



**Spark**<sup>nz</sup>

# Eyes Open - Swimming with PlanTech

Graeme McCarrison

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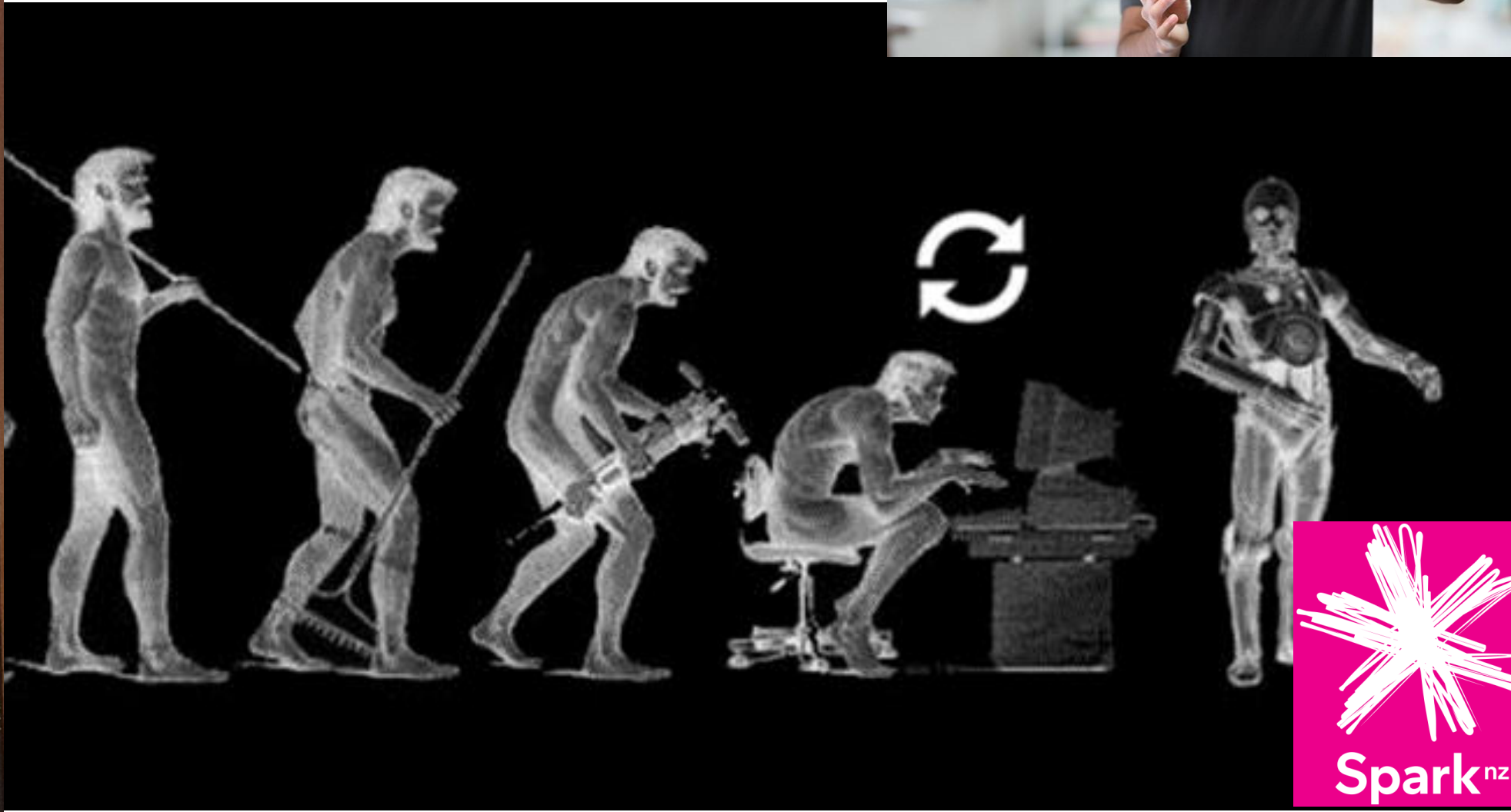


# Curiously

# Evolving



THE YEAR IS 1997.  
JORDAN GETS HIS FIFTH RING  
AND THE INTERNET IS A CHATROOM  
AND NOT MUCH ELSE. [REDACTED]  
MEANWHILE, A COLLECTION OF SKATE  
BOARDERS AND SHIT-TALKERS WERE  
WELL, SKATING AND TALKING SHIT.  
AND THAT'S HOW [REDACTED]  
[REDACTED] HUFFER WAS BORN  
FAST FORWARD AND IT'S 2020.  
A NEW DECADE. TIME TO REFLECT.  
TAKE A BREATH —  
OR MAYBE JUST GO EVEN HARDER.  
THE LAST 22 YEARS HAVEN'T ALWAYS  
BEEN EASY. WE'VE BEEN THROUGH  
OUR FAIR SHARE OF [REDACTED]  
[REDACTED] HIGHS AND LOWS.  
RIDING HIGH AT THE TOP, AND LAYING  
LOW STREET LEVEL. BUT WE'VE ALWAYS  
GOT BACK UP AND CONTINUED TO  
PUSH SHIT UP HILL.







**Planning Institute**

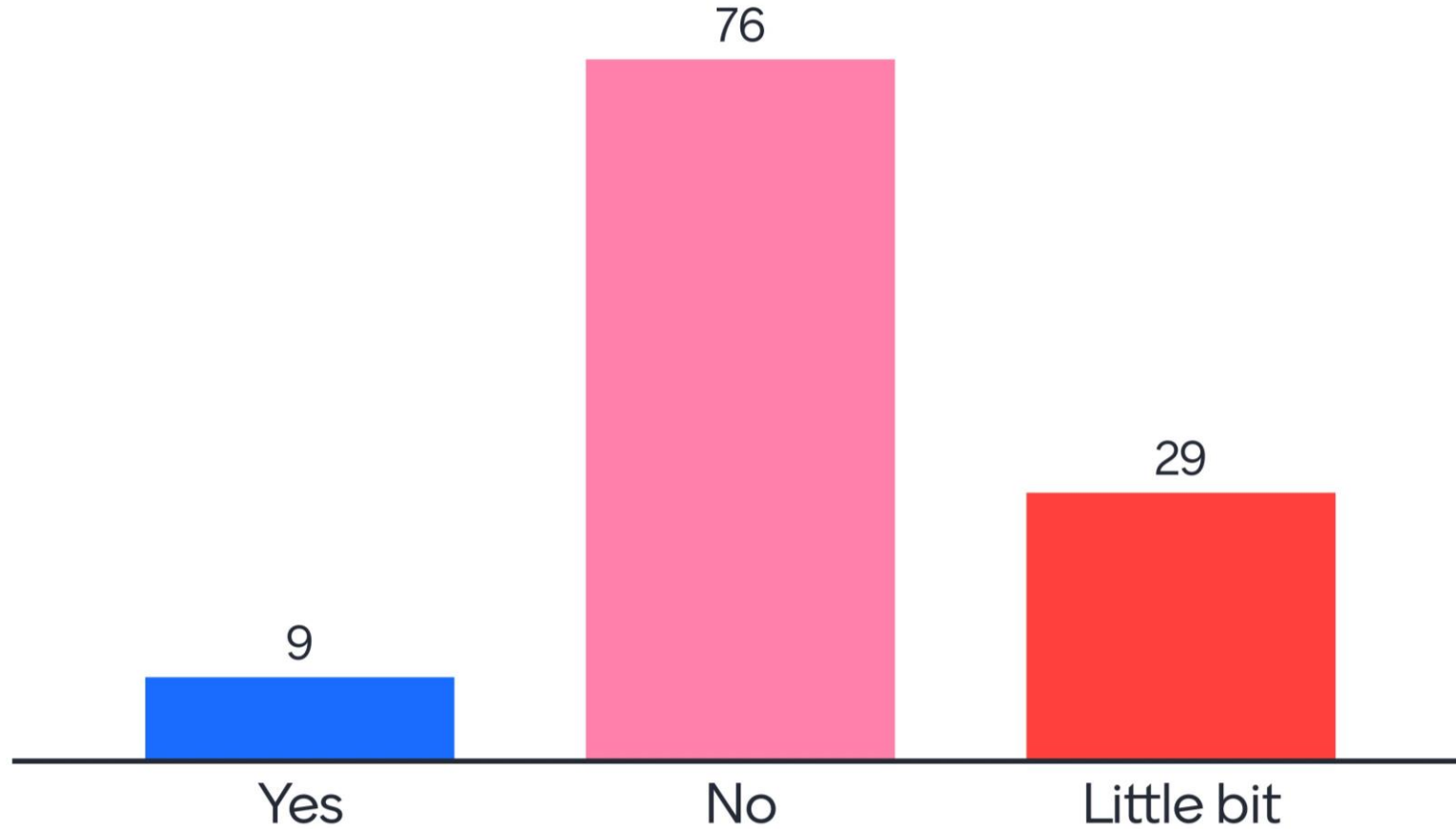
Te Kokiringa Taumata

Canterbury-Westland Bay

My passion is planning  
done with:  
Fearless collaboration,  
Curiously for ideas,  
Inclusive,  
Respect diversity,  
Data analytics,  
Being bold,  
Always learning,  
Agile

**“Tech tools enhance planning decisions”**

# Do understand what PlanTech is?



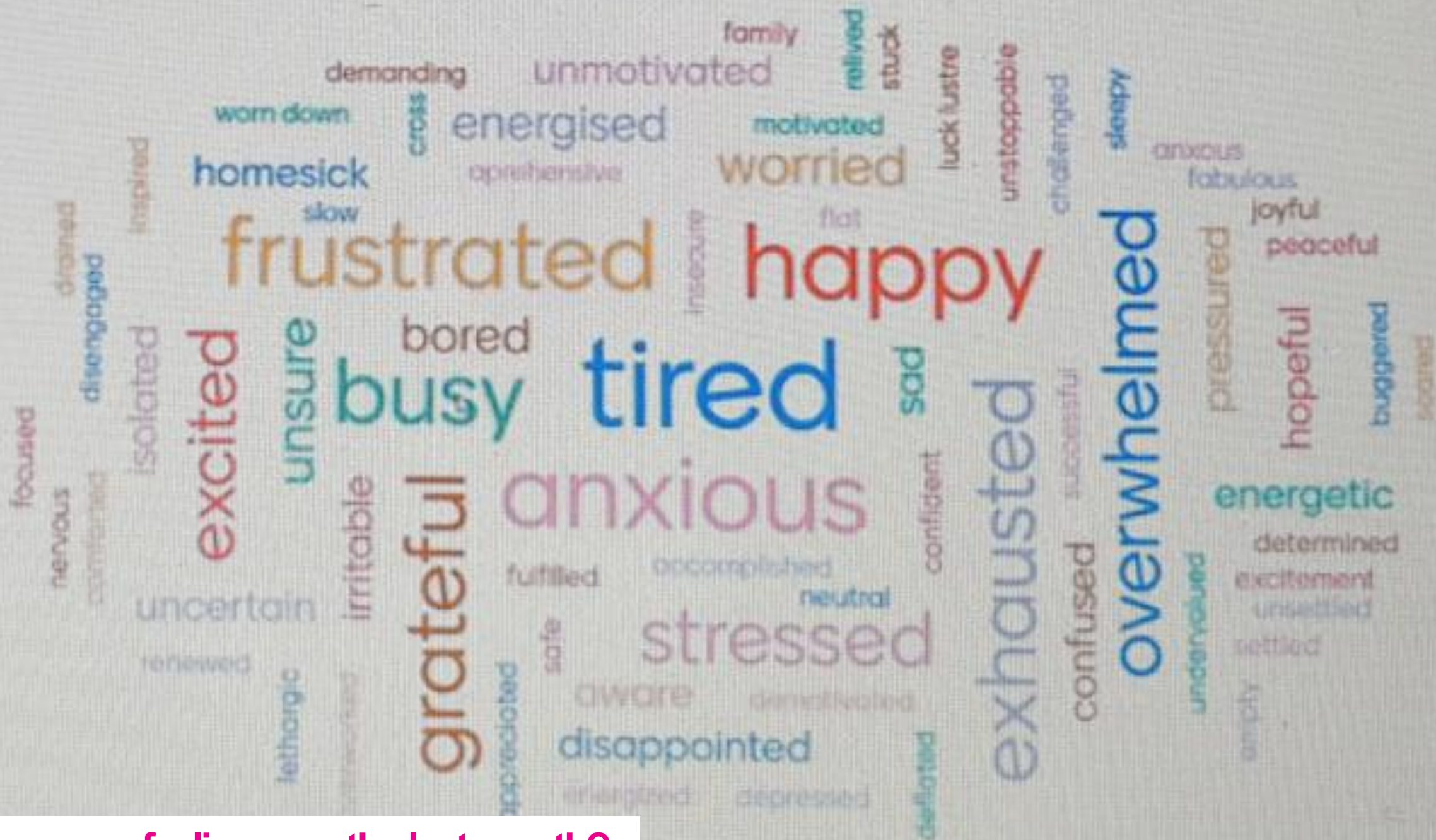


# What's stopping PlanTech being part of toolbox



Mentimeter 19 March 2021





How are you feeling over the last month?







