Sewage Reticulation – What Option Is Best For You?

Diana Kim, Environmental Engineer
Pattle Delamore Partners Ltd, Auckland

Introduction

This presentation covers:

- Sewage reticulation options
- Various projects carried out by PDP

Reticulation Systems

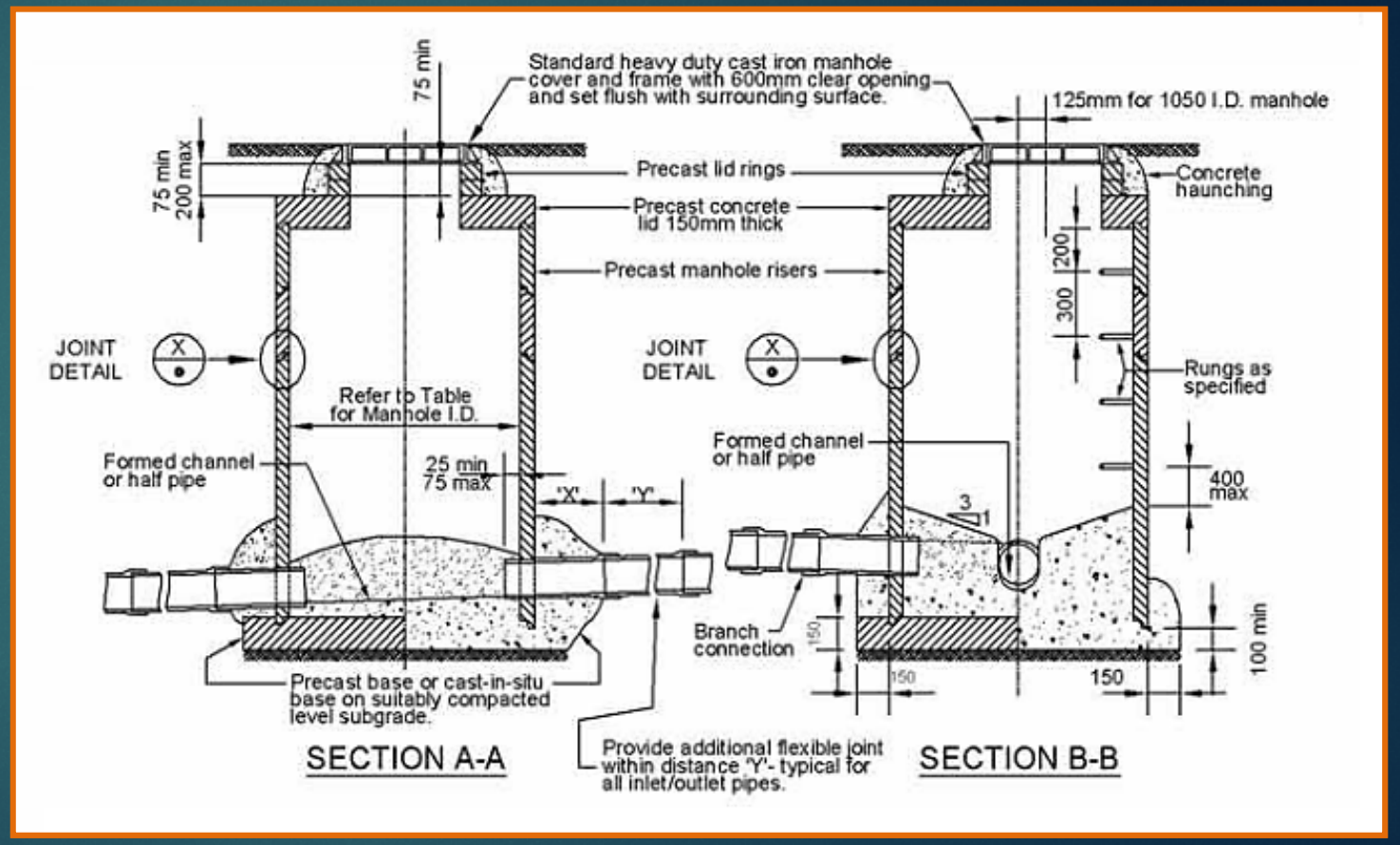
Gravity

- Conventional
- Enhanced

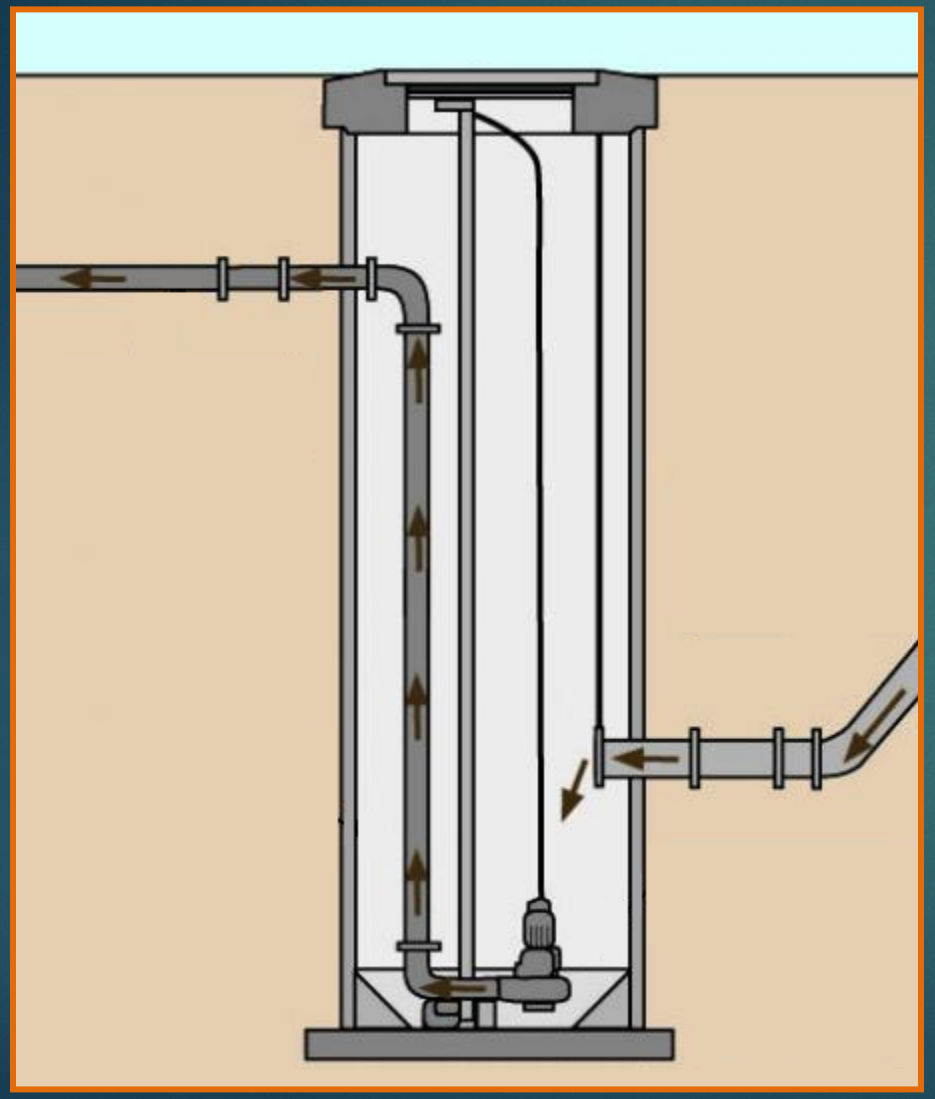
Pressure Sewer

- Septic Tank Effluent Pump
- Grinder Pump

Reticulation Systems – Conventional Gravity



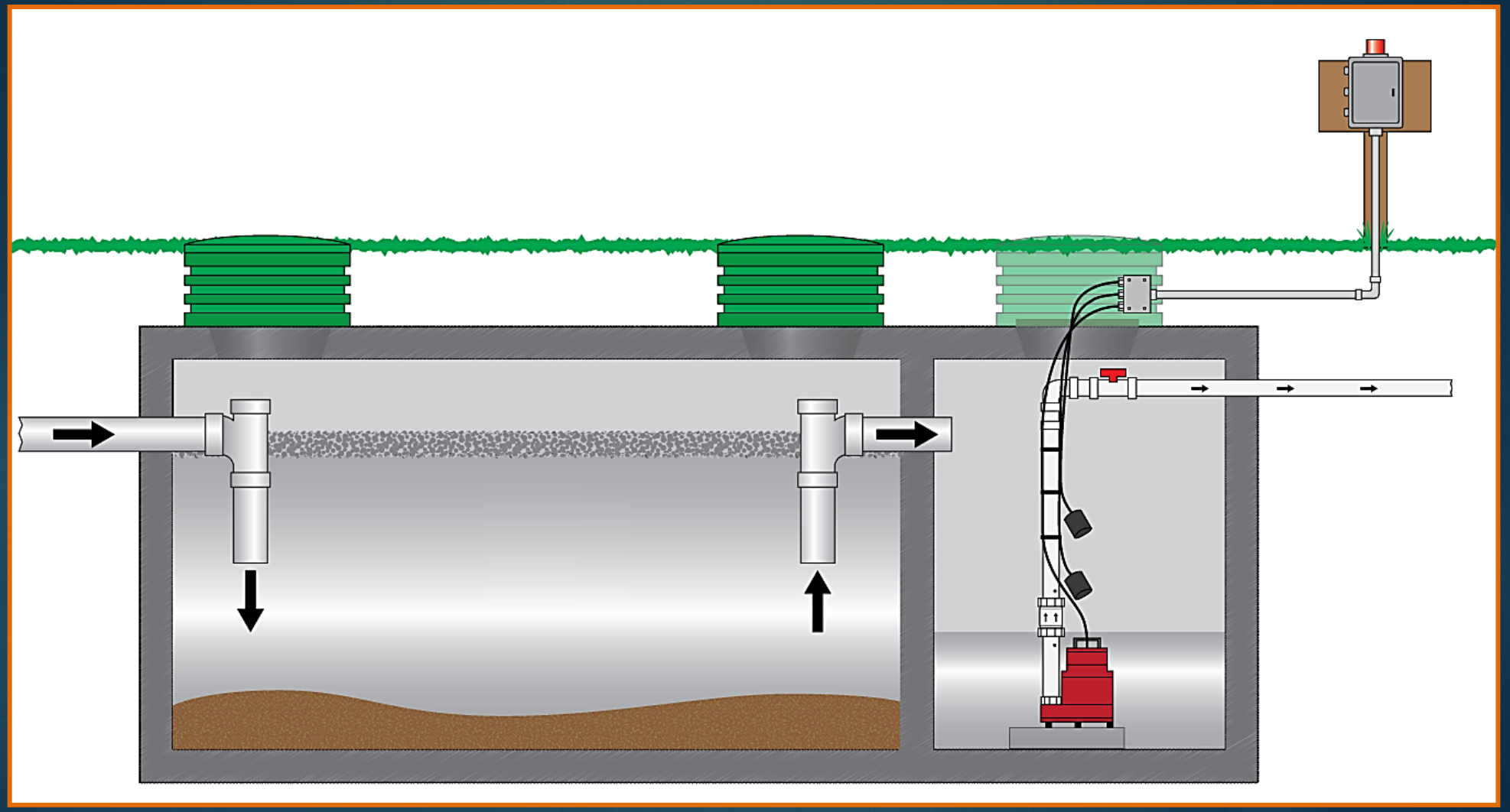
