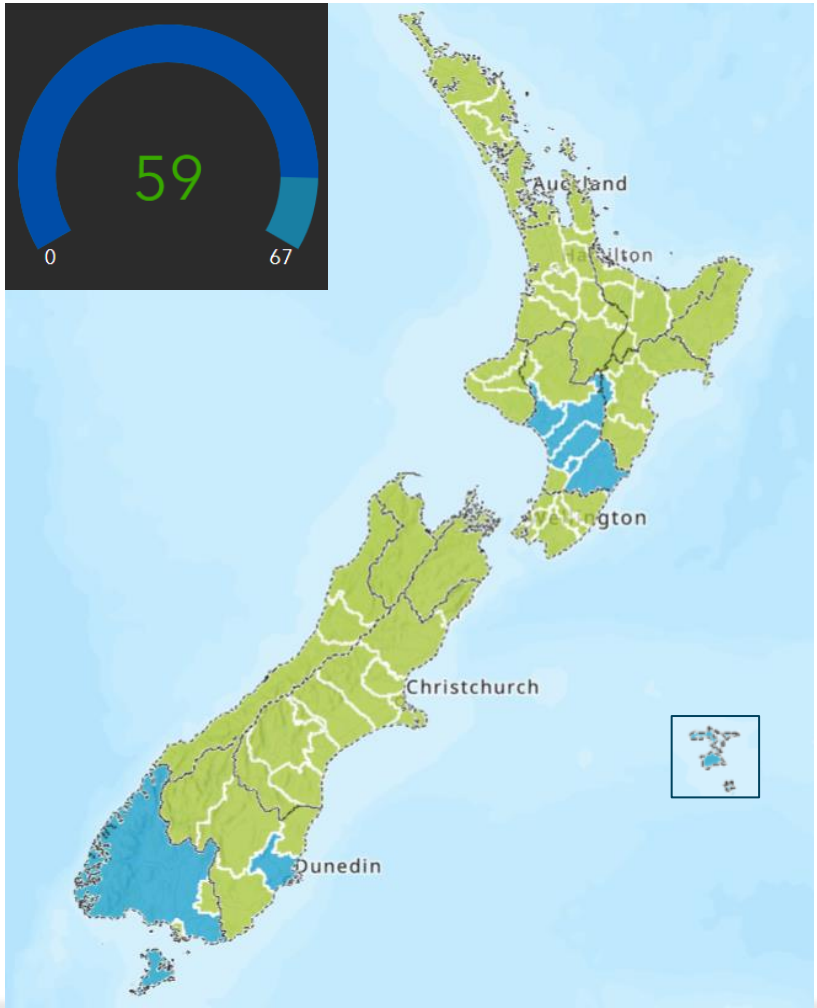
- Out of pilot early 2023
- Authoritative
- Formal communications to come

NZ Properties Hybrid



- Work about to commence
- Likely available from March 2023

Notice of Change



XML

- Going live 12 Dec with improvement for VSPs in most locations
- Working group with TAs underway
- Meeting with software developers (e.g. MAGIQ) about XML integration

Rating Valuation & DVR Rules Review

- Rating Valuation rules review has started.
- Initial focus is on gaining an understanding of how valuation providers manage, store transfer the District Valuation Roll (DVR) data.
- Significant change in the structure and content of the DVR is expected out of this process.
- Engagement with the sector will increase in 2023

Credit: Name

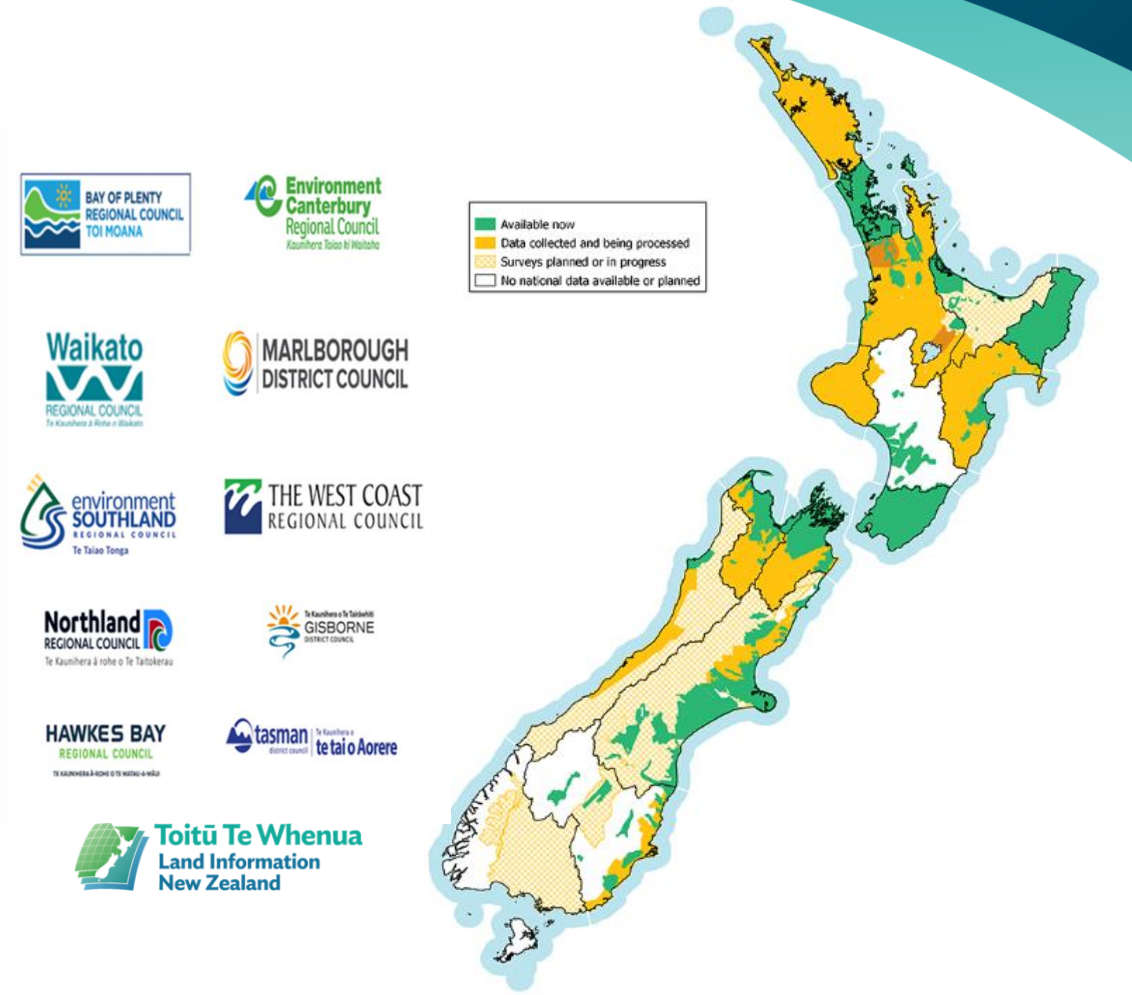
LiDAR

Toitū Te Whenua
Land Information
New Zealand

Te Kāwanatanga o Aotearoa
New Zealand Government

National Elevation Programme

- Baseline elevation data set
- Nationally consistent
- High spatial resolution and accuracy
- Creative Commons 4.0 - open data
- Benefits to NZ –
  forestry, agriculture, hydrological...
- Partnership model – accelerating capture



Visit the Elevation Aotearoa site for an interactive map showing LiDAR availability, use case examples, and other information on using LiDAR data.

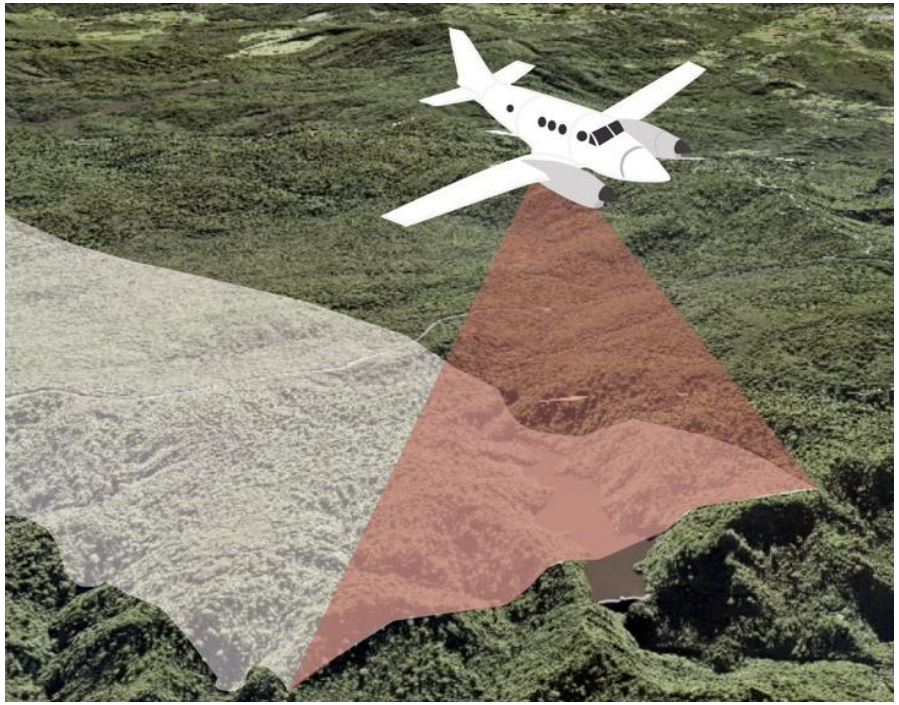
Elevation Aotearoa

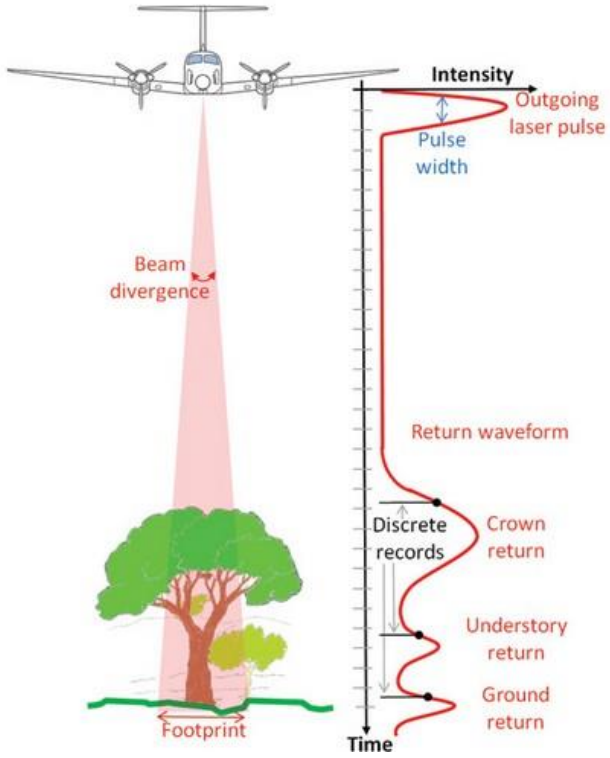
Getting to 80% by 2024

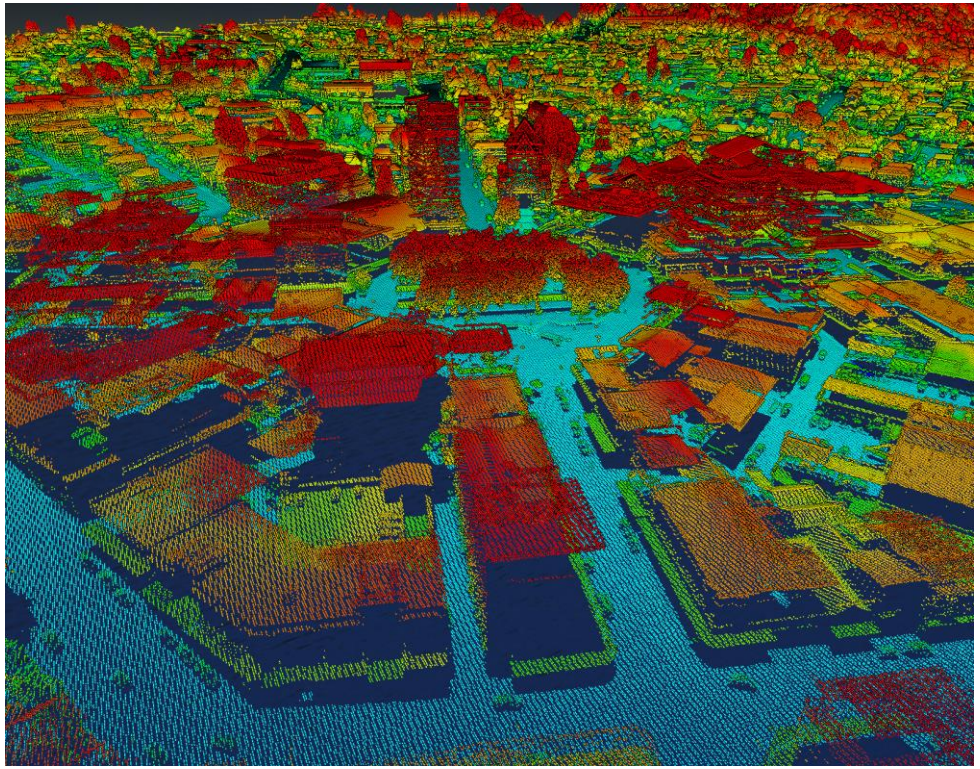
Now

2024

So what is LiDAR?

