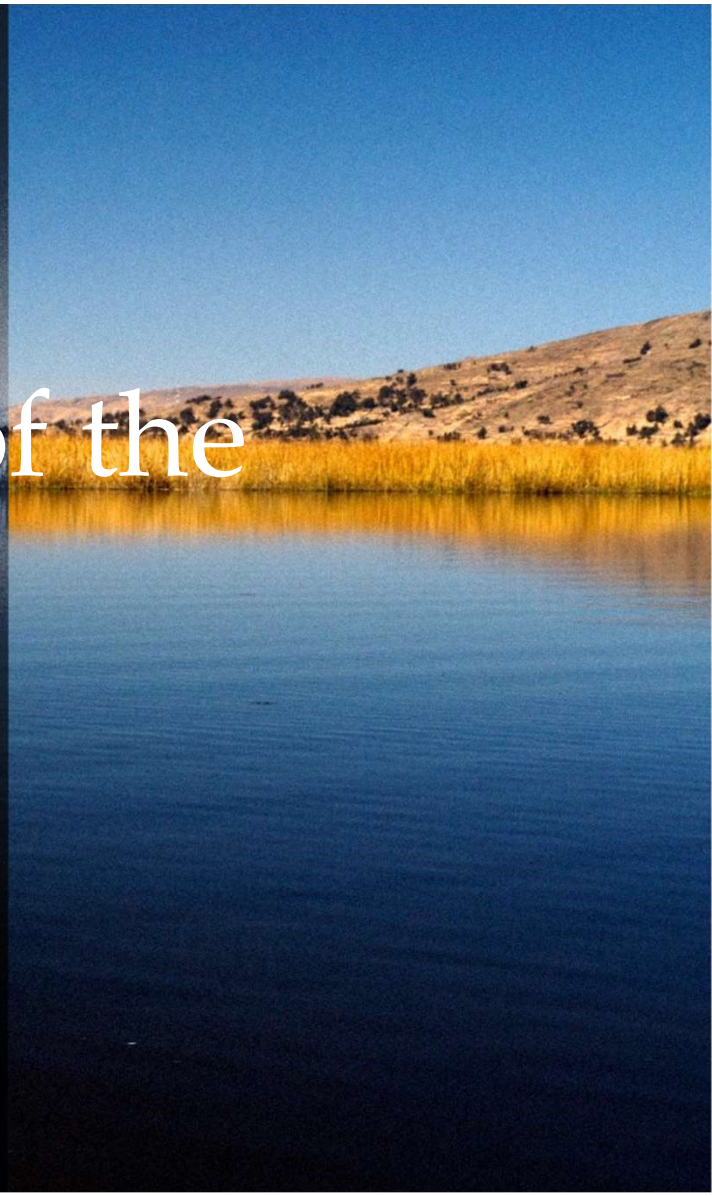
RMCG

Economic Assessment of the Ballarat IWM Plan

PRESENTED BY KYM WHITEOAK

STORMWATER VICTORIA CONFERENCE



Ballarat IWM Plan

Purpose: Recommendations for future water management in Ballarat

Ballarat has:
- A growing population (150% in 50 years)
- Secure water supplies (Goldfields Superpipe access to Goulburn-Murray system)
- Strong community interest in liveability aspects of water (aesthetics, recreational use)
- Influence on the Moorabool River, one of Victoria's most stressed

Analysis explored the entire water cycle:
- Stormwater
- Wastewater
- Surface water
- Groundwater
- Waterway health

Large number and variation in projects

Broader project involved involvement of key agencies (CHW, Council, CMA, DELWP) as well as community engagement workshops

Stakeholder engagement process produced:

- 139 suggestions
- 102 projects at different scales (city, precinct, local and site specific)
- 51 IWM projects in long-list
- 29 projects for economic analysis

Projects considered in the analysis

29 projects for economic analysis:

- Large-scale managed aquifer recharge (MAR) of stormwater or wastewater
- Extension of existing recycled water schemes for parks and commercial / industrial reuse
- Small stormwater or wastewater reuse at specific parks
- Waterway restoration projects
- Reuse for Moorabool River environmental flows
- Agricultural reuse projects

Costs and benefits explored for all projects

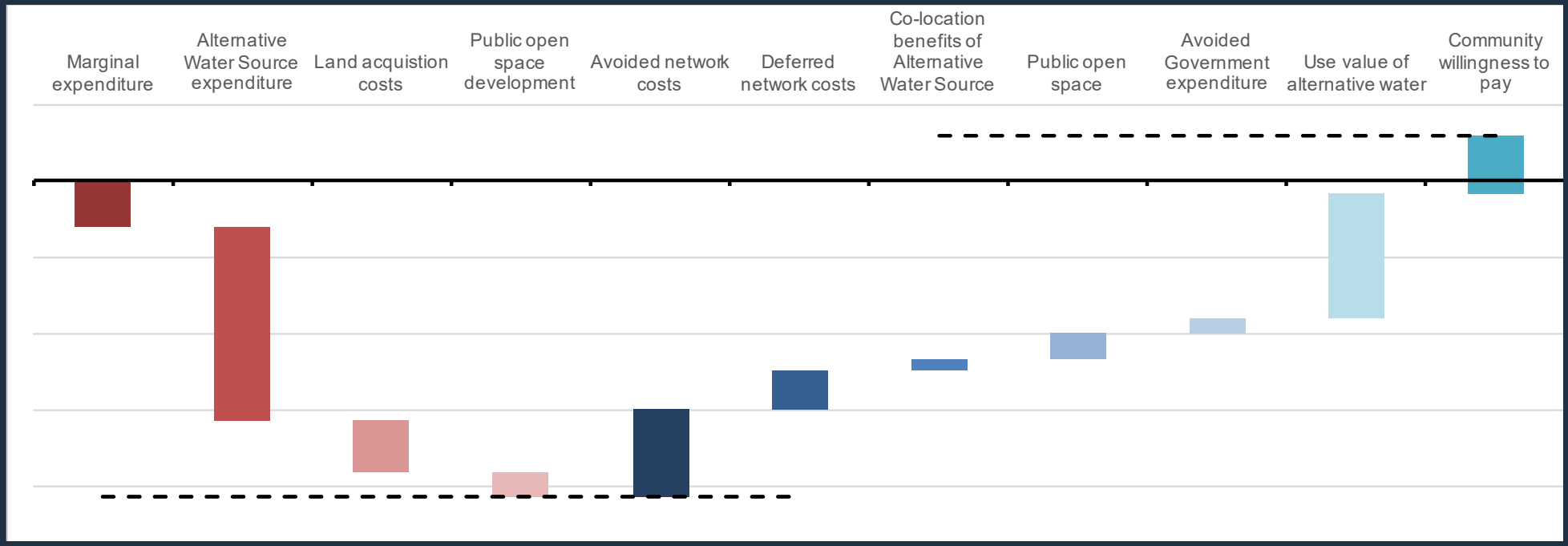
How we go about the economic analysis

Purpose: Help inform decisions on which options are preferred to others from a 'whole of society' perspective