Reticulation Systems – Enhanced Gravity



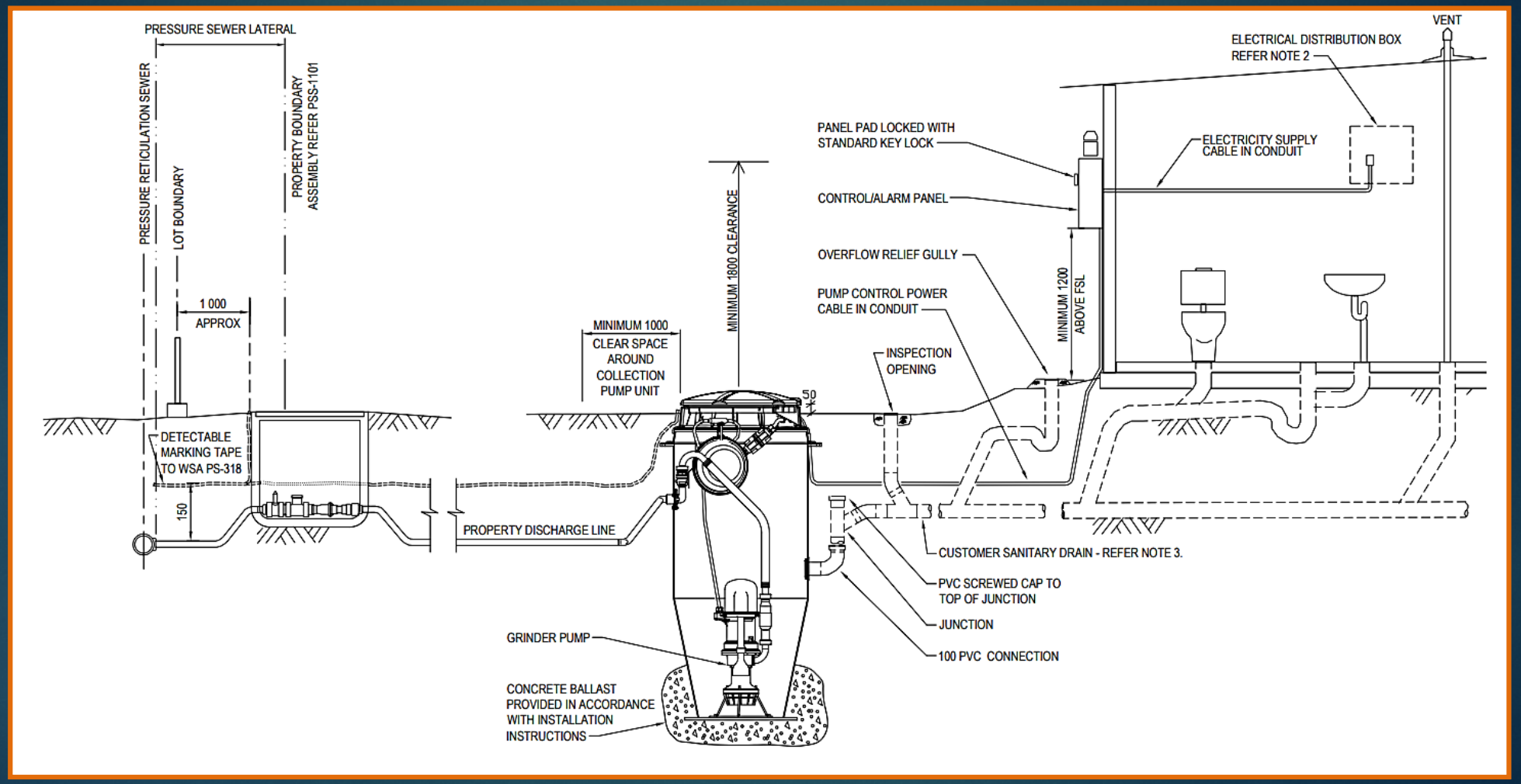
“Lift Stations”

Reticulation Systems – Pressure

Reticulation Systems – Pressure (STEP)



Reticulation Systems – Pressure (Grinder)



What have I learnt?