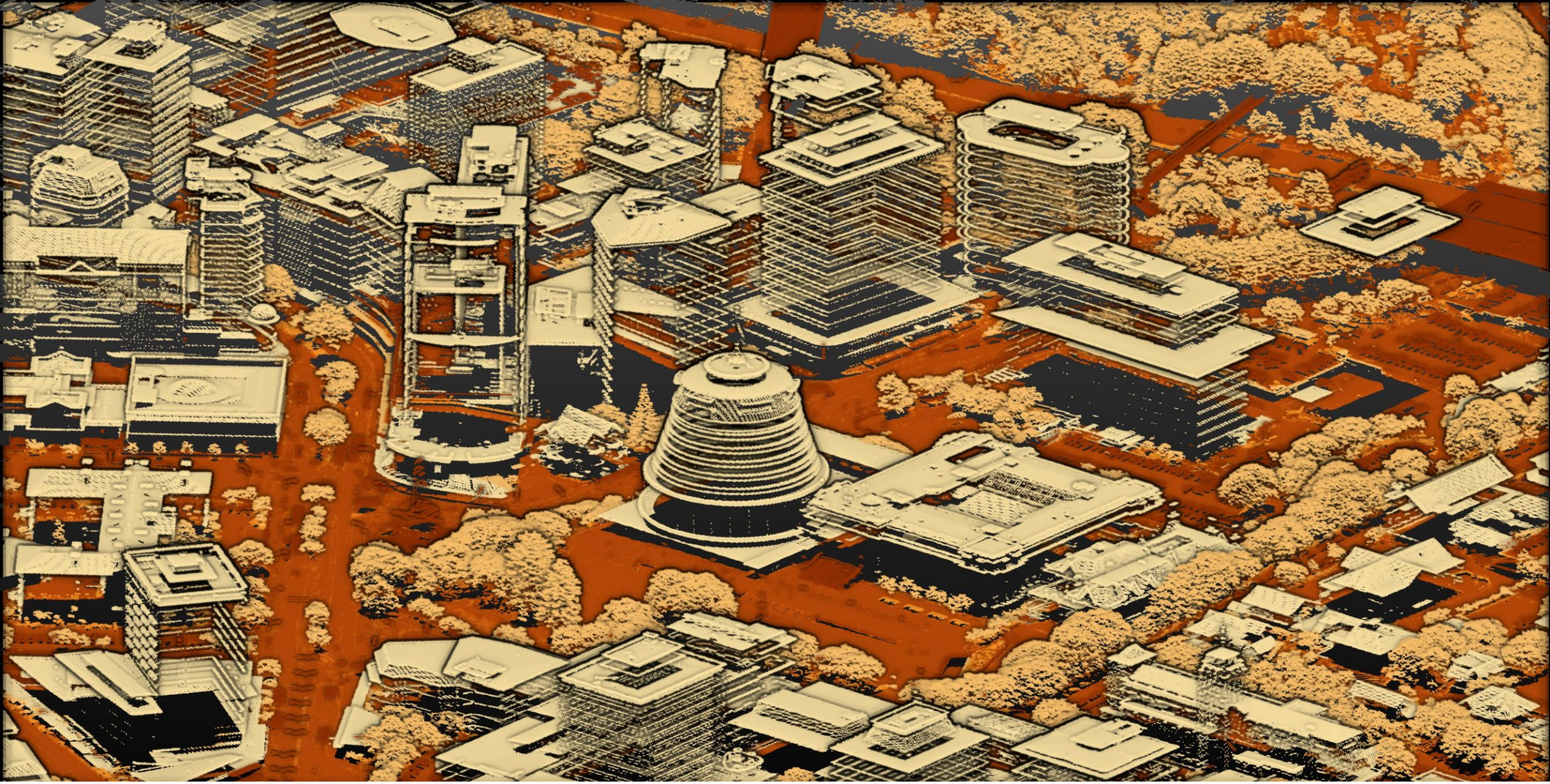






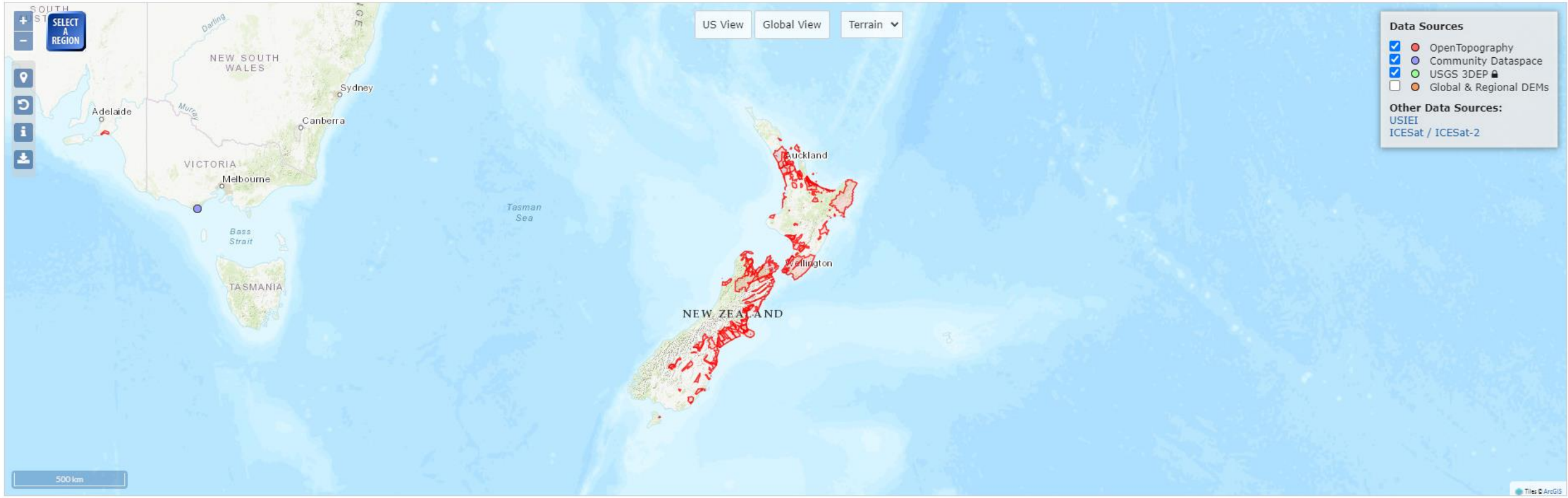
Airborne Light Detection and Ranging (LiDAR) data for terrestrial landscapes in NZ

Captures raw points that contain highly accurate elevation measurements



Find Topography Data

Welcome Guest (Sign In)



List all datasets

Filter by Funder | Filter by Collector | New Zealand | Advanced Filtering | Reset

Toitū Te Whenua
Land Information
New Zealand

Te Kāwanatanga o Aotearoa
New Zealand Government

Auckland North LiDAR 1m DEM (2016-2018)

National Elevation

Licence 7643 1414 Added 07 Nov 2021

About Metadata Tiles Table Analytics History Services Comments (0)

This layer contains the DEM for LiDAR data in the northern Auckland Region captured between 2016 and 2018.

- The DSM is available as layer Auckland North LiDAR 1m DSM (2016-2018).
- The index tiles are available as layer Auckland North LiDAR Index Tiles (2016-2018).
- The LAS point cloud and vendor project reports are available from OpenTopography.

LiDAR was captured for Auckland Council by Aerial Surveys from 16 August 2016 to 9 August 2018. These datasets were generated by Aerial Surveys and their subcontractors. Data management and distribution is by Toitū Te Whenua Land Information New Zealand.

Data comprises:

- DEM: tif or asc tiles in NZTM2000 projection, tiled into a 1:1,000 tile layout
- DSM: tif or asc tiles in NZTM2000 projection, tiled into a 1:1,000 tile layout
- Point cloud: las tiles in NZTM2000 projection, tiled into a 1:1,000 tile layout

Pulse density specification is at a minimum of 4 pulses/square metre.

Vertical Accuracy Specification is +/- 0.2m (95%).

Horizontal Accuracy Specification is +/- 0.6m (95%).

Vertical datum is NZVD2016.

License

Creative Commons Attribution 4.0 International

You may use this work for commercial purposes.

You must attribute the creator in your own works.

Information

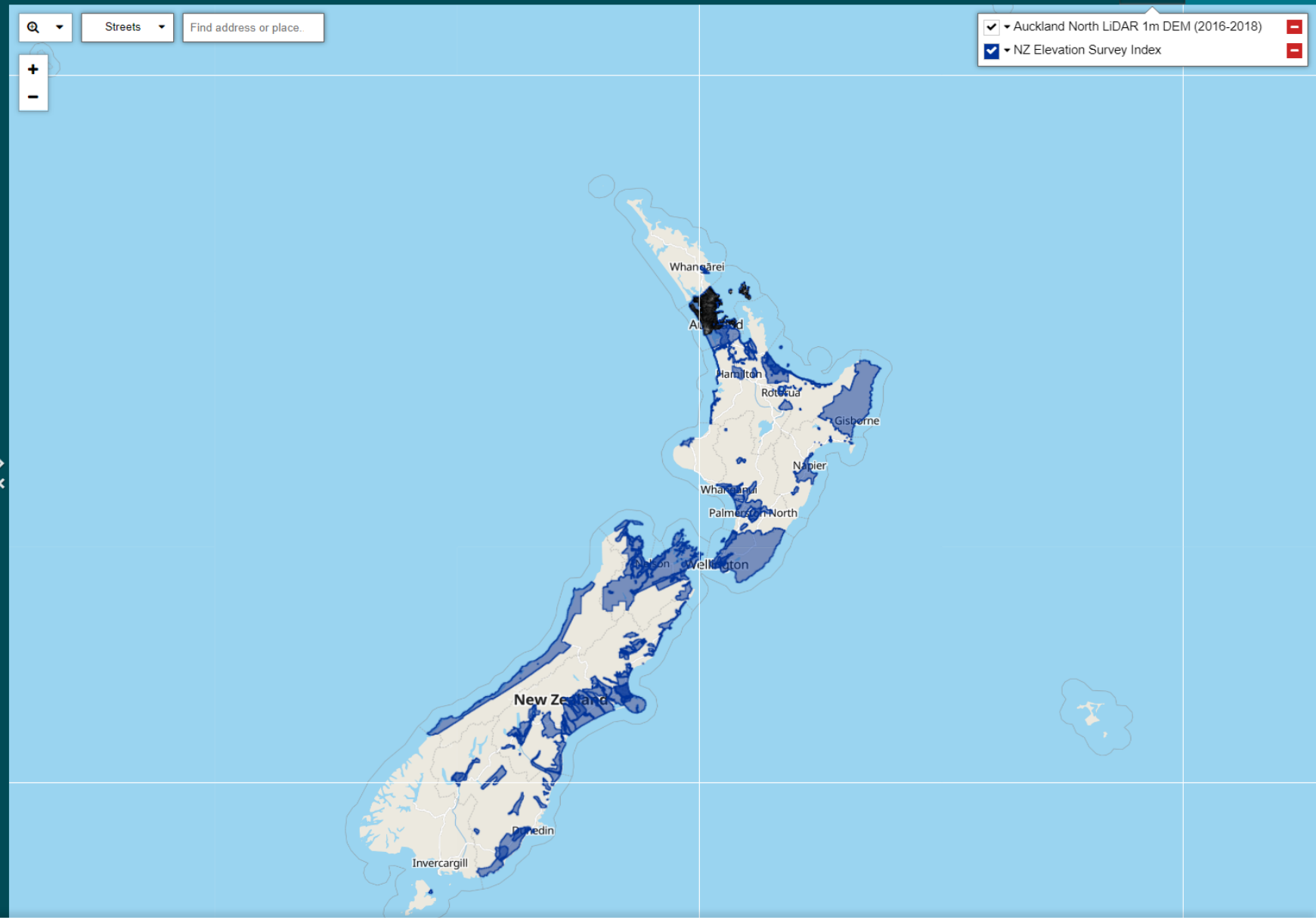
Category	Elevation
Tags	New Zealand, LiDAR, Elevation
Regions	Mangawhai, Auckland
Metadata	ISO 19115/19139, Dublin Core

Technical Details

Layer ID	106410
Data type	Grid
Resolution	1.000m
Services	Raster Query API, Catalog Service (CS-W), data.govt.nz Atom Feed

History

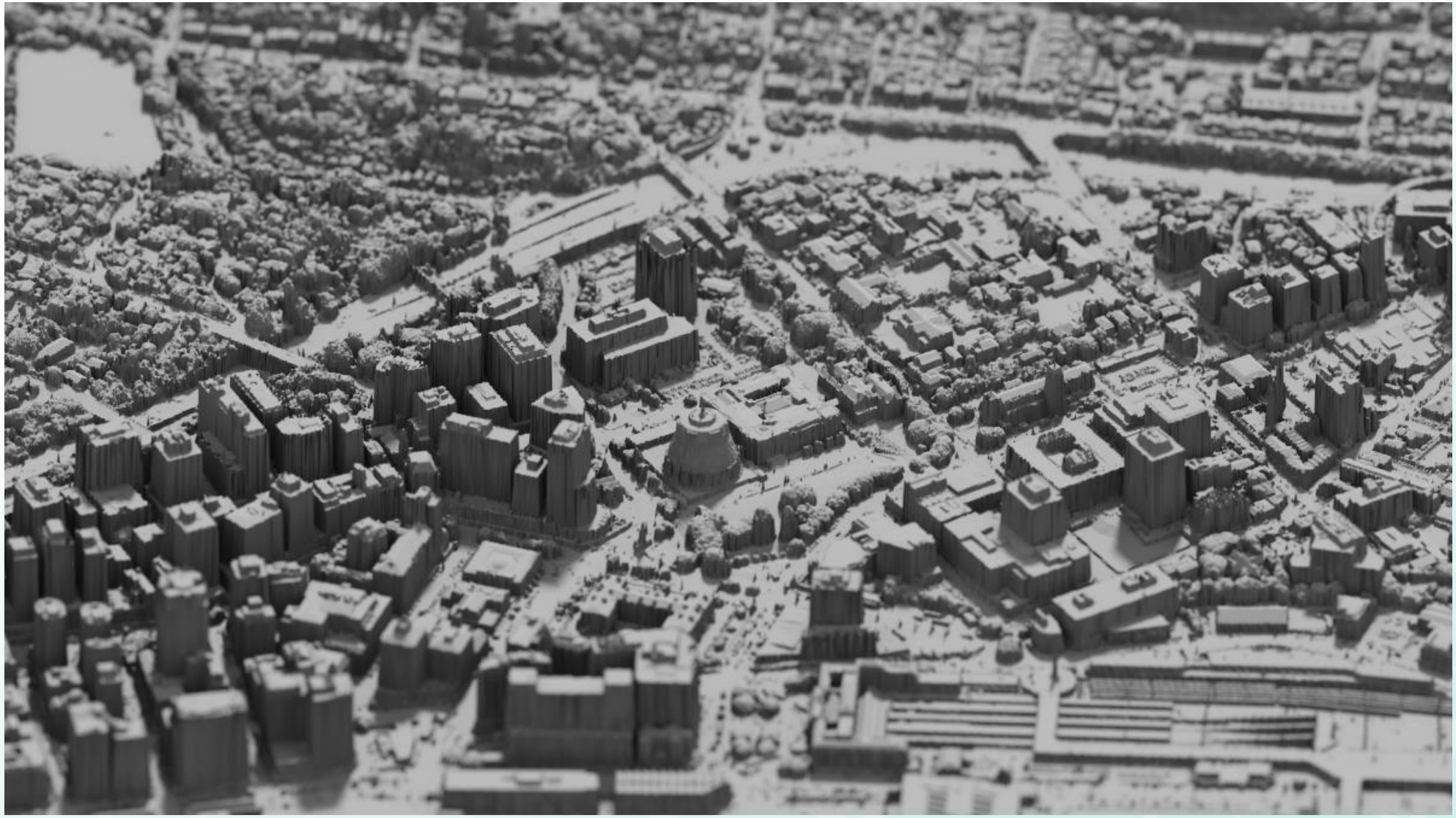
Added	7 Nov 2021
Revisions	3 - Browse all revisions
Current revision	Imported on Nov. 7, 2021 from 12201 GeoTIFF sources in NZGD2000 / New Zealand



Why use this data?

Wellington City LiDAR 1m DSM (2019-2020)

Printing 3D Models....