Approach: compare the costs and benefits of each project with what would have happened without the project (base case)

- Base case is 'business as usual': standard servicing for water, wastewater, stormwater management
- Explore all costs and benefits across all social groups (water authorities, councils, CMA, new residents, existing residents, whole of society)
- 50 year timeframe: considers capital, operating and renewal costs
- Discounts future costs to present day ("present value") with a 4.5% discount rate (WACC)

How we go about the economic analysis



Measuring costs

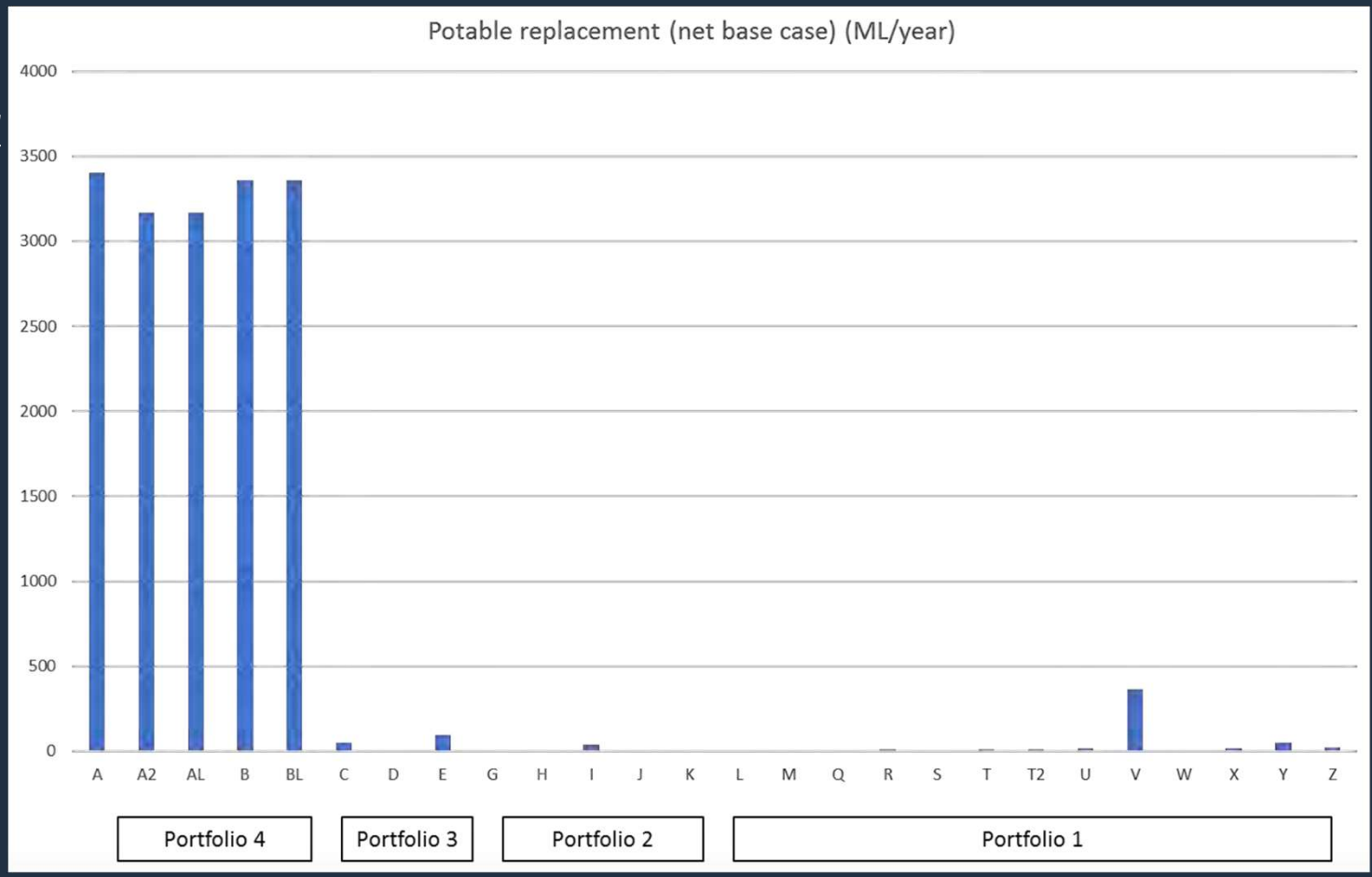
Approach: consider and estimate the full costs of each option over the 50 year timeframe

- Capital costs of construction (pipes, machinery, etc)
- Operating and maintenance costs going forward over 50 years
- Renewals (at end of asset life if less than 50 years)