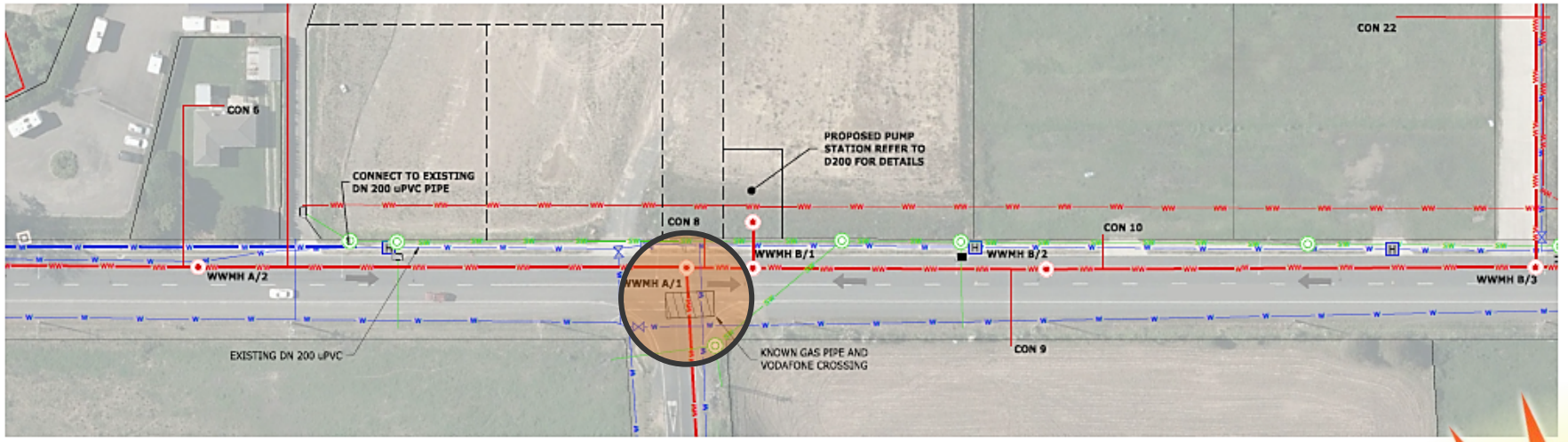
- Horses for Courses!
- Every project is different
- Assess each option against a **site-specific** set of criteria

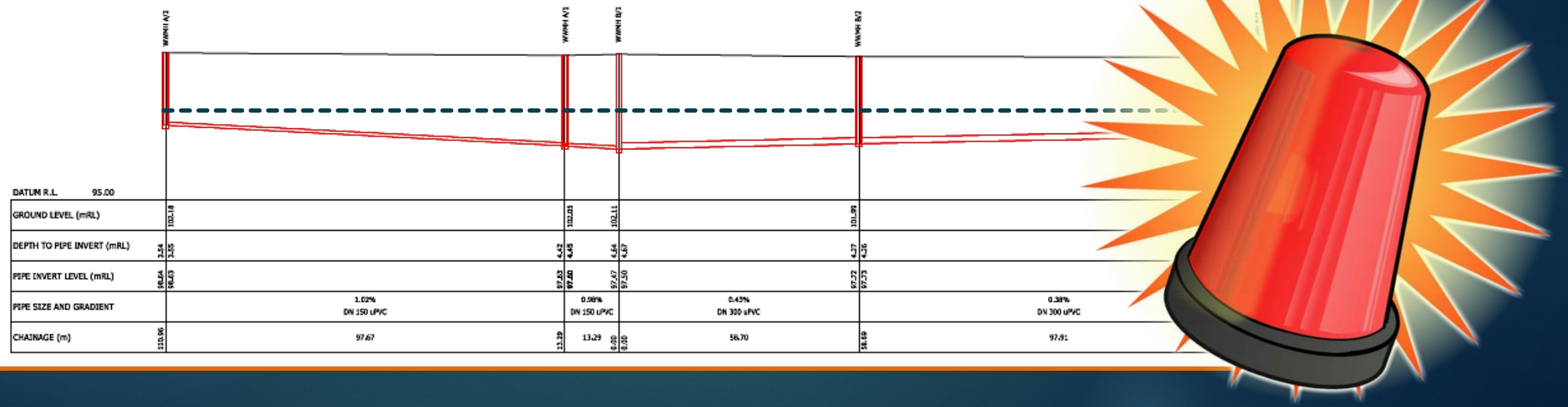
A Useful Tool: Multi Criteria Analysis

Assessment Criteria	Weighting	Option 1	Option 2
Constructability	1 to 100%	1 to 5	1 to 5
Cultural impact			
…			
…			
…			
Total Score (highest score is best)		**1 to 5**	**1 to 5**