# PlanTech

**Developing practice for emerging technologies and digital innovation for how we plan.**

**PlanTech focuses on technology to create better outcomes for our communities and the environment**

# Our journey it's just beginning

Digital environment  
Digital literacy  
Some digital tools



# Minecraft

World of Te Ao Māori





# Digital environment

# Digital Government

<https://www.digital.govt.nz/>

# Open Government Partnership“

**Active citizenship means people getting involved in their local communities and democracy at all levels, from towns to cities to nationwide activity. Active citizenship can be as small as a campaign to clean up your street or as big as educating young people about democratic values, skills and participation. Active citizenship is one of the most important steps towards healthy societies.”**

Source: <https://www.opengovpartnership.org/active-citizenship-and-partnership> definition originally from Andrej Nosko & Katalin Széger Active Citizenship Can Change Your Country for the Better (2013)

# Open Government - National Action Plan

An effective National Action Plan is one where, working together, New Zealanders develop commitments that further the OGP goals of strengthening democracy, building trust, and improving wellbeing

Transparency, participation and accountability are at the heart of open government:

- Transparency means citizens understand the workings of their government and its relevance to them
- Participation means citizens can influence the workings of government by engaging with public policy processes and public service providers
- Accountability means citizens can hold the government to account

New Zealand's 4th Open Government Partnership National Action Plan (NAP4) submission close 4<sup>th</sup> April 2021

- Source <https://ogp.org.nz/open-government-partnership/open-government/>



# NZ Intergenerational Wellbeing



**“...‘huge’ gaps in data and knowledge undermine our stewardship of the environment and is calling for concerted action to improve the system.”**

**Simon Upton, Environment Commissioner**

**07 November 2019**

# Fractured System

Statutes	Statutes cont.	Tools	Govt	Stakeholders
<ul style="list-style-type: none"> <li>• RMA 1991</li> <li>• Environment reporting Act 2015</li> <li>• Biosecurity Act 1993</li> <li>• Local Government Act 2002</li> <li>• Local Government (Auckland Council) Act 2009</li> <li>• Heritage Zealand Pouhere Taonga Act 2014</li> <li>• Environment Protection Authority Act 2011</li> <li>• Kāinga Ora–Homes and Communities Act 2019</li> <li>• New Zealand Infrastructure Commission/Te Waihanga Act 2019</li> <li>• EEZ Act 2002</li> <li>• Waste Minimisation Act 2008</li> <li>• Marine Reserves Act 1971</li> <li>• Reserves Act 1977</li> <li>• Conservation Act 1987</li> <li>• Queens Elizabeth II National Trust Act 1977</li> </ul>	<ul style="list-style-type: none"> <li>• Electricity Act 1992</li> <li>• Gas Act 1992</li> <li>• Land Transport Management Act 2003</li> <li>• Building Act 1991</li> <li>• Infrastructure (Amendments Relating to Utilities Access) Act 2010</li> <li>• Energy Efficiency &amp; Conversation Act 2000</li> <li>• Housing Accords and Special Housing Areas Act 2013</li> <li>• Climate Change Response (Zero Carbon) amend Act 2019</li> <li>• Ozone Layer Protection Act 1996</li> <li>• Marine Mammals Protection Act 1978</li> <li>• Wildlife Act 1953</li> <li>• Native Plants Protection Act 1934</li> <li>• Continental shelf Act 1964</li> <li>• Crown Pastoral Land Act 1998</li> <li>• Civil Defence Emergency Management Act 2002 and National Civil Defence Emergency Management Plan 2015</li> <li>• International agreements eg Paris Agreement</li> </ul>	<ul style="list-style-type: none"> <li>• Treaty settlements</li> <li>• Regulations</li> <li>• NPS</li> <li>• NES</li> <li>• Planning Standards</li> <li>• RPS</li> <li>• Coastal Plans</li> <li>• Regional/Unitary/District Plans</li> <li>• Bylaws</li> <li>• Budget – Wellbeing context</li> <li>• Data and monitoring eg Environment Aotearoa 2019</li> <li>• Enforcement tools eg fines</li> <li>• Spatial Plans,</li> <li>• Local Plans eg Long term and Annual, or Infrastructure</li> <li>• Consents</li> <li>• Water take permits</li> <li>• Coastal permits</li> <li>• Licenses eg exploration</li> <li>• Concessions on conservation land</li> <li>• New Zealand Heritage List</li> <li>• National Civil Defence Emergency Management Plan</li> <li>• National Disaster Resilience Strategy</li> <li>• Archaeological authority</li> <li>• Heritage covenants</li> <li>• National Guidelines eg Australian and New Zealand Guidelines for Fresh and Marine Water Quality</li> <li>• Local guidelines eg Urban design or subdivision</li> <li>• Awards</li> <li>• Research grants</li> </ul>	<ul style="list-style-type: none"> <li>• MfE</li> <li>• MBIE</li> <li>• MHUD</li> <li>• MPI</li> <li>• MoT</li> <li>• EPA</li> <li>• Kāinga Ora</li> <li>• Treasury</li> <li>• DoC</li> <li>• Stats NZ</li> <li>• Heritage NZ</li> <li>• DIA</li> <li>• QEII Trust</li> <li>• Regional Councils</li> <li>• Local Councils</li> <li>• National Emergency Management Agency (NEMA)</li> <li>• Justice incl Environment Courts</li> <li>• Treaty of Waitangi Tribunal</li> <li>• NZ Police</li> <li>• Environment Commissioner</li> <li>• Independent Climate Change Commission</li> <li>• Crown Infrastructure Partners</li> <li>• Infrastructure Commission</li> <li>• New Zealand Utilities Advisory Group Inc (NZUAG)</li> <li>• NZTA</li> <li>• Transpower</li> <li>• Kiwirail</li> <li>• LINZ</li> <li>• Water Services Regulator</li> <li>• New Zealand Lifelines Council (NZLC)</li> </ul>	<ul style="list-style-type: none"> <li>• New Zealanders</li> <li>• Mana whenua iwi/hapu</li> <li>• NZPI</li> <li>• Law Society, NZILA</li> <li>• RMLA</li> <li>• NIWA</li> <li>• GNS Science</li> <li>• ENA</li> <li>• TCF</li> <li>• EDS</li> <li>• Forest &amp; Bird</li> <li>• Rural Sector</li> <li>• Fish &amp; Game</li> <li>• Sustainable Business NZ</li> <li>• Infrastructure NZ</li> <li>• Water sector</li> <li>• Forestry Sector</li> <li>• Ports</li> <li>• Airports</li> <li>• First Gas/gas sector</li> <li>• Oil industry</li> <li>• Fishing industry</li> <li>• Water NZ</li> <li>• Heritage</li> <li>• Archaeologists</li> <li>• Etc</li> </ul>



# Massive Environment Govt program

- RM system reforms – whole new system
- RMA national direction under development, including for: freshwater management, urban development, highly productive land, indigenous biodiversity, historic heritage & aquaculture
- RMA and Crown relationship obligations in existing Treaty of Waitangi Settlement Acts
- Climate Change Response (Zero Carbon) Amendment Act, and directions to transition to a low emissions and climate-resilient New Zealand – Climate commission established
- National Climate Change Risk Assessment, and implications for a future National Adaptation Plan
- Alignment of regulatory frameworks for natural hazards and climate change under the Community Resilience Group (cross-government programme)
- Urban Growth Agenda – driven out of MHUD
- Kāinga Ora – Homes and Communities Act 2019 & Urban Development Act 2020
- Review of Three Waters regulation: drinking water, wastewater and stormwater management
- Building System Legislative Reform Programme
- Strengthening Heritage Protection work programme
- Open ocean aquaculture project
- Productivity Commission Inquiry into Local Government Funding and Financing
- Infrastructure Strategy, Funding & Infrastructure Commission
- Water Services Bill – Plus new Water Regulator

*The Minister for the Environment should provide national direction on how to incorporate Māori perspectives and mātauranga Māori in the environmental monitoring system.*

*The national environmental monitoring system should support the operation of both the Natural and Built Environments Act and the Environmental Reporting Act.*

*We recommend central government devotes attention to building science and data capability in both central and local government.*

# Panel RM report – technology?

*The Ministry for the Environment should work with other central government agencies to develop stronger monitoring frameworks and strategies for filling data and information gaps.*

*Council plan-making is often criticised for being slow, prone to litigation and unresponsive to changes in technology, community values and economic drivers.*

# Scotland National Strategy

SG Purpose	To focus government and public services on creating a more successful country, with opportunities for all to flourish, through increasing sustainable economic growth.										
SG National Outcomes	The planning system and service contribute to all 16 National Outcomes										
SG National Plans, Policies & Strategies	Government Economic Strategy										
	Infrastructure Investment Plan										
	Scotland's Digital Future	Electricity & Heat Generation Policy Statements	2020 Challenge for Scotland's Biodiversity	Scottish Historic Environment Strategy and Policy	Housing Strategy	National Planning Framework & Scottish Planning Policy	Land Use Strategy	Low Carbon Scotland: Report of Proposals and Policies	National Marine Plan	Regeneration Strategy	National Transport Strategy
Planning Vision	We live in a Scotland with a growing, low carbon economy with progressively narrowing disparities in well-being and opportunity. It is growth that can be achieved whilst reducing emissions and which respects the quality of environment, place and life which makes our country so special. It is growth which increases solidarity – reducing inequalities between our regions. We live in sustainable, well-designed places and homes which meet our needs. We enjoy excellent transport and digital connections, internally and with the rest of the world.										
Planning Outcomes	Planning makes Scotland <b>a successful, sustainable place</b> – supporting sustainable economic growth and regeneration, and the creation of well-designed places.			Planning makes Scotland <b>a low carbon place</b> – reducing our carbon emissions and adapting to climate change.		Planning makes Scotland <b>a natural, resilient place</b> – helping to protect and enhance our natural and cultural assets, and facilitating their sustainable use.			Planning makes Scotland <b>a connected place</b> – supporting better transport and digital connectivity.		
National Planning	Scottish Planning Policy (SPP)						National Planning Framework (NPF)				
	Principal Policies										
	Sustainability			Placemaking							
	Subject Policies										
	Town Centres	Heat and Electricity	Natural Environment		Travel	<div>Cities and Towns</div> <div>Rural Areas</div> <div>Coast and Islands</div> <div>National Developments</div>					
	Rural Development		Green Infrastructure								
	Homes										
	Business & Employment	Zero Waste	Aquacultural		Digital Connectivity						
	Historic Environment		Minerals								
	Flooding & Drainage										
	COMMUNITY PLANNING										
Strategic	Strategic Development Plans										
Local	Local Development Plans										
Site	Master Plans										