Collection

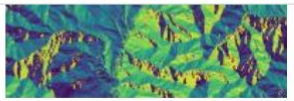
How-to guides for LiDAR

A collection of guides to using LiDAR data, from beginner to advanced.

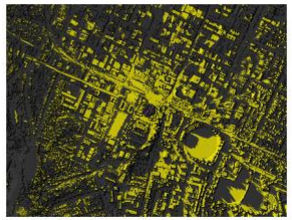
Get started

1 Hillshade - basic guide to displaying a hillshade in QGIS

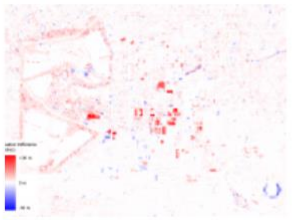
2 Slope - basic guide to displaying a slope in QGIS



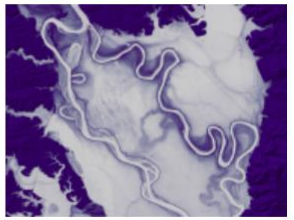
3 Aspect - basic guide to calculating aspect in QGIS



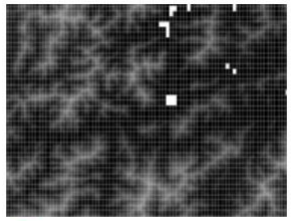
4 Viewshed - basic guide to creating viewshed rasters in...



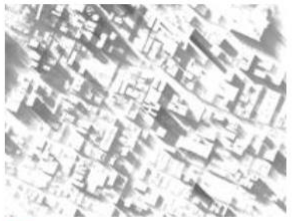
5 Topographic differencing - a basic guide to creating...



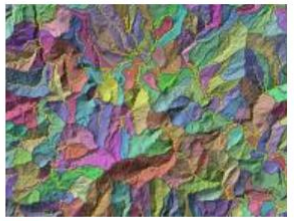
6 Relative elevation model - visualising NZ rivers



7 Virtual Raster's - basic guide to creating virtual raster's



8 Shadows - basic guide to creating shadow rasters in...



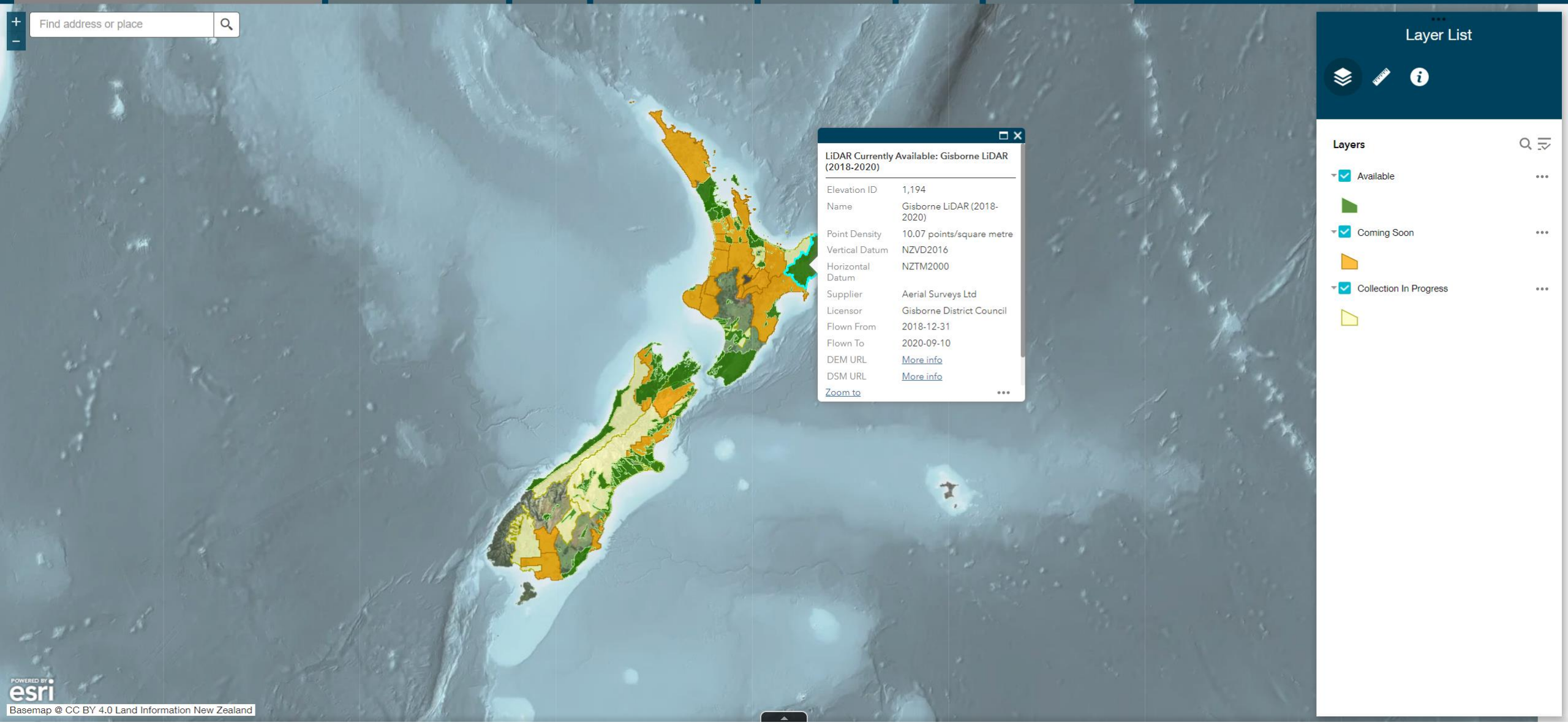
9 Watersheds - basic guide to creating watershed basins i...

10 Guide to Colourised Point Clouds

Elevation Aotearoa

Toitū Te Whenua Land Information New Zealand

NZ Elevation Map - LiDAR availability and release schedule | About the elevation programme | Get started | How-to guides - open source | How-to guides - ArcGIS | Case studies | Visualisations using LiDAR



Toitū Te Whenua Land Information New Zealand

elevationaotearoa.co.nz

Te Kāwanatanga o Aotearoa New Zealand Government

Keeping up to date with dataset availability - twitter

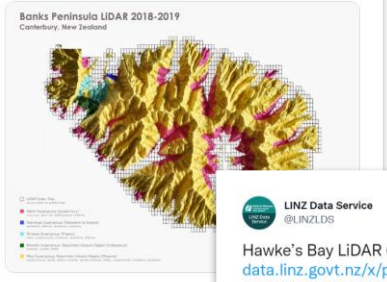
LINZ Data Service
@LINZLDS

New #LiDAR available! DEM/DSM of Westport data.linz.govt.nz/layer/105446. Point clouds @OpenTopography doi.org/10.5069/G9Z31W.... Check out this image of the Buller River showing land features not easily seen in aerial imagery alone #opendata

11:02 AM · Jun 8, 2021 · Tw

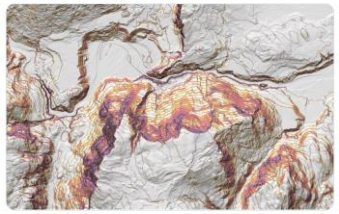
LINZ Data Service
@LINZLDS

New LiDAR available! Canterbury–Banks Peninsula. DEM/DSM data.linz.govt.nz/x/uLLGU5. Point clouds @OpenTopography doi.org/10.5069/G98W3B.... Volcanism and geomorphic processes have shaped the valleys, ridges & cliffs that characterise the area. See our map showing off its features.



LINZ Data Service
@LINZLDS

Today we've released the DEM/DSM for Queenstown 2021 data.linz.govt.nz/x/DguW38. Find point clouds at @OpenTopography doi.org/10.5069/G9MP51.... Thanks @QueenstownLakes #opendata #LiDAR (Image: Shotover River. Slope >30 degrees. Technique by CalTopo)



9:18 AM · Aug 31, 2021 · TweetDeck

LINZ Data Service
@LINZLDS

Check out 775 km sq of Bay of Plenty data in 3D. DEM and DSM from LDS and Classified Point Clouds from data.linz.govt.nz/x/b9Y99D @OpenTopography #opendata Image: DEM of Mount Maunganui, Tauranga

LINZ Data Service
@LINZLDS

Post earthquake 2016 #LiDAR for Kaikōura. This vis shows the big slips that blocked the state highway near Half Moon Bay, and the surrounding hills. DEM available at data.linz.govt.nz/layer/110632. Point cloud via @OpenTopography #OpenData

9:15 AM · Oct 14,

LINZ Data Service
@LINZLDS

Hutt City LiDAR! Thanks @HuttCityCounc our visualisation showing the extent of this DEM/DSM available at data.linz.govt.nz/x Point cloud via @OpenTopography #opendata

3:12 PM · Apr 6, 2022 · TweetDeck

LINZ Data Service
@LINZLDS

Hawke's Bay LiDAR (2020) data.linz.govt.nz/x/pxZGGw Point clouds available from @OpenTopography . Amazing detail from 8 pulses per square metre in urban areas. Thanks to all the Hawke's Bay councils involved. Check out this press release from HBRC: hbrc.govt.nz/home/article/1...

2:19 PM · Dec 23, 2021 · Twitter Web App

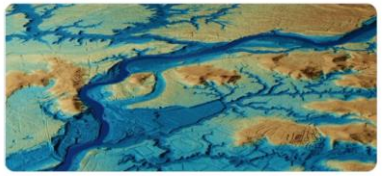
LINZ Data Service
@LINZLDS

New LiDAR for the Tasman Region. Thanks @tasmandc ! Check out our vis looking out over Maniniaro / Angelus Peak and Angelus Ridge toward Rotomaninitua / Lake Angelus. DEM/DSM available at data.linz.govt.nz/x/RDU9cq. Point cloud via @OpenTopography. Made using Aerialod. #opendata

10:08 AM · May 25, 2022 · TweetDeck

LINZ Data Service
@LINZLDS

And more LiDAR... Our first LiDAR dataset for Hamilton is now available. DEM+ DSM from LINZ Data Service data.linz.govt.nz/x/bv4T7C. Point Clouds from @OpenTopography. Image: DEM looking South East along the Waikato River highlighting how rivers shape the land #opendata #lidar



11:53 AM · Jul 28, 2020 · TweetDeck

LINZ Data Service
@LINZLDS

New Otago LiDAR dataset along the coast. Thanks @OtagoRC. DEM/DSM available at data.linz.govt.nz/layer/109627. Point cloud via @OpenTopography. Check out our REM of the Taieri Plain, made using our Elevation Aotearoa How-to guide bit.ly/howtoREM #opendata

11:59 AM · Jul 29, 2022 · TweetDeck

LINZ Data Service
@LINZLDS

New today, an awesome high point density LiDAR dataset of Christchurch City and surrounds. DSM/DEM at data.linz.govt.nz/layer/109642. Point Clouds @OpenTopography. Thanks @ChristchurchCC and @ECAN. Check out our point cloud vis of Christchurch Town Hall. Made in Blender #opendata

1:49 PM · Jul 21, 2022 · TweetDeck

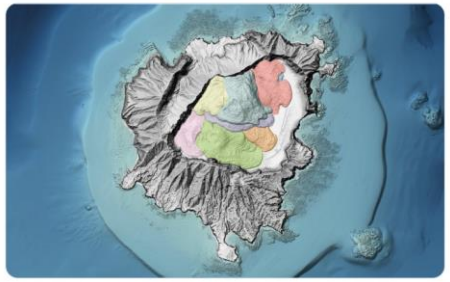
LINZ Data Service
@LINZLDS

DSM/DEM for Whanganui is available at data.linz.govt.nz/layer/105693. #LiDAR point clouds from @OpenTopography doi.org/10.5069/G90Z71... (Image: RGB-coloured point cloud using Whanganui 2017 urban imagery, data.linz.govt.nz/layer/99198, displayed in CloudCompare @WhanganuiDC

3:14 PM · Aug 11, 2021 · TweetDeck

LINZ Data Ser
@LINZLDS

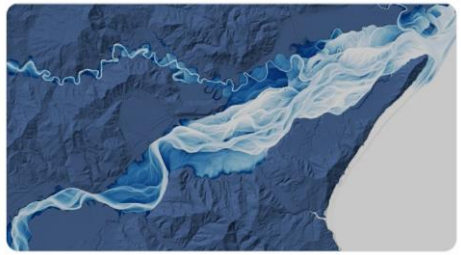
DEM/DSM of Northwest Bay of Plenty incl. Tauranga data.linz.govt.nz/layer/105690. Point Clouds available via @OpenTopography doi.org/10.5069/G9W66J.... Image: Mayor Island caldera that dominates the island and a succession of younger lava domes colourised #opendata #LiDAR @BOPRC



1:15 PM · Aug 5, 2021 · TweetDeck

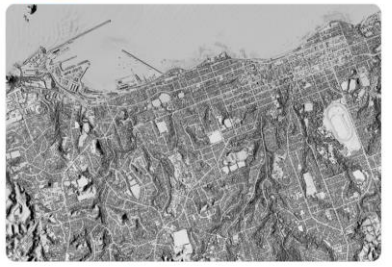
LINZ Data Service
@LINZLDS

Our first district size #LiDAR dataset is available! DEM/DSM for Gisborne District data.linz.govt.nz/layer/105614. Point clouds available soon @OpenTopography. Image: Relative Elevation Model of the Waiapu River and major tributaries, showing how it travels over the land #opendata



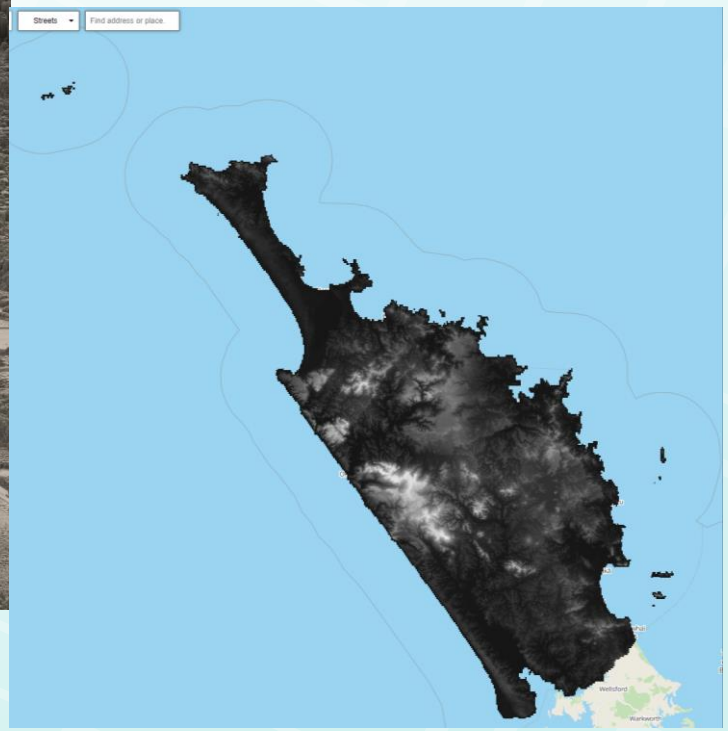
10:28 AM · Jul 20, 2021 · TweetDeck

New LiDAR covering New Plymouth. Thanks @TaranakiRC for the first LiDAR in this region! DEM/DSM at data.linz.govt.nz/layer/107436. Point clouds @OpenTopography. Image: Hillshade of the DSM showing Port Taranaki and New Plymouth #opendata