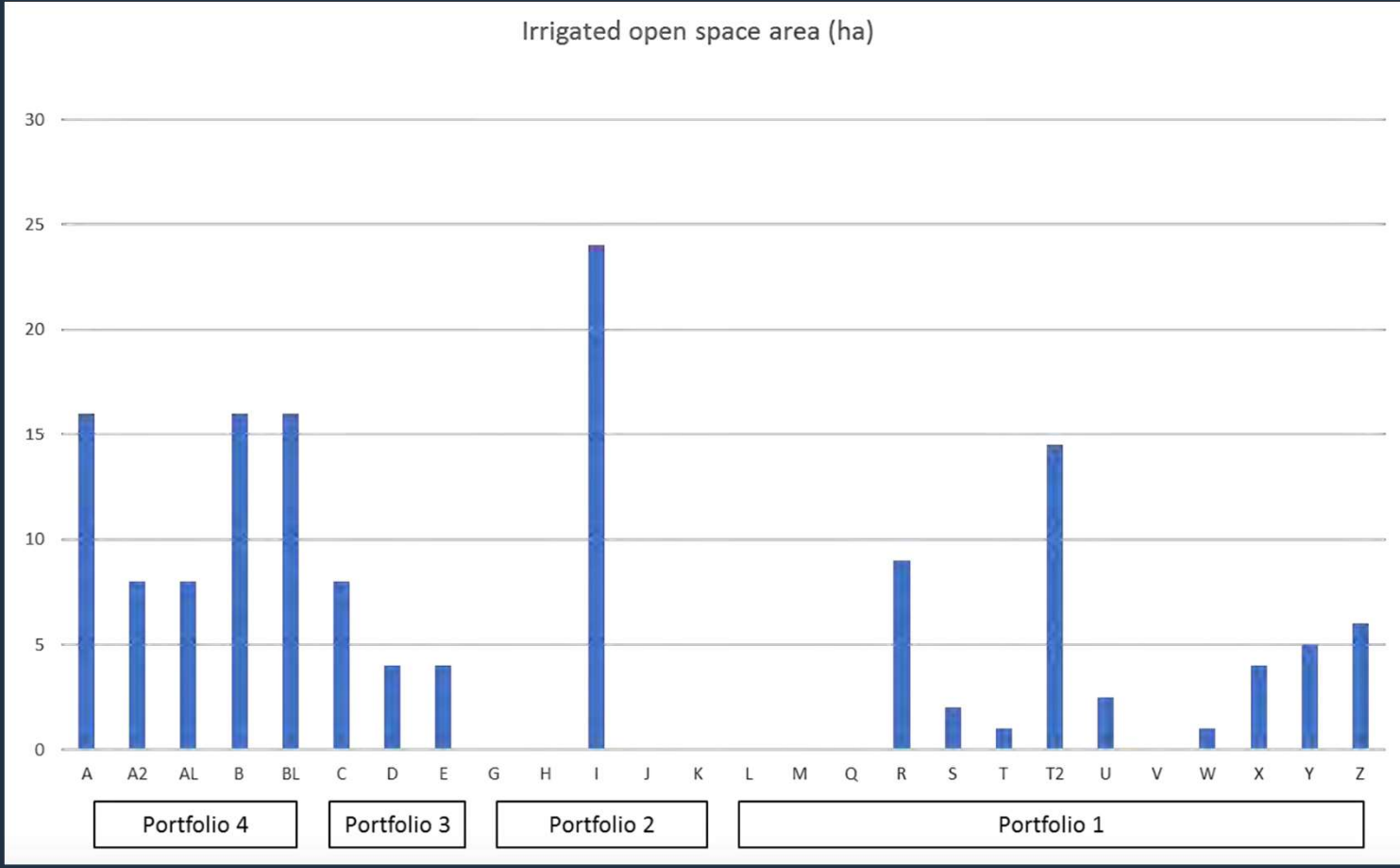
Measuring benefits

Performance of options across different types of benefits varied significantly:

