

# Wellington Street On-ramp Upgrade

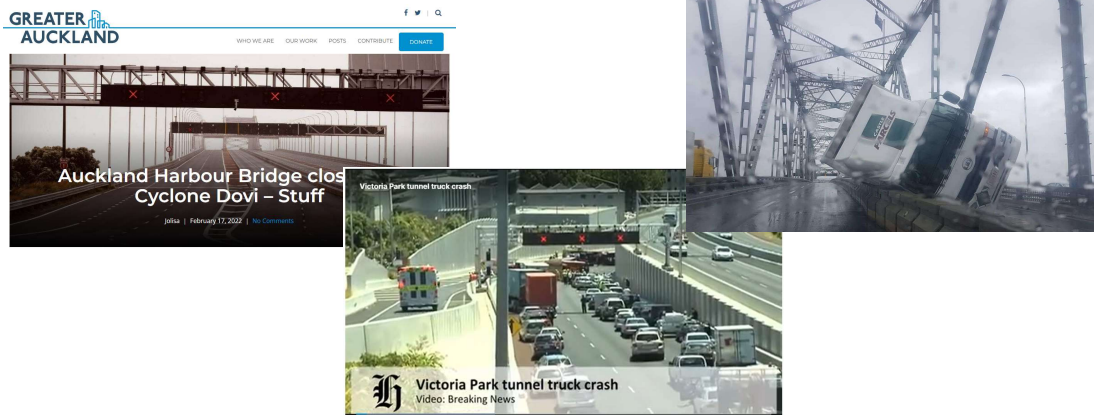
September 2024



New Zealand Government

Good afternoon everyone, my name is Alice Zhuang and I am a senior Transport engineer at beca, based in Auckland. As many of you here know, but for those who don't, this is James Ellison, technical director at beca, also based in Auckland. This presentation is about a project that has come from the Auckland System Management team to upgrade the Wellington St On-ramp