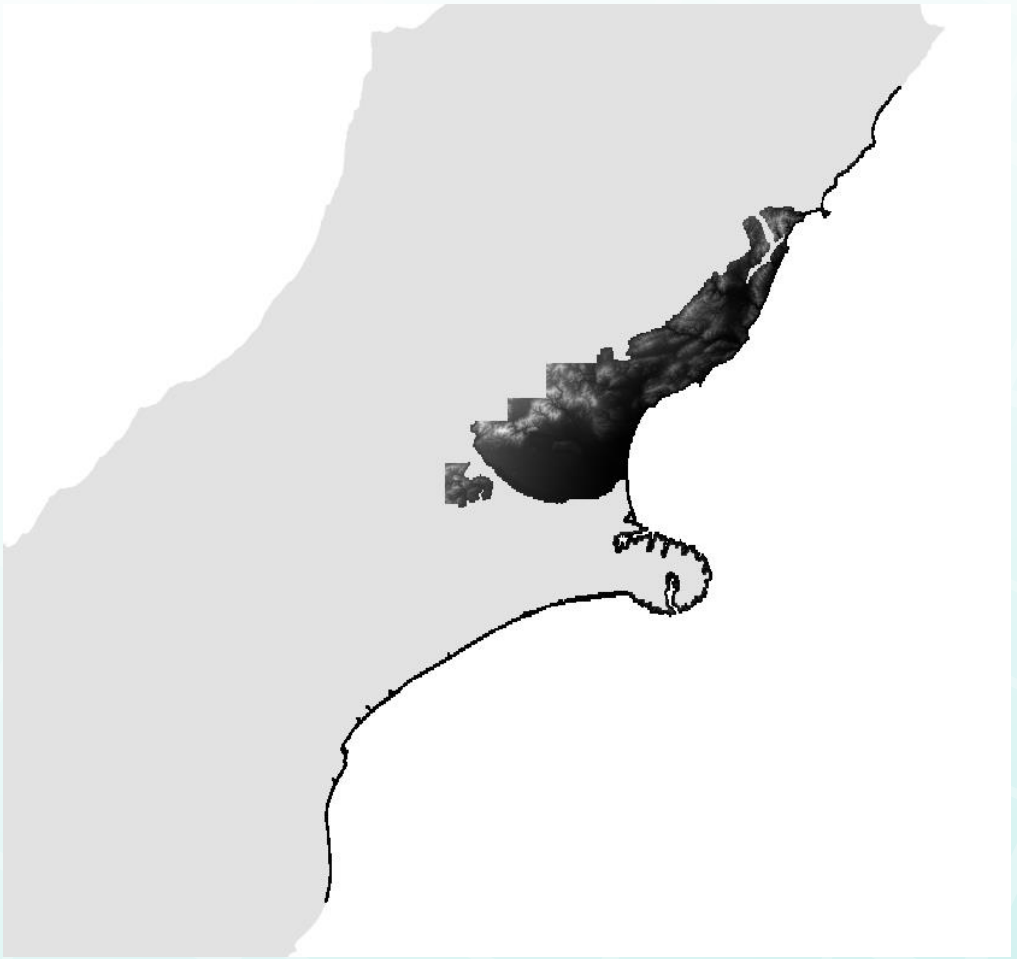
1:13 PM · May 3, 2022 · TweetDeck

Upcoming datasets Q4 2022 ....



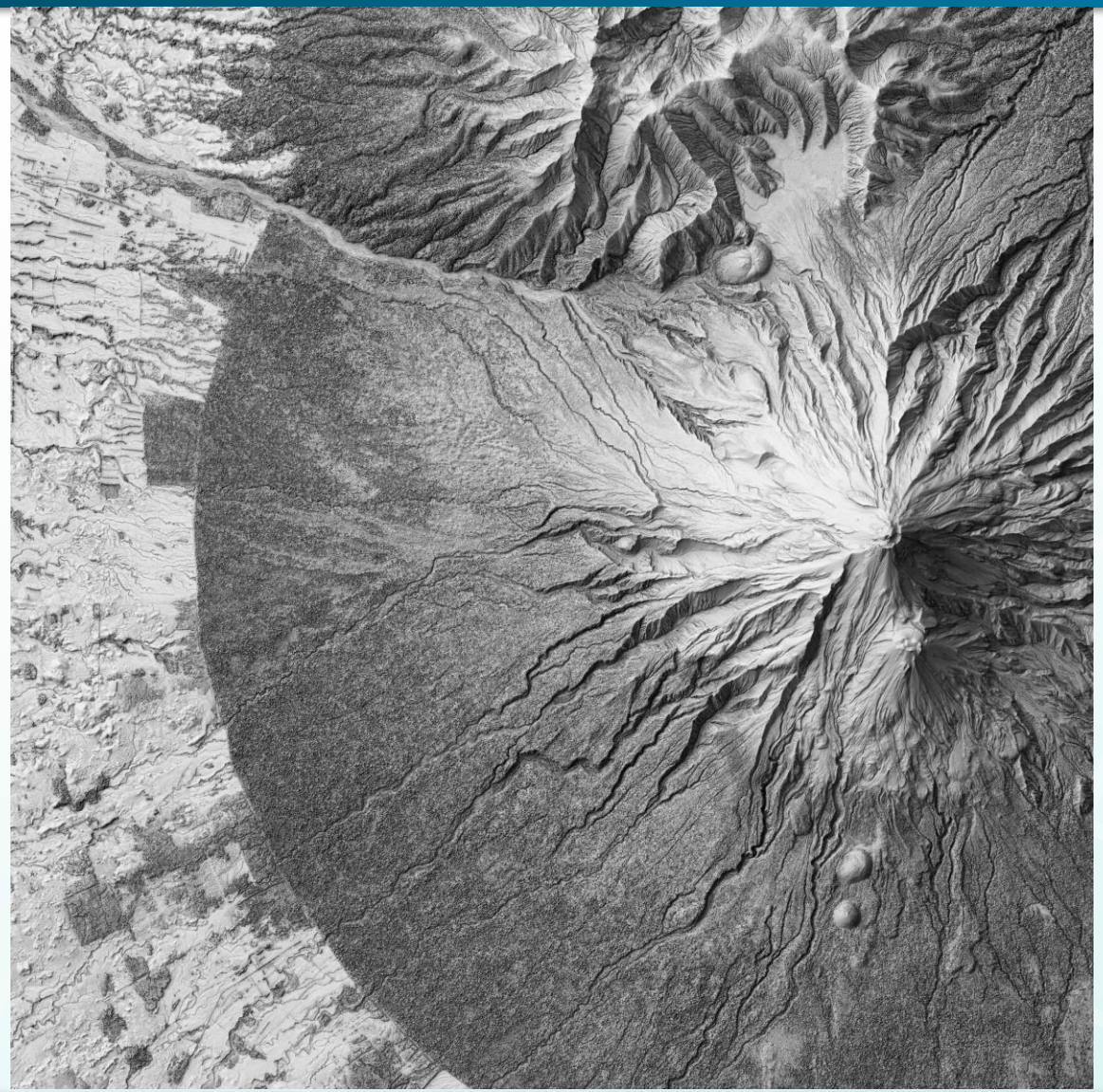
Northland – just published

Upcoming datasets Q4 2022 ....



Canterbury – imminent!

Upcoming datasets Q4 2022 ....



Taranaki – imminent!

Thank you!

elevationaotearoa.co.nz

data.linz.govt.nz

opentopography.org

twitter.com/LINZLDS

elevation@linz.govt.nz - drop us an email

Absolutely Positively
Wellington City Council

Me Heke Ki Pōneke

Info & Data Strategy

Toitū Te Whenua
Land Information
New Zealand

Te Kāwanatanga o Aotearoa
New Zealand Government

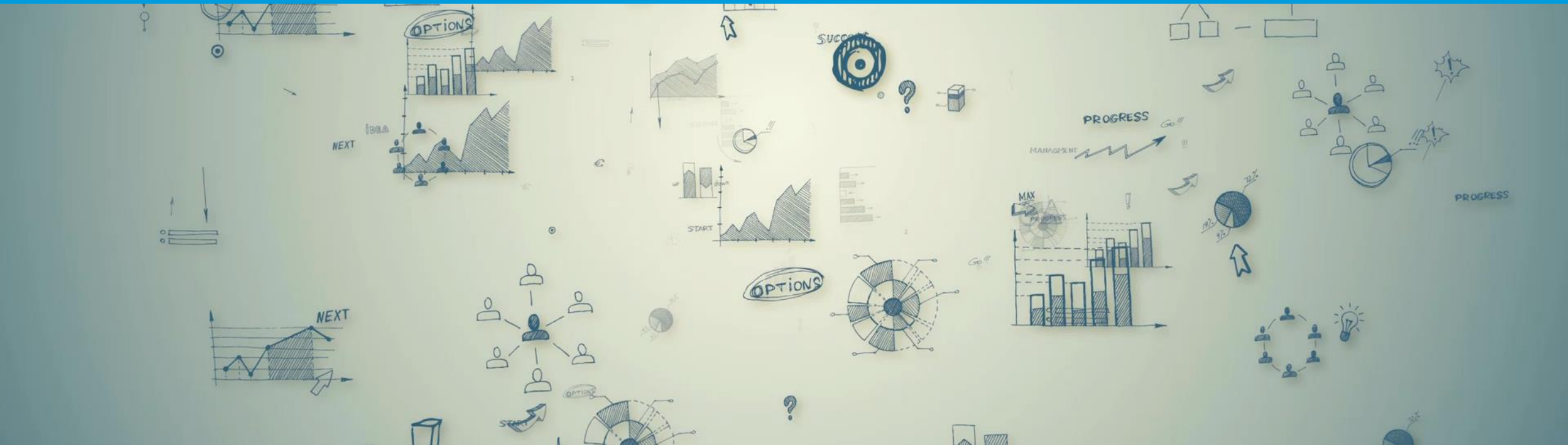
Info & Data Strategy:

- Property Search & Notice of Sale

Presentation to Aotearoa Property Data Network

Nadia Webster – Manager, Data & Insights

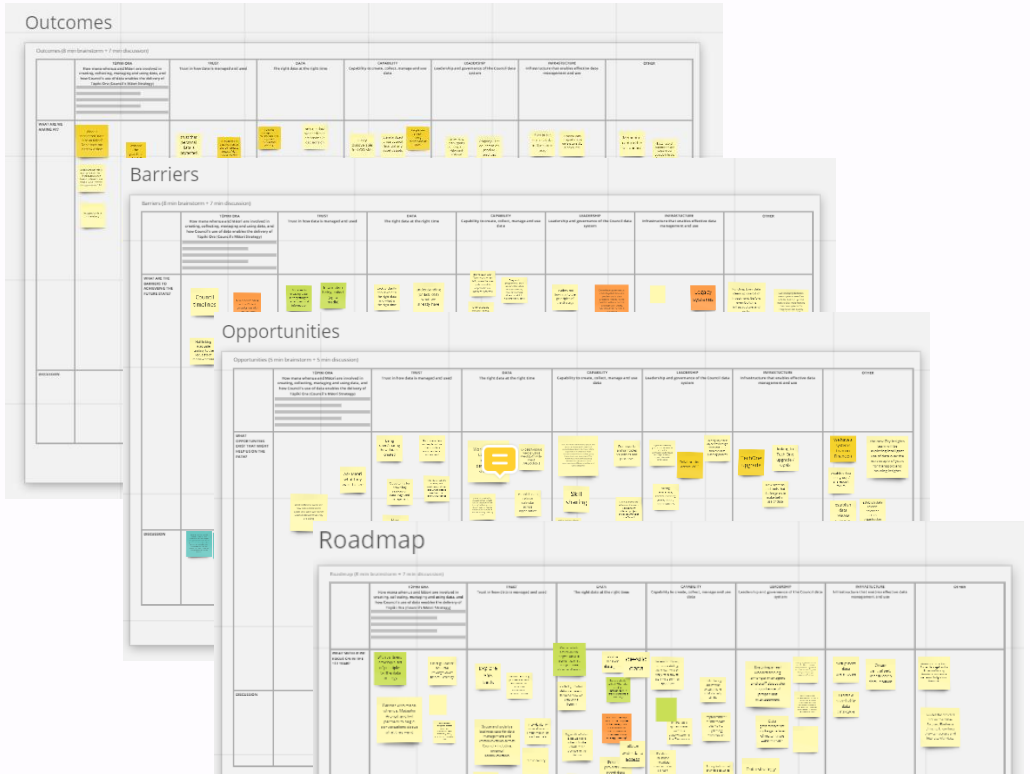
Absolutely Positively
Wellington City Council
Me Heke Ki Pōneke

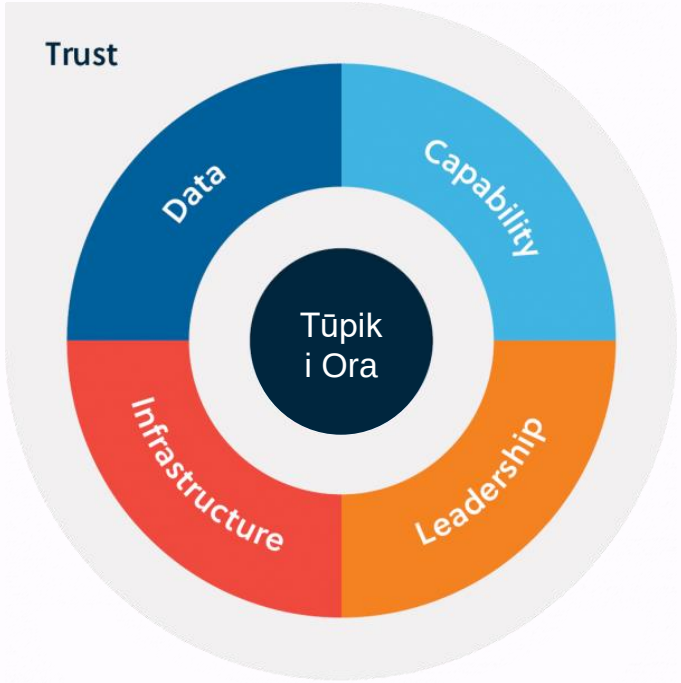


Data Strategy Development: Internal workshops

6 initial workshops, 75+ internal participants, identifying:

- Outcomes & Barriers
- Opportunities & Roadmap
- Mission Critical Data





Maturity model [draft]