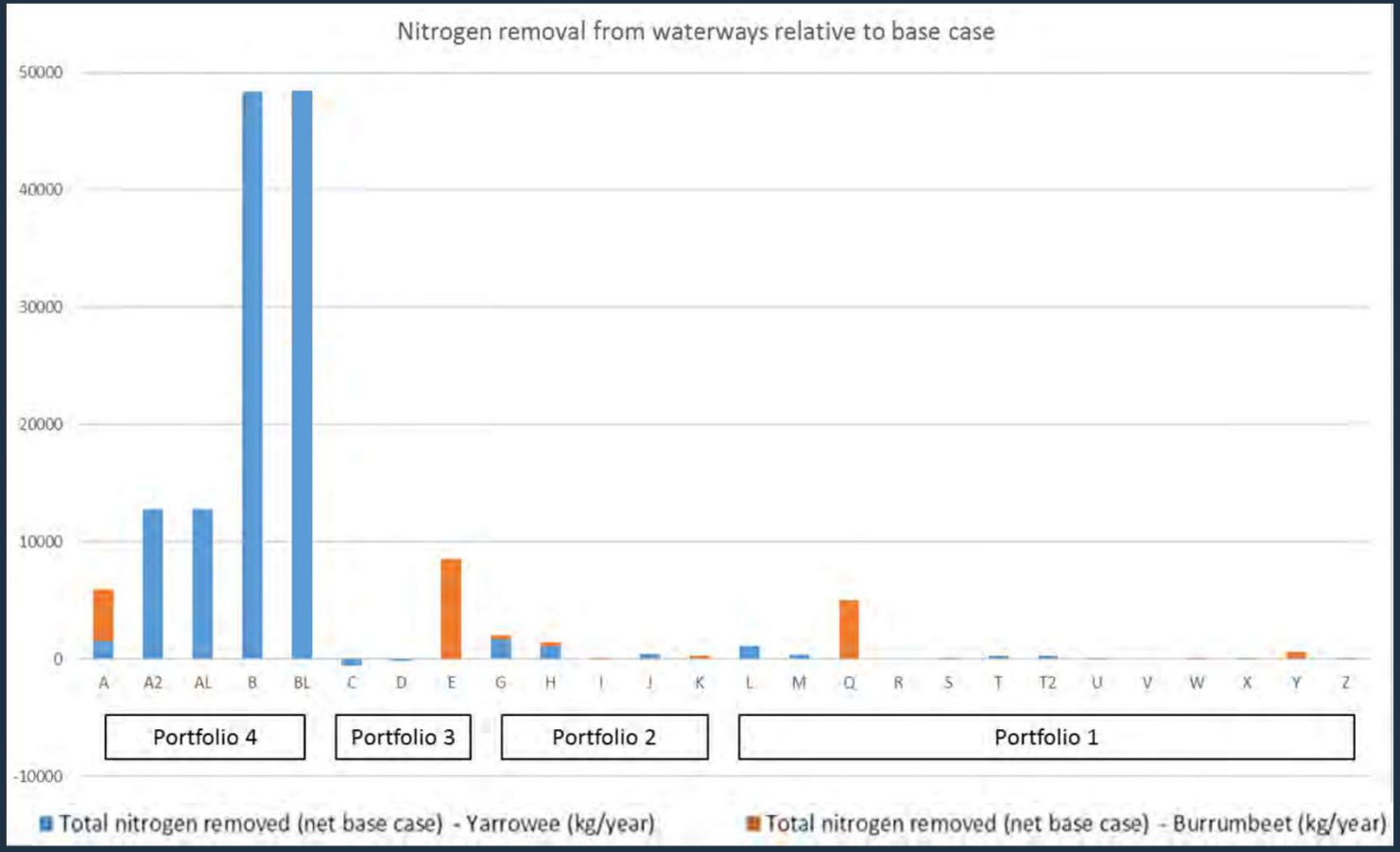
Potable replacement



Public open space irrigated area



Waterway pollution abatement



Benefits quantified

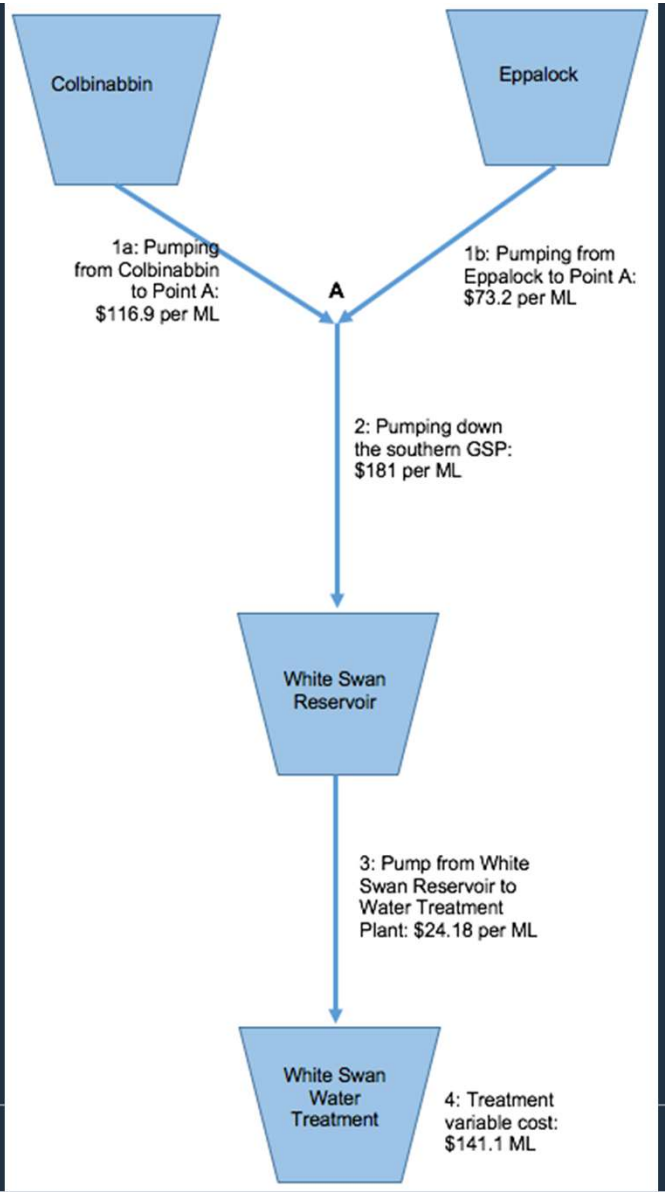
Mix of direct use, indirect use and non-use

- Potable substitution the main direct use benefit – financial assessment of value
- Other values reflect environmental and aesthetic / liveability benefits
- Also, avoided costs of base case (avoided rainwater tanks on new dwellings)

Benefit	How measured?	Type of benefit
Potable substitution	Avoided cost of water supply	Direct use
Agricultural value of water used	Change in productive capacity produced	Direct use
Pollution abatement waterways	Avoided cost of nitrogen abatement	Indirect use and non-use
Community value for recycled water and stormwater reuse	Choice modelling (stated preference)	Non-use
Community value for waterway health improvement	Choice modelling (stated preference)	Non-use
Waterway restoration value	Property price increase (hedonic pricing - revealed preference)	Indirect use
Improved street tree health (increased canopy cover	Property price increase (hedonic pricing - revealed preference)	Indirect use
Increased public open space	Property price increase (hedonic pricing - revealed preference)	Indirect use

The value of potable replacement

- Every unit of water saved from the potable network has a value
- That value is estimated at the cost of securing, treating and transferring potable water (avoided cost)
- Total value: $620/ML Eppaloch, $633/ML Colbinabbin



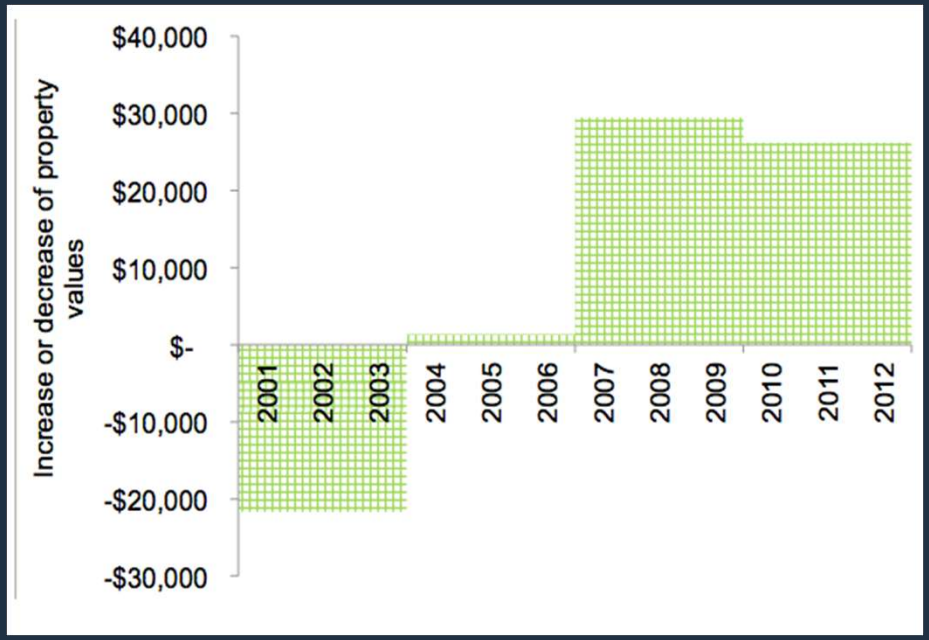
Pollution abatement

- Drawn from Melbourne Water nitrogen offset value
- Represents multiple benefits of wetland creation
- Imperfect value (predominantly derived for Port Phillip Bay)
- We adopt 50% of current offset value to reflect pollution abatement value
- $3,613/kg Nitrogen capitalised

