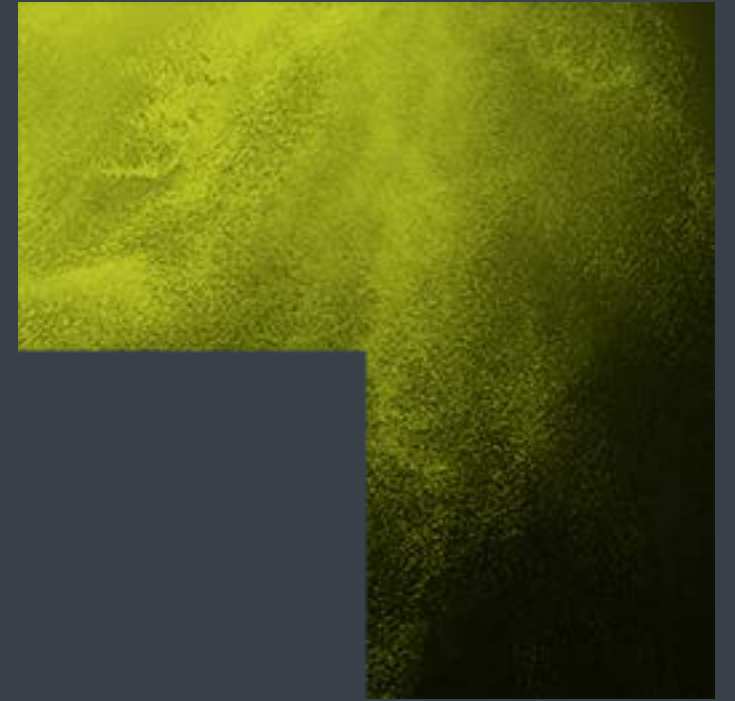


URBAN HOUSING ALTERNATIVE APPROACH TO PROVISION OF WATER & WASTEWATER INFRASTRUCTURE

G PEDERSEN, A HOQUE, HARRISON GRIERSON

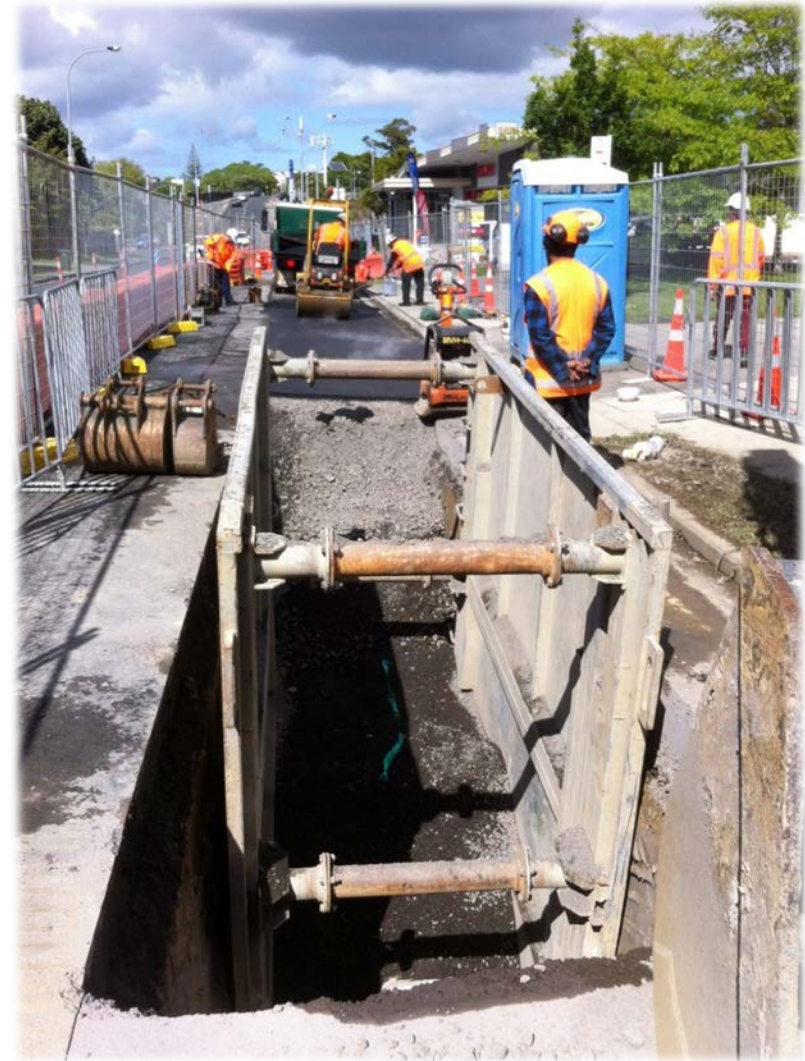
Water NZ Conference 2017



INTRODUCTION



- The background to Urban Development
- Urban Trends
- Infrastructure – the choke point
- Planning for growth – who should pay?
- I & I



