



CHAPTER 5

OPTIONS FILTER

Nullinga Dam and Other Options Preliminary Business Case



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5 OPTIONS FILTER

CHAPTER SUMMARY AND CONCLUSIONS

- This chapter describes the methodology and outcomes of the filtering process used to move from the long list of options to the short list of options.
- The long list of options was filtered against criteria encompassing strategic, legal and regulatory, market, public interest and sustainability considerations, in accordance with the Building Queensland Business Case Development Framework. Direct service need specific considerations such as direct agricultural benefit were also used in the analysis.
- Outcomes were tested against weighted and non-weighted criteria for sensitivity analysis.
- The three highest scoring options were:
 - Improve MDWSS rules and operation
 - Modernise MDWSS infrastructure and convert losses
 - Build Nullinga Dam for agricultural use.
- The highest scoring options were verified and refined through consultation with SunWater, government agencies and commercial irrigators in the region.
- A combination of the next highest scoring options of water trading and on-farm water efficiency measures were included as an additional do minimum option.

5.1 Purpose

The purpose of this section is to explain the options filtering process and summarise how the recommended short list of options was determined.

5.2 Method and Activities

Due to the large and diverse range of long list of options, a filtering process was undertaken to develop a shortlist of options for further consideration in the PBC. This process involved the development of a list of criteria to be applied to the long list of options, in consideration of the Building Queensland Business Case Development Framework requirements and specific service need circumstances. The long list of options was then assessed against these criteria to determine a shortlist of options.

5.3 Selection Criteria

The high-level options filtering selection criteria applied to the long list of options is listed in Table 1.

Table 1 Selection Criteria

SELECTION CRITERIA	
BUSINESS CASE DEVELOPMENT FRAMEWORK CRITERIA	
Strategic Considerations	<ul style="list-style-type: none"> ▪ Strategic alignment of option with government policy ▪ Ability of option to address service need ▪ Policy issues or limitations affecting the option



SELECTION CRITERIA	
Legal and Regulatory Considerations	<ul style="list-style-type: none"> Legislative and regulatory considerations with option Approval requirements for option
Market Considerations	<ul style="list-style-type: none"> Feedback/demand from potential water customers on option Affordability of option for irrigators in the region
Public Interest Considerations	<ul style="list-style-type: none"> Stakeholder engagement—support of government agencies for option Stakeholder engagement—support of/impact on water customers of option Impact on community—avoidance of direct social impacts from option
Sustainability Considerations	<ul style="list-style-type: none"> Future proofing of option Avoidance of direct negative environmental impacts from option Operational flexibility of option
SERVICE NEED SPECIFIC CRITERIA	
Direct agricultural benefit	<ul style="list-style-type: none"> Ability of the option to increase value of agricultural production in dollars per ML
Employment growth	<ul style="list-style-type: none"> Number of jobs able to be created from option
Affordable capex	<ul style="list-style-type: none"> Consideration of size of initial investment of option in dollars per ML

5.4 Option Scoring

To assist with the shortlisting process a qualitative numerical method was developed. Scores were ranked from one to five with higher scores being desirable and low scores indicating potential non-feasibility depending on the criteria.

Scores were defined as:

- Score = 1 is a ‘Cannot proceed’, for example, if an option is not possible technically or does not meet the identified service need
- Score = 2 is technically possible but is a weak qualitative performer
- Score = 3 is neutral/medium qualitative performance
- Score = 4 is a strong qualitative performance
- Score = 5 is exceptional qualitative performance.

5.5 Results

The following tables reproduce the scores for each option with and without weightings. A higher weighting was initially given to key criteria in Table 1 results. A sensitivity analysis was then performed with no weightings in the Table 2 results.

Weighting scores and applying equal weighting to all criteria did not change the scores materially, and all scenarios resulted in the same three highest scoring options. It is considered this demonstrates a robust filtering process, as it avoids achieving a result via application of judgement-based weightings.



Table 2 Results with Weighted Criteria

LONG LIST OF OPTIONS	WEIGHTED TOTAL
Improve MDWSS rules and operation	3.57
Modernise MDWSS and convert losses to new water allocations for sale	3.50
Build Nullinga Dam for agricultural use - initially delivery to Walsh River only (no distribution infrastructure)	3.21
Increase on farm water use efficiency	2.76
Build Nullinga Dam for agricultural use - limited interaction with western MDWSS distribution infrastructure	2.70
Improve water trading	2.26
Do nothing	2.25
Build Nullinga Weir for agricultural use	2.02
Build Nullinga Dam for mixed use - Cairns urban and agricultural water supply	1.88
Harvest water from the Johnstone River and build pipeline	1.39
Raise Tinaroo Falls Dam	1.32

