

Auckland's Infrastructure Hotspots

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Financial Sponsors



Other Steering Committee Members

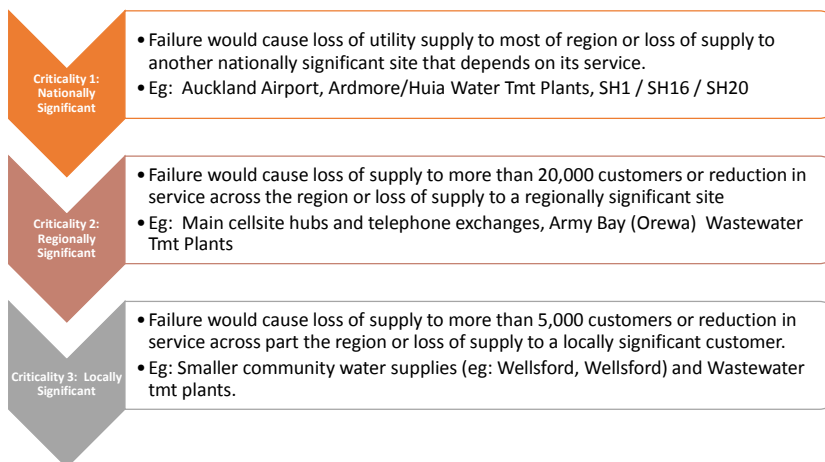


Hotspots and Pinchpoints



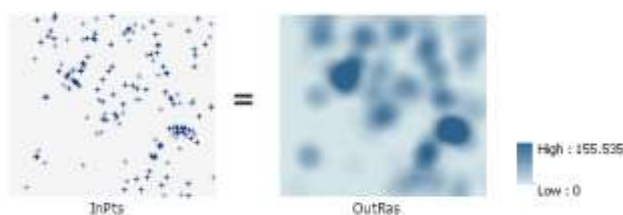
- **Hotspots:** Place where especially significant assets of different infrastructure utilities or sectors are co-located.
- **Pinchpoints:** Utility asset or site where a satisfactory alternative route is not available and which is therefore essential to service delivery to *critical sites or facilities*.
- *Note:* *Pinchpoint* is equivalent to a 'single point of failure' (a term sometimes used in telecommunications) or 'bottleneck' (a term often used in road transport).

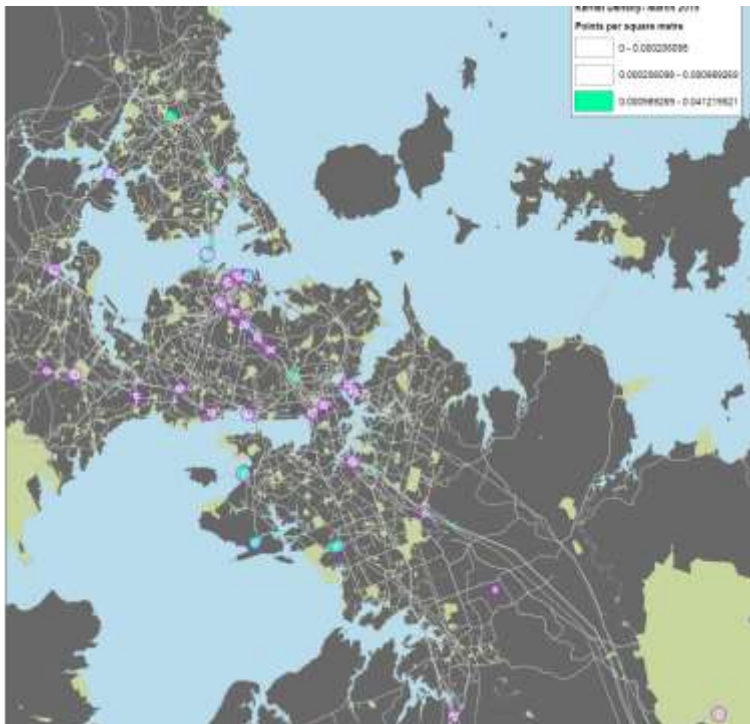
Mapping of Critical Sites / Routes



Infrastructure Density Analysis

- Infrastructure represented as points – more points per length for higher criticality.
- Data cleansing – on ramps/off ramps, multiple cables.
- Kernel Density Analysis.





Hotspot Map Example



Hotspots and Pinchpoints Rating

Score	Service Failure Impact
5	Affects most of region or national impacts (Criticality 1a)
4	Affects significant part of region > 100,000 customers (Criticality 1b)
3	Affects significant part of region > 20,000 customers (Criticality 2)
2	Affects significant local area > 5,000 customers (Criticality 3)
1	Affects minor localized areas
0	None
Score	Affect on LoS
4	Complete loss of service to impacted customers
3	Significant loss of service to impacted customers
2	Moderate loss of service to impacted customers
1	Minor loss of service to impacted customers
0	No affect on service provision
Score	Weight
4	Road/Electricity/Water
3	Telecommunications
2	Gas
1	Public Transport

Hotspots and Pinchpoints Rating

- confidential

Assessing Natural Hazard Risks

	<1:200 yr (3)	<1000 year (2)	> 1000 year probability (1)
Tsunami	Most assets in red zone	Most assets in orange zone	Most assets in yellow zone
Local volcano	NA	NA	Auckland volcanic field
Earthquake – liquefaction	NA	Major areas	Minor areas
Slope instability	NA	Major areas	Minor areas
Flooding	Most assets in flood plain area	Some assets in flood plan area	Minor assets in flood plain areas
Coastal inundation	Most assets in present day	Most assets in SLR+1	Most assets in SLR+2

Assessing asset failure risks

Assets posing risk to co-located assets	Consequence of Failure
Major water main burst Gas main explosion Fuel line explosion Electrical cable explosion/fire Bridge collapse.	Potential to cause major damage and disruption (2) Potential to cause minor damage and disruption (1) Unlikely to impact other critical infrastructure (0)



Risk Analysis

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General Findings

- Increased resilience of Auckland's infrastructure – both redundancy and robustness (not quantified).
- Catastrophic failure of hotspot areas is considered very low probability – would require a volcano, meteor, plane crash, terrorism type scenarios.

Lifelines Use of Project Outcomes

- Incorporate the hotspots maps into emergency response planning arrangements, so that staff who respond to failures at those sites can be aware of the significance of other utilities at the site.
- Consider re-location as an option during planning of future upgrades, if the risks warrant this.
- Carry out their own risk assessment at each site and identify appropriate mitigation actions.
- Input to rapid damage assessment targets.