# Network Impacts

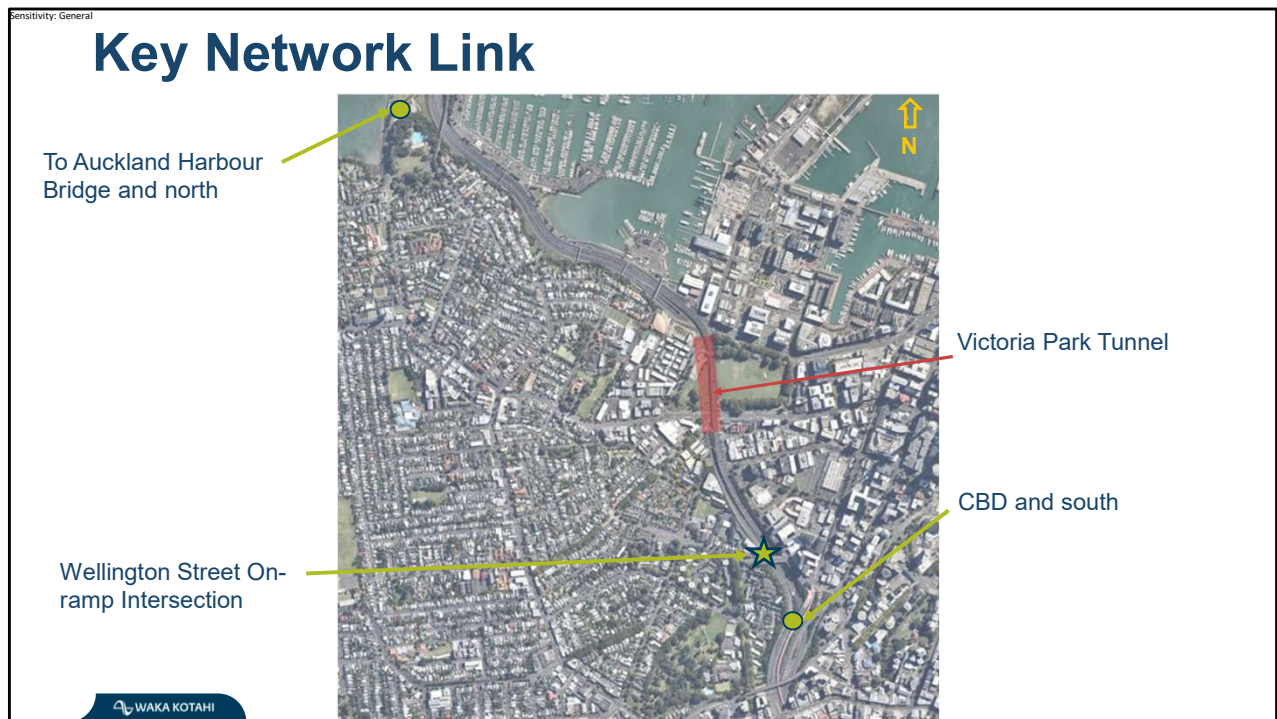


It seems that there is something happening on the Auckland motorway networks almost every week, according to the media  
But even minor incidents can cause massive knock-on effects on the network.  
The Auckland System Management team are the ones who look after the operation and maintenance of the motorways throughout the Auckland region  
They are the ones who initially respond and clear the incidents that occur on the network

# Auckland Network



To give context of where in Auckland the Wellington ST on-ramp is located, it is here by the CBD  
And this is where the Auckland Harbour Bridge is



One of the major sections of the Auckland motorway network is the Victoria Park Tunnel which provides a connection from the CBD to the Auckland harbour bridge and areas north  
 This one-way tunnel carries about 60,000 vehicles per day

The objectives of this project from Auckland System Management team wanted to :

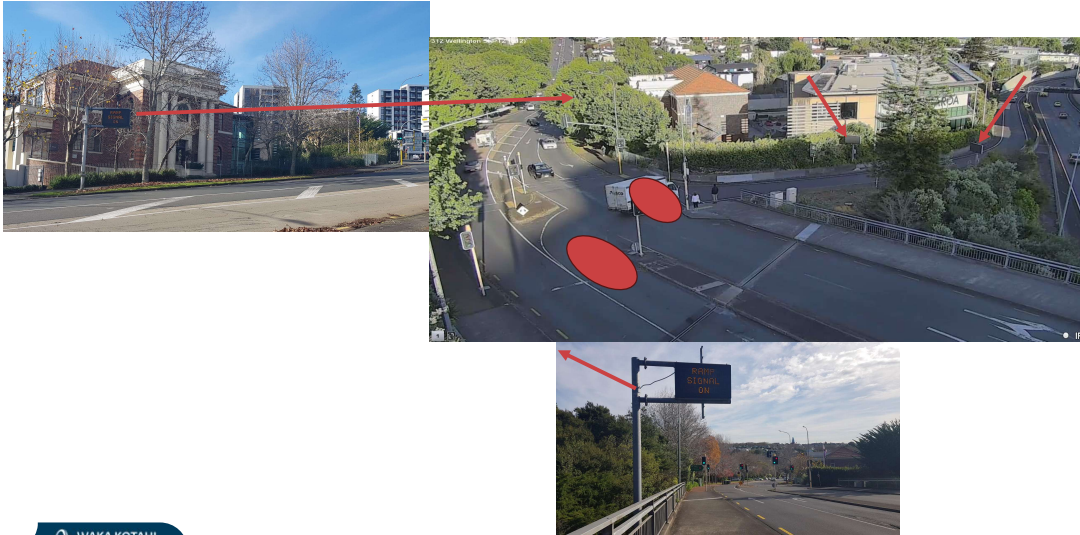
Improve response time of emergency services to incidents within the Victoria Park Tunnel.

Improving the evacuation of people (vehicles) trapped on the approach to the tunnel in emergency situations.

