



Northland Update: How we are transforming our ITS network

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25 September 2025

What I want to cover today:
How we have reorganised in the light of the
Where we were in 2021
What changes we have made or tried
What did and didn't work
My technology roadmap to get to a smarter city



Welcome



What I want to cover today:
How we have reorganised in the light of the demise of the NTA!
Where we were in 2021
What changes we have made or tried
What did and didn't work
My technology roadmap to get to a smarter city

Proposal Mixed Model



Bringing most
functions back into
each Council



Shared Services

Road Safety promotion
(WDC/KDC/FNDC)
Traffic signals and ITS
(WDC/KDC/NZTA)
Street Lighting Contracts
(WDC/KDC)



Regional
project collaboration

Individual Council resources
collaborating on specific
projects. This may include
the creation of Strategic
Asset Management Plan for
Northland and the delivery of
slips and resilience

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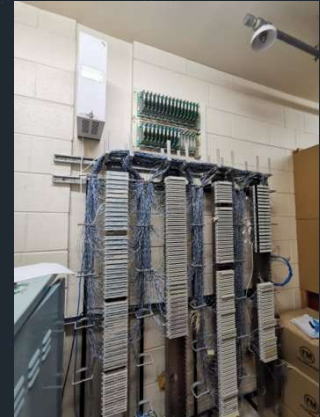
In August of 2024 the Northland Transportation Alliance ceased to exist, and some of us went back to our old jobs – me included!

There is still limited cross-council collaboration and shared services, but the focus shifted to seeing how we could get the best out of what we had.



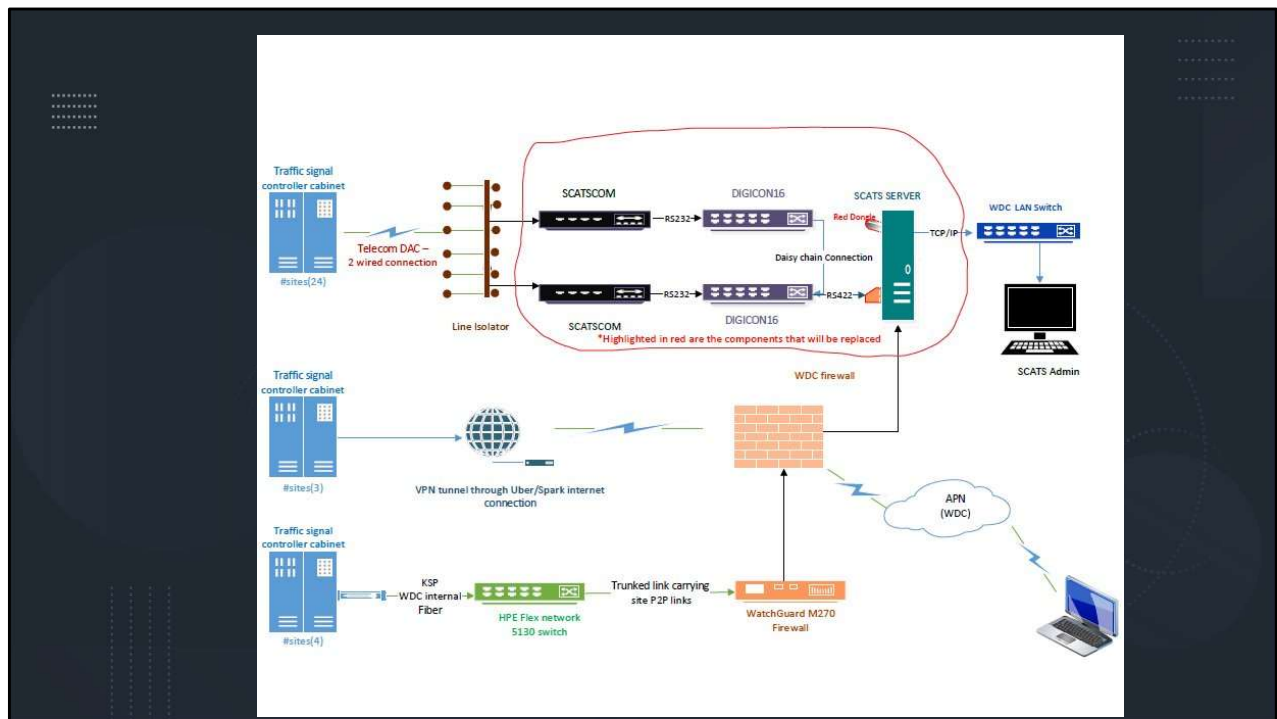
Where we came from 2021/22

- Our gear was obsolete
- We had to move in 6 months with no notice
- We couldn't afford the time for a full rebuild



The process really started off in late 2021/22 when we were told we had 6 months to get out of the old civic centre building in Forum North. At that time most of our traffic signals (about 22 sites) was still on leased circuit DP copper lines, SCATCOMs and so on, all obsolete tech.

