

Appendix E



Hamilton WRP Best Practice Assessment for the Treatment and Disposal of Excessive Winter Flows

Prepared for: Environmental Protection Authority

Dated: May 2018

1 Best Practice

Wannon Water has used the “*Integration of economic, social and environmental considerations*” analysis technique detailed in the EPA Publication 1517 “Demonstrating Best Practice”, to assess various alternatives for the treatment and disposal of excessive winter flows from the Hamilton WRP.

Four options were identified:

1. No change. Discharge from the Balancing storage to Grange Burn and from Monivae Winter Storage to Muddy Creek in winter.
2. Upgrade the current pumping capacity from the Balancing storage to Monivae Winter Storage to minimise discharges to the environment from the Balancing storage.
3. Extend the winter storage and purchase additional land so that all winter flows can be stored and irrigated in the warmer months.
4. Build a tertiary treatment plant to further treat the effluent, ensuring that the effluent quality is compliant with the SEPP guidelines.

2 Assessment

Wannon Water utilized a Multi Criteria Analysis (MCA) based on Melbourne Water’s 2011 “*Triple Bottom Line Guidelines - A Guide for Sustainable Decision Making*”

The Melbourne Water Guidelines use the same weightings and scoring methodology as published by The Department of Treasury in the “*Finance Investment Evaluation Policy and Guidelines*”.

Based on these guidelines the increase in size of the Hamilton WRP Monivae Winter Storage and additional irrigation land is technically classified as a “Revenue Generating Project” (Table 1). The Investment Objective is defined as “a service return with some financial returns to offset operating costs”. The financial return in this case is the leasing of irrigable land and the sale of recycled water. Therefore the weightings used for the Multi Criteria Analysis process are:

- 50% Financial
- 50% Environmental and Social.

Table 1: Weighting of Financial, Environmental and Social effects

Investment Type	Non-Revenue Generating Project	Revenue Generating Project	Commercial Project
Investment Objective	A service return	A service return with some financial returns to offset operating costs	A service return and a commercial return.
Financial Analysis Weighting	25% -40%	50%	75% - 60%
Weighting of Environmental and Social Effects	75 -60%	50%	25% -40%

The scoring scale is relative to the base case, **Table 2** lists the weightings.

Table 2: Scoring System

Very Much Better	+4
Much Better	+3
Moderately Better	+2
Little Better	+1
No Change (same as base case)	0
Little worse	-1
Moderately worse	-2
Much worse	-3
Very much worse	-4

2.1 Weightings of Environmental and Social Project Effects

To determine the weighting for the Environmental and Social effects of the project, Wannon Water used the Department of Environment, Land, Water and Planning’s “*Aquatic Value Identification and Risk Assessment (AVIRA) Environmental, Social and Economic Values and Threats 2015*” to identify the values most applicable to the Muddy Creek.

The values identified and the weightings given for the Environmental and Social Projects Effects are shown in **Table 3**.

Table 3: Environmental and Social effects

Environmental	Nutrient Load on Muddy Creek	15%
Environmental	Naturalness; Aquatic Invertebrate Community Condition ¹	10%
Environmental	Greenhouse Gas Emissions	5%
Social	Activity; Recreational Fishing ¹	10%
Social	People; community groups ¹	10%

¹ DELWP *Aquatic Value Identification and Risk Assessment (AVIRA) Environmental, Social and Economic Values and Threats 2015*”

2.2 Options

Option 1 - Base Case

The base case for the MCA process is to continue to discharge winter flows from the Balancing Storage to the Grange Burn when inflow exceeds pumping capacity to Monivae Winter Storage. Discharge to Muddy Creek from Monivae Winter Storage is the preferred discharge location due to the high quality of the water in Monivae Winter Storage compared to the Balancing Storage.

Option 2

Upgrade the current pumping capacity from the Balancing storage to Monivae Winter Storage to minimise discharges to the environment from the Balancing storage. Discharge of high quality water from Monivae Winter Storage will continue.

Option 3

Increase the Monivae Winter Storage volume by 18ML on the existing Hamilton WRP site and convert additional 60ha of dryland farm to irrigation. Plus purchase additional 25ha of land for irrigation.

Option 4

Construct a new WRP to treat the water to meet the SEPP standard and discharge to the receiving environment.

3 Multi Criteria Analysis

The multi criteria analysis is based on worst case.