This onramp as is the critical to these objectives as

it is closest access point to the tunnel

## Existing Site



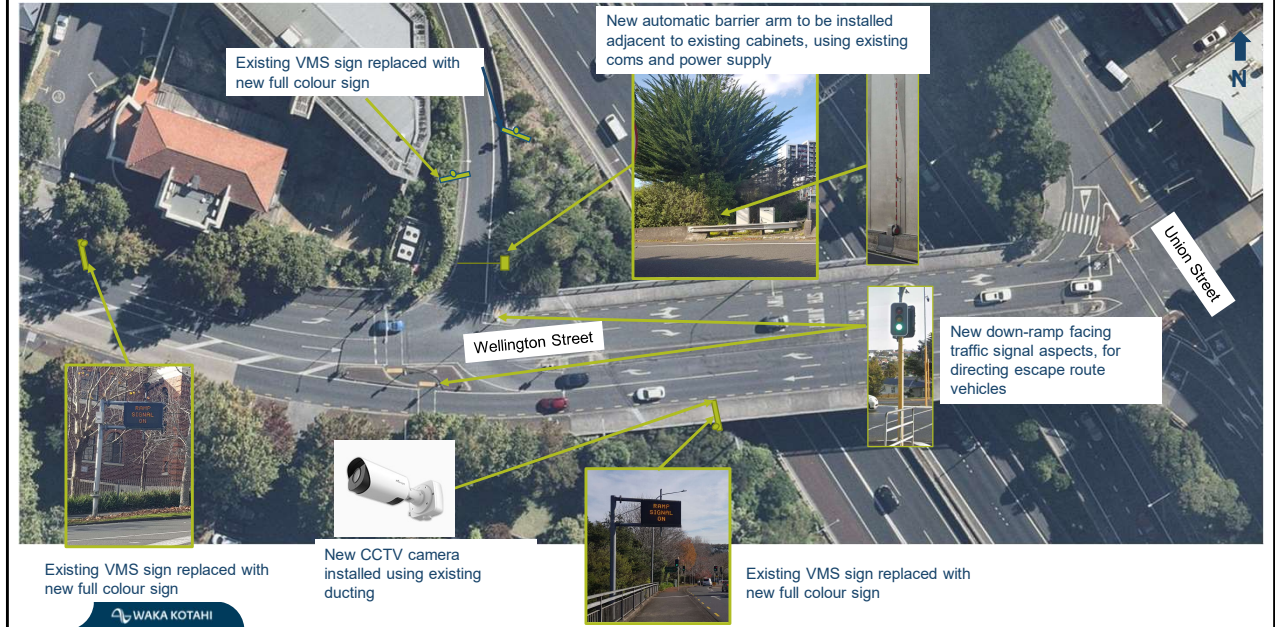
Here we can see the site- Currently we need use a lot of resources to close the ramp, such as during incident response, this includes vehicles and traffic management staff

The existing mono colour VMS signs can only display existing set programmed messages, When there is an incident 1+ hour delay expected on the motorway, the ramp is used as a clearance ramp, where the vehicle are directed to travel in a reverse flow.

Once the traffic reaches the intersection, there need to be traffic management staff/police need to manually direct vehicle movements to accommodate vehicles exiting the ramp

There is only one CCTV camera that had visibility of the site but it's main purpose is to provide a view the motorway itself.

## Proposed Improvement Equipment

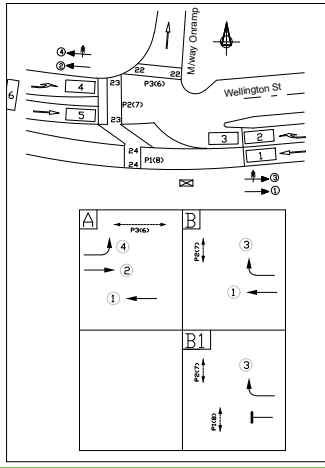


We have suggested the following equipment to improve Auckland System Management responses to different situations.