# National Digital Infrastructure Model - National Digital Twin

Figure 1: The information value chain

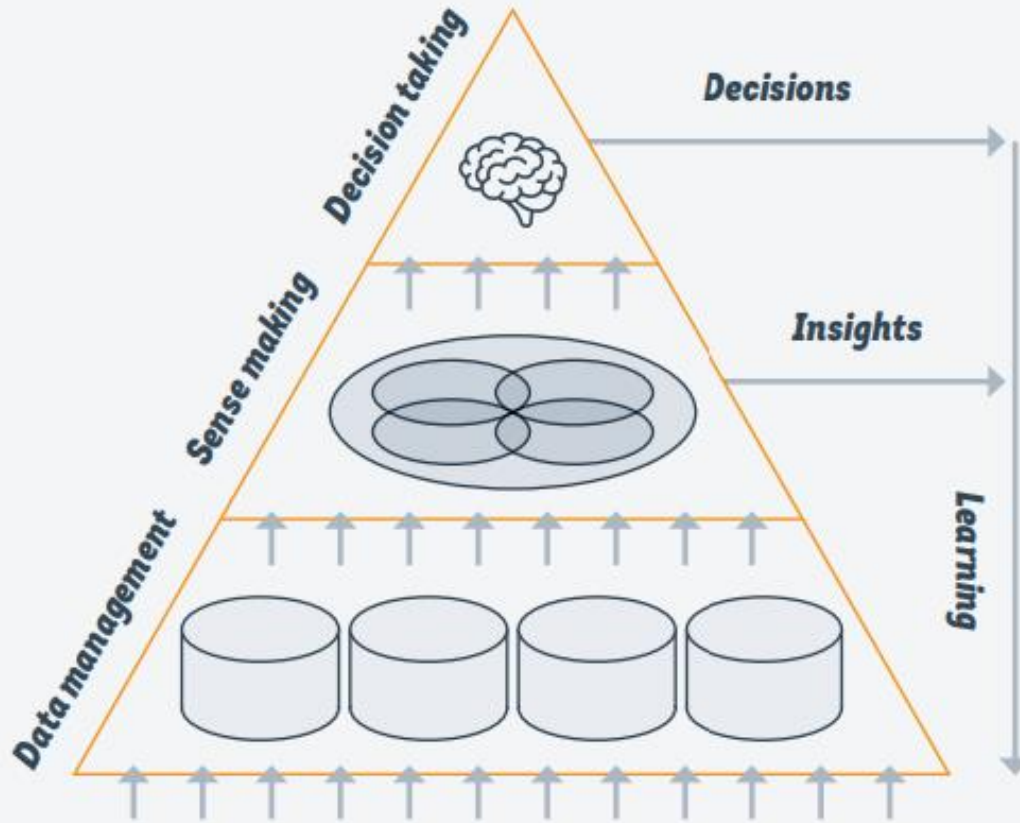
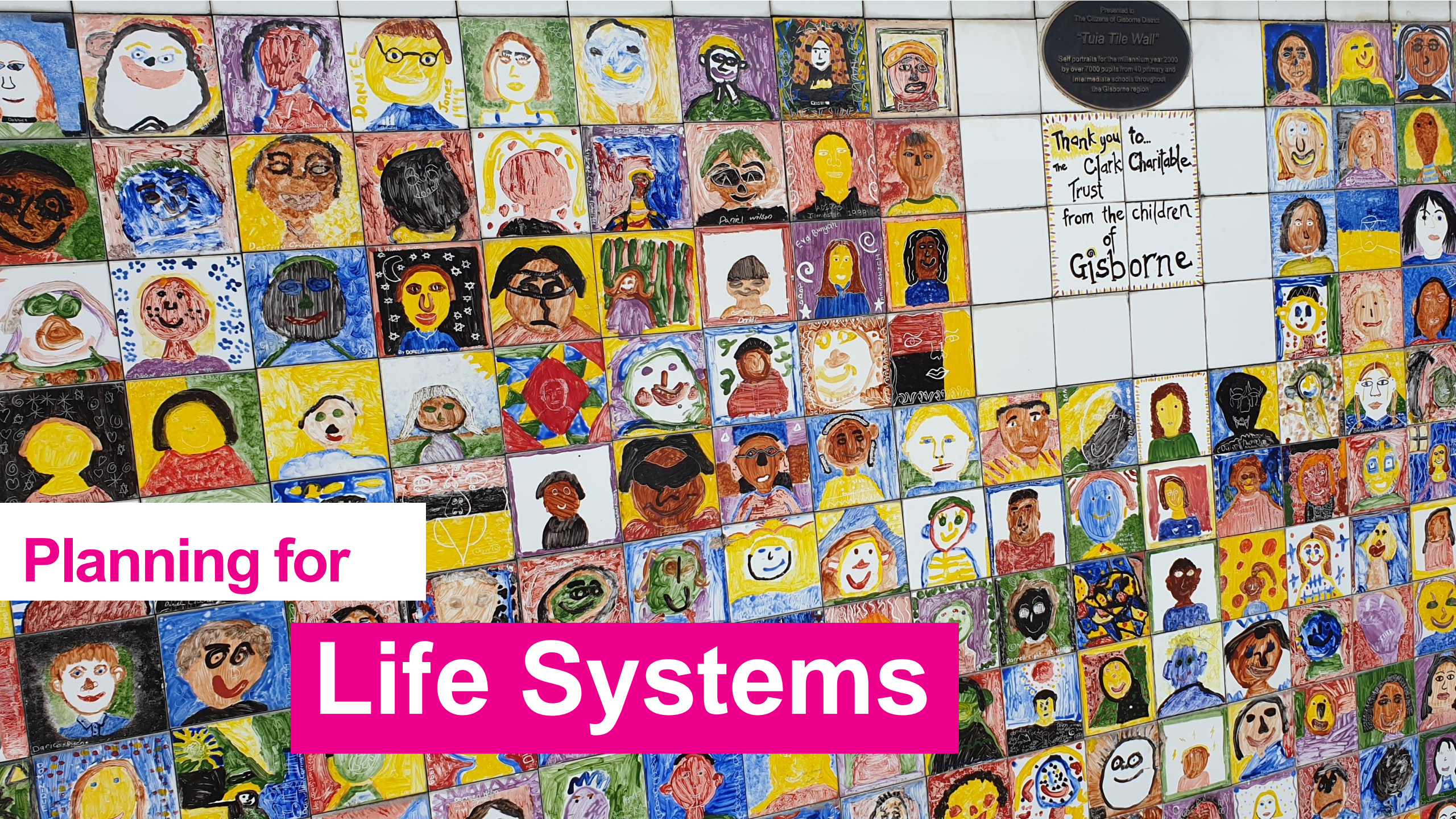


Figure 3: Why we need a National Digital Infrastructure Model







Presented to  
The Citizens of Gisborne District  
"Tuia Tile Wall"  
Self portraits for the millennium year 2000  
by over 7000 pupils from 40 primary and  
intermediate schools throughout  
the Gisborne region

Thank you to...  
the Clark Charitable  
Trust  
from the children  
of  
Gisborne

Planning for

Life Systems



**“A vigorous culture capable of making corrective, stabilizing changes depends heavily on its educated people, and especially upon their critical capacities and depth of understanding.”**

**Jane Jacobs**

# People & space Connected all around the world



**Digital innovation:**  
**Working together and really**  
**listening to people – everyone**  
**to the tech-savvy – to redesign**  
**services to better meet the**  
**needs of all New Zealanders**

# Digital you being a Planner - Big question

## Digital Skills –

- Good planners need to the ability to piece together, communicate and create pathways to decisions.
- Digitally that means skills to acquire and analyse data in digital platforms, particularly spatially- and to engage confidently, authentically and knowledgeably in conversations about the conclusions coming from that data.
- To communicate these conclusions planners need the skills to create basic visualisations, both for their work and to be able to critique and manage the outputs of multidisciplinary teams as part of planning processes.
- most importantly planners need to be able to explain the data and democratic ethics being applied digitally and be conversant with digital democratic and decisions support systems.

## Digital professionals –

- We must recognise that we are a digital profession – even if it means that we are not doing the coding and software development ourselves.
- Partnership, collaboration or working alongside other digital professionals, particularly service designers, software developers, geospatial & BIM professionals and digital engagement professionals to name a few.
- We already work as multi-disciplinary teams from across an organisation/s using digital capabilities to create better plans and processes.
- Rules as code and digital twin spaces.



# Digital you being a Planner - Big question

- Planning Institute of Australia - digital principle about “planning needs to reimagine community engagement”.
- “Reimagine” all the working relationships.
- Don’t wait as planners in a system and proactivity explore where planning is now being done and offer our skills and get ourselves involved.
- Look at how other sectors or processes work e.g. legal, architect, urban landscapes, accounting, planning lacks some the critical digital technology components that these sectors thing of as commonplace. Data is a big one, and there are multiple levels in which that interconnects with planning.
- We probably most critically need people who can connect these two very different worlds so that we have a common language to communicate in. This is where we could make much better use of our younger ones coming in to the profession.
- A non planning example NZ Covid strategy wouldn’t have been created without the data experts (collecting, modelling, forecasting/scenario testing), (tracing) app providers, digital communication experts, peer testing and the principle that every citizen is involved in the effort.
- These are all areas of expertise we could augment into the planning system to great effect. Plus business process automation given what we do.



PlanTechNZ

# PlanTechNZ

1. Establish the group and relaunch at Conference
2. Explore, within the PlanTechNZ membership, the opportunities and challenges of emerging technologies and planning in NZ
3. Introduce the wider NZPI membership to emerging technologies and what opportunities and challenges it brings to our practice
4. Advise the NZPI Board about any emerging technology issues the profession should address e.g. when making policy submissions, NZPI strategy work
5. Establish relationships with stakeholders outside planning – e.g. other professional bodies, tech providers, digital government, local government
6. Connect with PlanTech groups worldwide to contribute to the international conversation on PlanTech

Monthly workshops

Free to join

Every planner is welcome



# Mindset

## Reboot

### **Restricted mindset**

self limiting,  
victimised, process  
driven, blamed i.e.

RMA, avoids  
challenge, gives up  
easily, sees effort as  
fruitless, ignores  
feedback and is  
threatened by  
others



**Open mindset, curious,**  
seeks opportunities,  
embraces challenges,  
persists against  
obstacles, seeks and  
learns from feedback,  
inclusive, adaptive,  
evolving, energised,  
sees effort as necessary  
and is inspired by the  
success of others



# Digital/Innovation Strategy

- Have a strategy
- Digital vision
- Where are we going next
- Digital stocktake
- What problems are you trying to solve for our customers
- Collaboration is the norm
- Funding
- Pick the innovations of most benefit – kill those ideas that don't work fast

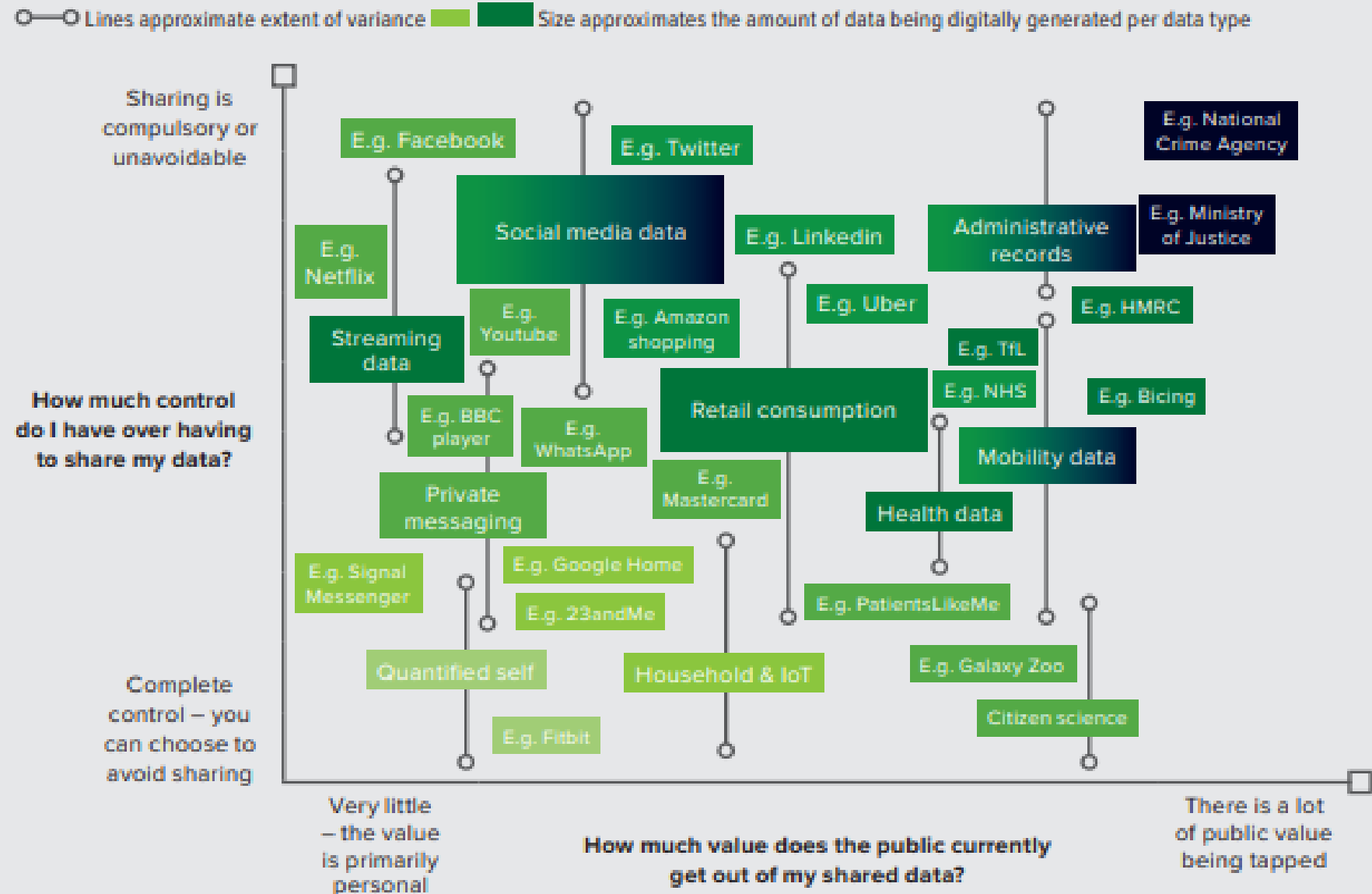
## What's the problem/question?

