

Auckland Lifelines Group Seminar

Tess Gillham, Healthy Waters

Brian Park, Watercare



Financial Sponsors



Other Steering Committee Members



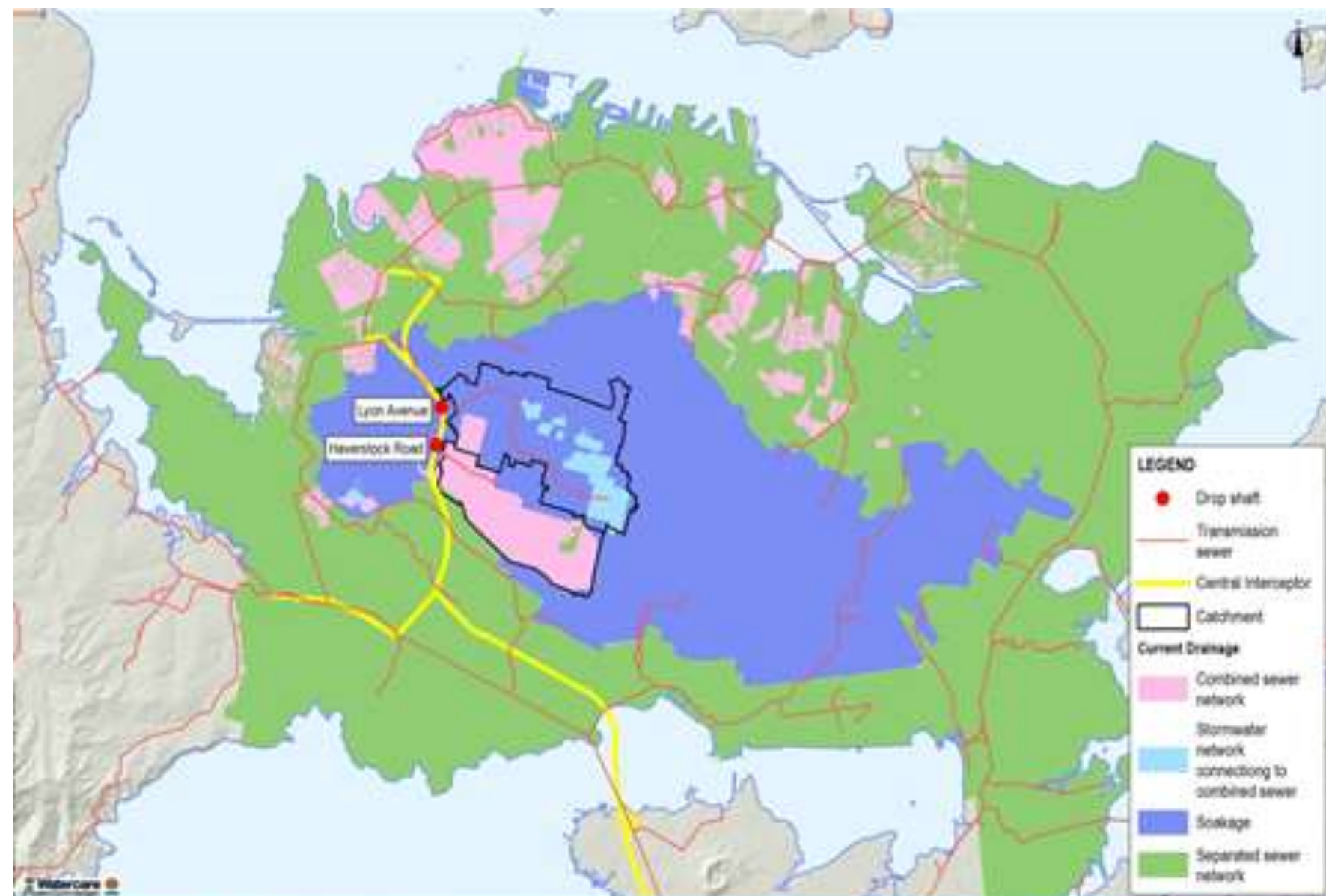
Stormwater:

Preparedness for volcanic event

- HW have commissioned a complete review of our incidence response plans. The development of contingency plans for volcanic eruption is part of this commission and is expected to be completed in 2020.
- HW critical assets, combined sewer, soakage areas and depressions have been identified and mapped.
- Priority to combined SW & WW buried networks and soakage areas, minimise ingress of ash to networks by covering catchpits in areas likely to be affected, using filter cloth/sand bags/filter socks



- HW keep a stock of 1000 sandbags, stock on hand will be extended to include similar stocks of filter cloth and inlet protection filter socks.
- HW keep list of available staff, plant and equipment AC, maintenance contractors/sub contractors, and consultants under service agreements



Combined Sewer and Soakage Areas

Potential Impacts – Local Volcano

- ‘Worst case’ location – For Healthy Waters Auckland CBD & outfalls to wharfs, combined network and soakage areas.
- Watercourses/streams/overland flow paths blocked by eruption/lava flow
- Localised flooding due to blockages in networks/overland flow paths, soakage areas due to eruption and ash fall, and from measures to protect mechanical equipment and to minimise ingress of ash to networks.