INTRODUCTION



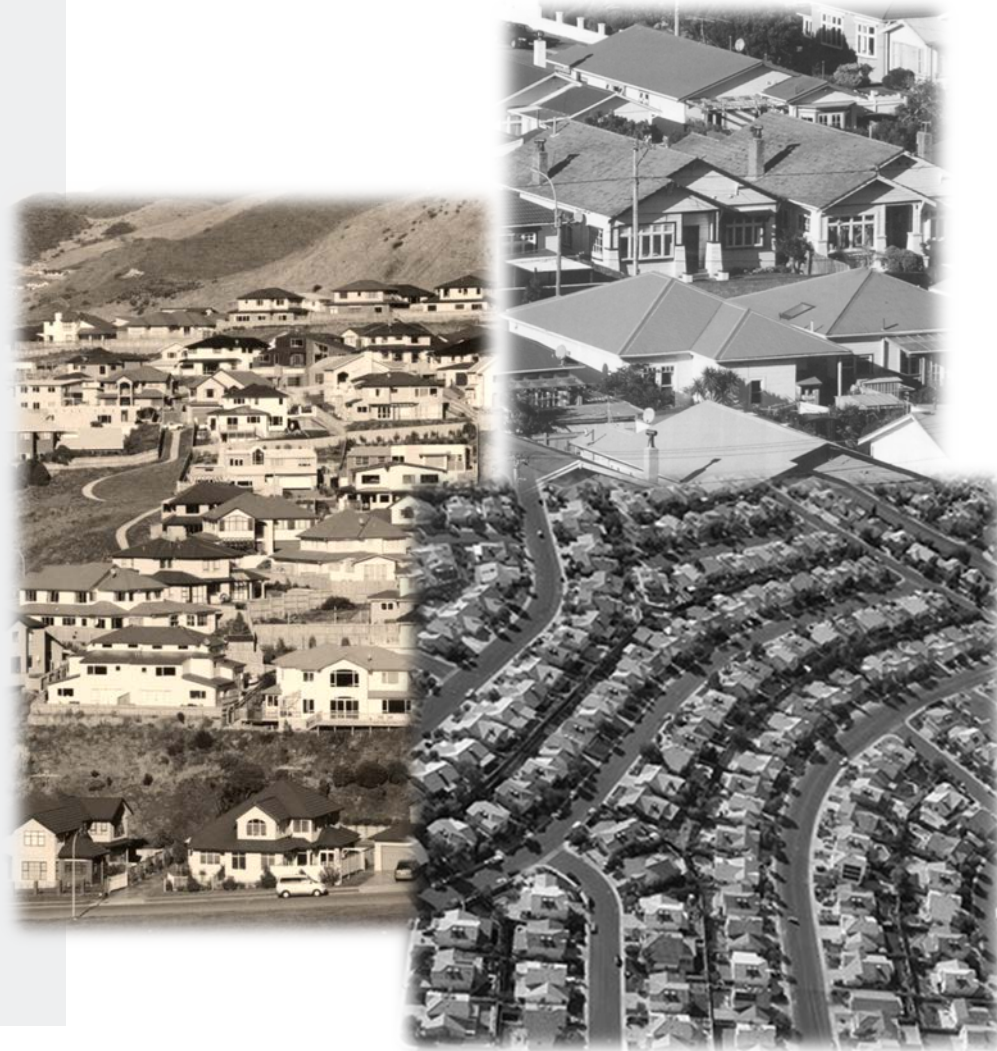
- Solutions
- Delivery Mechanisms – Public/Private
- Planning and Growth – Zoning and Density
- Alternative Servicing
 - Vacuum
 - Pressure
 - Smart Sewers
 - Flow Balancing
 - Emerging Technologies – Reuse
- NZ Planning Legislative Change
- Summary



BACKGROUND OF URBAN DEVELOPMENT



- 86% of New Zealanders live in towns and cities
- In the early days of urbanisation – suburban sprawl development – dominated the urban form
- The real shift in urban trend came in the mid-1990s when the Auckland Regional Council tried to change the low density pattern by imposing urban limits in Auckland



MODERN URBAN TRENDS



- In the mid-90s - 20 dwellings per hectare - was considered as an acceptable housing density
- Currently 80 to 100 dwellings per hectare for new apartment developments near the town centres are becoming reality
- The urban trend for going up instead of going out is evident in some extent to all major New Zealand cities



INFRASTRUCTURE CHALLENGES



HISTORICAL INFRASTRUCTURE SYSTEMS



- Infrastructure built 20-50 years ago lower density
- Never dreamed of now!



