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Small Rural Drinking Water System Consolidation and Infrastructure Development:

Lessons Learned from California

water NEW ZEALAND
The New Zealand Water & Wastes Association Waiora Aotearoa

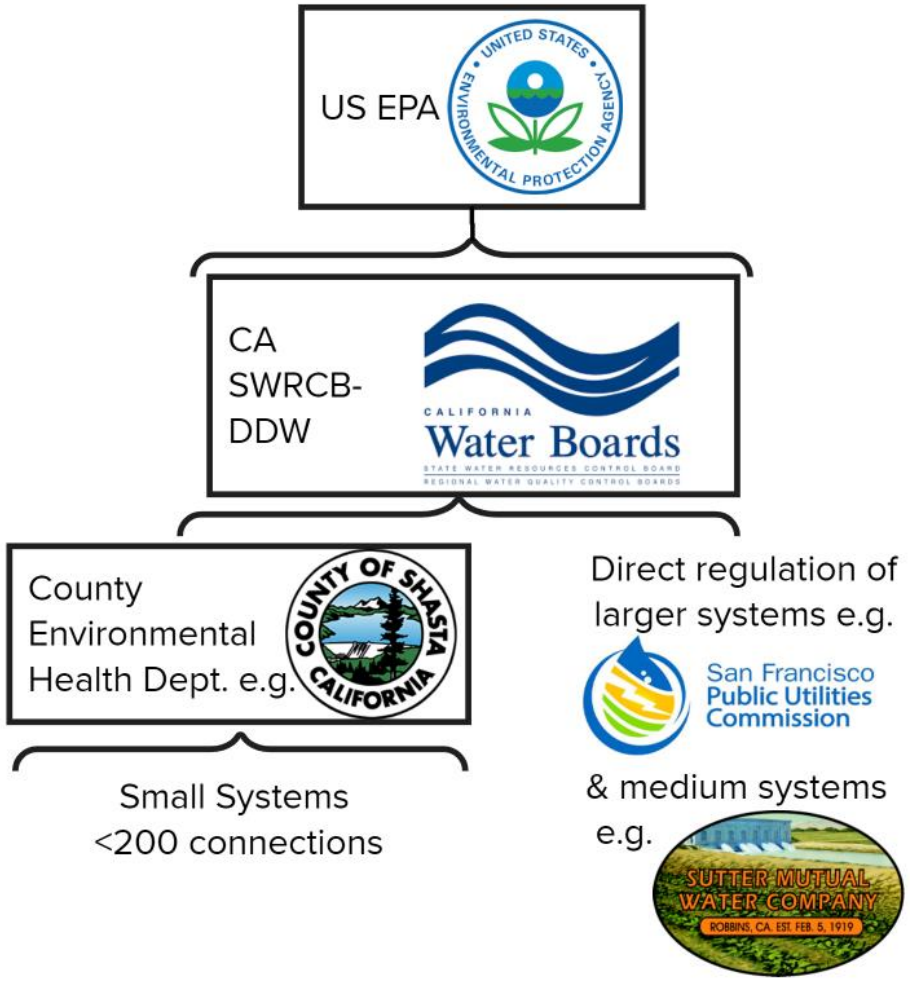
water NEW ZEALAND CONFERENCE & EXPO 17–19 OCTOBER 2023
Tākina, Te Whanganui-a-Tara Wellington

Overview

- Background: California drinking water system regulatory framework
- Prioritisation of access to clean water: HR2W & SAFER
- Scales of interest: example projects
  - Consolidation
- Programmatic takeaways
  - Common issues
  - Communication
  - Long-term success & viability
- Applicability to New Zealand

Water system regulation in California

- US EPA delegates regulation to states, sets min. Max. Contaminant Levels (MCLs)
- California regulator is State Water Resources Control Board (SWRCB), Division of Drinking Water (DDW)
- Further delegation to counties (~Councils) for small systems <200 connections
- Both private & public-owned water systems:
  - Mutual Water Companies (MWCs) or investor-owned utilities
  - City or District Water Utilities
- All systems >5 connections regulated