Waterway restoration value – aesthetic improvement

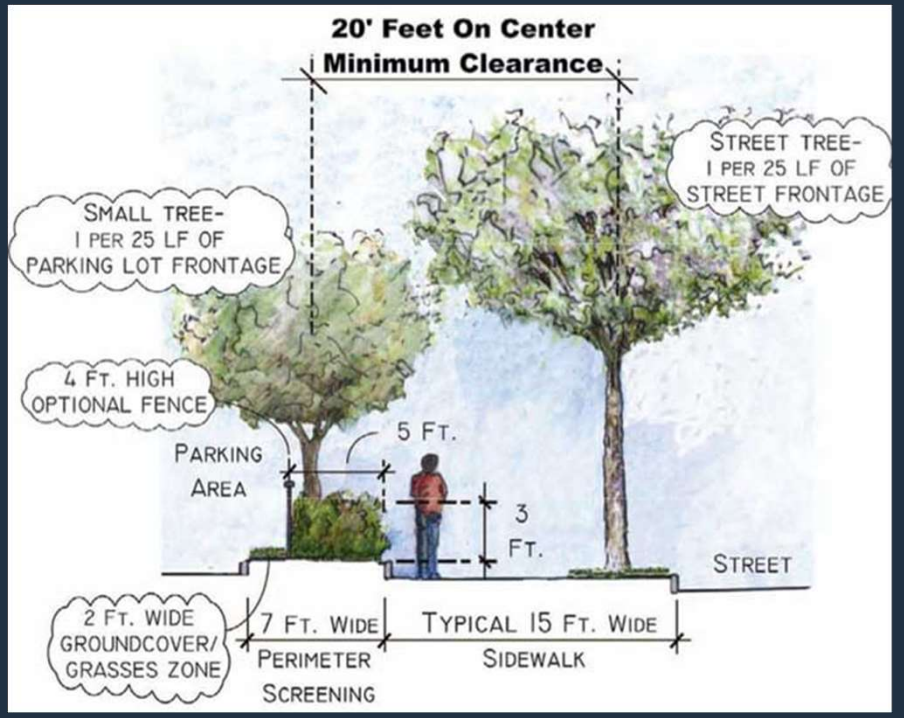
Waterway restoration value – aesthetic improvement

- Physical restoration projects improve aesthetics
- Households overlooking or nearby the project benefit the most
- ‘Hedonic pricing’ captures the impact of projects on property prices
- Source: Banister Creek restoration project
- Value: 4.7% increase in property price
- Properties within 200m of project
- We apply 75% of this value (revealed preference)
- Indirect use value



Passive street tree irrigation – the value of bigger, healthier trees

- Bigger, healthier street trees are valued by communities
- Property prices can reveal some of this value
- Source: Pandit *et al* (2014)
- Looked at relationship between street tree size and nearby property prices
- Value: increasing canopy size from 20% of street area by a further 10% increases property price by 1.8%
- We apply 75% of this value (revealed preference)
- Value commences 10 years after planting
- Indirect use value



Community willingness to pay (benefit transfer)

Two types of values used:

- Community willingness to pay for recycled water use (extended to stormwater): MJA 2012 at 50% of lower bound of range for residential, commercial, POS use or $238-$1,088/ML
- Community willingness to pay for waterway health improvement (Rolfe and Brouwer meta-analysis) at 50% or $0.53 per km per household

Agricultural use value

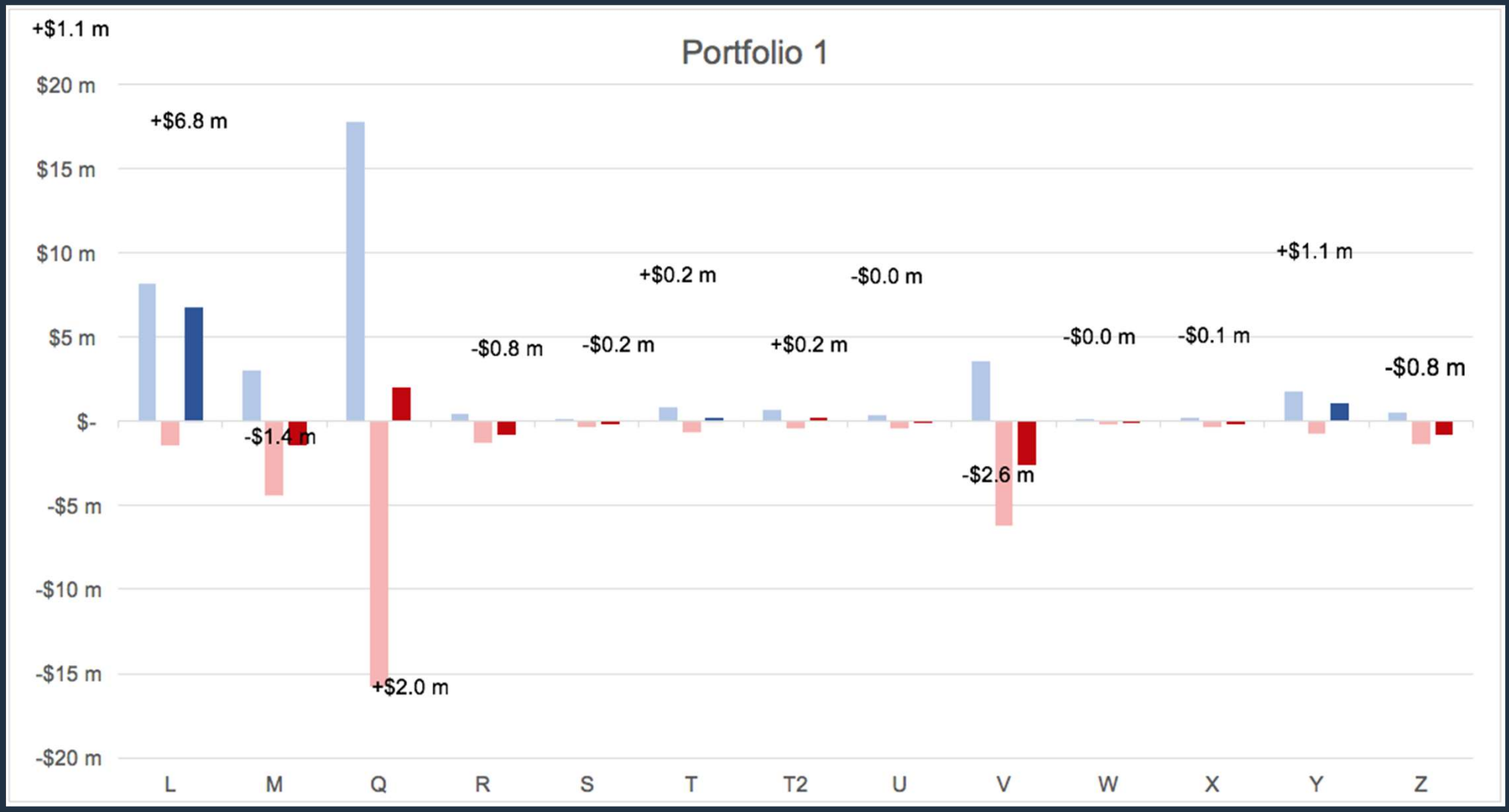
- Nearby potato farming is constrained by water supply
- Additional high reliability water for agricultural use
- Value: increase in productive capacity of agriculture
- Measurement: gross margin (profit) increase of agriculture moving from:
  - Dryland pasture ($970/ha); to
  - Irrigated potatoes ($281/ha)
- Value: $689/ha irrigated