GROWTH COST FUNDING



- Growth – hardly uniform prediction!
- Sporadic
- Costs rising – funding – by who?
- Who should pay? Council/Developer/Government
- Fair cost allocation?
- How to distribute cost – or let costs lie where they fall?



STRUCTURE PLANNING OR AD HOC



- Orderly Structure Planning - or
- Ad hoc – Reactions to outside stimuli ---
- Reliance on private development aspirations -

- Adequate provision for the future



INFRASTRUCTURE AGEING



- Ageing leaky infrastructure
- I&I
- New infrastructure



SOLUTIONS



- Delivery Mechanisms
- Planning and Growth
- Urban Form Change
- Alternative Servicing Systems
- Flow Balancing
- Emerging Technologies



UTILITIES ORGANISATIONS OR PRIVATE DEVELOPMENT



- Utilities Organisations or Private Developers
- Can the market plan and provide for the future?
- Allowance for areas outside current development





Removing the RUB won't necessarily work as planned

Matt L | May 19, 2016 |



Yesterday [Phil Twyford announced](#) that it would be Labour's Rural Urban Boundary (RUB), as part of a policy to improve housing affordability.

Labour wants the Government to abolish Auckland's rural urban boundary, which has led to the proliferation of caravans, garages and tents.

Labour housing spokesman Phil Twyford said the rural urban boundary has fuelled the housing crisis and people would not be able to afford to live in Auckland if the Government acted.

The map shows the Rural Urban Boundary (RUB) which defines the area where house prices are high.

“Making a dent in the housing shortfall by enabling more urban expansion to occur is therefore entirely about speeding up infrastructure, rather than whether or not there is a line on a map.”

As Auckland

plan to provide publicly-funded infrastructure to new urban areas. If you wanted to expand the yellow future urban zoned areas on the map, you'd *also* have to find the money for additional infrastructure.

In other words, greenfield land is in scarce supply because it's currently farmland that requires roads, pipes, train stations, parks, schools, hospitals and a myriad of other infrastructure investment to take place before development can actually happen. Making a dent in the housing shortfall by enabling more urban expansion to occur is therefore entirely about speeding up infrastructure, rather than whether or not there is a line on a map.

URBAN BOUNDARIES



- How relevant
- Natural catchment – or just what's zoned?
- Infrastructure Planners - Look at long term land use
- Make provision – where appropriate

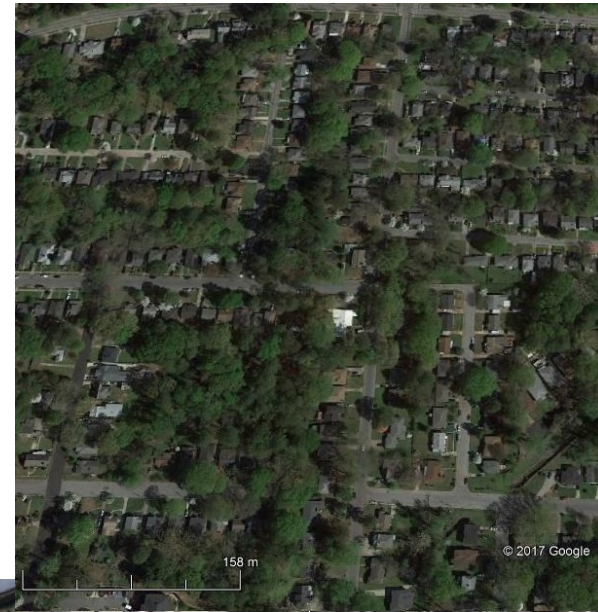


build it – they will come!