Project 1: Partially Developed Industrial Zone

Project 1: Partially Developed Industrial Zone



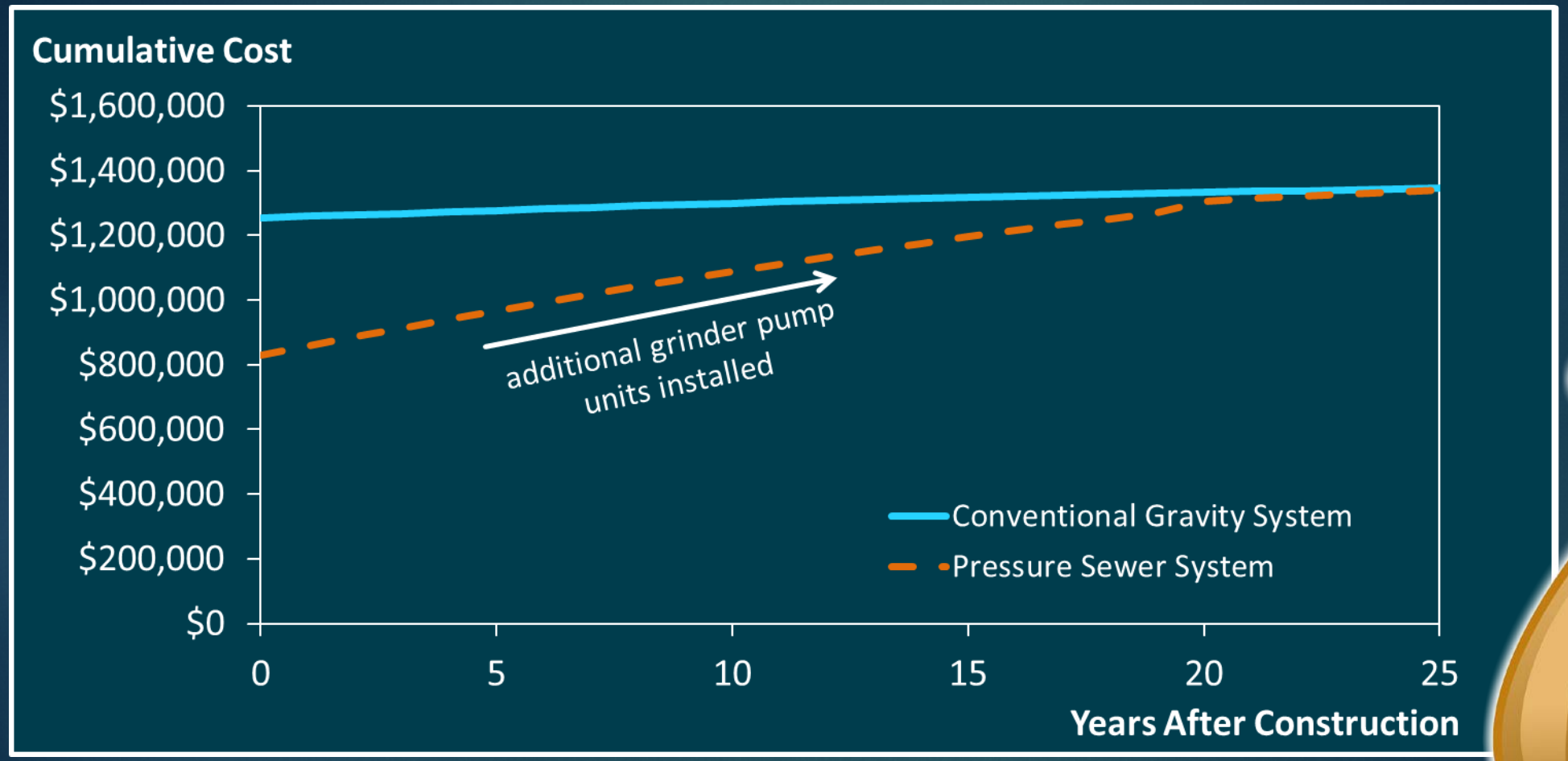


Project 1: Partially Developed Industrial Zone