Prioritising access to safe water: HR2W

- CA state law (Assembly Bill 685) 2012
- “Human Right to Water” law: every Californian has a right to clean, safe, & affordable drinking water
- HR2W List: systems failing water quality (WQ) or other regulatory criteria (391 of 3231 systems)
- Typically, systems on HR2W are one or more:
  - Underserved/ disadvantaged communities (<50% median household income)
  - Rural areas
  - Small systems (serving <500 people)
  - Difficulty with staffing & administration
- HR2W is priority list for funding improvements & regulator engagement

Prioritising access to safe water: SAFER

- Total ~$1.2B from GHG Emissions Fund & special taxes
- SAFER: **S**afe and **A**ffordable **F**unding for **E**quity and **R**esilience
  - Focus on long-term resilience of water system (financial, operational, climate, etc.)
  - Consolidation analysis- managerial, operational, and/or physical
  - Technical, managerial, financial (TMF) capacity
- Technical Assistance Program (TAP)
  - Online application for flexible assistance grants & low-interest loans
    - O&M, short-term water supply
    - Infrastructure design, purchase, & installation
    - Administration, billing, reporting support
    - Community engagement
  - TA Providers assigned for long-term success (3+ years)

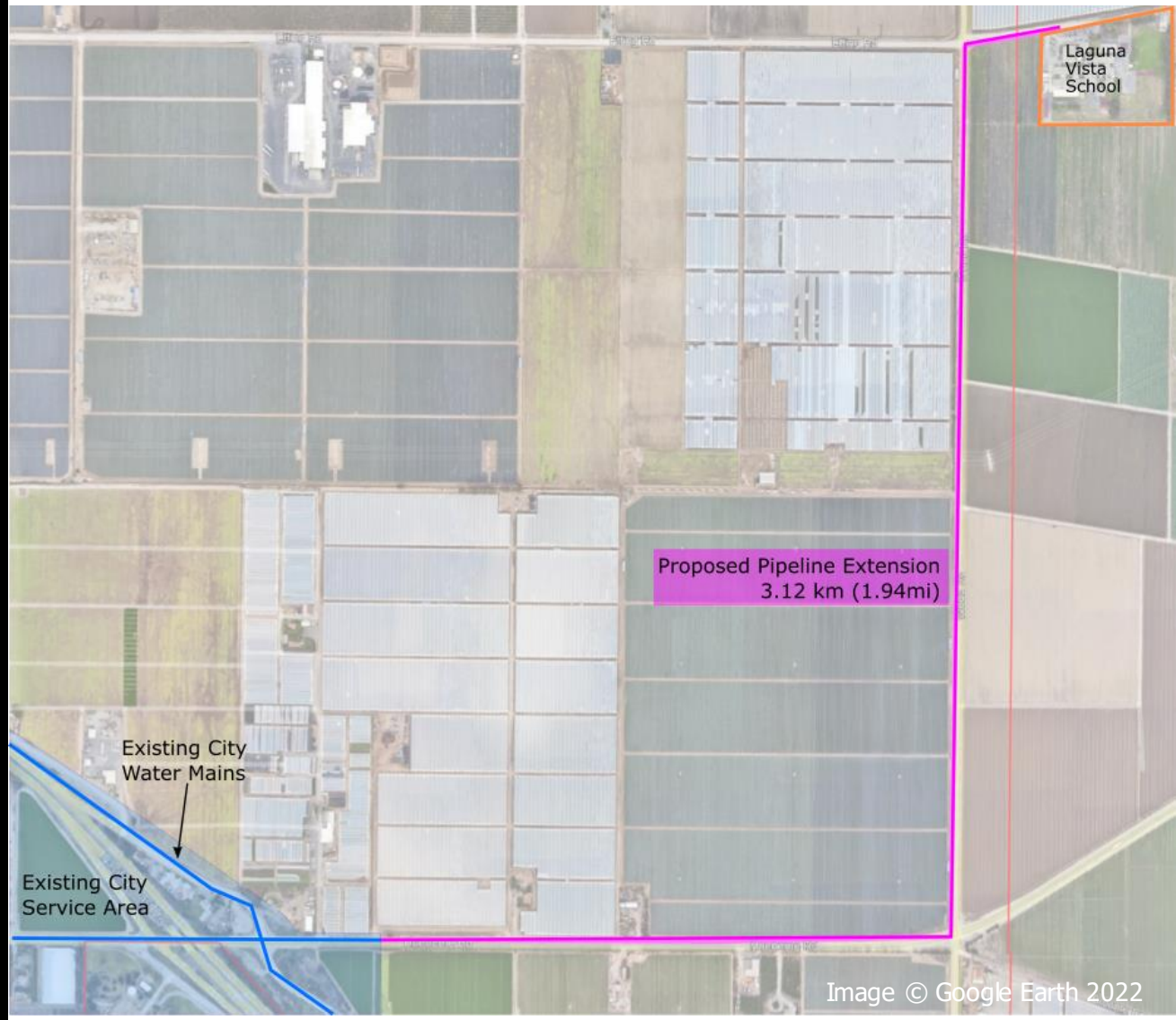
Case study: Laguna Vista Elementary School