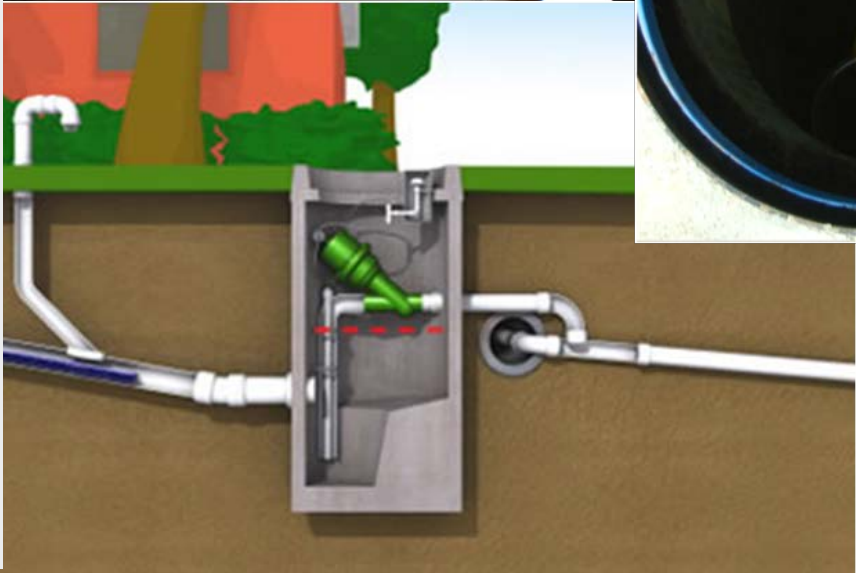
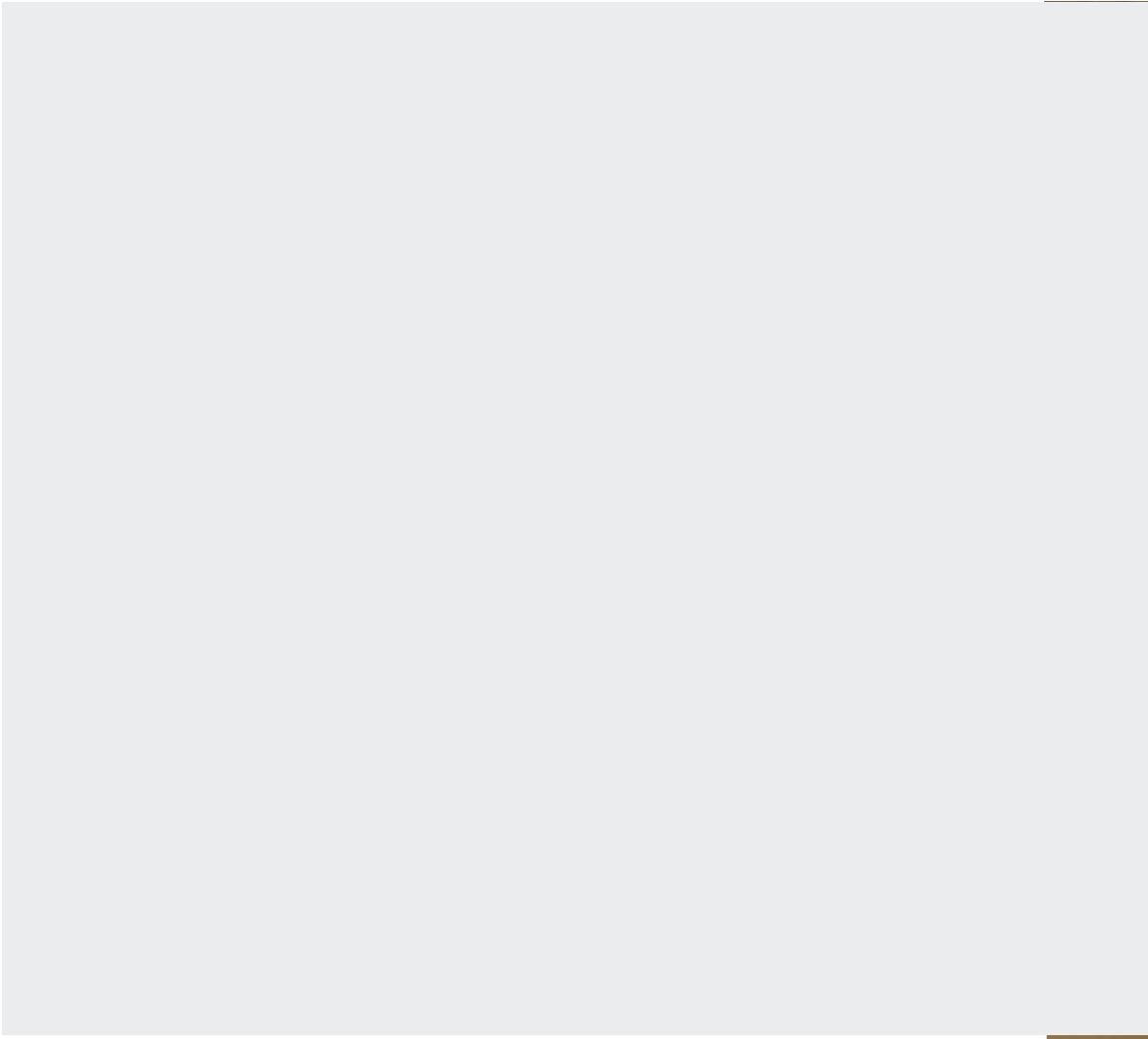
PEAK FLOW DETERMINATION