Restoration – Local Volcano

- Ashfall clean-up and restoration will require co-ordinated effort from NZTA/AT/WSL and HW
- Cleaning of transport routes to provide access for Water Sector - WSL and HW to focus on cleaning primary drainage network/overland flow paths, critical assets, combined networks and soakage areas
- Disposal of ash debris in such a manner that avoids exacerbating the issues. Normal Auckland weather will prevail!!
- Depending on severity of event and success with prevention of ash from entering drainage systems restoration likely to take months and years.
- Given that AT/WSL/HW make use of same pool of contractors restoration will require pooling of contractor resources on national and possibly Australasia/International basis.
- As in Christchurch co-ordination of volunteer efforts can be instrumental in speeding up clean-up operations

Potential Impacts – Distal Volcano

- Consider an ashfall event of up to 5mm for several weeks.
- Experience from historic volcanic eruptions would suggest although likely widespread across Auckland that ash impact of stormwater/sewer network likely to be minor and possibly limited to some localised blockages/flooding due to ash ingress to networks.
- It is expected that using vacuum loading and hydro jetting equipment the stormwater/sewer network can be kept open and operating.
- Difficulties foreseen
 - Prevention of ash ingress to drainage networks
 - Cleaning and unblocking primary pipe network.
 - Ash ingress from private properties due to action/inaction of private prop owners.
 - Availability of vacuum & hydro jetting units
 - Disposal sites & transport logistics, plant & equipment

Restoration – Distal Volcano

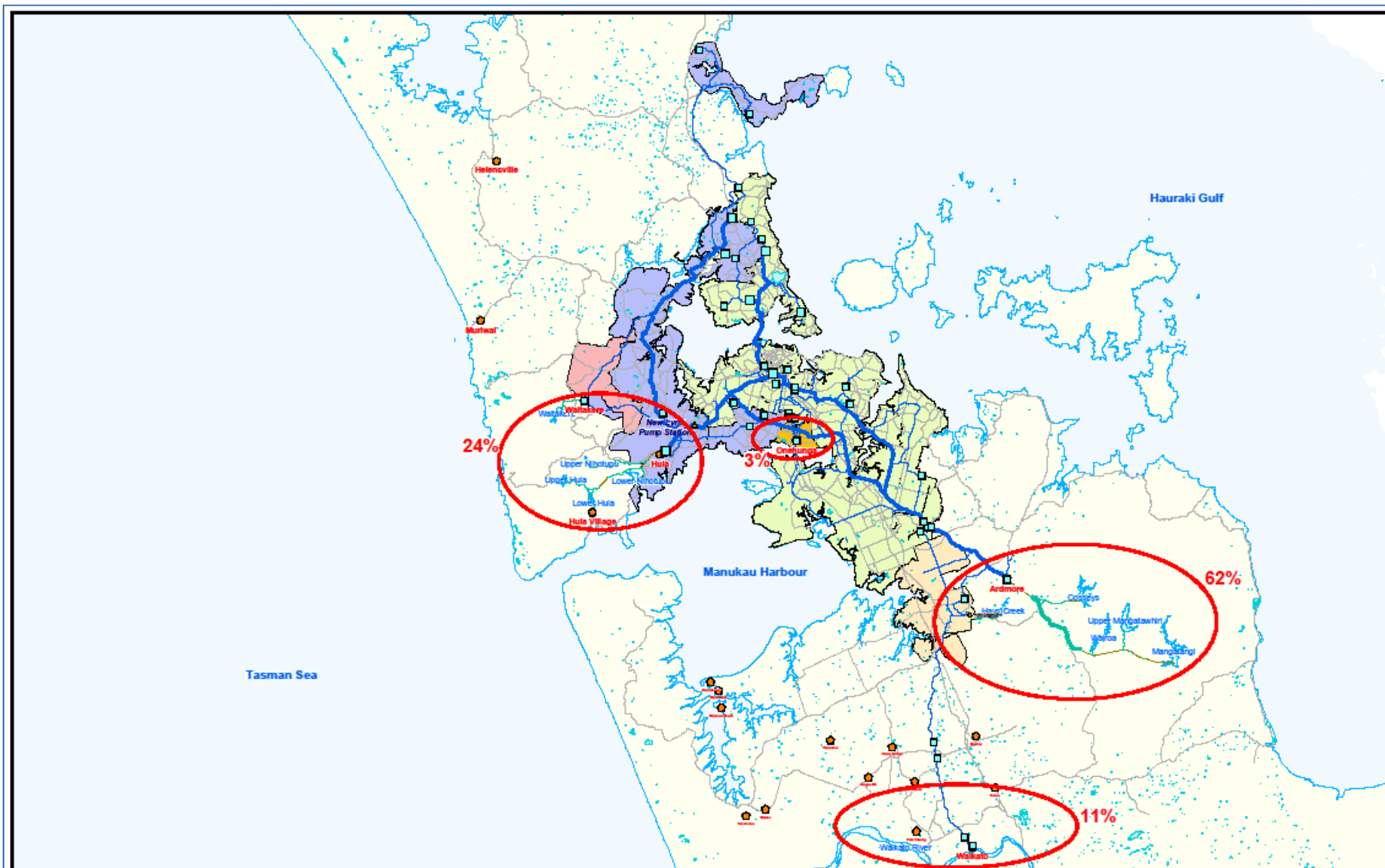
- As for local eruption - Deploy maintenance contactors/sub contractors using vacuum loading and hydro jetting equipment to keep the streets/stormwater/sewer network clear/open and operating.
- Cleaning of streets, catchpits and piped network is expected to be ongoing for the duration of the eruption, as long as ash continues to fall and could last for several weeks/months.