Option	1) Base Case	2) Primary Discharge from Monivae Winter Storage	3) Additional Winter Storage and Irrigation	4) Tertiary Treatment
Option Description	Continue to discharge to Grange Burn and Muddy Creek during the winter months	Upgrade the pumping capacity to allow all discharge to occur via Monivae Winter Storage to Muddy Creek	18ML winter storage, 110 Ha irrigation infrastructure	0.5 ML/d tertiary treatment plant
Financial (20 year NPV) Score	0 0	\$0.4 Million -1	\$2 Million -3	\$11.5 Million – over 20 years -4
Environmental – nutrient load on receiving environment	No change	Reduce Phosphorous and Total Nitrogen loads to the Creek by 0.12 T and 1.0 T respectively	Reduce Phosphorous and Total Nitrogen loads to the Creek by 0.85 T and 2.0 T respectively	Reduce Phosphorous and Total Nitrogen loads to the Creek by 0.67 T and 2.0 T respectively
Score	0	+1	+2	+2
Environmental – Greenhouse Gas emissions	No change	1.5 tonne/annum of CO ₂ eq. per year based on additional electricity usage	30 tonne of CO ₂ eq. as a once off during construction	>50 tonne/annum of CO ₂ eq. per year based on electricity and chemical usage
Score	0	-1	-2	-4
Environmental – Naturalness Aquatic Invertebrate Community Condition	No change	Potential slight improvement	Improvement in nutrient load.	Improvement in nutrient load, very clean water entering Muddy Creek, reduction in winter flows, increased flows in autumn and Spring
Score	0	+1	+2	+3
Social – Activity Recreation Fishing	No Change	Muddy Creek is a healthy fishery. Nutrient reduction is unlikely to be significantly beneficial to anglers	Muddy Creek is a healthy fishery. Reduction in winter flows and nutrient reduction unlikely to be significantly beneficial to anglers.	Muddy Creek is a healthy fishery. Increased flows in autumn and spring may be of slight benefit to anglers.
Score	0	0	0	+1
Social – People Community Groups	No Change	Noticeable presence of community groups engaged in supporting waterway's ¹ . Likely to value any improvements in river health	Noticeable presence of community groups engaged in supporting waterway's ¹ . Likely to value any improvements in river health	Noticeable presence of community groups engaged in supporting waterway's ¹ . Likely to value any improvements in river health
Score	0	+1	+2	+3

3.1 MCA Scores

The following table multiplies the scoring by the weighting to calculate the total score for each option. Each option is scored against the base case score of zero.

Table 4: Multi Criteria Analysis

			Financial	Environment– nutrient load on receiving environment	Environment – Greenhouse Gas emissions	Environment – Naturalness Aquatic Invertebrate Community Condition	Social – Activity Recreation Fishing	Social – People Community Groups	Total Score
Option 2)	Discharge from Monivae Winter Storage	Score	-1	+1	-1	+1	0	+1	
		Weight	50%	15%	5%	10%	10%	10%	
		Final Score	-0.5	0.15	0.05	0.1	0	0.1	-0.2
Option 3)	Winter Storage and Irrigation Extension	Score	-3	+2	-2	+2	0	+2	
		Weight	50%	15%	5%	10%	10%	10%	
		Final Score	-1.5	0.3	-0.1	0.2	0	0.2	-0.9
Option 4)	Tertiary Treatment	Score	-4	+2	-4	+3	1	+3	
		Weight	50%	15%	5%	10%	10%	10%	
		Final Score	-2	0.3	-0.2	0.3	0.1	0.3	-1.2

3.2 Results

The results of the Multi Criteria Analysis are provided in the table below

Option	Score
1) Base Case Winter Discharge from Balancing storage and Monivae storage	0
2) Winter discharge from Monivae Winter Storage only	-0.2
3) Winter Storage and Irrigation Extension no discharge	-0.9
4) Tertiary Treatment	-1.2

3.3 Sensitivity

A sensitivity analysis was carried out to rank the options if the weightings were split 33% Financial, 33% Environmental and 33% Social. The results with the revised weightings are shown below.

	Financial	Environment – nutrient load on Muddy Creek	Environment – Greenhouse Gas emissions	Environment – Naturalness Aquatic Invertebrate Community Condition	Social – Activity Recreation Fishing	Social – People Community Groups	Total Score
Weightings	33.3%	13%	4%	8%	16.66%	16.66%	
2) Winter discharge from Monivae Winter Storage only	-1	1	-1	1	0	1	
Score	-0.33	0.13	0.04	0.08	0.00	0.17	0.006
3) Winter Storage and Irrigation Extension no discharge	-3	2	-2	2	0	2	
Score	-1.00	0.26	-0.08	0.16	0.00	0.33	-0.317
4) Tertiary Treatment	-4	2	-4	3	1	3	
Score	-1.33	0.26	-0.16	0.24	0.17	0.50	-0.326

Discharge from the Monivae Winter Storage to Muddy Creek is still the preferred option with the revised weightings.

4 Conclusion

Based on the EPA Publication 1517, “*Demonstrating Best Practice*”, and using the “*Integration of economic, social and environmental considerations*” analysis technique, the preferred option, and therefore best practice, is to continue to discharge excessive flows into the receiving environment. With the discharge point for these releases restricted to Monivae winter storage in the winter months.

5 References

GHD (May 2017) Hamilton WRP Capacity Review and Strategy Process Management Plan – Report for Wannon Water

GHD (July 2012) Sewerage infiltration and water balance assessment and strategic recommendations report – Report for Wannon Region Water

GHD (August 2017) Hamilton WRP Capacity Review & strategy effluent management options update and costings – D2017/049822