	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Discovery and Availability • Identifying & connecting • Open & shared data				
Culture • Strategic value to the organisation • Value to the system & others				
Analytics • Informing decision-making • Informing strategy				
Governance: • Lifecycle stewardship & compliance • INFOSEC (PSR) • Data & Metadata Quality				
Architecture • Data architecture • Data modelling & design				
Technology • Storage & operations • Integration & interoperability • Warehousing				

Strategic Outcomes [draft]

1. People can use information, data and analysis to improve Council performance, understand the history of Whanganui-a-Tara and the Council, and plan for the future

2. The needs of Mana Whenua for the design, access and governance of information, data and analysis of significance to them are supported

3. People have trust and confidence in Council and it's decision-making because it is informed by reliable insights from authoritative, well managed data and information

Information & Data Domains [draft]

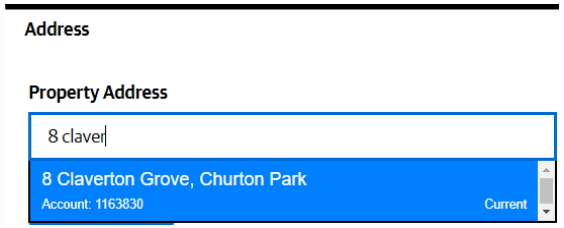
Action Plan [draft framework]

	Maturity		Actions			Outcomes		
	From	To	Now	Next	Later	1. People can use information, data and analysis to improve Council performance, understand the history of Whanganui-a-Tara and the Council, and plan for the future	2. The needs of Mana Whenua for the design, access and governance of information, data and analysis of significance to them are supported	3. People have trust and confidence in Council and it's decision-making because it is informed by reliable insights from authoritative, well managed data and information
Discovery and Availability • Identifying & connecting • Open & shared data	Level 1	Level 4	Activity Activity Activity Activity Foundations, Property	Activity Activity Activity Foundations, Assets Foundations, Services Foundations, Activities	Activity Activity Public	✓	✓	✓
Culture • Strategic value to the organisation • Value to the system & others	Level 1.5	Level 4	Activity Activity Activity Activity Foundations, Environment	Activity Activity Activity Foundations	Activity Activity	✓	✓	✓
Analytics • Informing decision-making • Informing strategy	Level 1.5	Level 3	Activity Activity Activity Activity Foundations, Property	Activity Activity Activity Foundations, Activities Foundations, Services Foundations, Finance	Activity Activity	✓	✓	✓
Governance: • Lifecycle stewardship & compliance • INFOSEC (PSR) • Data & Metadata Quality	Level 1.5	Level 4	Activity Activity Activity Activity Foundations	Activity Activity Activity Foundations	Activity Activity	✓	✓	✓
Architecture • Data architecture • Data modelling & design	Level 1	Level 4	Activity Activity Activity Activity Foundations, Finance	Activity Activity Activity Activities Services Staff	Activity Activity	✓	✓	✓
Technology • Storage & operations • Integration & interoperability • Warehousing	Level 1.5	Level 4	Activity Activity Activity Activity Foundations, Finance	Activity Activity Activity	Activity Activity	✓	✓	✓

Example: Property Search

User story: As a person looking for Council information relating to a property, I want to identify the correct property so I can be confident I'll find information specifically related to that property – e.g. all building consents

1. Select address



2. Display property

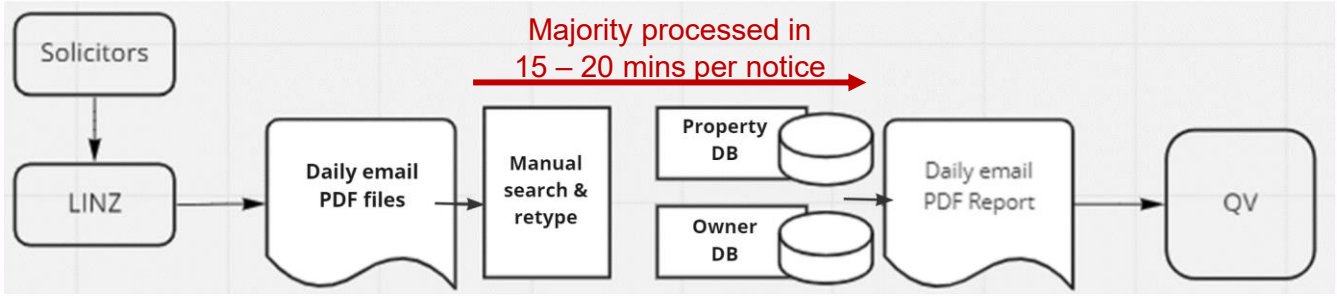
3. Confirm property

4. List ancestry properties and related Service Requests

Address	Property ID	Status	Number of Service Requests	Service Requests			
8 Claverton Grove Churton Park 6004	1059357	Current	7	LIMs	Resource Consents	Building Consents	
0 Amesbury Drive Churton Park 6004	1151820	Historic	2		Resource Consents		Subdivision Certificates
56 Waverton Terrace Churton Park 6037	1175166	Historic	2		Resource Consents		Subdivision Certificates
64 Waverton Terrace Churton Park 6037	1175196	Historic	6		Resource Consents	Building Consents	Subdivision Certificates

Example: Property Data – Notice of Sale

Today



July 2023

Sales Notice App (SNAP)

MVP = "Happy path"
Single rating unit & single title

Improved data quality
Improved data availability

Lynker ANALYTICS

Data not Pixels

Toitū Te Whenua
Land Information
New Zealand

Te Kāwanatanga o Aotearoa
New Zealand Government

Data not Pixels

Presentation to the Aotearoa Property Data Network

December 6th, 2022

Lynker ANALYTICS

Our Mission

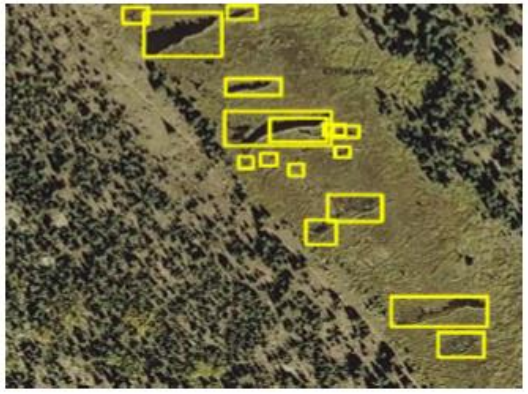
We have specialist expertise in machine learning, remote sensing and geospatial analytics. We build tools to extract new insights about the earth's surface including the marine and built environment from satellite imagery, aerial photography, unmanned and remote operated vehicles, Lidar, CCTV and other sensors.

Using neural networks and related AI techniques we can monitor and measure change in the environment at local, city, national and asset scales to support better decision making. #AI4EO

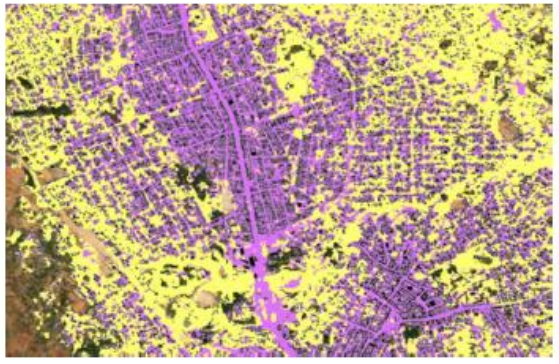
AI for Earth Observation has many applications…

Rooftop Solar Estimation

Land Cover Mapping

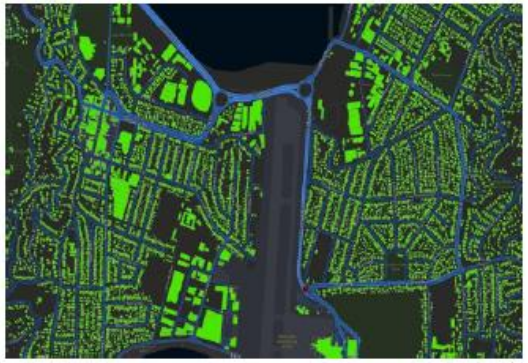


Beaver Ponds



Settlement Analysis

Roof material & condition



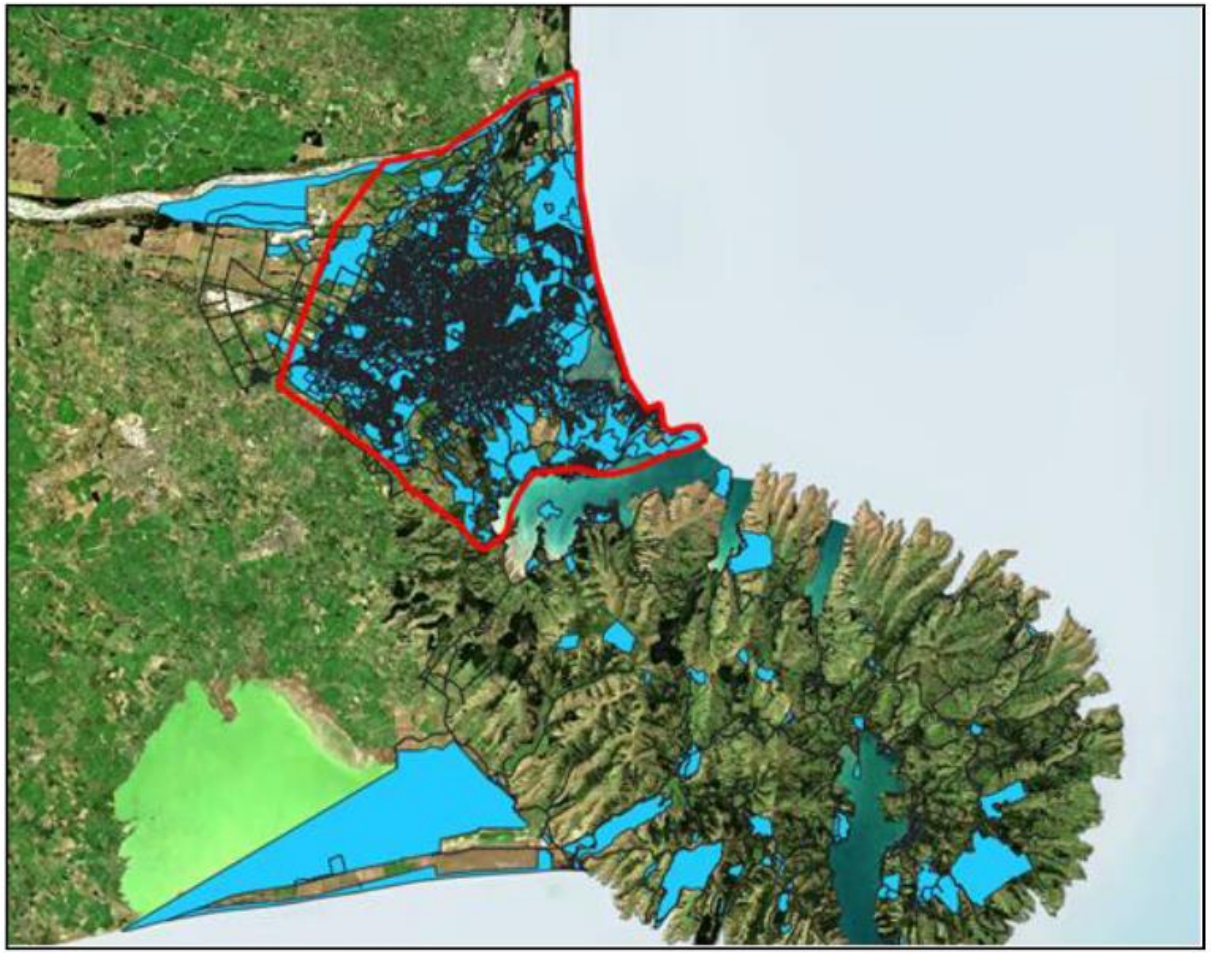
Buildings and Roads

Roof Analysis – **Christchurch City Council**

The purpose of this work was to help to better understand the contributions of roof material run-off contaminants entering the city's stormwater network.

The main goal of this study was to inform the proportions of zinc-coated roofs and secondly to estimate the condition of metal roofs across the entire city.

Study Area and Inputs



Two imagery sets were used:

1. Airbus Pléiades 0.50m pan sharpened satellite imagery captured on 25 March 2022. Pléiades imagery has a four-band response in the visible red, green, and blue, and near infrared (referenced as RGBI), with a higher resolution panchromatic (greyscale) image.

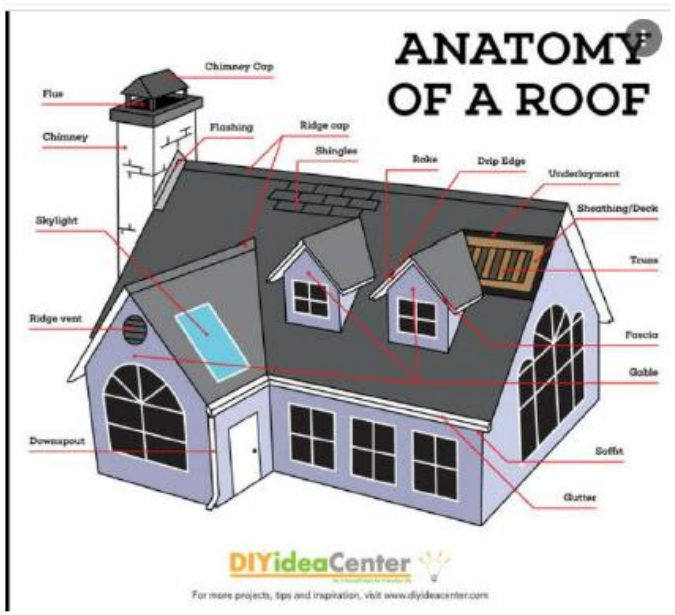
2. Orthophotography for the Canterbury Region captured in December 2020 to February 2021. Coverage encompasses Christchurch City and Banks Peninsula townships. Imagery supplied as 7.5cm pixel resolution (0.075m GSD), 3-band (RGB) uncompressed GeoTIFF.