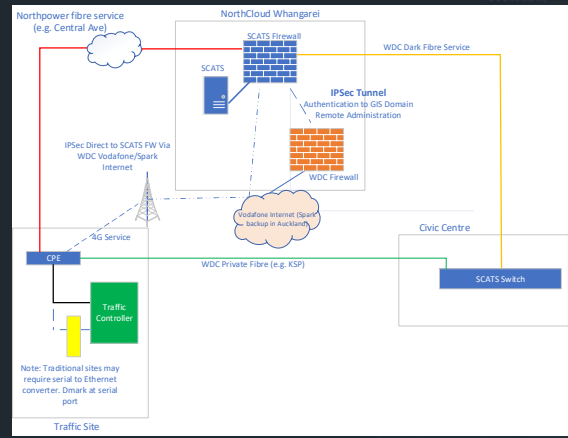
My team lead at the time took the decision to migrate that network to 4G communications as an interim measure as fibre comms was ~@\$250k and we couldn't turn a project like that around in <6 months.



It became clear that we needed to transition, and transition quickly. We needed reliable solutions that were just going to work. It was obvious that IP comms were the way forward and with most of our fleet being Eclipse the easiest way was to connect serial to ethernet converters onto the RS232 outputs, and install native ethernet controllers in new builds (QTC)

The 4G solution

- We partnered with Council's ISP Northcloud and One.NZ
- This project was started in August 2021 and completed by July 2022
- We used standard VPN/IPSec with hardware serial to ethernet on site and Eltima software at the SCATS end

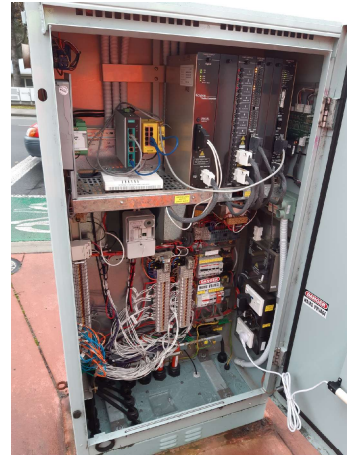


Did 4G work? 4G worked fairly well as an interim measure but it has some shortcomings as we found out. We encountered dead zones in a critical area feeding onto SH 1 Western Hills Dr and in Bank St, and we encountered issues with comms dropouts ranging from ~20 seconds to minutes, even hours at times. The traffic signal controllers (mostly Tyco Eclipse) didn't always cope well with this instability.

4G does have its place but it was only a stepping stone to full communications on fibre and failover for selected critical traffic signals sites.

Some of the things that didnt work!

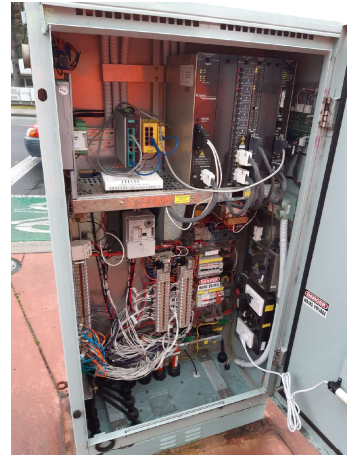
- We initially used MOXA EDR-G903 devices for security, routing and encryption
- We found they weren't reliable enough in service, would hang and need power cycling
- We encountered issues with firmware upgrades, so these were replaced with Mikrotik CS112 CPE



"It's fine to celebrate success, but it is more important to heed the lessons of failure" Bill Gates

The 4G overall

- Cellular has been great in that we could deploy quickly
- We didn't expect the number of dead zones we encountered in critical areas of the town
- We experienced brief interruptions in communications, which SCATS didn't like and promoted congestion at the worst moments!



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SCATS Upgrades

- When we moved to a virtualised environment we also needed to tackle our SCATS version – we were way behind (6.7.2)
- This meant a migration to 6.9.5.8 and a specific project team to deal with that, comprised of TNO Networks, NTA and Northcloud with support from WDC ICT.
- In early 2025 shortly after the breakup of the NTA a further upgrade was required to 6.11.



A key pillar of this process was 2 major upgrades to SCATS. We had got very behind in the late 2010's with our upgrades and so in 2022 we carried out an upgrade from 6.7.2 to 6.9.5.8.

This resolved a number of problems with controller support for us. It was also an opportunity to retire the physical SCATS server and transition to a virtual SCATS environment.

However even that was not enough and in early 2025 we were faced with going from 6.9.5.8 to 6.11, purely to keep up with the speed of new releases. That was completed early this year and we are scheduling a further migration to 6.12 in October 2025 – as I am aware that sometime in this financial year Transport for NSW intends to release 6.13!

New Detection solutions

- We started off using FLIR devices for pedestrian detection (Traficam)
- This is a larger trial at the intersection of Kamo Rd and Whau Valley Rd to the NE of SH1
- The Thermicam AI are quite effective but at least in Whangarei we have found loops are still superior at the stopline position



The Northland climate is quite harsh on electrical equipment in its own way. Heat, humidity and outright rain all take their toll. We have found that inductive loops, while rugged, simple and fairly reliable did need to be backed up with new detection technologies.