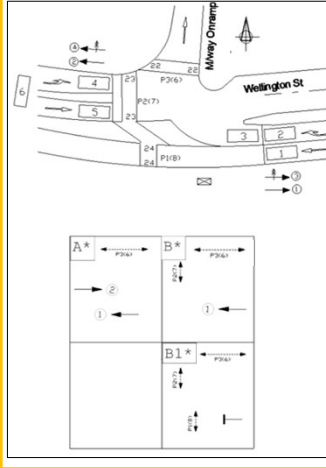
- New fixed CCTV camera to monitor intersection
- Linking the VMS control to DYNAC system to allow quicker response to traffic changes
- A new automatic barrier arm installed at the start of the on-ramp to control traffic
- And New reverse facing traffic signals that face towards the on-ramp, so it can control traffic movements from reverse traffic flow when it is used an emergency motorway exit

# Traffic Signal Phasing Scenarios

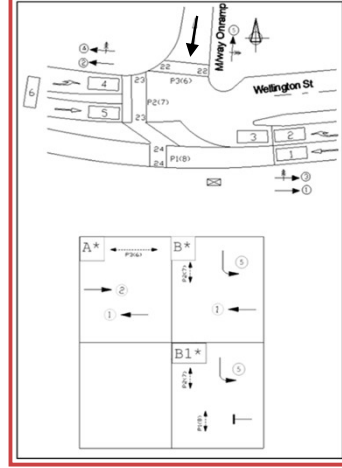
- Typical Operation (existing phasing)



- Proposed Ramp Closure



- Ramp Reversal



With the new reverse facing signals, we broke down how we wanted the intersection to operate under different scenarios. this was then used to plan the updated signal phases needed

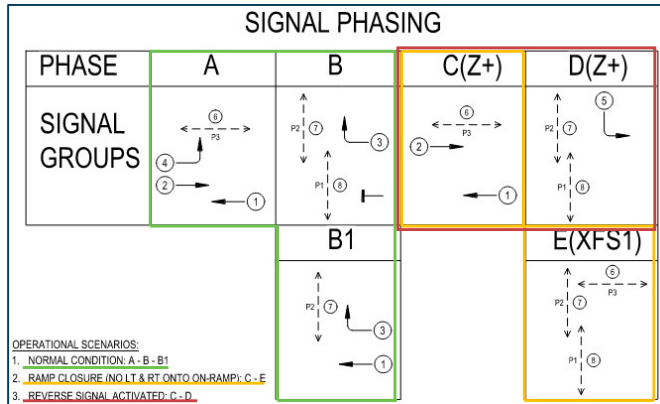
These were for:

- The everyday, typical operation
- Closure of the ramp

And Ramp reversal, when traffic from the motorway is travelling up the ramp, exiting at the intersection



# Traffic Signal Phasing



This is the final phasing arrangement is as shown to cover the three scenarios

## Proposed Maintenance/Closure Mode

Event	DYNAC Controls	SCATs Controls	Onsite	Proposed alert notes
Closure required		Signs* and signal change	TM arrive	
Check visual of ramp status on site	Barrier arm comes down at on-ramp			Alarm prompt in the DYNAC to check traffic signal operation (i.e. traffic phase set)
Standard operations ready to resume	Barrier arm is raised		TM leave	Alarm prompt in the DYNAC to check traffic signal operation (i.e. traffic phase set)
Normal operation		Signs* and signal change		Alarm in SCATs to check barrier arm position

With the new CCTV cameras, VMS signs, barrier arm, reverse facing signals (including updated signal phases) we have also prepared concept of operations to describe the procedure of how all this equipment are to be used together in several scenarios:

- in ramp closure,
- when authorised vehicles need to access the ramp during closure situation
- and when there is a reverse flow of traffic on the on-ramp from vehicles exiting the motorway.