# Tech - only part of the Story

# Governance

- Governance
- Digital literacy
- Privacy
- Bias
- Security
- Education
- Adaption
- Legislation
- Funding
- Digital Ownership

**FIGURE 26: The current landscape of data governance**



SOURCE: Adapted from Nesta. Licensed under CC-BY-NC-SA 4.0 International.



**“..use of technology such CCTV, which is not pervasive throughout our community. These are difficult ethical question sitting in of technology..”**

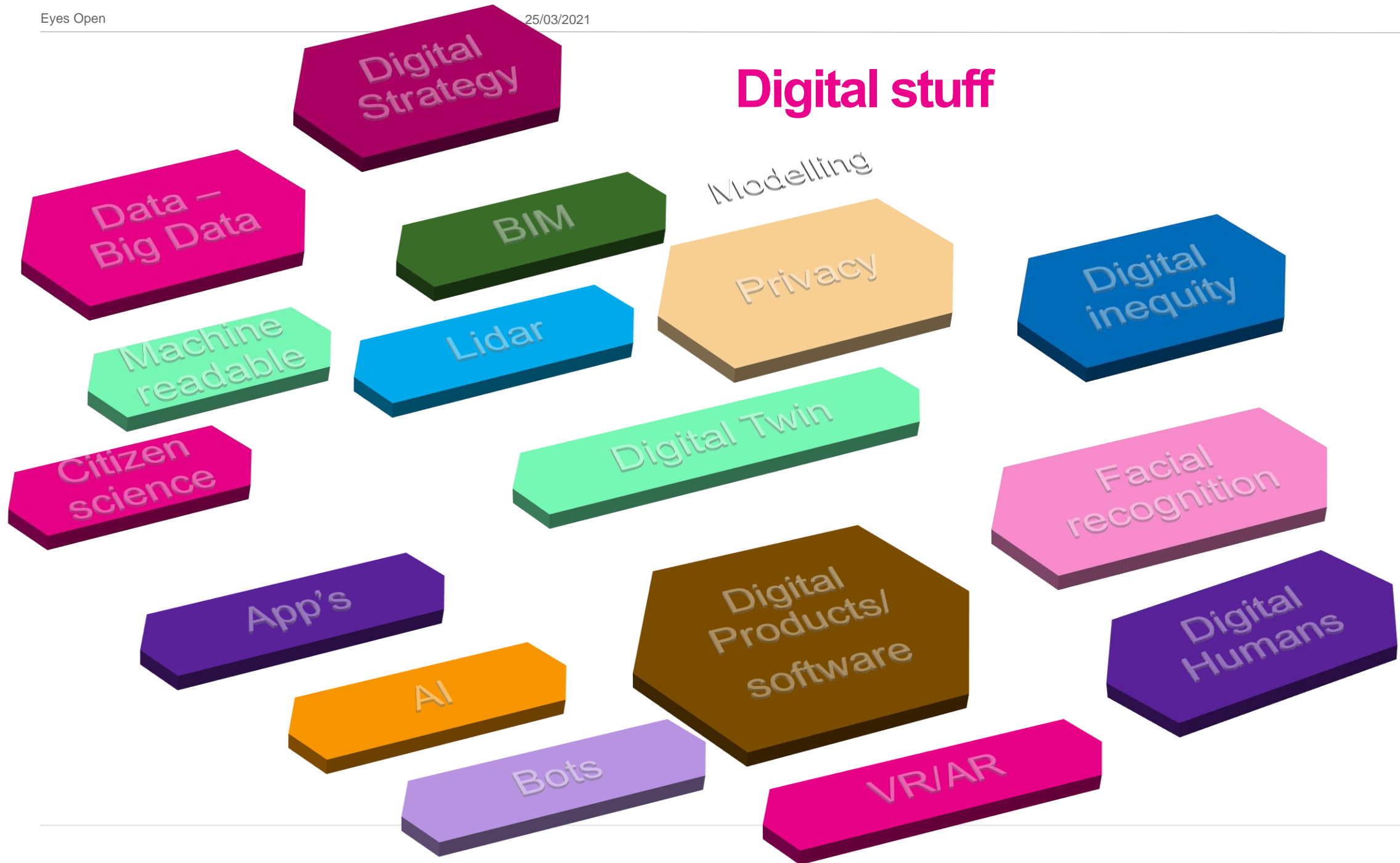
Source; Andrew Coster , Herald 11 March 2021

# Privacy

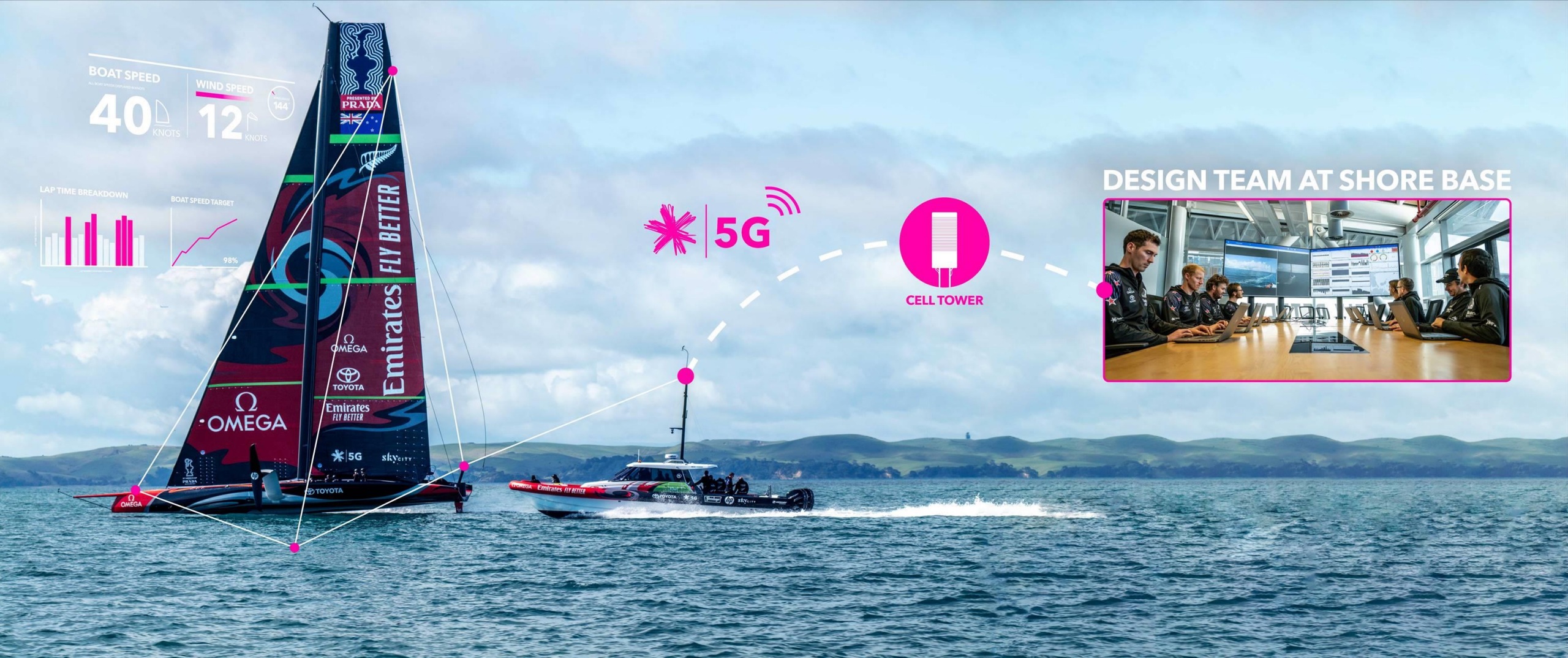
## NZ Privacy Act 2020

- Protection of personal information
- Everyone's data is valuable
- Privacy settings
- Risks company actively change privacy settings to maximise the amount of information you publish
- Privacy policies & processes are critical
- Aggregated data is being used to solve a problem, not to breach anyone's privacy
- [Disconnect.Me](#) and [Jumbo](#) act as something like a digital concierge for their users, tweaking privacy settings, deleting sensitive data and throwing a spanner into the inner workings of surveillance capitalism

# Digital stuff







DESIGN TEAM AT SHORE BASE



# Professionals & Tech

# Building Information Modelling (BIM)

- Architecture, engineering and construction, the BIM system is revolutionising how infrastructure & buildings are designed, constructed and operated and maintained.
- Government funded building projects must now utilise BIM and it is similar in other countries such as the US and UK. As other professions come together around the project's BIM hub, we need to ensure that planners are not left out of the conversation.
- Planners have a critical role in the development of buildings, activities and urban spaces and if we are to continue to have this role we need to understand more about the BIM process.
- Visualised via other emerging technologies such as digital twins, virtual reality/mixed reality, artificial intelligence, big data and machine learning.

# Machine readable

Machine-readable data as data in a format that can be easily processed by a computer without human intervention while ensuring no logical semantic meaning is lost.

## Collaboration – just the norm



# Rules and Legislation as Code

- Rethinking the way we develop and express the rules of regulatory systems, ensuring they work for us in a digital world
- Software code can then easily be used in our devices and systems to assist people and businesses to understand, benefit from, and comply with legislation
- Force us to look at the background evidence to justify the role; what the purpose or intended outcome; monitoring or proof of compliance
- Automation
- Multi-disciplinary team using human-centred design techniques – focused on the end user/customer. Bringing together all of the people invested in developing and implementing a regulatory system – the policy analysts, planners, BIM managers, lawyers, legislative drafters, the service designers, the software engineers and end users plus many more
- Check out what's happening in Wellington City is doing or Tauranga City or The Service Innovation Lab <https://serviceinnovationlab.github.io/projects/legislation-as-code/>

# BETTER RULES FOR BETTER OUTCOMES

Eyes Open

25/03/2021

TO EXPLORE  
A NEW APPROACH TO HOW WE CREATE AND IMPLEMENT RULES THAT BOTH PEOPLE AND MACHINES CAN EASILY UNDERSTAND.