3. Building Outlines

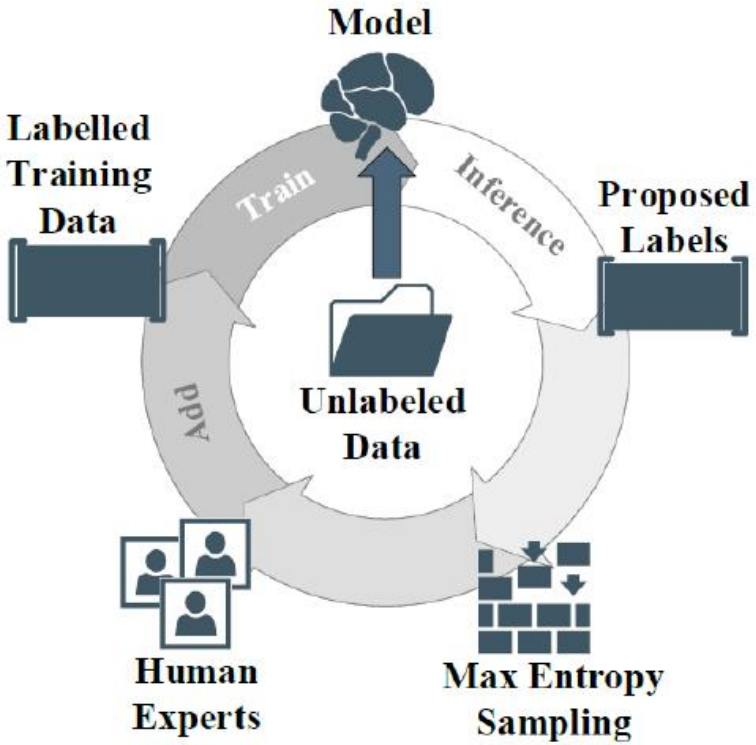
Approach

Four models were developed including:

1. A supervised remote sensing classification model using the satellite image area
2. A deep learning image classification model trained using active learning to discriminate metal and non-metal
3. A deep learning image classification model to discriminate poor condition metal roofs from good condition roofs
4. A machine learning ensemble model to predict a final roof condition (decay index)



Predictions and confidences from the first two models, alongside existing council datasets, were used to train the final ensemble model.

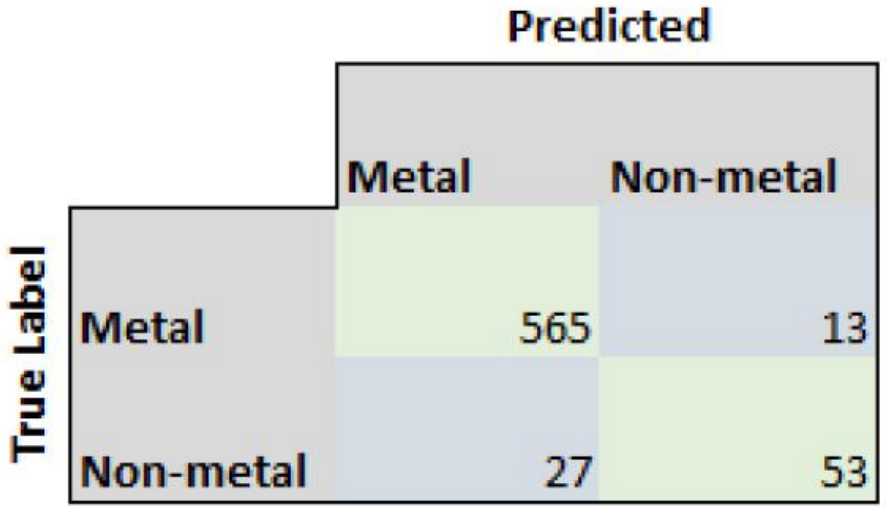


ACTIVE LEARNING CYCLE

Demo

Results

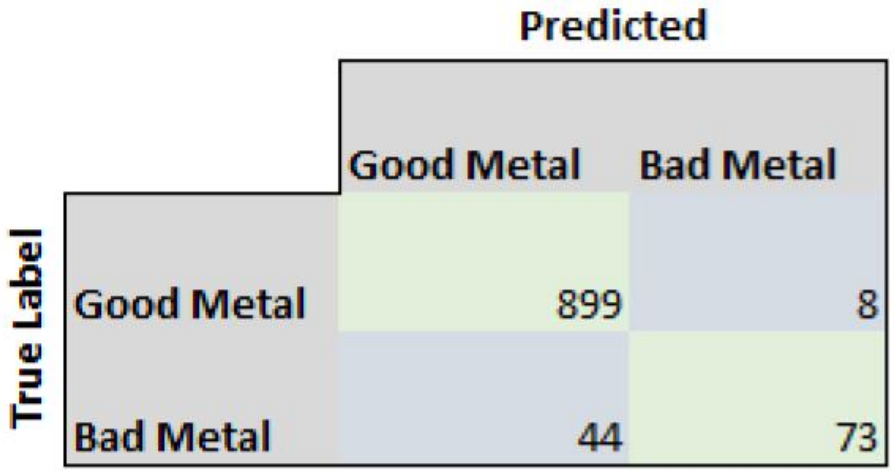
Confusion matrix, ensemble model



Deep Learning Material F1 scores

Class	Precision	Recall	F1
Metal	0.95	0.98	0.97
Non-metal	0.80	0.66	0.73

Confusion matrix, condition model



Deep Learning condition F1 scores

Class	Precision	Recall	F1
Good metal	0.95	0.99	0.97
Bad metal	0.90	0.62	0.74

Thank You

FIGURE 18. DECAY INDEX EXAMPLES.

LEFT: 0.002, CENTER: 0.550, RIGHT: 0.983

david.knox@lynker-analytics.com
matt.lythe@lynker-analytics.com

CRITCHLOW GEOSPATIAL

Innovating for a low carbon future

New Zealand Satellite Imagery Marketplace

Lyttelton Harbour / Whakaraupō, Canterbury, Source: LINZ Basemaps

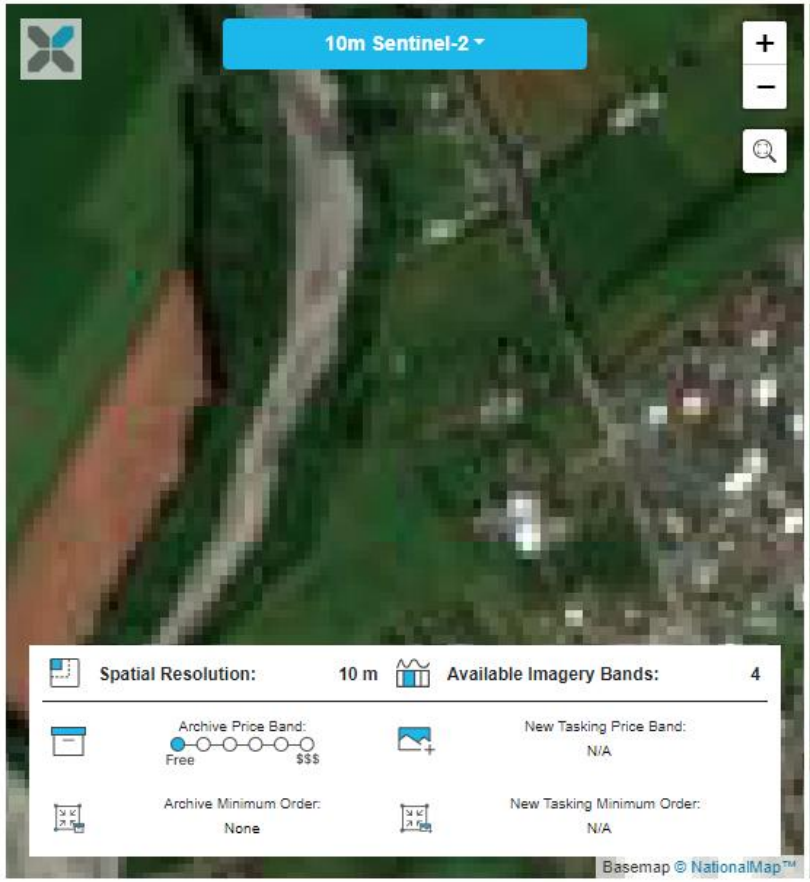
Toitū Te Whenua
Land Information New Zealand

Te Kāwanatanga o Aotearoa
New Zealand Government

NEW ZEALAND
SATELLITE IMAGERY MARKETPLACE

CRITCHLOW GEOSPATIAL
Innovating for a low carbon future

Blurry to Insightful



Aotearoa Property Data Network
hosted by Toitū Te Whenua LINZ

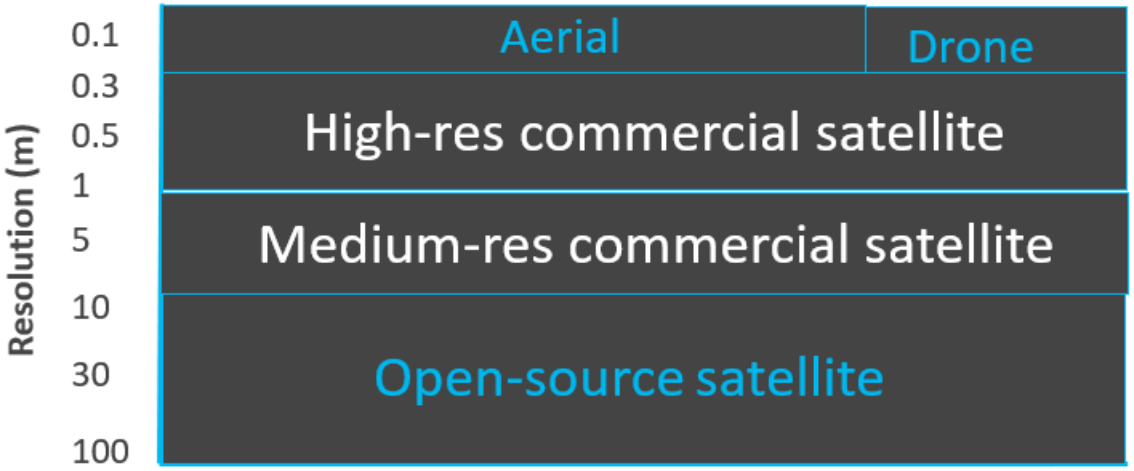
06 December 2022
info@critchlow.co.nz
www.critchlow.co.nz

Imagery types

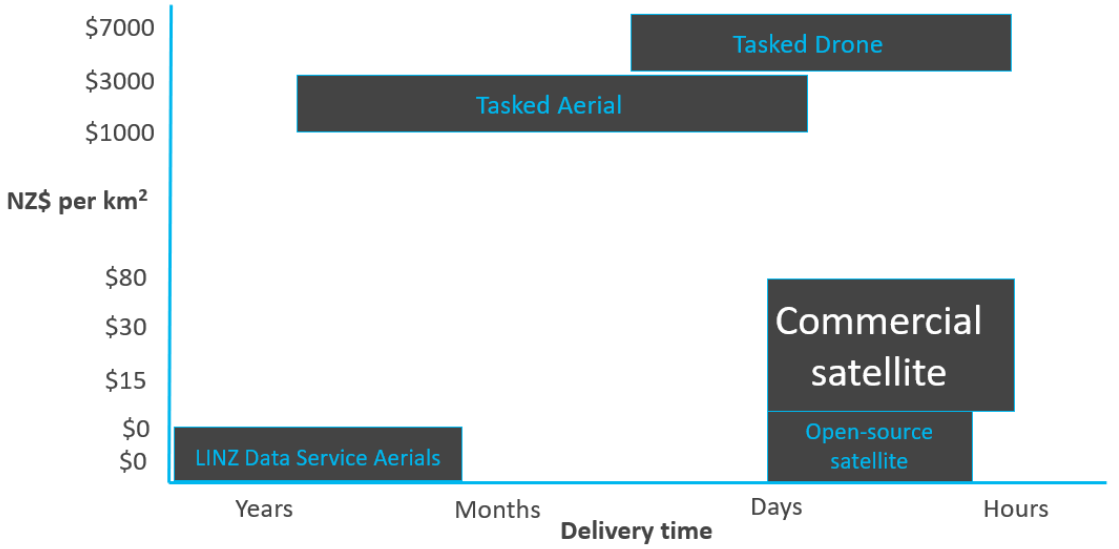
CRITCHLOW GEOSPATIAL
Innovating for a low carbon future

- Hi-res colour and multi-spectral
- Night-time
- Video
- Hyperspectral
- Radar
- 3D elevation models

Pixel size (degree of detail)



Price + delivery time



The New Zealand Satellite Imagery Marketplace

A location intelligence game changer

NEW ZEALAND

SATELLITE IMAGERY MARKETPLACE

CRITCHLOW GEOSPATIAL

Innovating for a low carbon future

MAXAR

CRITCHLOW GEOSPATIAL
Innovating for a low carbon future

- Subscription access available
- 20-year archive
- 0.3 – 0.5m resolution
- 8 band multispectral
- 6 new 0.3m Legion satellites launching starting January 2023
- Legion provides up to 15 revisits per day

SPACEWILL

CRITCHLOW GEOSPATIAL
Innovating for a low carbon future

- Fast growing SuperView constellation
- 0.3 – 0.5m resolution
- Tasking based
- Daily revisits currently
- 2 SuperView-Neo satellites at 0.3m
- Plan is for 16 SuperView-Neo satellites

- 91 accessible earth observation satellites in orbit
- 3 EarthScanner satellites with 136-150km wide swaths (capture Whangarei – Dunedin in 3 mins)
- The DailyVision (0.75m) tasking-based constellation currently provides 18 revisits per day with 15-minute targeting from 9:00 am to 12:30 pm
- HyperScan – 3m RGB, 5m multi-spectral visits every 2 days. Capturing 1-2 passes over NZ per month
- Several medium resolution special purpose agricultural monitoring satellites

SI Imaging

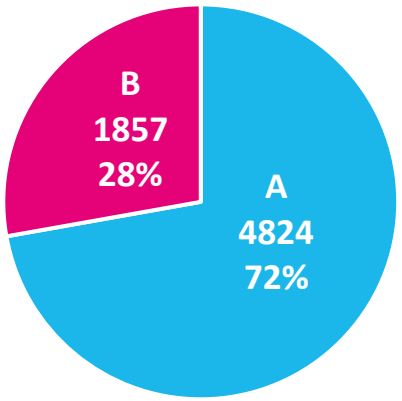
- SI Imaging's KOMPSAT-3/3A satellites (0.5 – 0.4 m) are currently capturing on average ~250 scenes per month over all NZ.
- 10-year archive of 15,000+ largely cloud-free images of NZ.
- KompSat-5 radar satellite can be tasked down to 1m resolution or cover large areas at medium resolution.