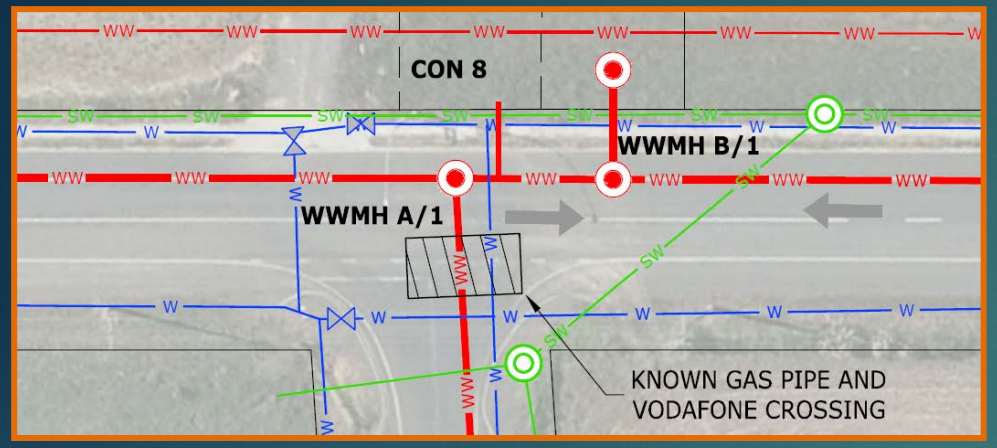
Options Considered:

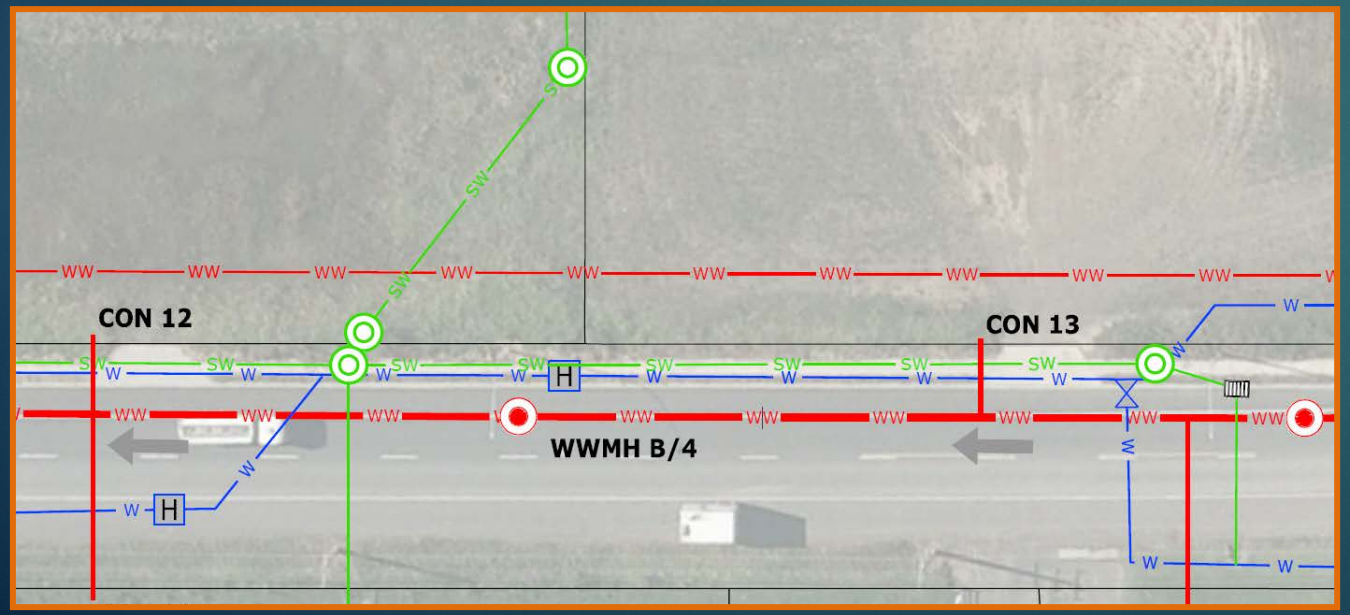
- Conventional Gravity
- Enhanced Gravity
- Pressure Sewer