- One source well, poorly sealed
- High organic content (agricultural setting)
- Flush tanks to waste up to every 2 weeks
- Not allowed to decrease storage (fire)
- Fire storage not up to code
- Limited lifetime for well, treatment & reticulation infrastructure

Excess storage (fire) → **Water age** → **DBP formation**

Case study: Laguna Vista Elementary School Proposed Solutions

- Full (physical) consolidation with City of Oxnard
  - 3-km pipeline provides potable AND fire service
  - School becomes regular customer
  - School no longer maintains permit, treatment system, controls, or flushing
- Consider water quality in pipeline (6-inch):
  - Area to be developed in future
  - Convert potable tanks to irrigation storage
  - Occasional flushing to irrigation tanks when DBPs rise

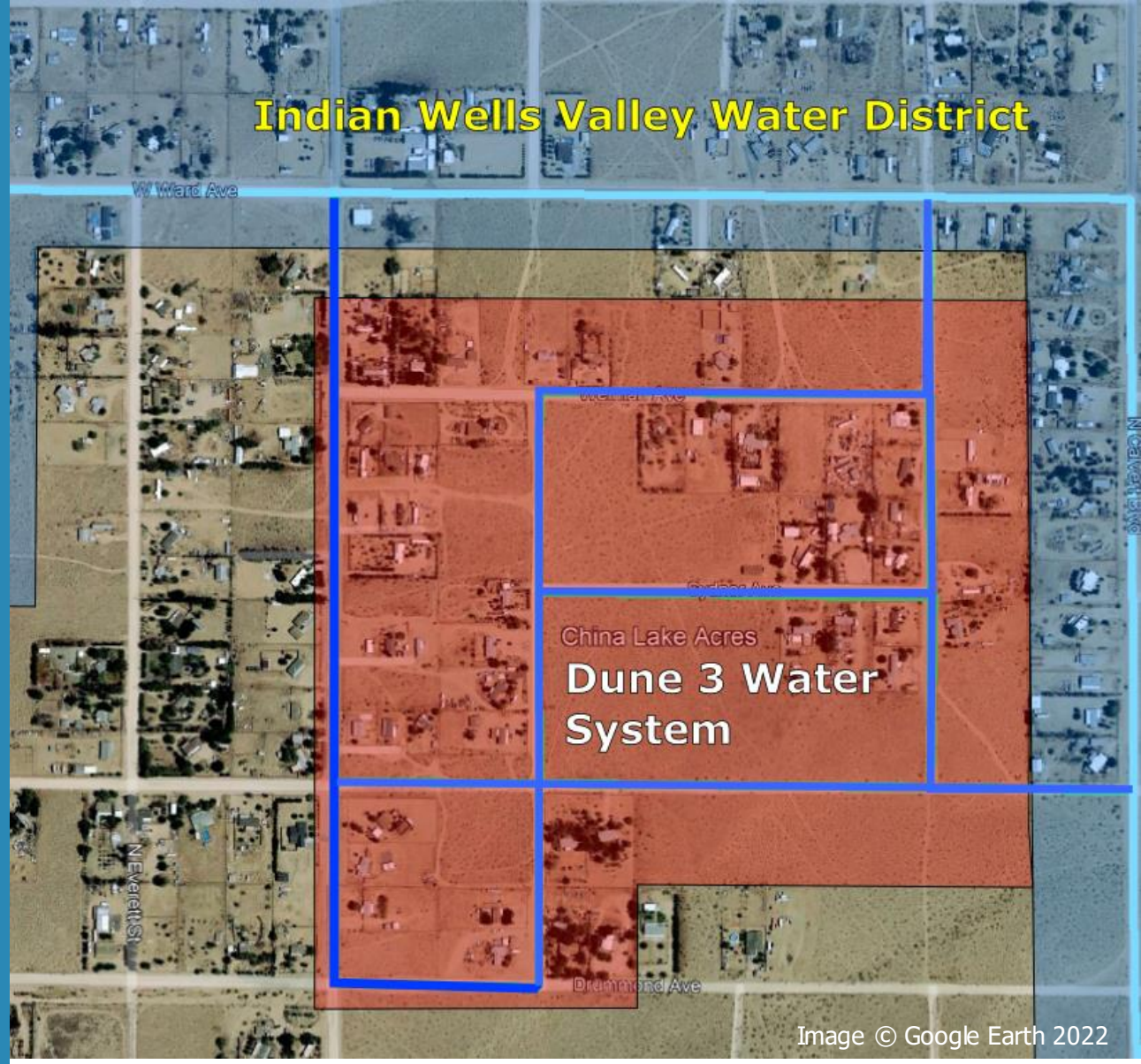


Case study: Dune 3 Consolidation

- Sparsely populated community
- Very deep wells, running dry
- Insufficient storage (maximum day demand)
- Economically disadvantaged area (MHI ~$28,000 p.a.)
- Infrastructure under homes, across private property

Proposed Solution:

- Physical (full) consolidation with adjacent water system
- Long-term source management
- Connect all eligible properties through looped system