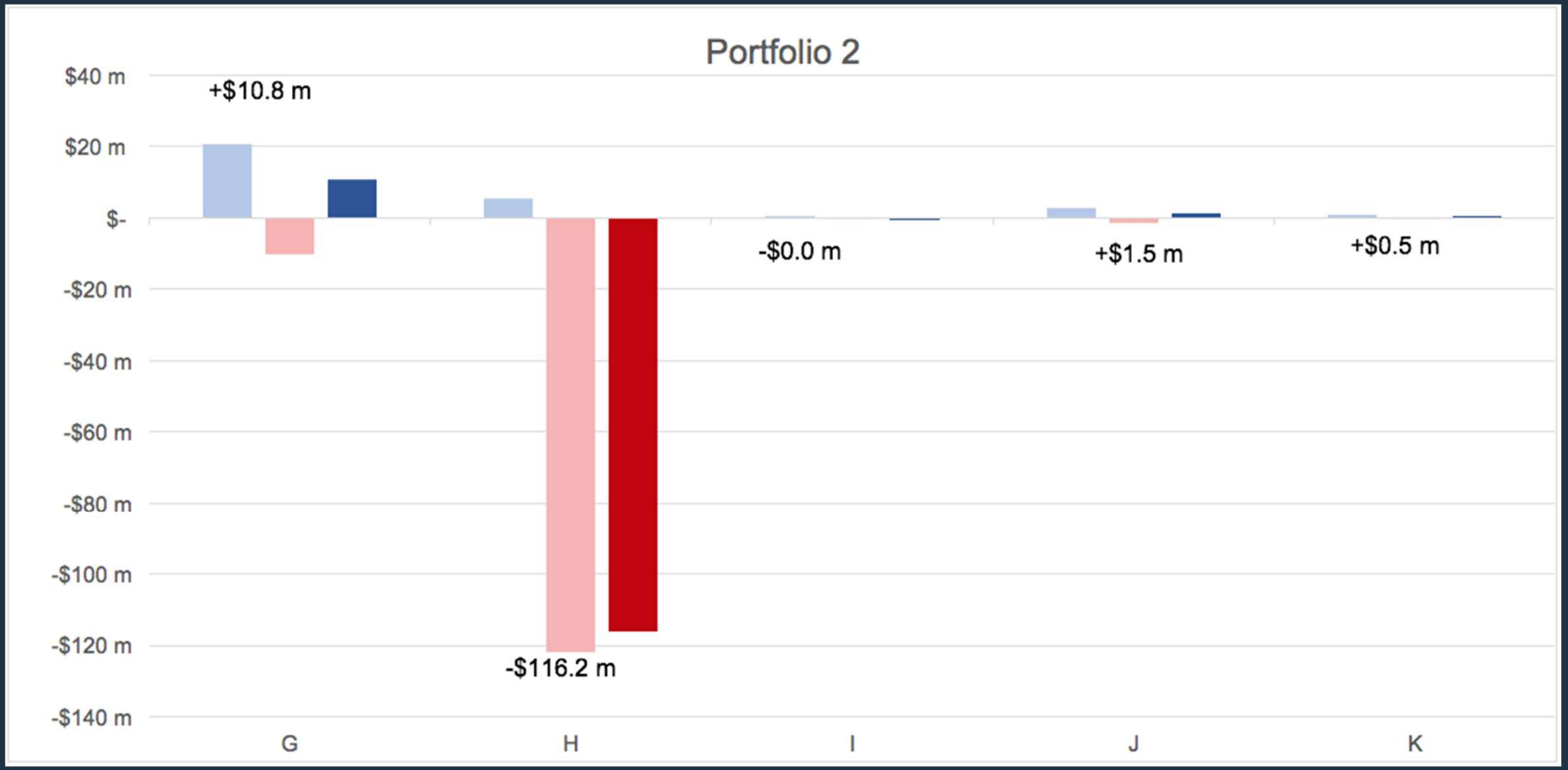
Avoided costs

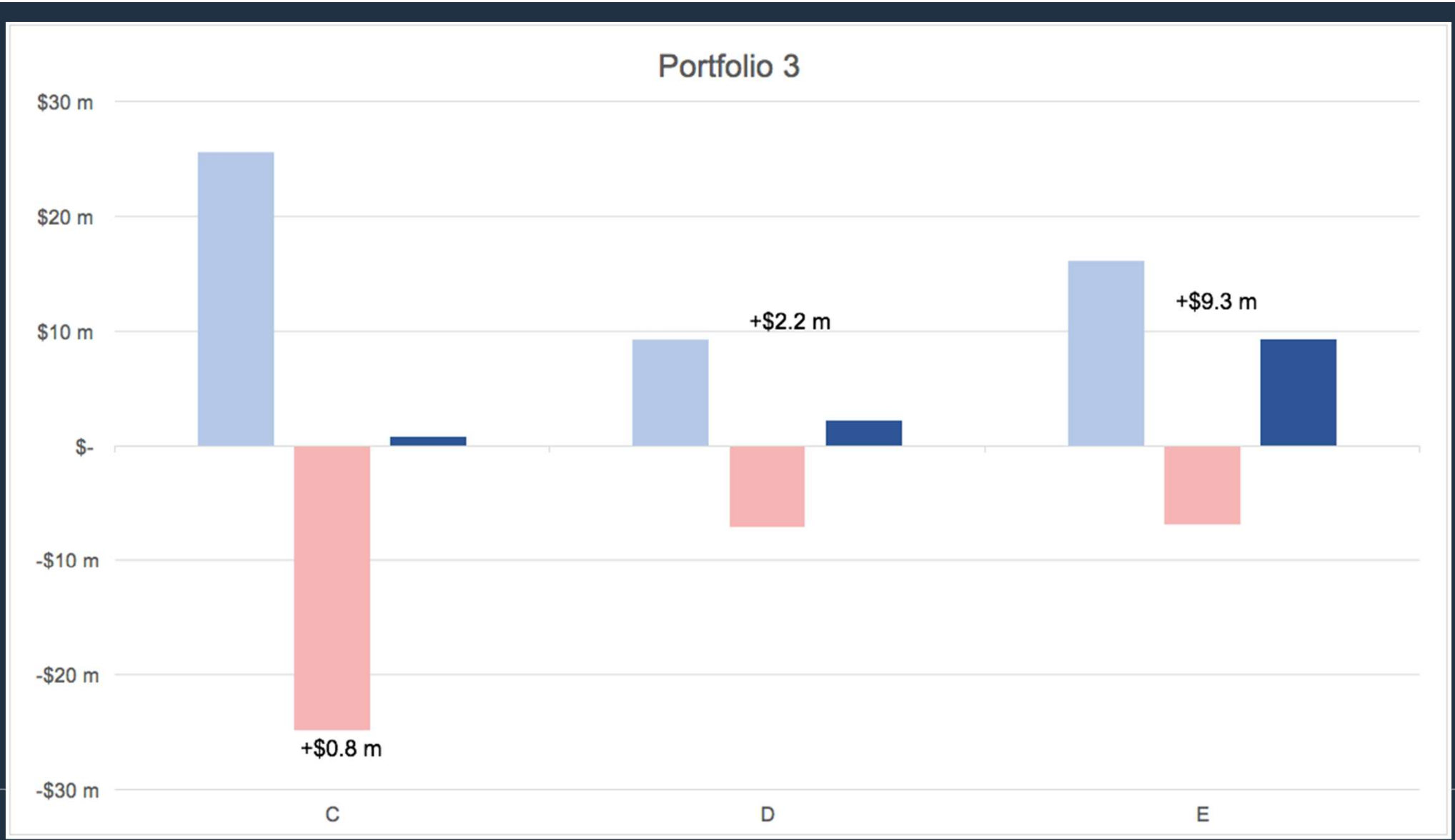
- Rainwater tanks are required on all new dwellings in Ballarat
- Two projects (A&B – ASR projects) produce significant volumes of alternative supply
- It is assumed that these would replace the need for RWTs on each new property
- This replaces the tank cost, but we also lose the volume supplied by the tanks