- Population based vs. Population and area based flow criteria
- Standard rules for high-density and multi-storey development?



ALTERNATIVE SERVICING VACUUM SEWERS



ALTERNATIVE SERVICING PRESSURE SEWERS



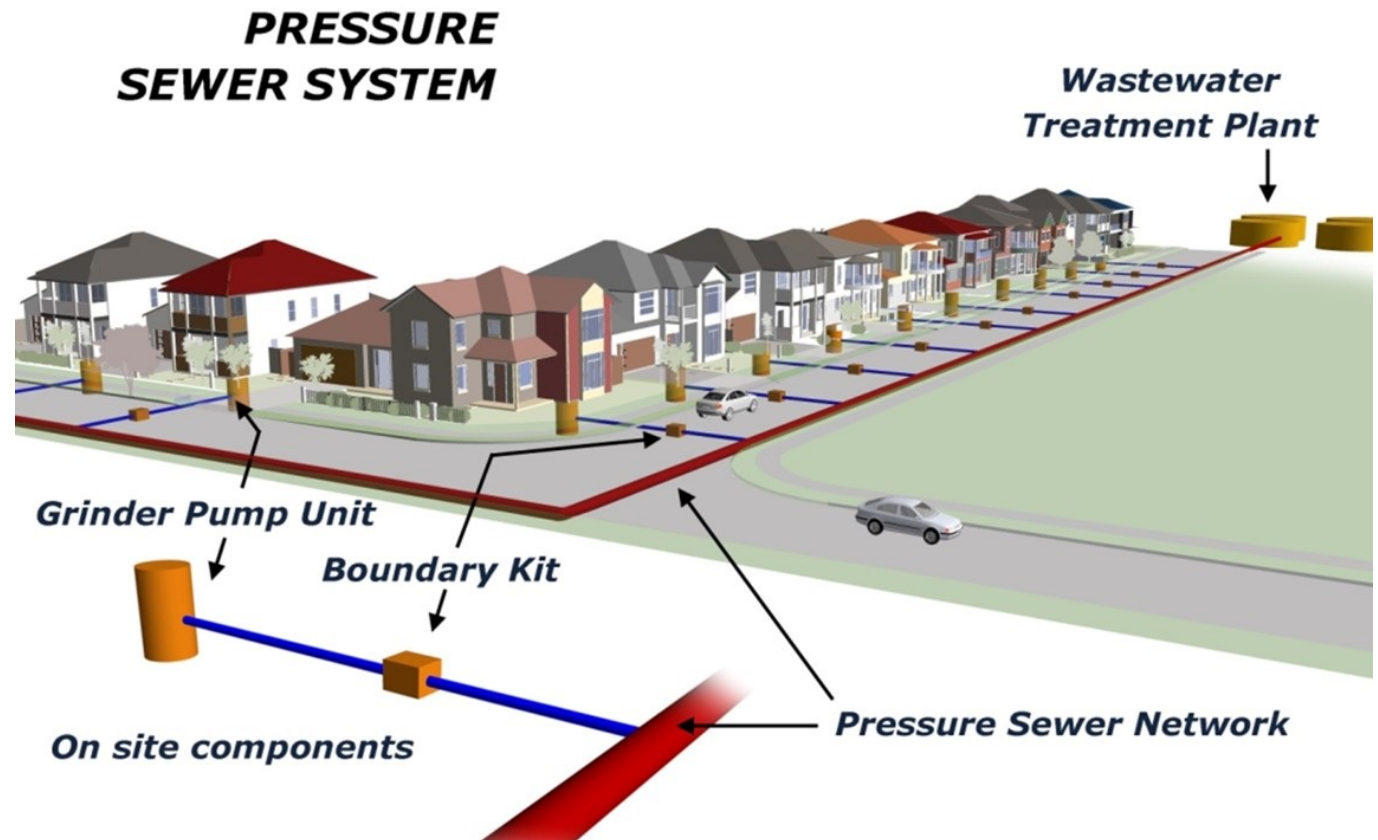
- Terminal pump station often not needed
- Lower I&I