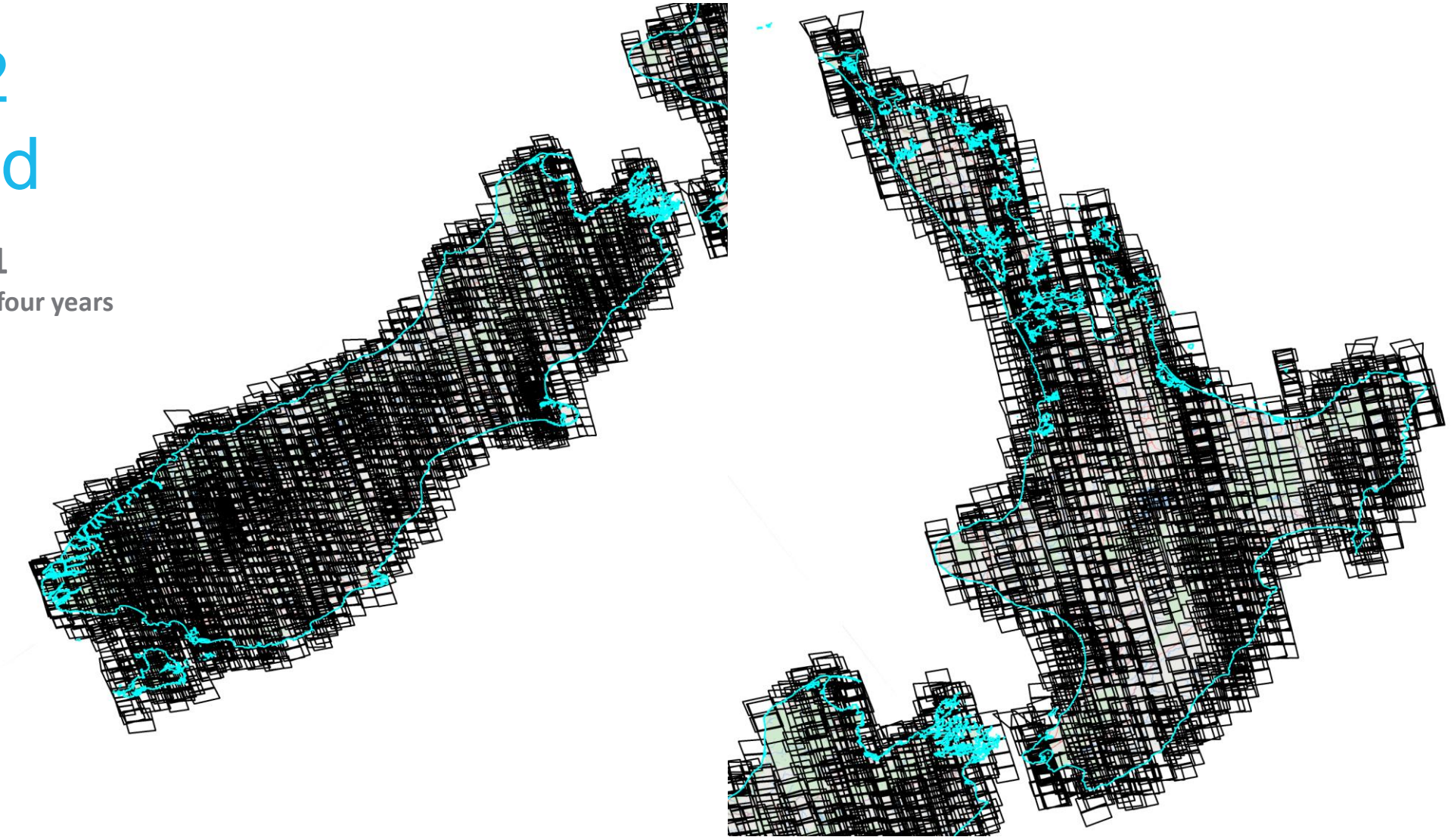
2019-2022
≤10% cloud

Total captures: 6,681

66.6% of all captures for the four years

Cloud Cover
- A = 0% (cloud free)
- B = From 0% to 10%

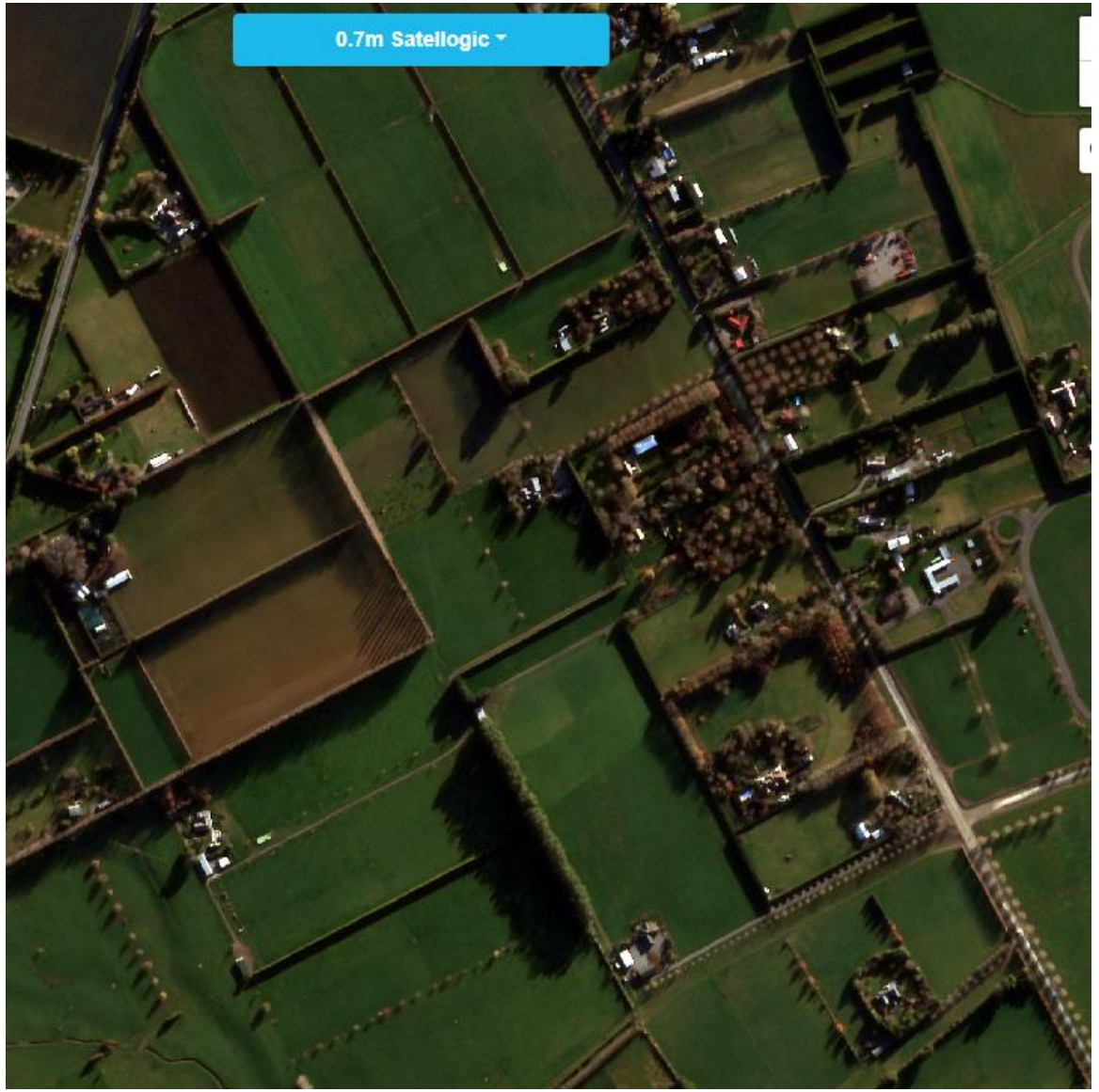




SATELLOGIC

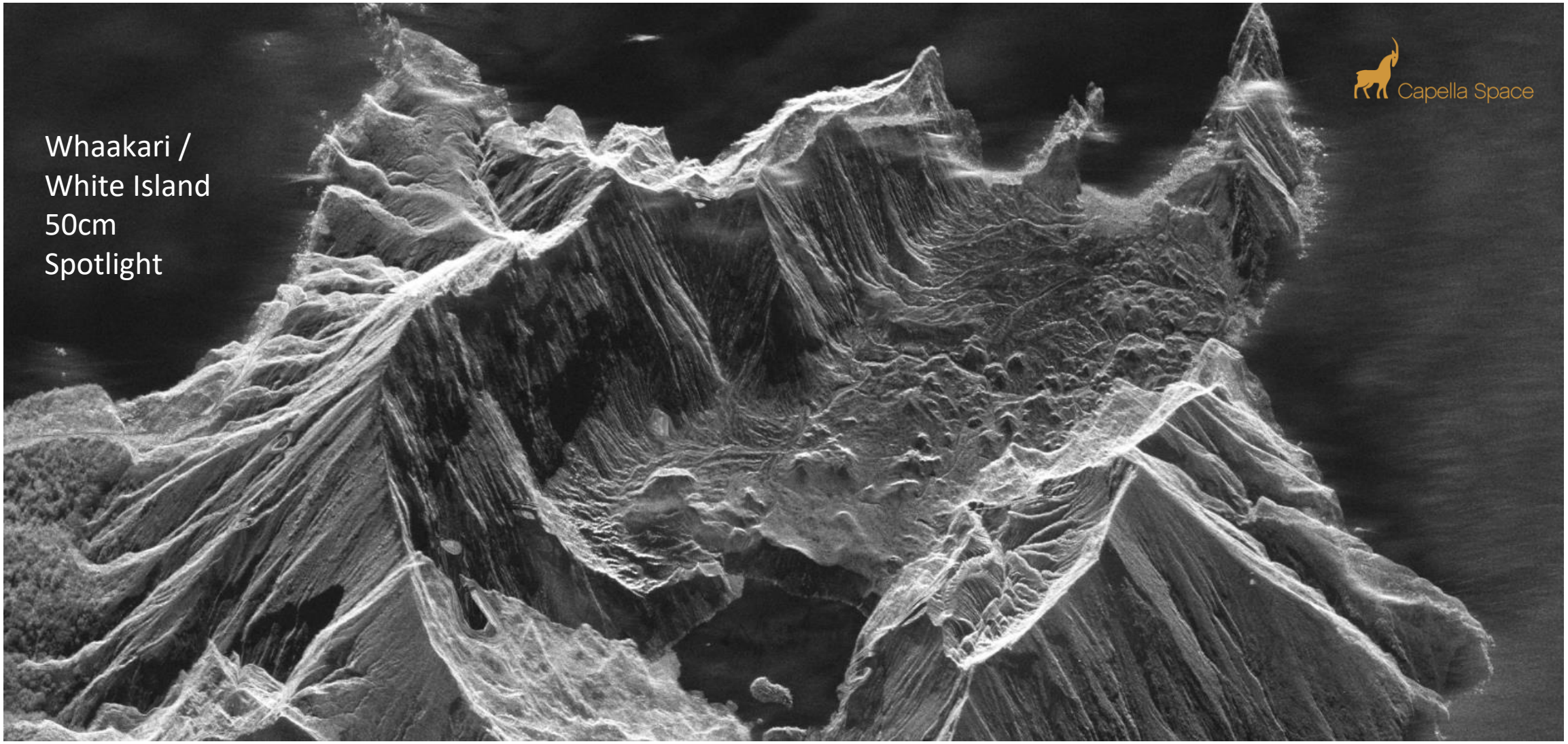
CRITCHLOW GEOSPATIAL
Innovating for a low carbon future

- Low-cost, rapid delivery tasking options
- Satellogic's current constellation of 26 satellites (0.7 m) can currently provide up to 5 re-visits per day.
- This will grow to 40 re-visits per day with 200 satellites by 2025.
- Mainly tasking-based, but with 40 satellites in their constellation in 2023, they plan for monthly re-mapping of the planet.
- Daily re-maps of the planet with the 200 satellites in 2025.