## Proposed Emergency Sequence

Event	DYNAC Controls	SCATs Controls	Onsite	Proposed alert notes
Closure incident occurs	Operator triggers the DYNAC system	Signs* and signal change	TM / Police arrive	
Check visual of ramp status on site	Barrier arm comes down at on-ramp			Alarm prompt in the DYNAC to check traffic signal operation (i.e. traffic phase set)
Emergency vehicles need to enter ramp while public is stopped	Barrier opens for individual authorised vehicles		Authorised vehicles queue to be let through	Use of cameras to check/operate barrier for individual authorised vehicles
Standard operations ready to resume	Barrier arm is raised		TM / Police leave	Alarm prompt in the DYNAC to check traffic signal operation (i.e. traffic phase set)
Normal operation		Signs* and signal change		Alarm in SCATs to check barrier arm position

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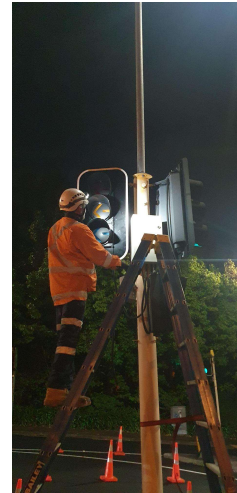
## Proposed Mainline Clearance Sequence

Event	DYNAC Controls	SCATs Controls	Onsite	Proposed alert notes
Closure incident occurs	Operator triggers the DYNAC system	Signs* and signal change	TM / Police arrive	
Check visual of ramp status on site	Barrier arm comes down at on-ramp			Alarm prompt in the DYNAC to check traffic signal operation (i.e. traffic phase set)
Traffic is cleared from on-ramp		Signs* and signal change	TM on-site contacts ATOC to trigger ramp reverse signals	
Vehicles on mainline is cleared using Wellington St on ramp as exit	Barrier arm is raised			Alarm prompt in the DYNAC to check traffic signal operation (i.e. traffic phase set)
On-ramp is cleared	Barrier arm is lowered and signals change to keep ramp closed	Signs* and signal change	TM / Police leave site	
Standard operations ready to resume	Barrier arm is raised	Signs* and signal change		Alarm prompt in the DYNAC to check traffic signal operation (i.e. traffic phase set) / SCATs alarm to check barrier arm position

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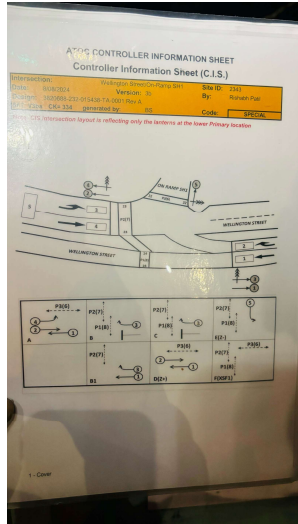
- in ramp closure,
- when authorised vehicles need to access the ramp during closure situation
- and when there is a reverse flow of traffic on the on-ramp from vehicles exiting the motorway.

# Installation



Here is the site with the equipment installed

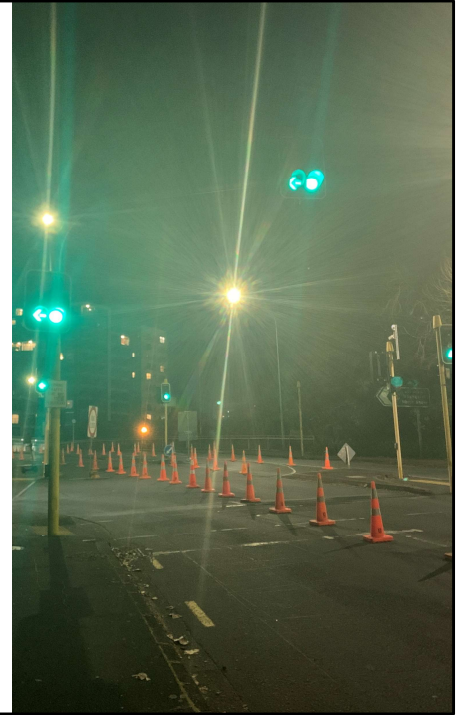
# Installation



There was a scheduled maintenance closure last month and that was when these traffic signals came live

## Next Steps

- Trial Operation under closure – will require updated TMP
- Investigate traffic phasing of interchanges during night closures
- Investigate further opportunities to reduce the number of staff on-site and attenuator requirements
- Renewal does not mean like for like replacement



**Any Questions?**



Thank you



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