Water Supply & Wastewater

- Understanding the Risk & Planning by
- Supported Research by GNS Science/Canterbury University
 - 2004 Impacts of volcanic ash on water supplies in Auckland
 - 2011 Treatment of ash contaminated surface waters
 - Impacts of ash on wastewater pumping equipment
- Input to GNS Posters Development
- Confirming water treatment processes at WTPs are capable of treating ash contaminated water to NZDWS

Risk Exposure

- Majority (97%) of metropolitan water supply is ex-surface water sources large exposed water bodies
 - Capacity bias to southern sources (>75% increasing)
 - 4 Hunua, 5 Waitakere & Helensville dams
 - Waikato R.
- Treatment plants
 - Water - Clarifiers and filters – exposed water bodies
 - Wastewater – clarifier/reactors /BNR – exposed water bodies
 - Exposed plant and equipment
- Transmission systems
 - Combined sewer/stormwater system Auckland Central Isthmus
 - Damage/destruction of WW pumping equipment

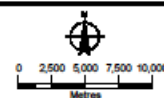


Legend

- | | | | | | | | |
|--|-----------------------|--|-------------------|--|----------|--|--------------------|
| | Reservoir | | Treated Watermain | | Waikato | | West plus New Lynn |
| | New Lynn Pump Station | | Raw Watermain | | Onehunga | | Admore / Waikato |
| | Treatment Plant | | Water Tunnel | | Admore | | |

WATERCARE SERVICES LTD

Water Supply Sources



Vaping
WestCare
Services Ltd

SCALE 1:50,000 A3
DATE 10 September 2011
GIS REF PR11105_TF
MAP NO PR11105_03

This plan is illustrative only and all information should be independently verified on site before being used. Watercare Services Limited gives no warranty as to the accuracy and completeness of any information on this plan and accepts no liability for any error, omission or use of the information on this plan and accepts no liability for any error, omission or use of the information on this plan.

Watercare Assets

Ardmore WTP



Mangatangi Dam



Rosedale WWTP



Resilience - Water

- Diversity of sources - Hunua's (60%), Waitakere's (26%), Waikato (14% increasing as future water sources)
- Water Treatment Processes can process ash contaminated water (GNS Science research 2011)
- Buried trunk high capacity redundant transmission systems geographic separation
- 80+ Service Reservoirs enclosed structures regionally distributed >600ML emergency storage
- Full Load Standby gensets at Ardmore, Huia, Waitakere and number of key water pump stations

Resilience – Wastewater

- Mangere/Rosedale/Army Bay WWTPs provide north/south diversity of treatment
- WWTPs generate majority of power requirements
- Buried trunk interceptors servicing geographically diverse catchments

Response Strategy

- Dependent upon event scenario
- Reconfigure water supply system to extent possible
- Maintain water quality and quantity – may require restrictions
- Protect plant and equipment from ash – may require shutdown in order to reduce recovery time and cost
- “Shrink-wrapped” structures of WTP Filters and exposed equipment (per leaky buildings)
- May result in wastewater overflows and environmental impacts
- Refer GNS posters

Service Level Impacts

- Dependent upon nature (local/distal), season and duration
- Potential water supply restrictions of varying magnitude from severe regional to local
- Potential wastewater overflows and environmental effects
- Local source event worst case scenario
 - Destruction of facilities
 - Extended duration disruption – location critical in respect of scale of effects
 - Extended duration rebuild – could be Christchurch scale event
 - Significant costs and economic effects

Local Source: Worst Case Locations

Water Supply in order of “diminishing” effects

- Hunua Headworks – raw water transmission & Ardmore WTP (>60%) - combined other sources cannot meet demand
- Treated water transmission – Mt Smart Rd/Victoria St, Onehunga - crossover of Hunua 3 & 4 watermains
- Huia 2 Watermain – Avondale/New Lynn
- North Shore watermains – south of bridge

Local Source: Worst Case Locations

Wastewater

- Major treatment facilities Mangere, Rosedale, Army Bay
- Failure of Trunk interceptors will have significant service level and environmental effects

Recovery

- No quick fix – could be Christchurch scenario
- Large diameter pipe not available “off shelf”
- Transmission pipelines must be buried to avoid disruption to transport systems
- Pipeline routes must be available – not affected by eruption
- Civil structures – extended rebuild duration
- Mechanical/electrical equipment more readily available – sourced off-shore
- Resources – local suppliers will also be impacted