# THE OPPORTUNITIES

40

WE BUILD RULES USING A NEW APPROACH WITH PEOPLE EXPERIENCE (BOTH FOR PEOPLE AND THE BUSINESSES THAT IMPLEMENT THEM) AT THE CENTRE. RULES THAT ARE:

- EASY TO UNDERSTAND
- EASY TO USE

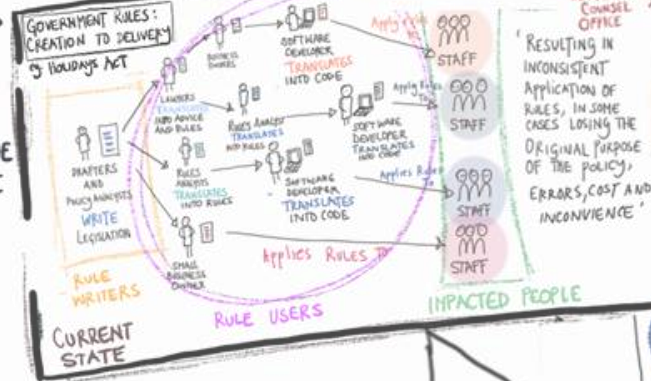
ENABLING DIGITAL SERVICES WHERE POSSIBLE BUT WILL RESULT IN BETTER OUTCOMES EVEN IN PAPER BASED PROCESSES

A JOINT SERVICE INNOVATION AND BETTER FOR BUSINESS INITIATIVE

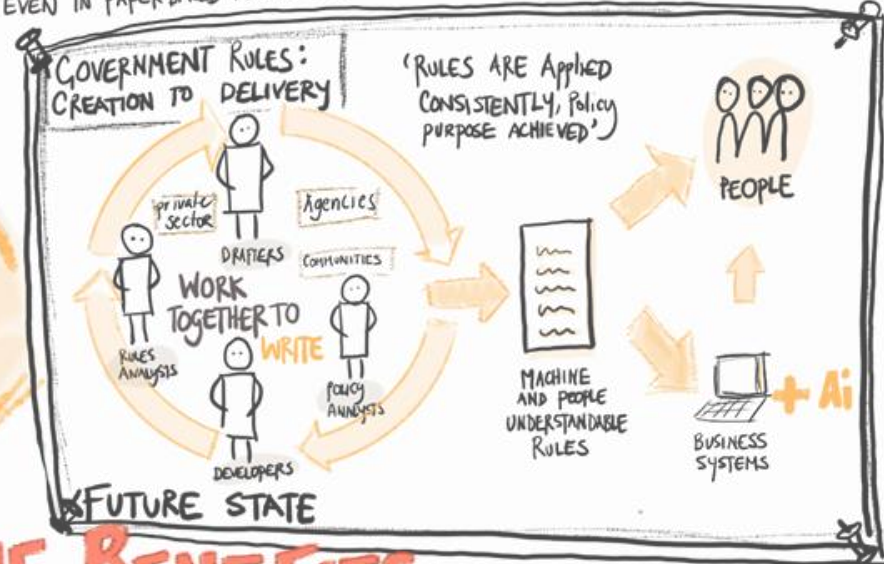
## THE PROBLEM

GOVERNMENT RULES HAVE TRADITIONALLY BEEN DEVELOPED FOR A PAPER BASED ENVIRONMENT AND THEN TRANSLATED BY PEOPLE INTO BOTH DIGITAL AND NON-DIGITAL ENVIRONMENTS

- ↳ RULES ARE INTERPRETED AND APPLIED INCONSISTENTLY BY THE MULTIPLE PARTIES USING THEM
- ↳ RULES ARE HARD TO UNDERSTAND AND ARE OFTEN MISUNDERSTOOD BY THE PEOPLE IMPLEMENTING THEM, AND THE PEOPLE THEY IMPACT.



WE DID A 3 WEEK Collaboration



## THE BENEFITS...

THE NEW APPROACH WILL ALLOW MULTI AGENCY AND MULTI-SKILLED TEAMS TO WORK TOGETHER TO CREATE GOVERNMENT RULES FASTER, EASIER AND BETTER RESULTING IN BENEFITS FOR...

IMPACTED PEOPLE



- RULES ARE EASIER TO UNDERSTAND
- EASIER TO DESIGN SERVICES AROUND PEOPLE
- EASIER TO DESIGN SERVICES USING NEW TECHNOLOGIES LIKE SELF-SERVICE, XOFFICIAL INTELLIGENCE

RULE USERS



- REDUCED RISK FROM RULES BEING MISINTERPRETED
- RULES ARE CONSISTENTLY APPLIED AND MANAGED ACROSS AGENCIES
- WHO'S, COMMUNITIES, SOCIAL ENTERPRISES AND PRIVATE SECTOR CAN PARTICIPATE IN THE FORMING OF BETTER RULES
- QUICKER ABILITY TO COMPLY WITH LEGISLATIVE CHANGES

RULE WRITERS



- RULE OUTCOMES ARE EASY TO MODEL AND TEST
- CHANGES CAN BE MADE QUICKER AND EASIER
- RULES ARE FASTER TO CREATE AND IMPLEMENT INTO SERVICES
- IMPROVED ACCOUNTABILITY THROUGH BETTER DECISIONS AND MEASUREMENT OUTCOMES
- FUTURE PROOFING THE WAY POLICY IS CREATED AND DELIVERED

## Our 2 YEAR GOALS

- ★ A GLOBAL COMMUNITY (IN & OUTSIDE GOV) THAT SUPPORTS AND PROMOTES A BETTER RULES APPROACH
- ★ A BETTER RULES APPROACH IS USED AS STANDARD WHEN DEVELOPING POLICY IN NEW ZEALAND GOVERNMENT
- ★ OUR COMMUNITY HAS DEFINED A FRAMEWORK AND STANDARDS FOR NZ THAT ENABLES CONSISTENT, CO-ORDINATED AND REUSABLE RULES
- ★ PARLIAMENTARY COUNCIL OFFICE IS ABLE TO MANAGE MACHINE UNDERSTANDABLE LEGISLATION
- ★ WE HAVE CASE STUDIES THAT HELP US SHARE

THE NEXT 3-6 MONTHS

## DELIVER



PEOPLE HAVE EASY ACCESS TO PUBLIC SERVICES WHICH



# Evidence

Research and Evaluation Unit, RIMU

supports and informs the council's core function, which includes planning for growth and meeting legislative requirements under the Resource Management Act 1991 and the Local Government Acts in relation to social, economic, land use and environmental issues

Foster innovative and collaborative approaches to the complex issues Auckland faces now and in the future

- collecting and managing qualitative and quantitative data
- analysing data using statistical analysis and modelling
- learning from others, including bench-marking and international comparisons
- looking forward by using scenario development and forecasting
- monitoring national and international trends, events and government policy developments.

Source <https://knowledgeauckland.org.nz/about/>



# LiDAR 3D mapping

- LINZ <https://www.linz.govt.nz/>
- LiDAR is Light Detection and Ranging, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges
- Collaboration of an Australian/New Zealand 3D Cadastral Survey Data Model and Exchange (3D CSDM) programme
- Satellite-based augmentation system (SBAS) to improve the accuracy of GPS - useful for intelligent transport systems like driverless cars, unmanned aerial deliveries, as well as precision agriculture and smart phone-based services
- First 3D geographic mapping - 3 March 2020 Marlborough, Tasman and Hawkes Bay co-fund contracts with aerial data suppliers.
- Expanding to Bay of Plenty, West Coast, Waikato, Canterbury and Southland regions
- Hawkes Bay Regional Council, said the LIDAR data would enable the creation of 3D models of the landscape that would support the region's economic development
- Used for land management decisions, roading design, precise understanding of sea-level rise impacts, stormwater design, and geohazard mapping including ground surface change, faults, liquefaction and slips
- Stuart Crosby (LGNZ) "funding would smash the affordability problem" that prevented smaller councils from undertaking such mapping and make it cheaper for both the private and public sectors to access the high-quality elevation data needed for good decision making"
- The LINZ National Elevation Programme provides LiDAR based elevation open data for much of New Zealand. This data provides significant value to both the public and private sectors for applications including land management, natural hazards, climate change, 3D visualisation, surveying, engineering, construction, communications, archaeology,
- SouthPAN will augment standard positioning capability provided by GPS and Galileo across all of Australia and New Zealand, improving the accuracy of positioning from 5-10 metres to 10 centimetres without the need for mobile or internet coverage

## Air Quality Sensors



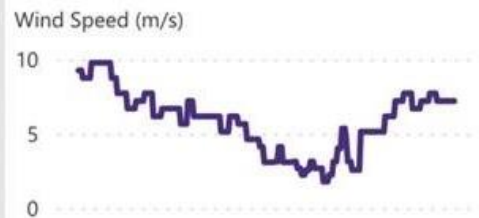
Sensors Online:

100%

Are pollutants at safe levels in Central Auckland?

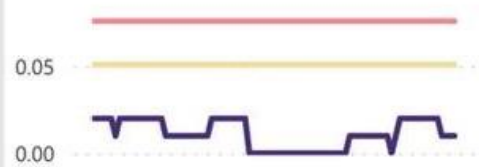
Carbon Monoxide: Ozone:   
Sulfur Dioxide: Nitrogen Dioxide:

How have gas concentrations behaved over the last 3 days?

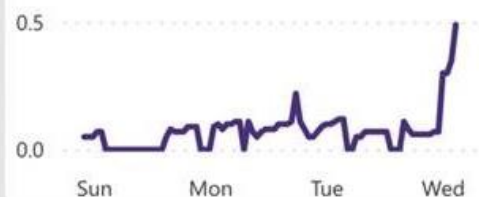


Ozone Concentration (ppm)

— O<sub>3</sub> — 8 Hour Limit — Hour Limit



Carbon Monoxide Concentration (ppm)



## Smart Bins

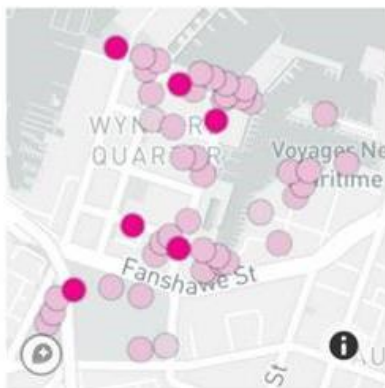


Sensors Online:

100%

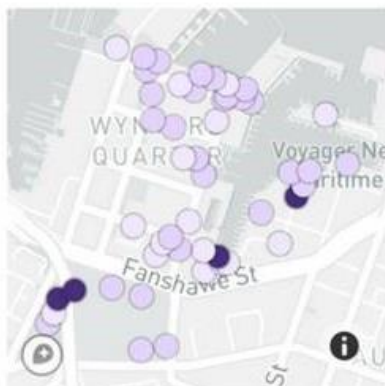
Which bins need to be emptied?

Current Fill (%): 0-10 10-90 90-100



Which bins fill the fastest?

Daily Increase (%): 0-15 15-30 30-100



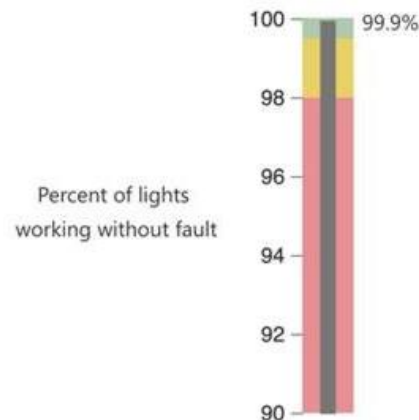
## Smart Street Lights



Sensors Online:

100%

Are all lights working as intended?



Light **Madden St N6** is using above average power.

Working as intended: Has an issue:



## Parking Sensors



Sensors Online:

100%

Are the car park spaces at Victoria Park Cricket Club Carpark used efficiently?

Number of car parks filled over the past 3 days



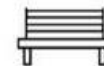
Breakdown of average car park usage over a week

Time	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Early Morning	4	3	2	3	2	1	2
Morning	11	22	19	24	18	21	20
Noon	24	26	26	27	24	24	25
Afternoon	12	24	19	26	22	17	27
Evening	18	23	20		19	15	21
Night	5	6	7	2	5	6	8

[View past week](#)

[View all time](#)

## Smart Benches



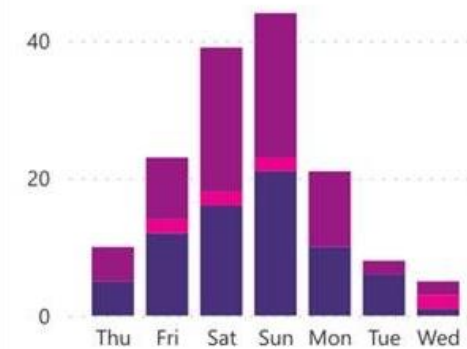
Sensors Online:

100%

Has smart bench usage over the past week been affected by weather?