ALTERNATIVE SERVICING PRESSURE SEWERS



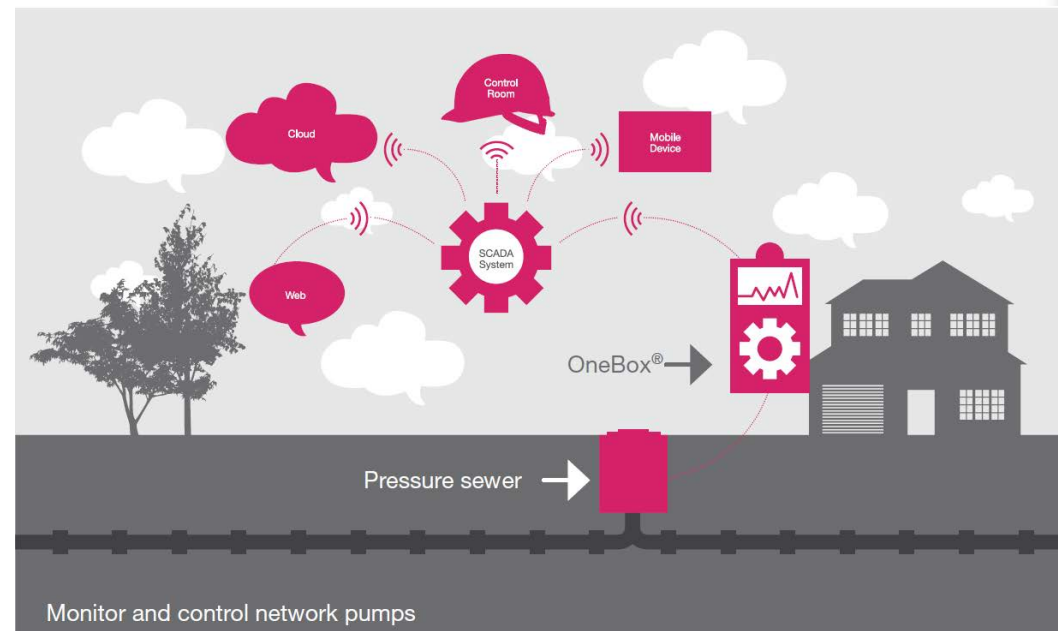
- Terminal pump station often not needed
- Very economical distribution system