Table 3 Results with Unweighted Criteria

LONG LIST OF OPTIONS	UNWEIGHTED TOTAL
Improve MDWSS rules and operation	3.53
Modernise MDWSS distribution infrastructure and convert losses to new water allocations for sale	3.47
Build Nullinga Dam for agricultural use – initially delivery to Walsh River only (no distribution infrastructure)	3.20
Increase on farm water use efficiency	2.80
Build Nullinga Dam for agricultural use - limited interaction with western MDWSS	2.73
Improve water trading	2.27
Do nothing	2.25
Build Nullinga Weir for agricultural use	2.00
Build Nullinga Dam for mixed use - Cairns urban and agricultural water supply	1.93
Harvest water from the Johnstone River and build pipeline	1.40
Raise Tinaroo Falls Dam	1.33



5.6 Filtering Options—Summary of Key Reasons

5.6.1 Do Nothing Option

OPTION	SHORTLIST	REASONS	STRENGTHS	WEAKNESSES
Do nothing	No	<ul style="list-style-type: none">▪ Status quo▪ Does not meet service need	<ul style="list-style-type: none">▪ Requires no additional government investment	<ul style="list-style-type: none">▪ Does not create new water allocations▪ Does not increase agricultural production



5.6.2 Reform Options

OPTION	SHORTLIST	REASONS	STRENGTHS	WEAKNESSES
Improve MDWSS rules and operation	Yes – Option 2	<ul style="list-style-type: none">▪ Crop types have changed towards tree crops and horticulture and water use patterns have changed over the past 5–10 years (opportunity to update rules)▪ Water ordering is not consistent across MDWSS creating inefficiencies▪ Carryover provisions exist but could be modified to increase irrigator confidence (and potentially reduce 70-85 per cent buffer—increasing utilisation to 95%+)▪ Reform examples in other water supply schemes have produced significant benefits (e.g. Nogoia Mackenzie WSS utilises 90–100% each year)	<ul style="list-style-type: none">▪ Meets service need▪ Cost effective use of existing infrastructure▪ Makes better use of existing resources▪ Strong stakeholder support	<ul style="list-style-type: none">▪ Does not create new water allocations▪ Requires review of regulatory framework▪ Requires water users to change behaviour▪ Potential implications for ongoing management should MDWSS transition to LMA



NULLINGA DAM AND OTHER OPTIONS PRELIMINARY BUSINESS CASE

OPTION	SHORTLIST	REASONS	STRENGTHS	WEAKNESSES
Increase on-farm water use efficiency	Yes – Option 1	<ul style="list-style-type: none"> Would deliver minimal additional water and will not alleviate water scarcity materially Already addressed via other government programs and separate (past) funding Per ML can be less cost-effective than other options Not an option that necessarily requires further government investment/intervention (i.e. market drivers are such that it is occurring at present in the irrigation sector to a great extent with the switch from flood to overhead irrigation or trickle irrigation) 	<ul style="list-style-type: none"> Well understood process Implemented by agriculturalists May not require additional government investment (depending on approach) 	<ul style="list-style-type: none"> Majority of cost effective gains already implemented Does not create new water allocations

5.6.3 Better Use/Improve Existing Options

OPTION	SHORTLIST	REASONS	STRENGTHS	WEAKNESSES
Modernise MDWSS distribution infrastructure and convert losses to new water allocations for sale	Yes – Option 3	<ul style="list-style-type: none"> Strong stakeholder support from all sectors if done correctly (without undermining current entitlements) Should be considered before a new large infrastructure (e.g. dam) is constructed, as lower cost option to address current water scarcity and meet the service need 	<ul style="list-style-type: none"> Effective use of existing resources Creates new water allocations Strong stakeholder support 	<ul style="list-style-type: none"> Requires capital investment Potential implications for delivery and recovery of capital costs should MDWSS transition to LMA
Improve water trading	Yes – Option 1	<ul style="list-style-type: none"> Water trading market is currently operating effectively Would not be able to provide long term additional water security for region 	<ul style="list-style-type: none"> Shifts water to highest and best use May not require additional government investment (depending on approach) 	<ul style="list-style-type: none"> Does not create new water allocations Does not readily meet service need
Utilise Mitchell Dam/Quaid Dam and build pipeline	No	<ul style="list-style-type: none"> Shallow and inefficient dam with limited ability to meet the service need Private ownership/governance issues 	<ul style="list-style-type: none"> Makes use of existing infrastructure 	<ul style="list-style-type: none"> Unlikely to meet service need Private infrastructure issues