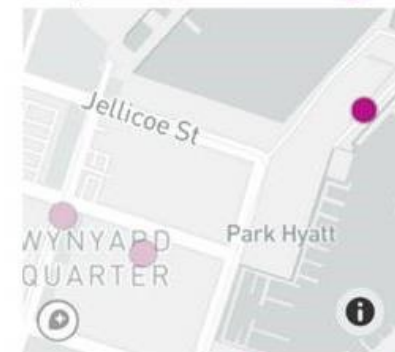
Wireless Charges USB Charges WiFi Users

Weather:



How often is each bench used?

High Use: Low Use:



# Citizen Science – enabling people to participate

Citizen science is now recognised as an important method of data collection, a means for enhancing the public understanding of science, and of strengthening links between professional scientists and community members

Check out some of these:

Niwa developed a number projects – you can support via an app et rainfall

<https://niwa.co.nz/climate/information-and-resources/citizen-science-new-zealand-rainfall-monitoring-network>

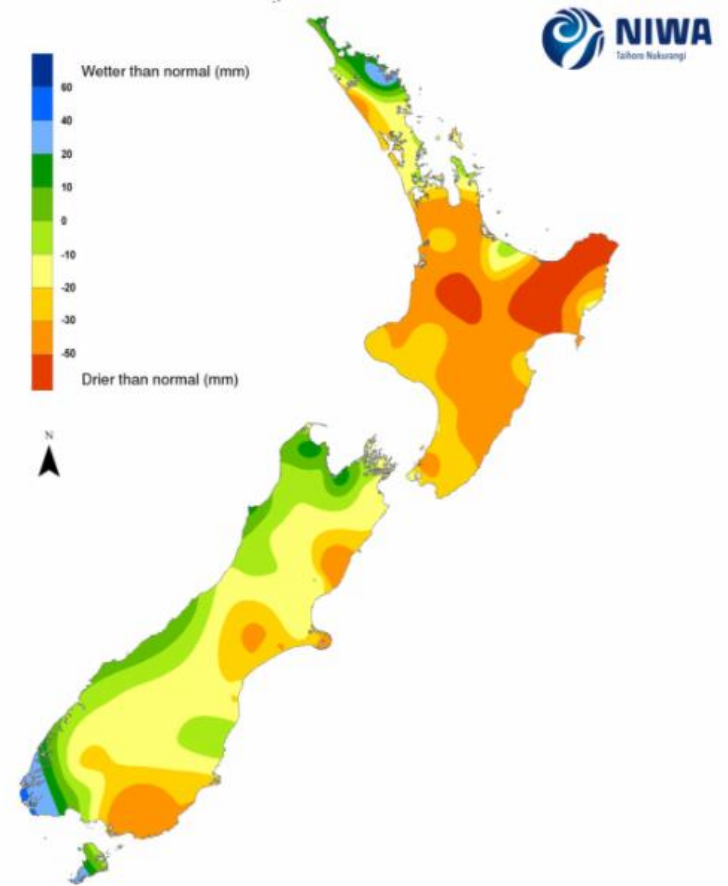
Science Learn NZ

[https://www.sciencelearn.org.nz/citizen\\_science](https://www.sciencelearn.org.nz/citizen_science)

Curious Minds is a New Zealand Government initiative

<https://www.curiousminds.nz/funding/participatory-science-platform/>

Soil moisture anomaly (mm) at 9am on 04/03/2021



Soil moisture anomaly (mm) at 9am on 11/03/2021



# Diversity

Microsoft – Include program

Smart Christchurch <https://smartchristchurch.org.nz/>

Wellington & Horowhenua (draft) Regional Growth Framework 2021

**Diagram 7: Mana whenua aspirations regarding this Framework**



## \_our purpose

To trial technology and approaches that accelerate Christchurch becoming a city of opportunity for all – a city where anything is possible.

## \_our vision

To promote Christchurch as an exemplar open and connected city, showcasing solutions that make life better and are replicated by others.

## \_our mission

Making it better for people in Christchurch by delivering rapid proof-of-concept projects that promote the power of:

- Open data, open platform, open city.
- Aggregating and visualising real-time data.
- Leveraging the collective genius around us.
- Removing barriers to access.
- Inspiring fresh thinking.

## \_our values

- Be brave – take risks.
- Fast is better than slow.
- We make it better for people.
- We're proud to put our name on it.
- We keep it real and operate with integrity.
- We take responsibility and know when to pivot.

## \_our principles

- Benefits without borders; we share our solutions with whomever can benefit from them.
- Perfect is the enemy of good; innovation moves too quickly to focus on perfect – we get the job done.
- Collaboration is better than competition; we respect our colleagues and help them achieve their goals.
- Think globally act locally; wherever possible we choose local partners to solve Christchurch problems.
- The city keeps the farm; we appreciate the value of digital assets and maintain ownership in the city.
- Efficiency over bureaucracy; right-size processes support rapid delivery and accelerate innovation.
- Fail well; if we never fail we're not trying hard enough, so we own our failures and salvage what we can.
- What gets recognised gets repeated; celebrating success encourages high performance and motivation.
- Fun is our fuel; in every job there is an element of fun – a sense of play helps us do serious stuff better.

# Digital inequity – digital divide

“Māori and Pasifika people, the elderly, those living in social housing, unemployed people, disabled individuals and those living in rural areas are more likely to be digitally excluded and more likely to face other barriers to wellbeing than the general population.”

Labour MP and Minister Kris Faafoi

## NZ Digital Inclusion Blueprint 2020-2021

Vision

“Everyone in New Zealand has what they need to participate in, contribute to, and benefit from a digital world.”

**Tech is cool**  
**Opportunities vast**  
**Frontier wide open**



# Digital Twin

Digital Twin – basic definition – more than a digital replica of the physical

Activates data, to power better decision making. Help you do more with less. More engaging and transparent way

- Geometric and graphical data
- Geospatial reference data
- Asset attributes (natural, physical, social, economic)
- Management data
- Real-time asset performance and utilisation data.

Digital Twin is not a Digital Twin until it provides the following minimum five (5) capabilities:

**Connected** - there is a 'live' connection between the digital replica and the physical world

**Integrated** - it checks and links multiple data sources

**Visualise** - it provides visualisation of real-time multisource data

**Analysis** - federated data sets can be processed, modelled, analysed and simulated

**Secure** - information is managed in a way that reduces its risk of being compromised

<https://www.digitaltwinhub.org/post/digital-twin-community-of-practice-for-nz-cities>

Smart Cities Council Australia New Zealand <https://www.digitaltwinhub.org/resources>

# <https://www.digital.govt.nz/showcase/smart-wellington/>

## What is Smart Wellington?

A Smart Wellington is more than having a technically-enabled local government — it's about having an involved and engaged community and business sector. In partnership with NEC New Zealand and other partners, Wellington City Council has implemented:

- a flexible Internet of Things backbone making the installation of sensors simple, inexpensive and from any provider or maker
- an inter-agency platform facilitating co-operation across the social and community agencies in the city
- machine learning and advanced analytic processing to create further insight into city issues
- putting virtual reality engagement platforms in place to make that data accessible, useful and understandable
- developing our Civic Hacking communities to create new citizen made apps, websites and services using city data.

A core design driver is to make these systems modular, scalable and as open as possible to meet the changing needs of the city.

Six transformational moves support the vision of the plan.

1. **Waikato River:** celebrating the Waikato River as the defining ecological feature connecting the metro area to the heart of a blue-green network supporting environmental and recreational use and creating a sense of place.
2. **A radical transport shift:** a multimodal transport network, connecting the metro area and facilitating a radical shift to using public transport through the establishment of a rapid and frequent public transport network shaped around where and how our communities will grow.
3. **A vibrant metro core and lively metropolitan centres:** growing Hamilton central city as our civic, administrative, cultural and commercial metro core, alongside lively metropolitan centres, well connected by public transport and safe walking and cycling networks, where people can afford to live, work and play.
4. **A strong and productive economic corridor:** establishing an economic corridor that links the highly productive employment areas between Ruakura, Hamilton central city and north to Horotiu.
5. **Iwi aspirations:** enhancing the environmental health and wellbeing of the Waikato River in accordance with the Te Ture Whaimana o Te Awa o Waikato – Vision and Strategy for the Waikato River, while supporting iwi in embracing social and economic opportunities within the metro area with a specific emphasis on Hopuhopu and Ruakura.
6. **Thriving communities and neighbourhoods:** enabling quality denser housing options that allow our natural and built environments to coexist in harmony increasing housing affordability and choice to meet the needs of growing and changing communities.

# Spatial Plans – Hamilton-Waikato

<https://futureproof.org.nz/assets/FutureProof/H2A/Metro-Spatial-Plan/Hamilton-Waikato-Metropolitan-Spatial-Plan-Final-Low-Res.pdf>

## MSP

### Future Proof Partners

Note:  
The following Future Proof partners have participated in the development of the MSP:



### The role and purpose of the MSP

The MSP is a non-statutory spatial plan which sets out the spatial growth pattern of where and how growth will occur.

The MSP sets out the overarching strategic guidance which will inform many central and local government initiatives including strategic land use plans, infrastructure business cases, and central government funding and financing.

### Drivers and Direction Statutory and strategic drivers

#### Future Proof Partnership (enduring governance structure)

- Urban Growth Agenda
- Vision and Strategy/Te Ture Whaimana o Te Awa Waikato
- NPS Urban Development
- NPS Highly Productive Land
- NPS Freshwater
- GPS on Land Transport
- Climate Change programme
- Regional and local strategies
- Case for Change
- Aratiki (Waka Kotahi 10 year plan)

### Set Strategic Direction Non-statutory direction

Metro Spatial Plan  
(non statutory)

MSP incorporated into Future Proof Phase 2 Strategy Update  
(statutory weight)

### Implement Strategic Direction Through statutory documents and business case development

Urban Growth	Water	Transport	Other Infrastructure
Regional Policy Statement, District Plans, Long Term Plans, Regional Plans	Long Term Plans, 30-year Infrastructure Strategy	Long Term Plans, Regional Land Transport Plan, Regional Public Transport Plan, 30-year Infrastructure Strategy	Long Term Plans
Structure Plans, Masterplans	Programme Business Case, Detailed Business Case, Structure Plans	Programme Business Case, Detailed Business Case, Structure Plans	Programme Business Case, Detailed Business Case, Structure Plans

Central Government Funding and Financing Tool Kit  
Other Funding Options

## Project objectives

- 1 Increase housing supply, and improve housing affordability and choice
- 2 Enable growth that protects and enhances the quality of the natural environment and accounts for a transition to a low/no carbon future
- 3 Improve multi-modal access to and between housing, employment, education and services
- 4 Encourage sustainable, resilient and affordable settlement patterns/urban form that make efficient use of existing infrastructure and resources
- 5 Build climate change resilience and avoid increasing the impacts and risks from natural hazards
- 6 Create employment opportunities.