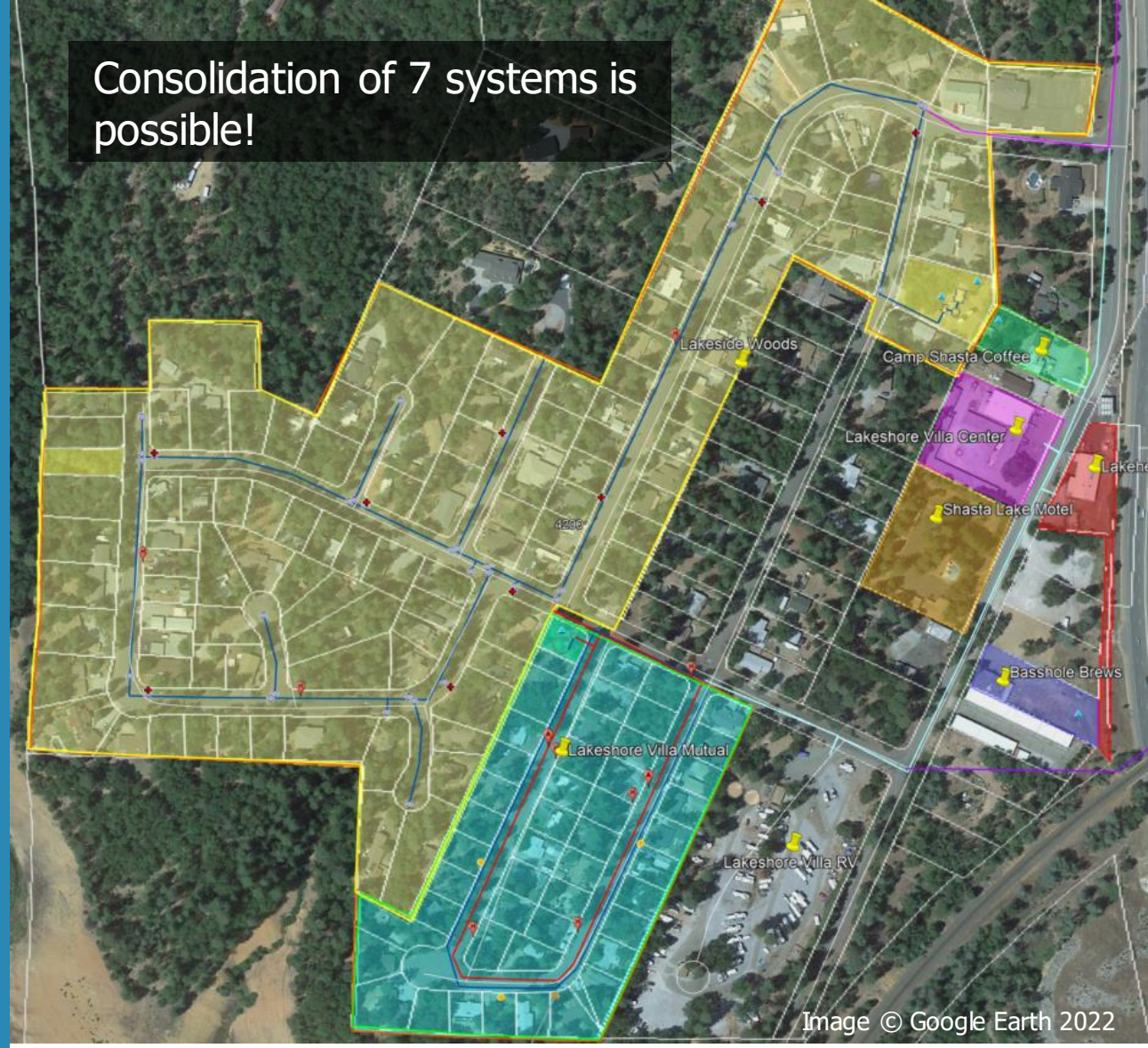


Lessons learned: common issues facing small, rural systems

- Insufficient local funding to support O&M, planning, and necessary capital improvements
  - Often economically under-resourced
- Lack of community understanding
  - Value of safe potable water - and what this means
  - How to protect those most vulnerable
- Lack of local expertise
  - Water treatment, system maintenance, oversight/ technology
  - Financial planning & management
- Aging population (volunteers, managers)
- Distrust of outside experts & regulators

Lessons learned: communication

- Community engagement is key to project success
  - Technical solutions require buy-in from communities to succeed
  - No technology is truly a solution if recipient is unable or unwilling to employ it as intended
- Consolidation is a very emotional topic- even when funding is free!
  - Perceived loss of control and ownership ("giving away" assets)
  - Valuation of each partner's assets (mine vs yours)
  - Ongoing collaboration & cooperation
- Emphasize community & individual benefit; need to protect vulnerable
- Be willing to listen and discuss community concerns (technical people too!)