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5.6.4 Build New Options

BUILD NEW	SHORTLIST	REASONS	ADVANTAGES	DISADVANTAGES
Build Nullinga Dam for agricultural use – initially delivery to Walsh River only (no distribution infrastructure)	Yes – Option 4	<ul style="list-style-type: none"> ▪ Simpler implementation process to meet service need compared with other Nullinga Dam options ▪ Avoids Cairns allocation swap/substitution ▪ Avoids issues with water quality and reliability in Nullinga Dam entering MDWSS system (initially) ▪ Avoids mixing different water prices for water in one scheme by creating two schemes ▪ Opportunity to develop new large greenfield area of new irrigation 	<ul style="list-style-type: none"> ▪ Meets service need ▪ Creates new water allocations ▪ Supports continued functioning of existing MDWSS irrigation area 	<ul style="list-style-type: none"> ▪ High capital cost ▪ Long approvals process ▪ Uncertainty over agricultural demand profile and capacity to pay
Build Nullinga Dam for agricultural use - limited interaction with western MDWSS distribution infrastructure	No	<ul style="list-style-type: none"> ▪ More complex (initially) and costly than other Nullinga Dam agricultural options ▪ Cost of distribution infrastructure cannot be determined until the location of demand in the MDWSS is known and understood ▪ Issues with water quality and reliability from Nullinga Dam for existing MDWSS users ▪ Issues mixing different water prices within the one scheme 	<ul style="list-style-type: none"> ▪ Meets service need ▪ Creates new water allocations ▪ Supplies additional water to existing scheme 	<ul style="list-style-type: none"> ▪ High capital cost ▪ Long approvals process ▪ Uncertainty over agricultural demand profile and capacity to pay ▪ More complex than other agricultural options
Build Nullinga Dam for mixed use - Cairns urban and agricultural water supply	No	<ul style="list-style-type: none"> ▪ Most complex and costly Nullinga Dam option to implement - additional complexity and cost not necessary to meet identified service need ▪ Issues with Cairns allocation swap/substitution ▪ Issues with water quality and reliability from Nullinga Dam for existing MDWSS users ▪ Issues mixing different water prices within the one scheme 	<ul style="list-style-type: none"> ▪ Meets service need ▪ Creates new water allocations ▪ Supplies additional water to existing scheme ▪ Supplies additional water to Cairns urban customers 	<ul style="list-style-type: none"> ▪ High capital cost ▪ Long approvals process ▪ Demand from Cairns not apparent ▪ Uncertainty over agricultural demand profile and capacity to pay ▪ Highly complex
Build Nullinga Weir for agricultural use	No	<ul style="list-style-type: none"> ▪ Likely very small yield (e.g. 1,000-2,000 ML) ▪ Limited ability to meet service need ▪ Very high capex (\$/ML) 	<ul style="list-style-type: none"> ▪ Creates new water allocations 	<ul style="list-style-type: none"> ▪ High capital cost ▪ Low yield ▪ Unlikely to meet service need



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BUILD NEW	SHORTLIST	REASONS	ADVANTAGES	DISADVANTAGES
Raise Tinaroo Falls Dam	No	<ul style="list-style-type: none">▪ Very high capex to raise dam▪ Potential for inundation of existing developed areas - stakeholders living in areas near Yungaburra and Atherton unlikely to support this option▪ Unlikely to be supported by the Tablelands Regional Council	<ul style="list-style-type: none">▪ Makes use of water supply from existing infrastructure▪ Creates new water allocations	<ul style="list-style-type: none">▪ Very high capital cost▪ Long approvals process▪ Uncertainty over agricultural demand profile and capacity to pay▪ High community impact▪ Low stakeholder support
Extract water from Johnstone River and build pipeline	No	<ul style="list-style-type: none">▪ Likely to have approval issues▪ Significantly high costs due to pipeline (capex and opex)▪ Not considered to be a practical option by government department stakeholders due to its potential environmental impacts on the Johnstone River environmental flows	<ul style="list-style-type: none">▪ Accesses new water supply for region▪ Likely to meet service need	<ul style="list-style-type: none">▪ High capital cost▪ Long approvals process▪ Environmental impacts▪ Uncertainty over agricultural demand profile and capacity to pay



5.7 Verification and Refinement of Options Filtering

The options filtering results were discussed with key stakeholder government agencies in Brisbane and in the Tablelands region, and with irrigators and their representatives. This consultation included discussion of the long list of options, the four options presented in the MJA report and the draft shortlisted options.

There was moderate to strong support from stakeholders for the emerging three highest scoring options.