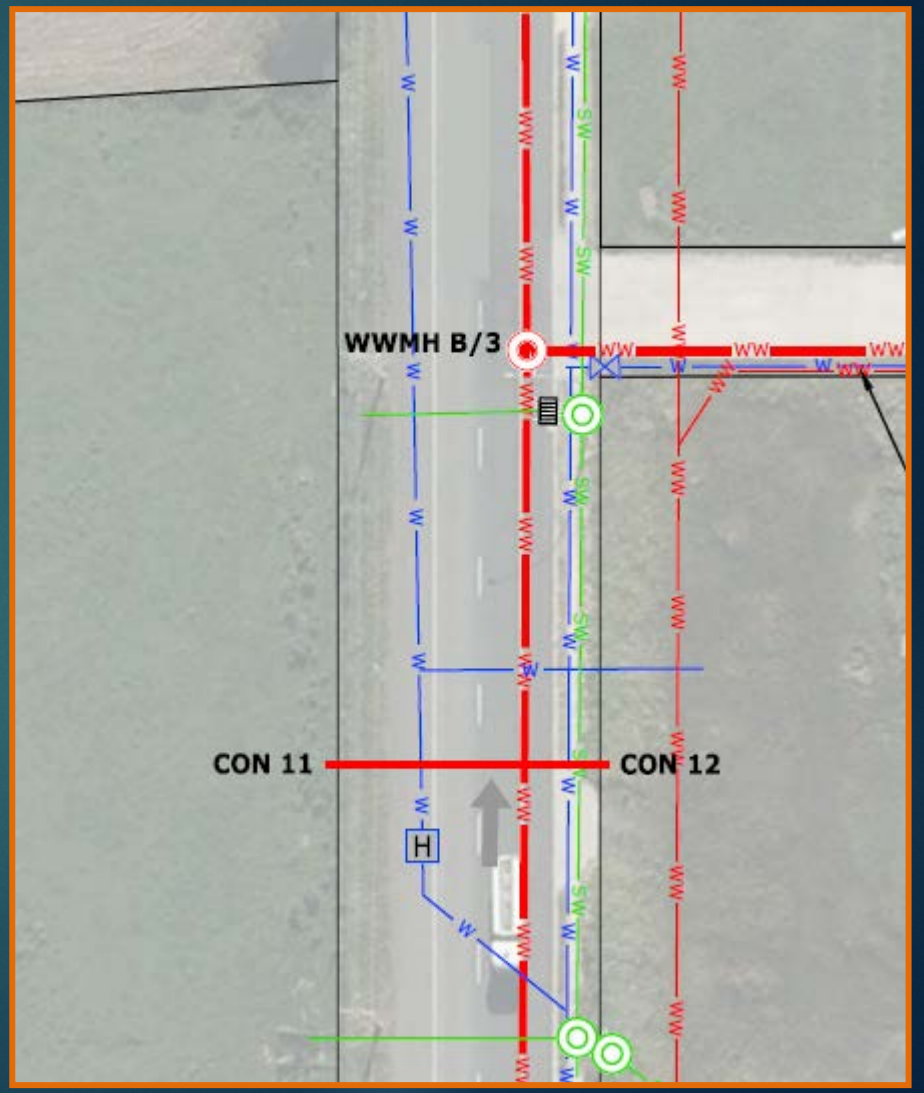
Project 1: Partially Developed Industrial Zone