ALTERNATIVE SERVICING SMART SEWERS



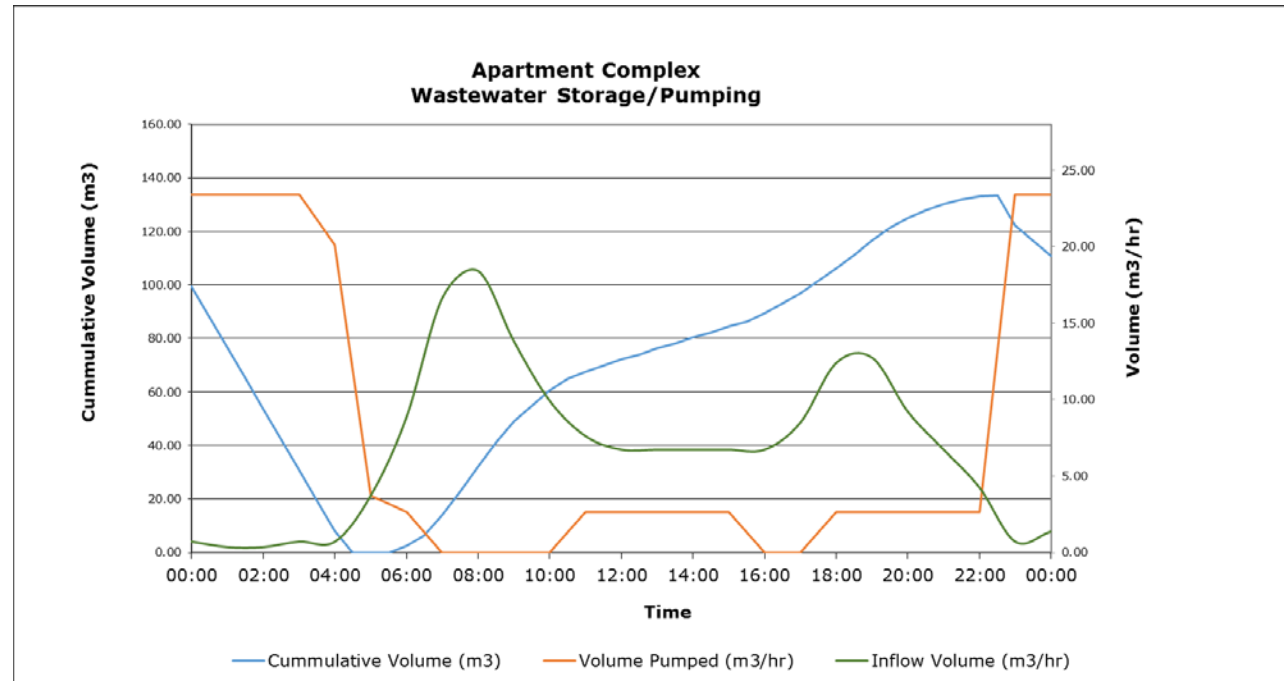
- Communication of system status
- Control of incoming flows
- Can be implemented in various ways



FLOW BALANCING



- Making existing infrastructure go further
- Equalises diurnal flows
- Reduce costly transmission pipe upgrades



WATER RECYCLING



- Public acceptance yet to catch up to technology
- A matter of time and necessity
- Indirect reuse somehow vaguely more palatable (it happens in some way now)
- Non-potable use would be more accepted



Raveen Jaduram says other countries are already reusing treated wastewater.
FAIRFAX NZ

JAMES PASLEY

Aucklanders' future water supply may come in the form of treated sewage.

At a recent forum on the wellbeing of the Manukau Harbour Raveen Jaduram, the chief executive of council controlled organisation Watercare, said it was looking at the possibility of reusing treated sewage for either human consumption, industry, agriculture or reinjection into the aquifer.

"The challenging bit for us remains the effluent," Jaduram said.

"In the rest of the world where they have urgency and pressures for water, they're now reusing their recycled, treated wastewater."

In 2013 the United Nations said that by 2030 nearly half the world's population could be facing water scarcity.

To combat scarcity issues, treated sewage was already being used in Australia, Belgium,

Singapore and the United States. Treated wastewater has had the organic and inorganic solids separated from a liquid waste stream. Currently, once treated it is discharged into waterways.

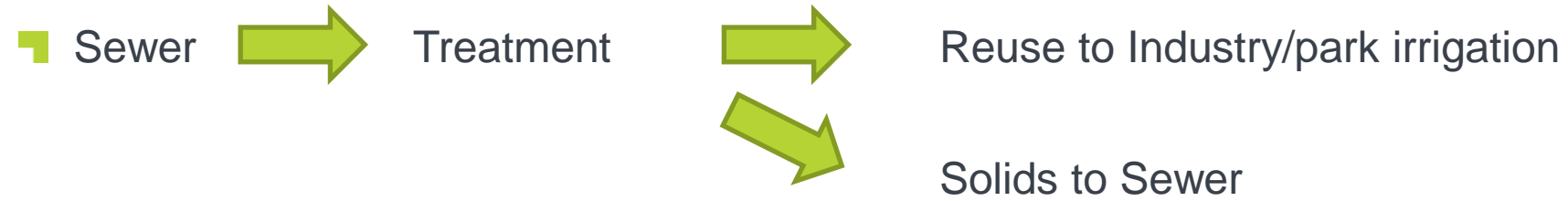
Watercare communication manager Rachel Hughes said its current infrastructure plan, which goes to 2036, did not plan for supplying the public with treated wastewater.

Hughes said the potential use of treated wastewater as a water source was well acknowledged.