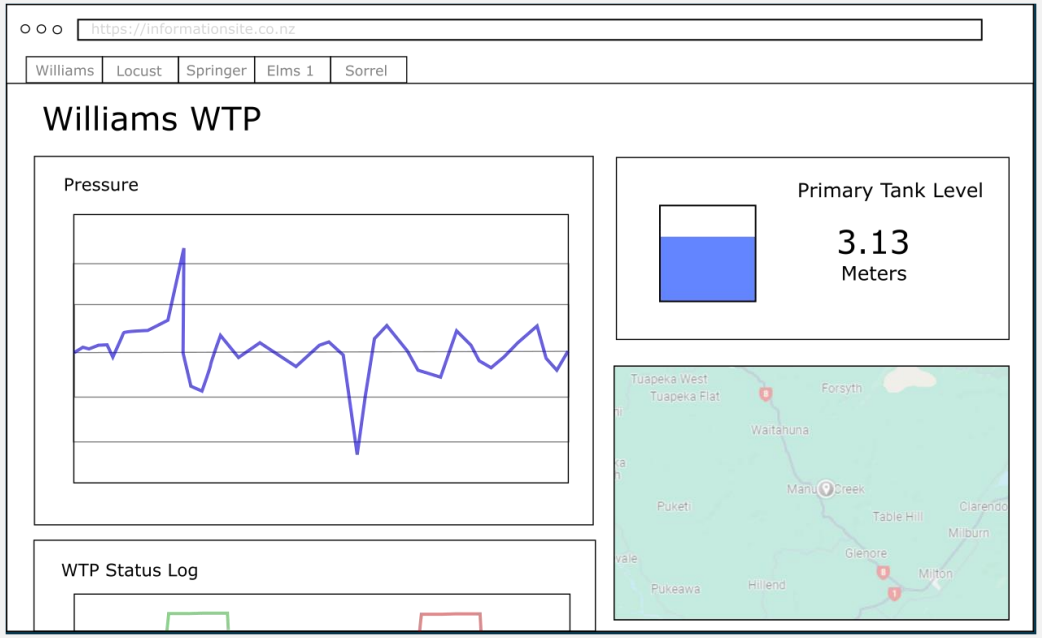


Lessons learned: communication

- Consider cultural heritage alongside technical needs – Native American Tribes
  - Historical and alternative uses of source water
  - Careful examination of excavation/building sites for cultural resources
  - Community involvement and respect for elders
- Additional considerations for project success
  - Initiate discussions early
  - Allow extra time for approval processes
  - Be careful with terminology
  - Don’t assume you understand concerns

Image courtesy of GHD Water Sciences Group

Lessons learned: long-term success & viability



- Match technology to capability, interest, & commitment of community
- Make solutions as straightforward as possible- local expertise may be limited!
  - Minimize breakable/moving parts
  - Limit specialised oversight & maintenance
  - Standardised designs
- Use remote operation/oversight or SCADA
  - Share resources & expertise- one qualified operator overseeing multiple systems
  - Simplified real-time data capture & cloud solutions for oversight & reporting
- Add controls to reduce water age
  - Improved turnover is one of the easiest & most impactful water quality controls
  - Inlet nozzles or powered mixers in tanks

Lessons learned: long-term success & viability

- Consider both current & future regulations and concerns in design
  - Treatment options consider multiple/emerging contaminants (PFOS)
  - Consider source water quality changes (climate change/algae, quantity)
- Replace ageing components nearing end of useful life- not just those which have failed
  - Funding process lengthy: future-proof
  - Relative cost of one more element small next to revisiting planning, design, & installation a few years from now
- Design for expansion or reconfiguration where possible
  - Bypass valves to allow component replacement
  - Flexible and/or expandable controls
  - Additional treatment elements (capacity or multiple types)

Observations for New Zealand

- Water Industry leaders can (and should!) lead the way with communication about the importance of water quality standards
  - Speak up at community meetings, talk with local politicians
  - Reach out on your social media (or your employer's)
- Water Quality regulations & needs tied up with politics
  - Promoting public health needs vs political control
  - Similar issues of "mine vs yours" and reluctance to cooperate
- Promote clear planning on *how* required upgrades will be funded and implemented
  - Cost savings under Reform plan clear, but how does this actually happen?

Observations for New Zealand

- Informed community members can be our greatest allies and advocates for positive change
  - Engage with tangata whenua- focus on health outcomes
  - Inspire confidence that change & more treatment/oversight is positive outcome

- Discuss value of prioritising under-resourced communities for funding
  - Common minimum standard of water quality
  - Protecting the young, aged, and immunocompromised
  - Systems with recent investment will also be eligible for upgrades as needed

Thank You!

Contact with any additional questions:

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