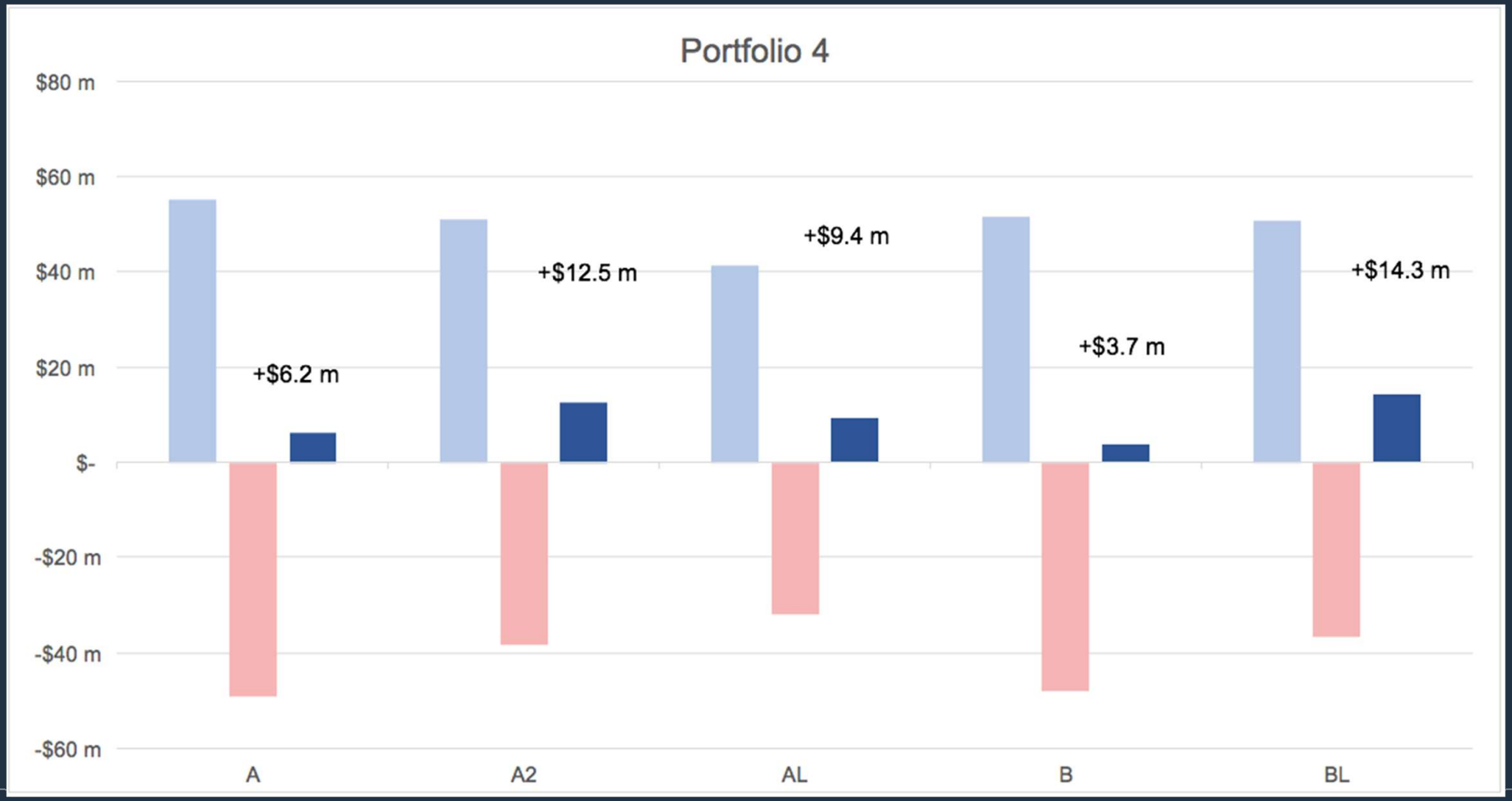
Results

- 29 projects assessed
- Wide variation in results:
  - Project H had a NPV of -$116m (BCR of 0.05)
  - Project L had an NPV of $7m (BCR of 5.8)
- Best performing types of projects:
  - Large scale Managed Aquifer Storage and Recovery projects
  - Opportunistic third pipe recycled water extensions
  - Passive irrigation of street trees
  - Waterway restoration projects