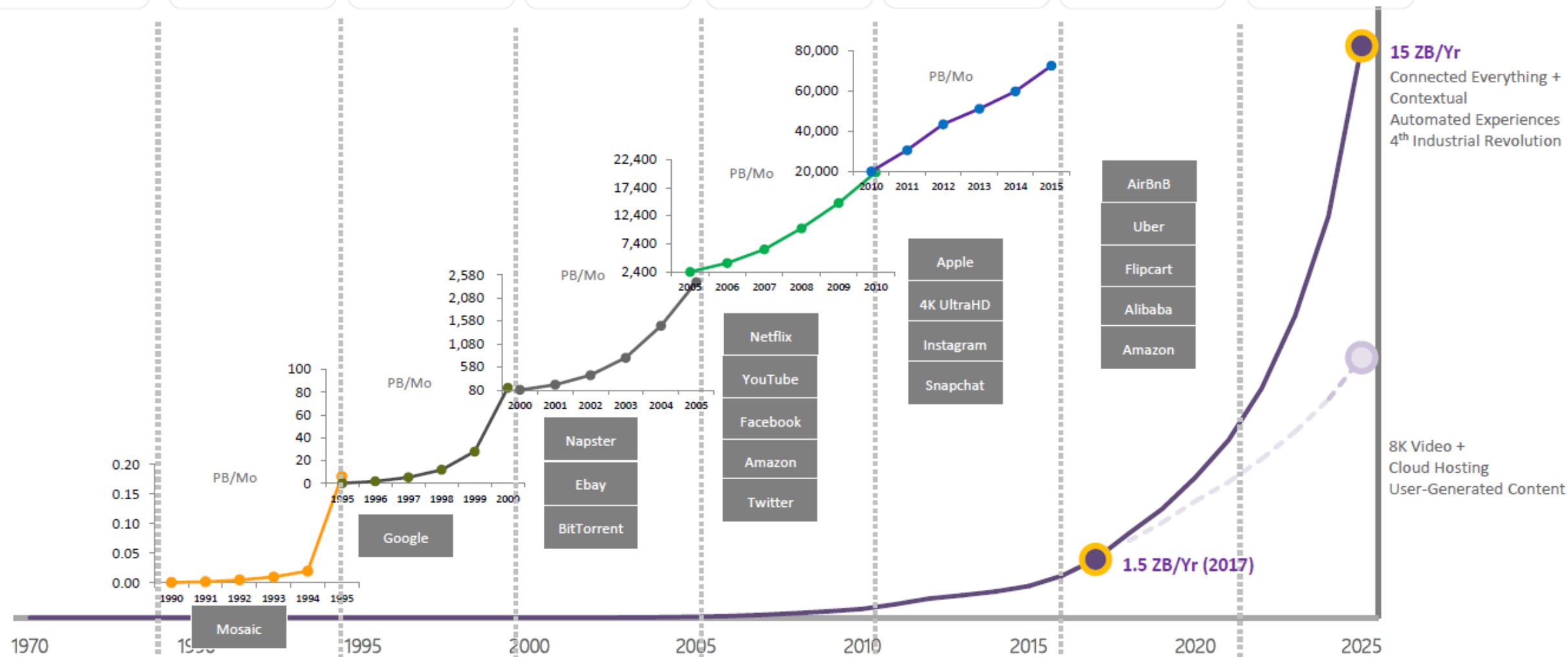
# Datasets

Map Content	Data Layers	Description	Source data layer	Data source contact
Wahi Toitu	Flood Data	Operative district plan flooding data	WaipaDPFlood	Waipa District Council
Wahi Toitu	OperativeDP_2017.SDEADMIN.Flood_Modeling_Combined	Operative district plan flooding data	OperativeDP_2017.SDEADMIN.Flood_Modeling_Combined	Hamilton City Council
Wahi Toitu	HAZ_FLOOD_EXTENT_1_AEP_POLY	Operative district plan flooding data	HAZ_FLOOD_EXTENT_1_AEP_POLY	Waikato District Council
Wahi Toitu	Flood_Hazard_ICMP_EDCC_100yr	Operative district plan flooding data	Flood_Hazard_ICMP_EDCC_100yr	WRC
Wahi Toitu	DP Geotech Hazard Area	Gully hazards around HCC	OperativeDP_2017.SDEADMIN.GeotechHazard	Hamilton City Council
Wahi Toitu	Significant Natural Areas	Significant Natural Areas for Waipa	WaipaDCSNA	Waipa District Council
Wahi Toitu	WaikatoDCSNA	Significant Natural Areas for Waikato	WaikatoDCSNA	Waikato District Council
Wahi Toitu	OperativeDP_2017.SDEADMIN.SignificantNaturalAreas	Significant Natural Areas for HCC	OperativeDP_2017.SDEADMIN.SignificantNaturalAreas	Hamilton City Council
Wahi Toitu	Wetlands (HCC)	Wetlands and Ponds for HCC	WetlandsAndPonds	Hamilton City Council
Wahi Toitu	Peat Soil Depth	Peat soil > 3m	peat_dpth6.tif	WRC
Wahi Toitu	HertiageSites100mBuffer	100m buffers of Waipa heritage sites	WaipaDC_DP_Policy_Heritage_Points.shp	Waipa District Council
Wahi Toitu	HertiageSites100mBuffer	100m buffers of HCC heritage sites	OperativeDP_2017.SDEADMIN.HistoricHeritage	Hamilton City Council
Wahi Toitu	HertiageSites100mBuffer	100m buffers of Waikato heritage sites	heritage-item-legal-effect.shp	Waikato District Council
Wahi Toitu	Reserves	Reserves for Waipa	WaipaDCReserves	Waipa District Council
Wahi Toitu	OperativeDP_2017.SDEADMIN.Zoning	Reserves for HCC	OperativeDP_2017.SDEADMIN.Zoning	Hamilton City Council
Wahi Toitu	WaikatoDCZoning	Reserves for Waikato	WaikatoDCZoning	Waikato District Council
Wahi Toitu	Doc Public Conservation Areas	Doc Public Conservation Areas for Metro Plan area.	DocPublicConservationAreas	DOC
Wahi Toitu	QEII Trust Covenants	QEII Trust Covenant protected land	QEIITrustCovenants	QEII Trust
Wahi Toitu	Designations	Designations for Waipa	WaipaDCDesignations	Waipa District Council
Wahi Toitu	WaikatoDCDesignations	Designations for Waikato	WaikatoDCDesignationsClipped	Waikato District Council
Wahi Toitu	HamiltonDCDesignations	Designations for HCC	OperativeDP_2017.SDEADMIN.DesignatedSites	Hamilton City Council
Wahi Toitu	Outstanding Natural Features and Landscapes	Central Hill Country and Western Hill Country	OutstandingNaturalFeaturesandLandscapesBroadLandscapeTypesWRC	WRC
Wahi Toitu	Steep Slopes	> 25 degrees	HRWO_DOMINANT_SLOPE_CLASS_clip	WRC
Wahi Toitu	Elite Soils	LUC 1 soils	NzIriLandUseCapability	<a href="https://iris.scinfo.org.nz/">https://iris.scinfo.org.nz/</a>
Wahi Toitu	PEAT_LAKE_HEALTH_RIVER_LAKE_CATCHMENT_MetroSpatialPlan	All Peat lakes excluding Rotokauri	PEAT_LAKE_HEALTH_RIVER_LAKE_CATCHMENT_MetroSpatialPlan	WRC
Wahi Toitu	Wahi Tapu areas	Location of Wahi Tapu sites		WRC
Wahi Toitu	Wahi Toitu Extent	Entire extent of the Wahi Toitu with the MSP	NoGoFinalV6	HCC
Wahi Toiroa	High Quality Soils	LUC 2 & 3 soils	SoilClassV3	<a href="https://iris.scinfo.org.nz/">https://iris.scinfo.org.nz/</a>
Wahi Toiroa	Peat Soil Depth	Peat soil < 2m	peat_dpth6.tif	WRC
Wahi Toiroa	PEAT_LAKE_HEALTH_RIVER_LAKE_CATCHMENT_MetroSpatialPlan	Only Rotokauri peat lakes	PEAT_LAKE_HEALTH_RIVER_LAKE_CATCHMENT_MetroSpatialPlan	WRC
Wahi Toiroa	Digital Terrain Model (Motoriki Datum)	Elevation of Metro Plan area	DTM5mRegoinalCouncil	WRC
Wahi Toiroa	Moderate Slopes	15 - 25 degrees	HRWO_DOMINANT_SLOPE_CLASS_clip	WRC
Wahi Toiroa	Mineral resources	Sites of mineral resources		WRC
Wahi Toiroa	Pest plants	Sites of pest plants		WRC
Wahi Toiroa	Erodible soils	Areas of erodible soils	LR_Soil_Risk	WRC
Wahi Toiroa	Wahi Toiroa Extent	Entire extent of the Wahi Toiroa with the MSP	SlowGoFinalV5	HCC
	TLA Boundaries	Waipa, Waikato and Hamilton City TLA boundaires	context.SDEADMIN.TLA_2014	LINZ
	2019 Aerial Photography	2019 Aerial photography for Hamilton	SDEADMIN.AERIAL_2019	HCC
	LINZ Aerial Photography	Aerial photography for Waipa and Waikato Districts	Imagery/newzealand	<a href="https://services.arcgisonline.co.nz">https://services.arcgisonline.co.nz</a>
	Metro Spatial Plan Extent	Extent of the Metro Spatial Plan area	MetroPlanAreaofInterest06052019	Stats NZ
	Metro Spatial Plan Nodes	Locations of Metro Spatial Plan nodes	AllNodesV4	HCC
Wahi Toiroa	Significant Archaeological Sites (HCC)	Significant Archaeological Sites from District Plan	Significant Archaeological Sites	HCC
	LINZSwamp	Swamps within the MSP area	LINZSwamp	LINZ



## GROWTH PREDICTION

Pre-Internet Era

1st Discovery Era  
(Browsers)2nd Discovery Era  
(Search)1st Sharing Era  
(Personal Content)1st Commerce Era  
(Video & eGoods)2nd Sharing Era  
(Personal Context)3rd Sharing and  
2nd Commerce Era  
(Everything)1st Networked  
Intelligence and  
Automation Era

**APP's**

# Activating Space

**Sculpture In Sound** - Using a smart-phone app and headphones, users can walk around them, and activate layered, location-specific audio that change as you move around the sculpture

**[www.sonicity.nz](http://www.sonicity.nz)**

# Digital Visibility



# Visualisation of data

3D animations used increasingly widely for giving visualisations and experience, give an experience for users

Real-time rendering engine can support custom-built assets, photogrammetry data, measuring tools, embedded video, access to live cameras on location and visual analysis of 3rd party data - these features can be cherry-picked for inclusion on a project-by-project basis, and bundled into a 3D visualization platform for desktop or mobile, offline or on the web.

<https://arl.co.nz/> Amination Research Ltd

Architecture, RCL, NZTA

<https://www.virtualview.co.nz/3d-animations>

VR learning, entertainment, remote support

# Digital Humans

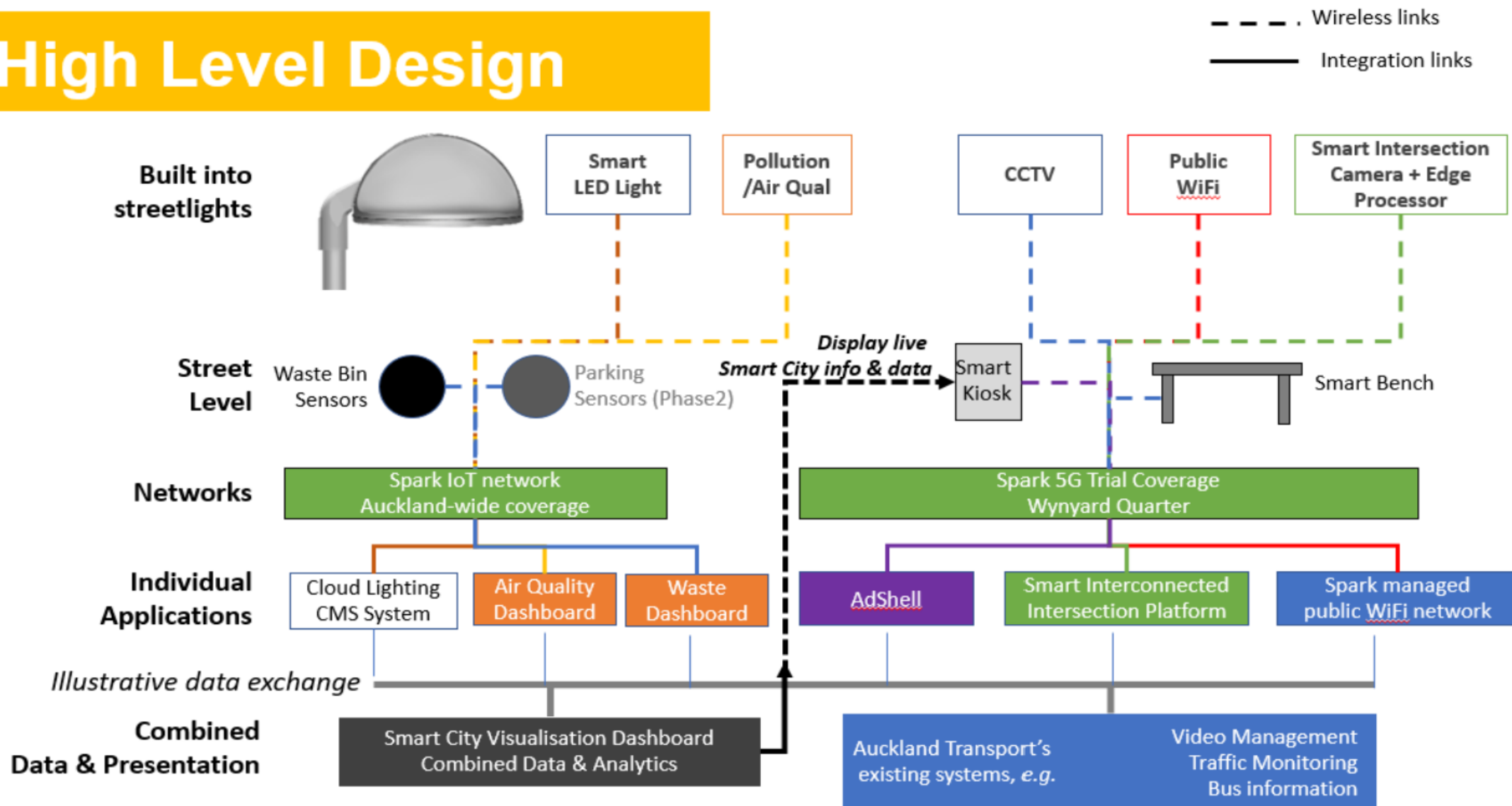
**Artificial intelligence (AI)** simulation of human **intelligence** in machines that are programmed to think like humans and mimic their actions.