Project 1: Partially Developed Industrial Zone



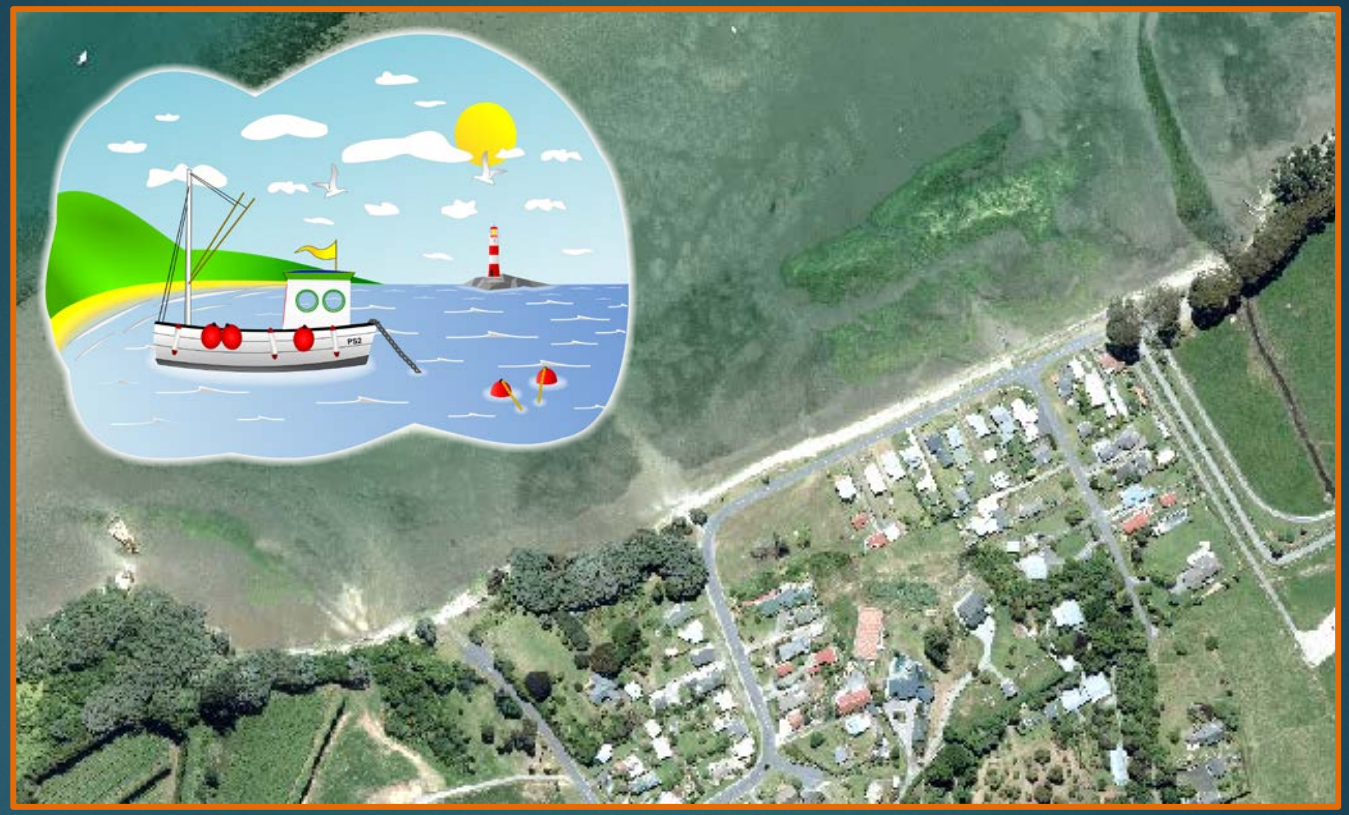




Project 1: Partially Developed Industrial Zone

Assessment Criteria	Weighting	Gravity	Pressure
Constructability	25%	2	4
Operational complexity	15%	4	2
Operational resilience	15%	2	4
Capital cost	25%	3	4
NPV	20%	3	4
Total Score (highest score is best)		**2.8**	**3.7**

Project 2: Coastal Residential Community



The Proposal: Pressurised reticulation network to a proprietary WWTP

Project 2: Coastal Residential Community

- Proprietary WWTP with subsurface drip irrigation
- Cost Comparison: STEP vs Grinder Pump
  - WWTP costs
  - On-property and Reticulation costs

Project 2: Coastal Residential Community

Project 3: Lakeside Residential Community

- 250 residential properties
- Septic tank failures → Public health risk

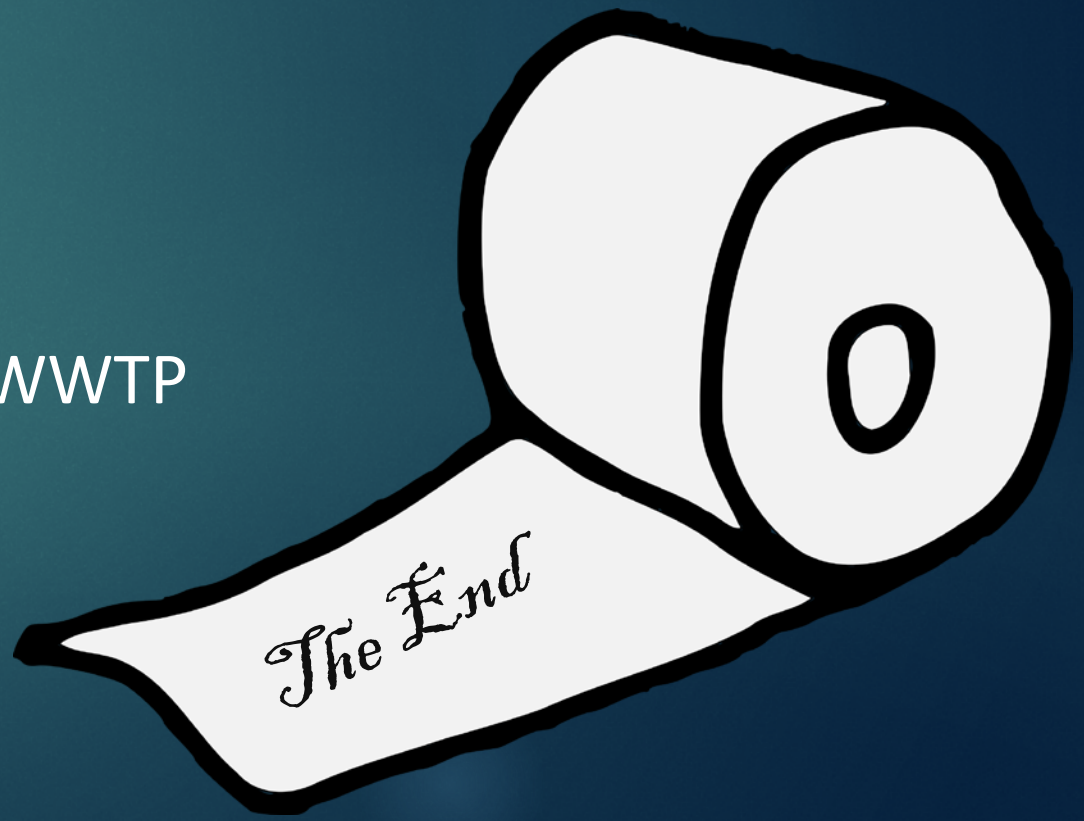
The Proposal: Pressurised reticulation network to a BNR WWTP

Project 3: Lakeside Residential Community

- Cost Comparison: STEP vs Grinder Pump
  - BNR WWTP and rapid infiltration
  - Grinder pump system retains biological carbon
  - STEP system requires chemical dosing at the WWTP
  - Higher WWTP operating costs for STEP

Conclusions

- Horses for Courses
- Assess each option against a **site-specific** set of criteria
- Consider:
  - Physical constraints
  - Capital, operating, life-cycle costs
  - Requirements at the downstream WWTP



Acknowledgements