We tried radar and thermal imaging, and in the end settled on thermal imaging for pedestrian detection (FLIR Traficam) and Thermal imaging + AI processing and a standard image (FLIR Traficam/Thermicam)

The Traficam has proven to be very effective at queue detection, particularly so with KEEP CLEAR zones, and has the useful benefit of remote vision of the site.

New Detection solutions

- The FLIR Traficams are a very cost effective way of dealing with KEEP CLEAR problems
- The combination we have found works best is to retain the stopline loop and use the FLIR for queuing and clear management.



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Traffic CCTV

- We have been progressively installing a combination of FLIR devices and CCTV in new sites.
- Now we need to formalise it onto a proper production environment, which is in design



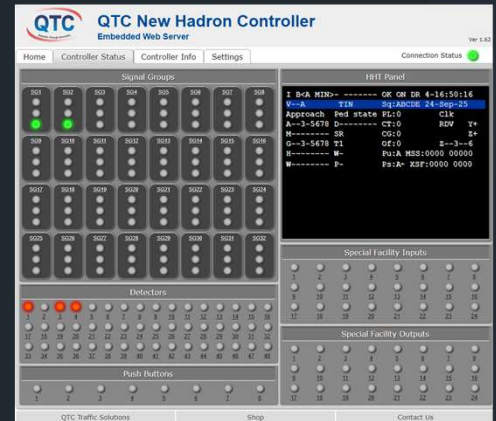
We started playing around with CCTV when WDC built a shared footway/cycleway from Rust Avenue near the Civic Centre to Kamo Town over 5 stages, much of it over a leased section of the Kiwirail corridor.

Since then, a lot of hard lessons have been learned, in particular about good network design and as-building practices!

The current units we have been deploying on new builds are Vivotek FD9367-EHTV-v2/v3 devices but we have legacy Dahua gear from KSP which we will change out as it is due for replacement.

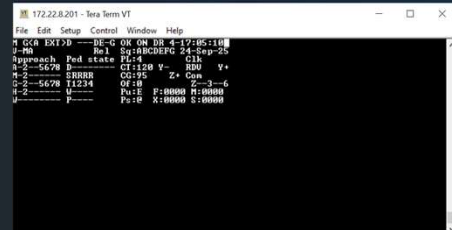
Controller webserver 1

- A question was asked a while ago who was using remote operator terminal type operation.
- This is one configuration I have where I use DHCP with 1 IP address only in the DHCP pool to mimic the effect of a static IP. I've tested this OK with a QTC.
- Using this gets around the XNW port defaulting to 192.168.12.251!



Controller webserver 2

- Most of my fleet are VC5 Eclipse.
- These only output RS232 serial on the XHHT port so these are connected to a serial to ethernet converter.
- Teraterm terminal programme is used to operate them, this works well.
- The main thing I use this for is to verify sites are operating in the event SCATS comms go down.



So that's the QTC and the Eclipse on this system which I find very helpful, particularly with remote sites like Paihia pedestrian crossing which is about an hour and a half from Whangarei.

My next challenges in this area are to evaluate the Johnson Controls/TYCO CPM 5 to see if I can get that running on this system. Also to play with the ATC Controller with a view to doing the same.

Technology Roadmap

- The technology roadmap is mainly about Transport defining its priorities.
- it is also a communications tool for the rest of the WDC business to obtain buy-in and support to procure the things we are going to need
- Key elements: Further SCATS system modernisation, controller and intersection modernisation, security and hardening, public transport promotion, architectural improvements, asset management.



Obviously a key with the tech roadmap is to ensure that we maintain and develop our relationship with the WDC ICT department, so they understand our needs and priorities and we in turn understand their concerns and drivers.

The tech roadmap is also a document that will inform the WDC Asset Management Plan in terms of what projects we are going to need and provide a vehicle so that those projects can be scoped and costed.

My next steps

- Updating the WDC Asset Management Plan for ITS operations for Whangarei town and beyond.
- Creating a technology road map for ITS and obtaining buy-in from Council for the work we are going to need.
- Implementing a proof of concept system for our detection cameras, CCTV and SCATS to operate in the one environment.



I have a number of items that I need to complete and/or update over the next year:

WDC Asset Management Plan

Asset and Work Manager data cleansing, field validation and conversion to AMDS standard for data

WDC ITS Technology Roadmap

WDC Traffic signals and ITS Maintenance Contract retendering CON21021

TOMs system/PoC for mini ToC functionality



Thanks to:
Currie Electrical & CSLi
Northcloud Ltd – WDC ISP

I am grateful to Currie Electrical, WDC's long time maintenance contractor, and their parent company CSLi who have been brilliant with advice and suggestions at critical times. I also want to acknowledge and thank WDC's ISP Northcloud who have gone out of their way to come up with solutions, sometimes in impossibly tight timeframes.



Thank you for your attention
and questions!