# Smart Precinct

## High Level Design







# Wynyard Smart Precinct





# 5G WILL BE

## GAME CHANGING

Bringing 5G to New Zealand by investing in immediate use cases that create the most value



### Wireless Broadband

Introducing unconstrained capacity and enhanced speed to support customer's growing demand for more data



### Massive IoT<sup>(1)</sup>

Innovative IoT<sup>(1)</sup> solutions providing customers with real-time data and benefits of digital monitoring



### 5G Partner of Choice

Co-creating smart solutions and network customisation to meet customer needs on speed, latency and number of devices

5G provides opportunity beyond 'connectivity' and will enable the delivery of smart solutions for enterprise and industry

#### Latency and Reliability



Cloud Gaming



Autonomous Vehicles



Industrial automation



Immersive experience



4K/8K Video



Smart Stadium/ Universities

#### Massive IoT



In-vehicle connectivity



Drones and connected robots



Connected Platform



Connected Wearables



mIoT sensors



Smart City/home sensors

#### Edge Computing

Real-time data/video analytics



#### Network Slicing

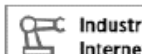
Vertical / Private Networks



AR/VR



Government



Industrial Internet



Automotive



Utilities



Health & Wellness



ENVIRONMENT

PEOPLE

PLANT

DATA GATHERING...  
IoT Camera Vision

[https://www.youtube.com/watch?v=pITZJ8yqzYM&feature=emb\\_title](https://www.youtube.com/watch?v=pITZJ8yqzYM&feature=emb_title)

system checking system checking

BOOM LIFT DETECTED

( ☐ system recalibrated ..... )

2 WORKERS DETECTED

( ☐ High Vis Check ☐ Hard Hat Check ... )



# asBUILT



asBuilt's collaboration with Microsoft, Spark and NZ Strong has resulted in the first ever "connected construction site" in New Zealand. This combines **intelligent IoT devices, drone and 3D camera imaging and geolocation** to make construction safer, reduce costs, enable real-time decision making and connect all project partners together in one platform.



# Quayside - Toronto

The smart city project on the Toronto waterfront is the most highly evolved version of surveillance capitalism? Google using “algorithms to nudge human behaviour” in ways to “favour its business”?

Sidewalk Labs - Not proceeding currently with project but heavy involved innovative companies

- [urban mobility](#),
- [next-generation infrastructure](#)
- [community-based healthcare](#)
- [robotic furniture](#) to [digital electricity](#)
- [factory-made mass timber construction](#) that can improve housing affordability and sustainability
- [digital master-planning tool](#) that can improve quality of life outcomes and project economics,
- new approach to [all-electric neighborhoods](#)

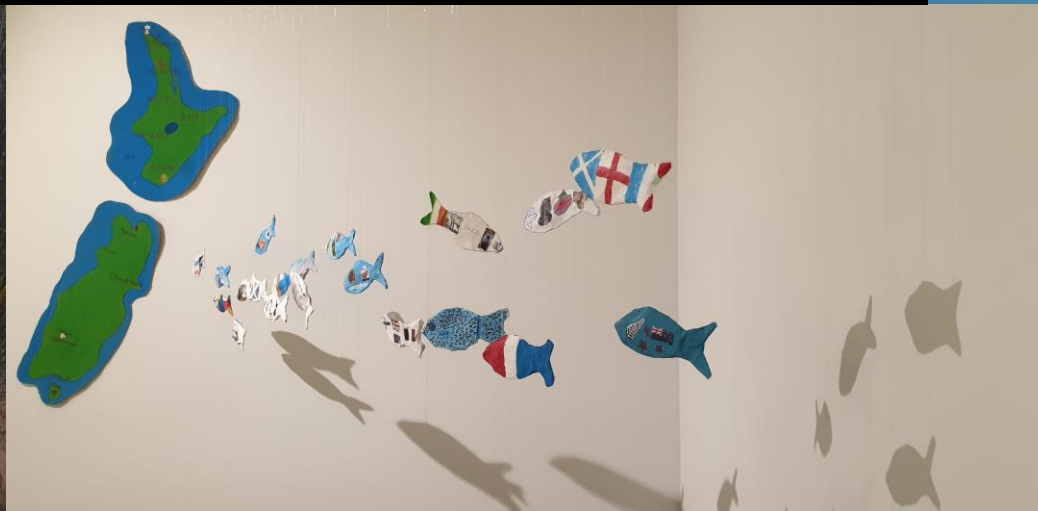
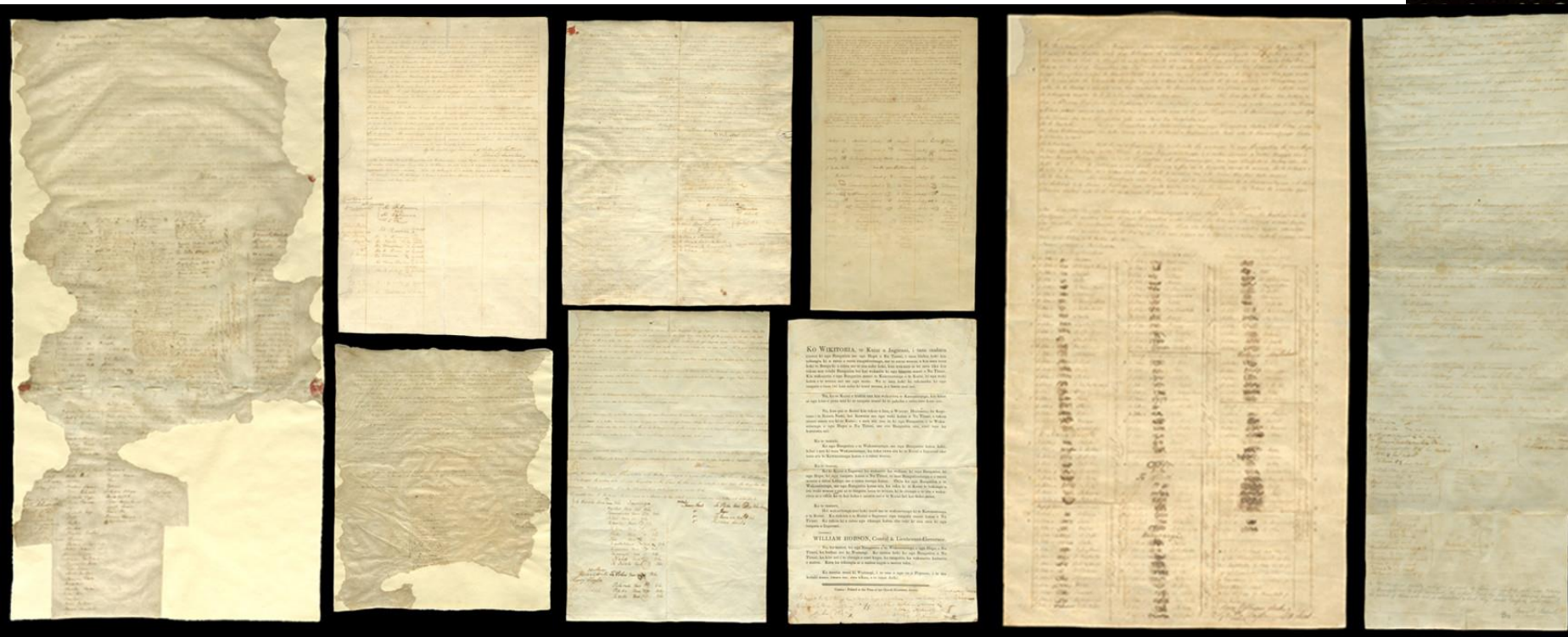
March 10, 2021, Waterfront Toronto launched the Quayside Development Opportunity



***“When distance and convenience sets in; the small, the various and the personal wither away.” Jane Jacobs***



# Planning with PlanTech





# NZ Herald Rod Emmerson Cartoon 13 Aug 2020





# Questions – time for the swim



Maree Horner *Diving Board* 1974-98. Govett-Brewster Art Gallery Collection

## 275 Love Letters To Southside

Auckland is not the same place as South Auckland.  
When I learnt that no place outside of South Auckland would want to  
pronounce my name properly  
I scraped it off their tongues  
So now all they do is spit on us instead  
And still.  
Haven't my ancestors' screams been muffled between textbook  
pages?  
Didn't a white teacher at my south Auckland sch tell us we're just  
"typical South Auckland crap"?  
Aren't I lucky I wasn't born when the dawns were raided?  
Still.  
My South Auckland  
Red and blue runs through your streets in the forms of bandanas,  
flags and flashing lights  
So much that everyone chooses to forget what the color of our sun  
looks like.  
Chooses to see the negative rather than what shines more bright.  
Shine flashlights in our brown boys eyes so much  
That I can never forget what the color of our sons look like.  
While our daughters become mothers to their siblings so young  
because their parents work shifts at night.  
The media won't talk about that but will focus on any recorded street  
fight.  
Everyone loves to quickly point fingers but no one can afford the time  
to ask why?  
I've lived my life growing up in classes where I had more friends with  
no lunch than friends who were eating  
I've heard my friends say "they growl us for not having laptops when  
we barely have lunch" more times than I've heard a school bell.  
Joking about your pain is a right of passage in South Auckland  
schools

Because it's not like these education systems teach us how to deal  
with it.  
And still,  
Isn't the reality of our lives to you just politics?  
And ever since Ponsonby left my mother for a white woman  
I noticed that any door I walk through outside of Southside lacks a  
welcoming mat.  
Driving through Ponsonby is looking at collections of faded photos I  
don't remember living through.  
It is the movie I never got to watch.  
A chance of a happier brown community is just another one of its  
deleted scenes.  
Ponsonby is your cousin that forgot their roots so their branches  
grew away from us  
But in Southside family is still family  
So when Ponsonby shows up uninvited to the family function I will  
awkwardly kiss their cheek.  
Wait for them to tell me I am a splitting image of my mother  
But they never do.  
And still.  
I could stand here and offer all the reasons I love my home as a peace  
offering.  
Try to pull the moana out of my lungs so I can breathe easier.  
Drop my slang and fix my posture.  
Make you feel all kinds of ways while I stand here.  
But if you saw me on TV?  
If you drove past me on my streets?  
Aren't I just a little brown girl from South Auckland?  
Still.

— Aigagalefili Fepulea'i-Tapua'i, Aorere College