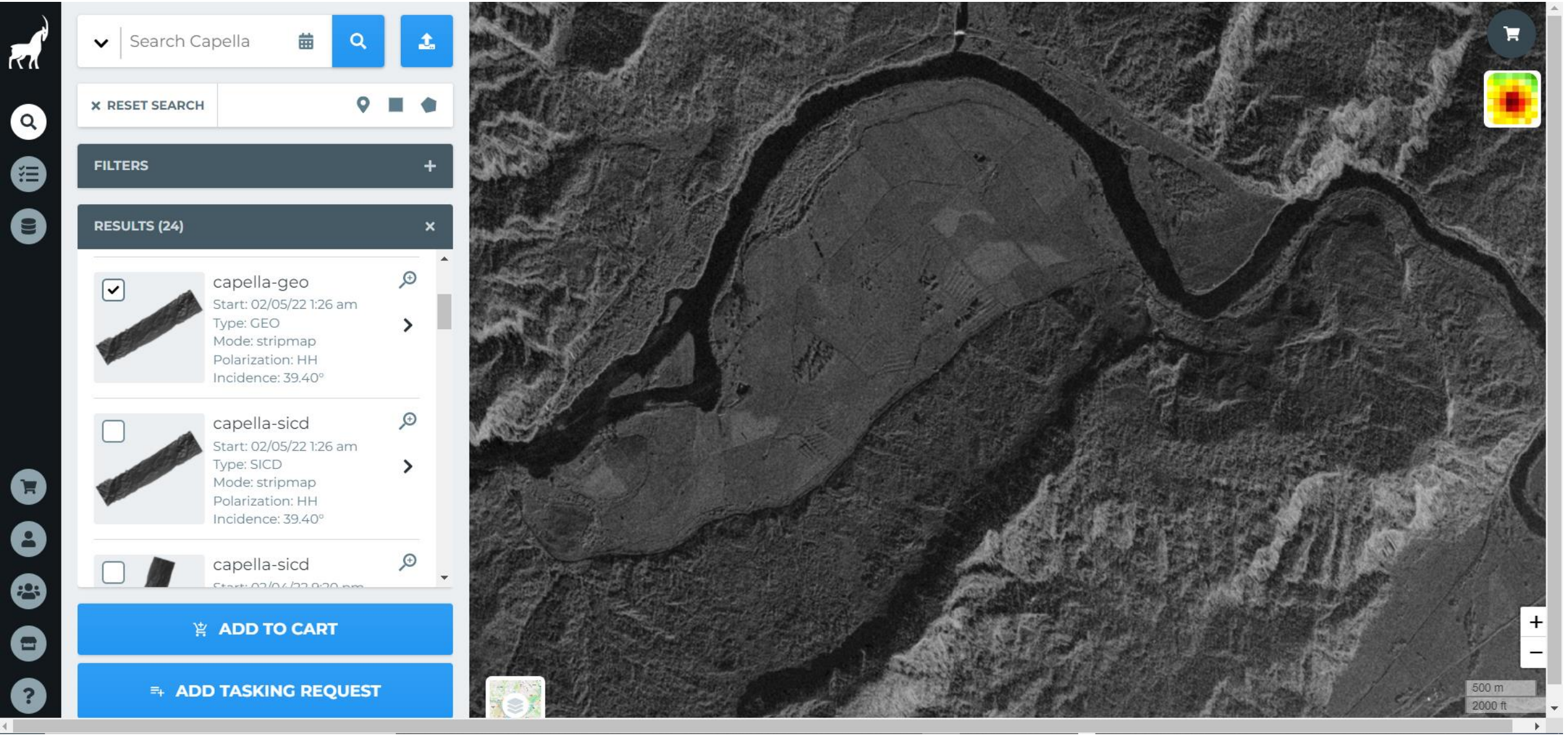


Capella Space

CRITCHLOW GEOSPATIAL
Innovating for a low carbon future

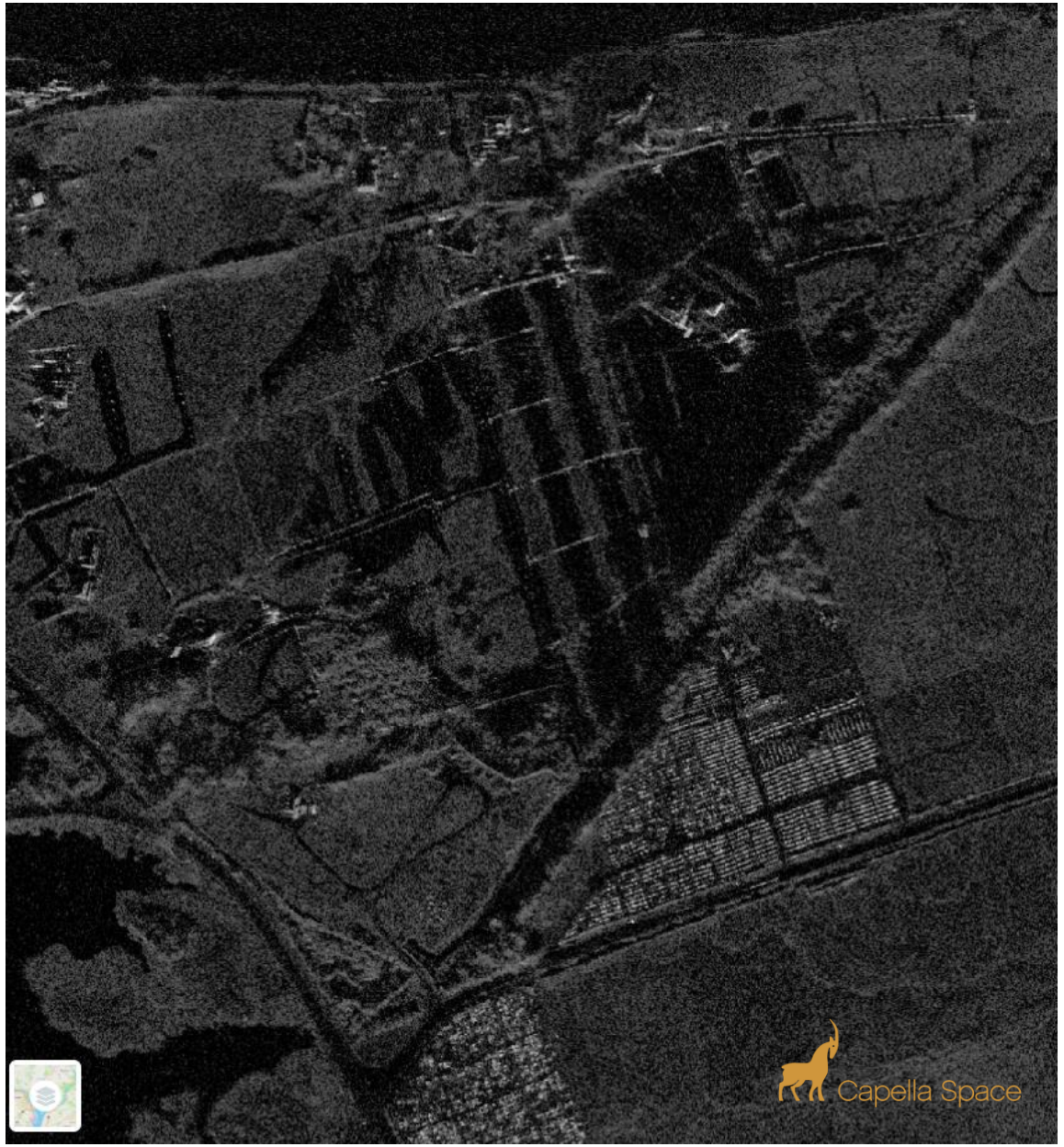


Self-service tasking + delivery



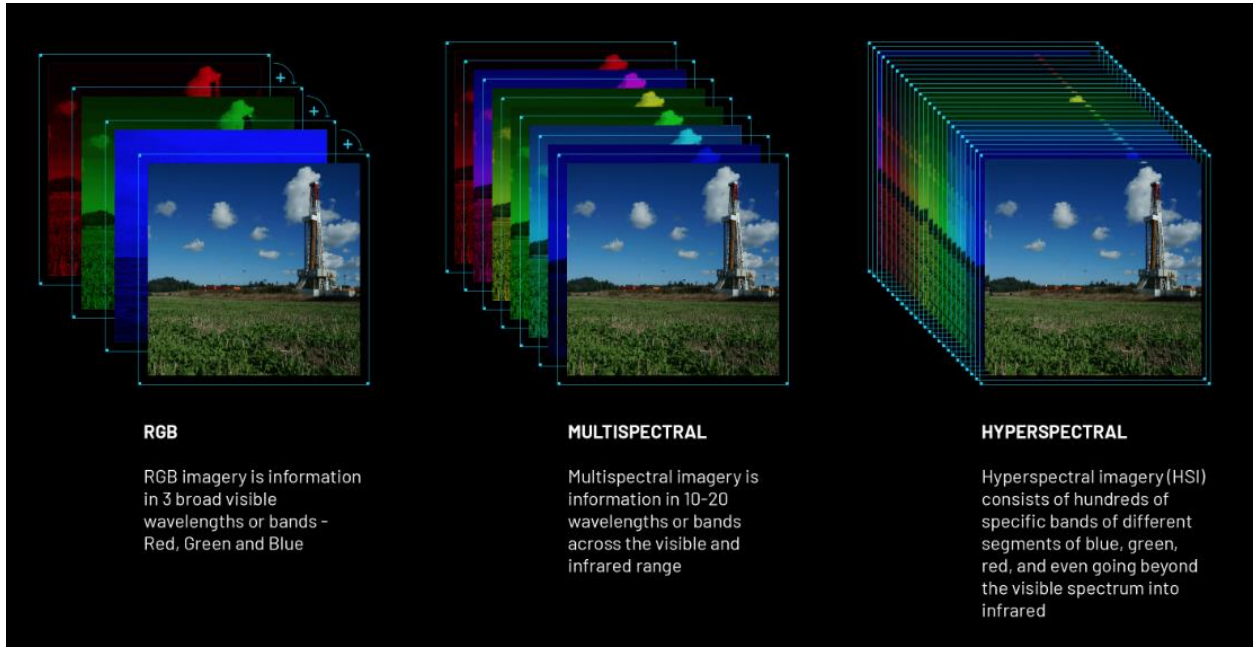
LINZ Aerial Imagery

Capella Spotlight @ 50cm (04 Feb 4:27pm)



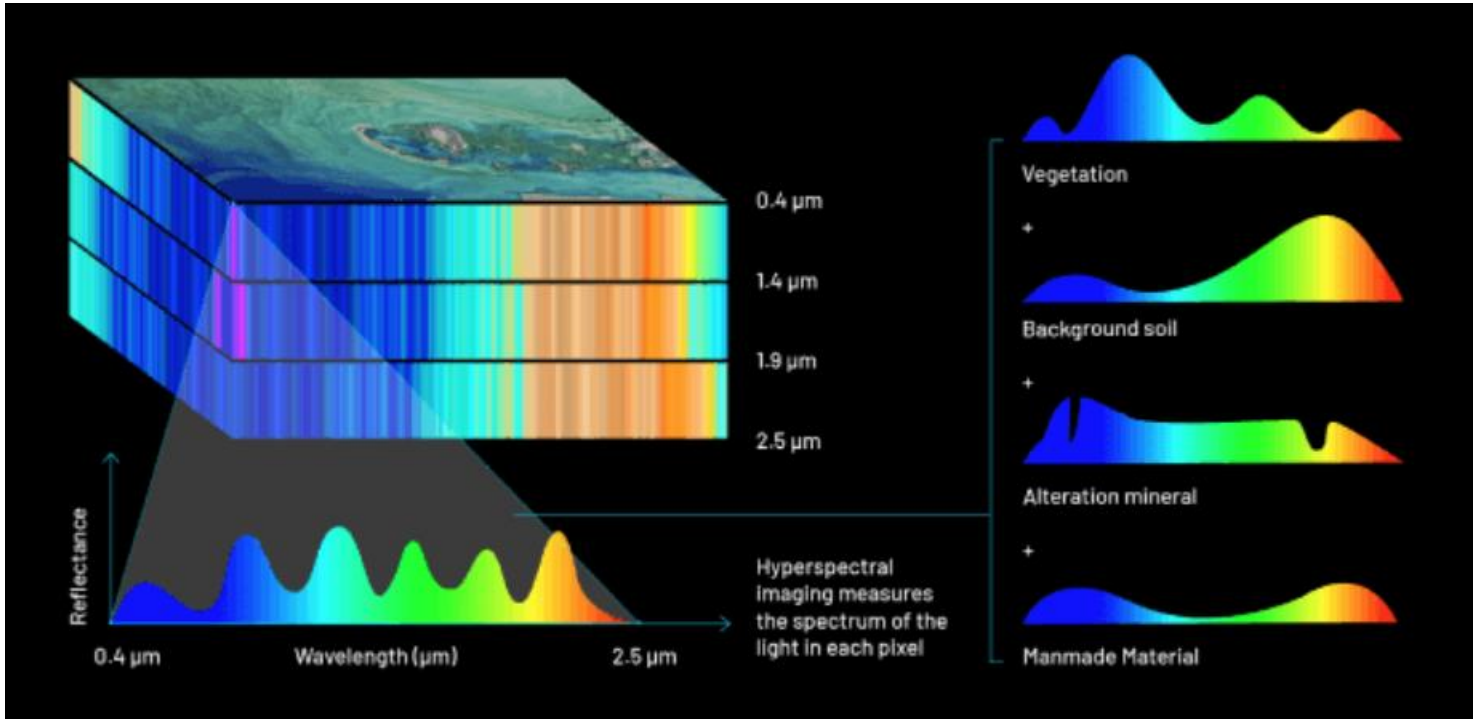
pixxel

Early Adopter partner



CRITCHLOW GEOSPATIAL
Innovating for a low carbon future

- Pixxel is building a constellation of hyperspectral earth imaging satellites and the analytical tools to mine insights.
- The constellation is designed to provide global coverage every 24 hours, with the aim of detecting, monitoring and predicting global phenomena.



NTT DATA
Trusted Global Innovator

If you need to see objects in greater detail, then you will want to consider NTT Data's AW3D, the world's most precise global 3D map. AW3D covers all global spaces with 5 metre resolution. In urban areas, 3D data is available at 0.5 metre resolution. AW3D utilises Maxar Technologies' satellite images.

CRITCHLOW GEOSPATIAL
Innovating for a low carbon future

- NTT Data is our provider of high-resolution satellite-derived 3D elevation datasets.
- Often used for radio frequency planning by telcos for mobile networks eg. locating 5G cell sites
- Have recently completed 3D model of entire UK

NEW ZEALAND
SATELLITE IMAGERY MARKETPLACE

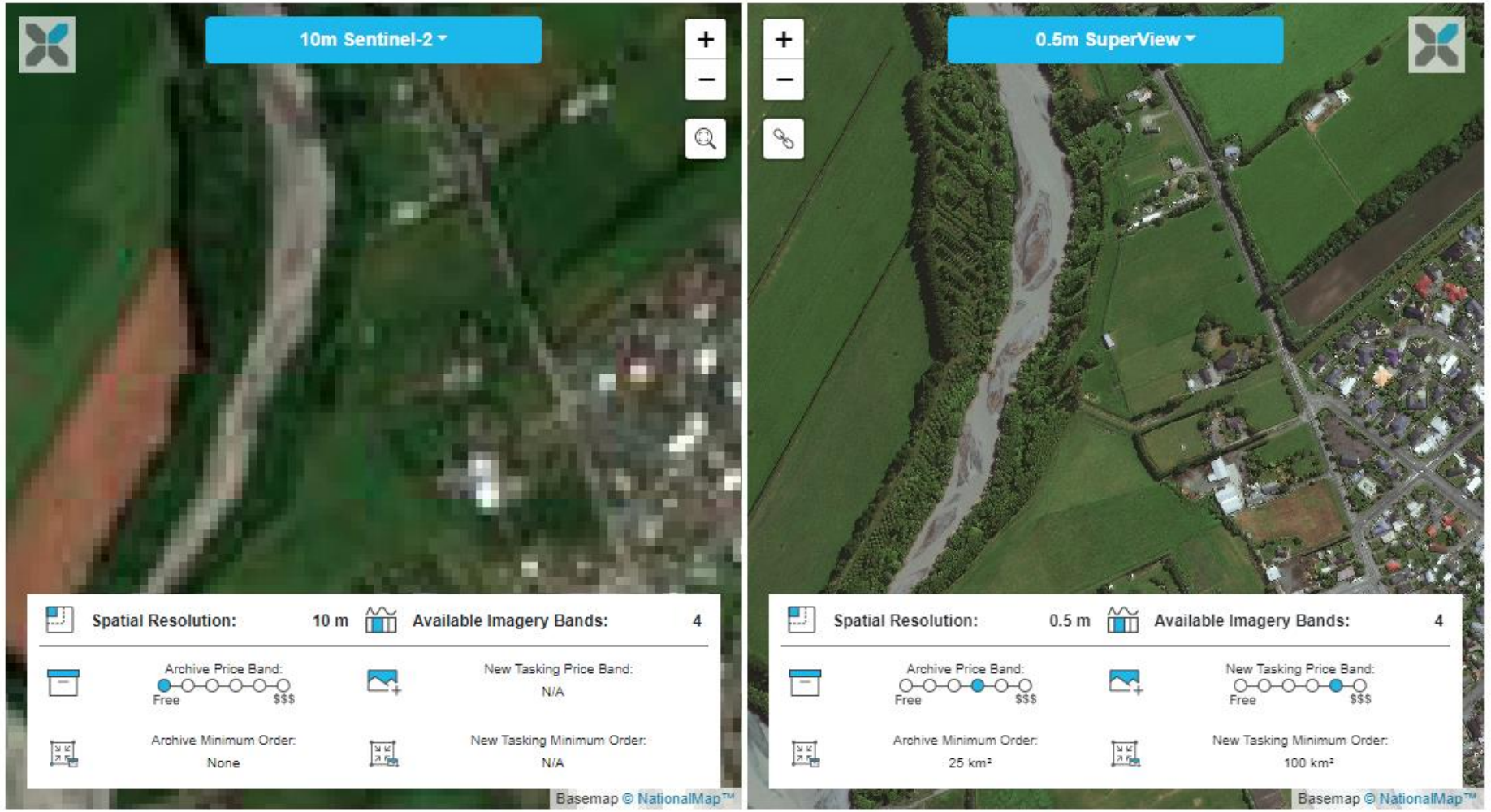
www.critchlow.co.nz/satellite-imagery-marketplace

CRITCHLOW GEOSPATIAL
Innovating for a low carbon future

Side-by-side comparison and shortlisting tool

It makes it easier for you to compare options to build your own shortlist from popular satellite imagery providers

- Resolution
- Imagery bands
- Price bands
- Minimum area sizes
- Access to archives
- Tasking availability



CRITCHLOW GEOSPATIAL

Innovating for a low carbon future

Thank you

Steve Critchlow – Group Managing Director
Ph +64 21 702 130
steve.critchlow@critchlow.co.nz

www.critchlow.co.nz

Thank you!