SEWER MINING



- Technology to Reuse Wastewater Locally



- Saves transmission costs for both water and wastewater

NZ PLANNING SYSTEM - LEGISLATIVE CHANGE



- 7 The New Zealand planning system is predominantly guided by three legislations - LGA, RMA & LTMA
- 7 Four potential problems have been identified within a complex planning system



NZ PLANNING SYSTEM - LEGISLATIVE CHANGE



There is an opportunity to use our urban planning system to better

- drive productivity

- enable development

- get value for money from

infrastructure investment

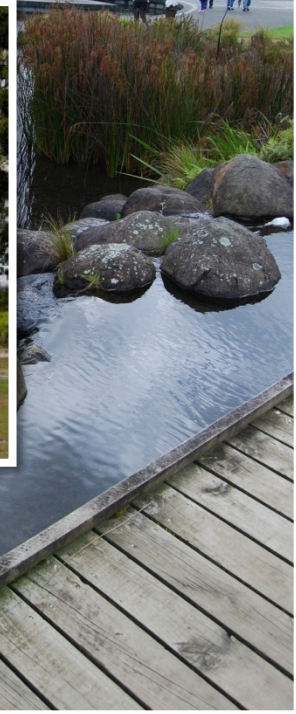
- deliver a quality built

environment

- achieve desired social,

economic, cultural and

outcomes





- Infrastructure is the combination of fundamental systems that support cities, towns and villages
- Urban design is the spatial process of designing and shaping cities, towns and villages



BERNE, SWITZERLAND

BUILDINGS
ROADS &
INFRASTRUCTURE
OPEN SPACES
VEGETATION
WATER COURSES



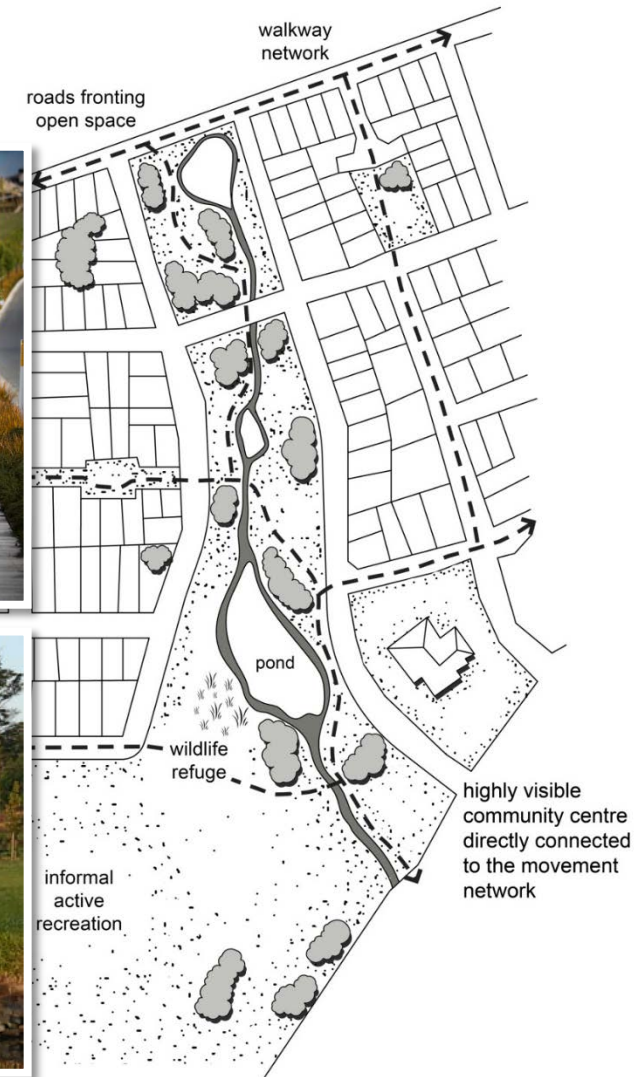
- Urban Design deals with the physical system of neighbourhood's both built and natural environment
- Urban design is an interdisciplinary subject that utilizes elements of many professions



URBAN DESIGN & INFRASTRUCTURE



- Urban Design is about making connections between people and places, movement and urban form, nature and the built fabric
- Good Urban design is heavily dependent on the quality of infrastructure design and its maintenance



TAKE HOME THOUGHTS



- Look Beyond the Boundaries
 - Review Standards to Embrace Change in Urban Trends
 - Embrace Equitable Funding Methodologies
 - Plan for unexpected changes in growth
 - Embrace Proven Emerging Technologies
 - Utilise Smart Sewer Flow Management
 - Planning Legislation Change
-



“Any intelligent fool can make things bigger and more complex... It takes a touch of genius...and a lot of courage to move in the opposite direction.”

Albert Einstein, Physicist

HC

“