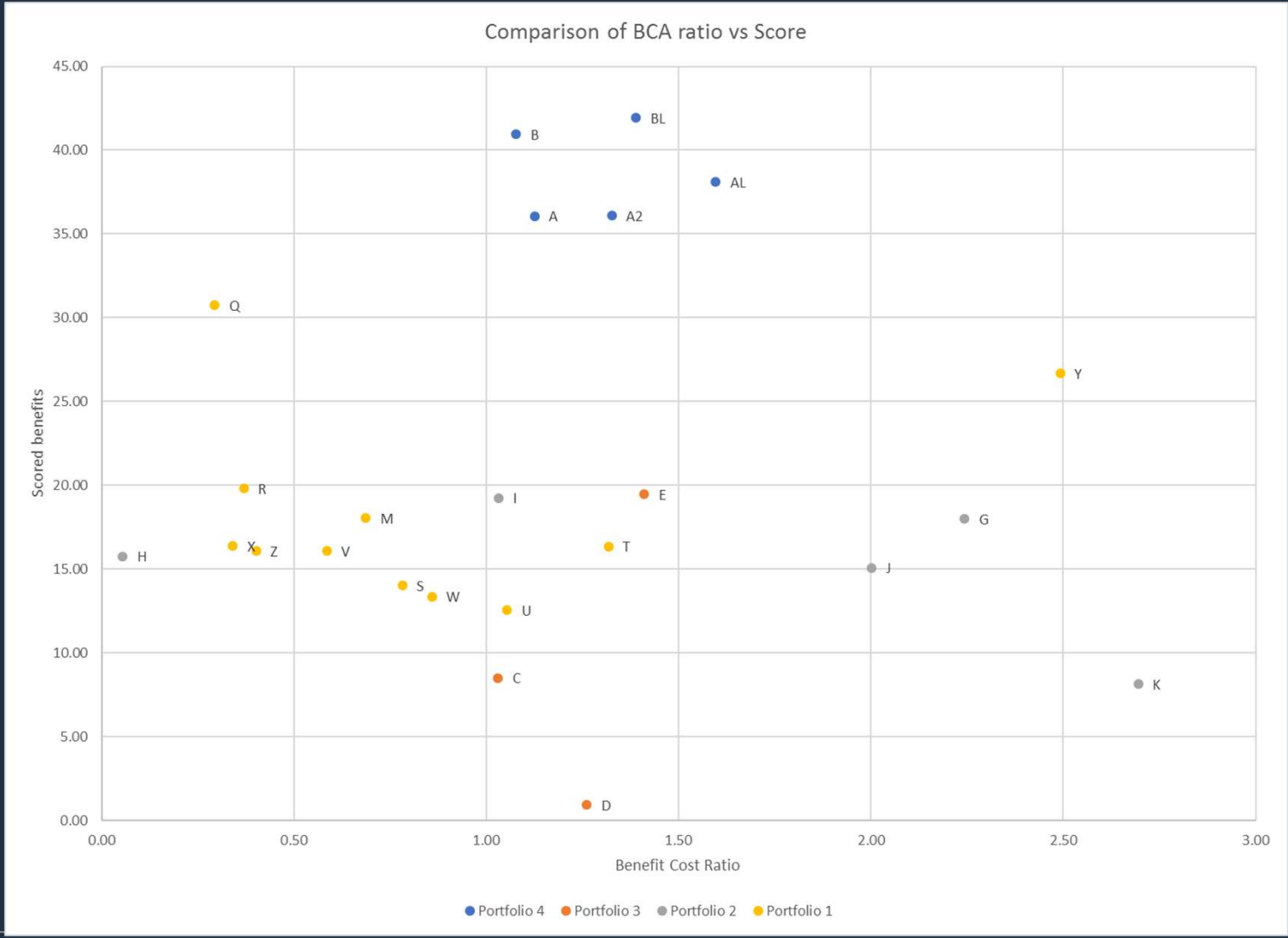

Portfolio 1
+$1.1 m
$20 m
$15 m
$10 m
$5 m
$-
-$5 m
-$10 m
-$15 m
-$20 m
+$6.8 m
-$1.4 m
+$2.0 m
-$0.8 m
-$0.2 m
+$0.2 m
+$0.2 m
-$0.0 m
-$2.6 m
-$0.0 m
-$0.1 m
+$1.1 m
-$0.8 m
L
M
Q
R
S
T
T2
U
V
W
X
Y
Z


Portfolio 2
$40 m
$20 m
$-
-$20 m
-$40 m
-$60 m
-$80 m
-$100 m
-$120 m
-$140 m
+$10.8 m
-$116.2 m
-$0.0 m
+$1.5 m
+$0.5 m
G
H
I
J
K


Portfolio 3
$30 m
$20 m
$10 m
$-
-$10 m
-$20 m
-$30 m
+$0.8 m
+$2.2 m
+$9.3 m
C
D
E


Portfolio 4
$80 m
$60 m
$40 m
$20 m
$-
-$20 m
-$40 m
-$60 m
+$6.2 m
+$12.5 m
+$9.4 m
+$3.7 m
+$14.3 m
A
A2
AL
B
BL

Dual Assessment Method



Key findings

- Wide variety of projects with many and varied benefits
- We can find ways to measure many (but not all) benefits
- Economic assessment is a way to compare various projects on a like-for-like basis
- Outputs were helpful in identifying the most valuable projects
- When combined with qualitative measures, provides a well rounded way to assess options

Thank you

Extra slides

Creating Portfolios