



Engineering Services

Engineering the Goulburn Murray & Riverina

13th April 2010

Hepburn Shire Council
PO. Box 21,
DAYLESFORD, Vic. 3460

Attention: Rob Jennings

Re; Creswick Industrial Park - STORMWATER REUSE OVERVIEW

Dear Rob,

Further to our earlier discussions on this subject we write to confirm the following.

We understand from our discussions that Council would like to explore further the viability of deploying a reduced scale of stormwater reuse system. That stormwater reuse system would only need to treat and supply sufficient water for irrigation of the Doug Lindsay Park Recreation Reserve.

Estimated Water Needs

Our review of the Lindsay Park work requires the following

Proposed Oval Water Needs: With a 5m perimeter between the boundary line of the oval to the spectator fence, total area within the spectator fence line is 2.02 hectares. A grassed surface of this area requires approximately 10ML of water per hectare to maintain during the summer months (as per consultation with StrathAyr). Thus to maintain an oval/field of this size would require at least 20ML of water during the summer. At a rate of 50mm per watering, once a week, 20ML will allow 20 weeks of watering for an oval/field of this size.

Soccer Ground Water Needs: The two existing soccer fields have a combined area of about 1.5 hectares. Applying a similar watering regime to the oval we estimate about 15ML will be required for each summer irrigation period. Therefore the total estimated annual irrigation water needs at Lindsay Park are about 35ML.

Estimated Water Available

Our review of the Industrial Park report provides the following information;

We estimate that the existing undeveloped site presently sheds about 50 megalitres of stormwater runoff per annum. Post development of the site that runoff is estimated to increase to about 120 megalitres. The development of a wetland and water storage downstream of the development site will ensure an improved water quality outcome and provide adequate supplies for irrigation of the public open spaces at Lindsay Park.

There is also further capacity to capture significant quantities of water with the further development of the catchment upstream of the site. We estimate that at present the average stormwater flow through the site from the upper catchment ranges from 500 to 800 megalitres per annum. With further development of land in the up stream catchment that discharge will increase dramatically. However Council will need to purchase water rights to secure a license to capture and use that water.

The report also explains that the wetland was situated below the Industrial Park and that it had been sized to treat the entire upstream catchment (about 175ha). It is unlikely that a diversion license will allow the capture of the entire runoff/flow from any catchment.

Whole of Catchment Development Costs

In our consideration of the stormwater reuse component of the Industrial Park we developed a conceptual design for water treatment and reuse system. The design describes a 2Ha site for the wetland. An estimate for the development of that system was also included (copy attached). The estimated development cost for a whole of catchment system was \$965,000.



That estimate provided a whole of catchment water treatment system (ie. treating up to 800ML per annum) and a reuse system capable of returning up to 50ML per annum to Lindsay Park (ie. a 28m lift over 1,900m length).

Feasibility of a Reduced Scale Stormwater Reuse System

We offer the following in response to the question "is it feasible to deploy a smaller scale water treatment and reuse facility", ie. to capture and treat only the portion of that runoff which is necessary to deliver the quantities required (for irrigation), without treating the runoff from the entire catchment.

It is feasible in engineering terms to simply reduce the scale of the stormwater diversion and capture/storage. The reduced scale storage is simply a smaller dam, however our original concept only allowed for a 10 to 20ML capacity storage dam. A smaller scale dam is not recommended.

The proposed treatment system elements include a gross pollutant interception system and the wetland. The design of these elements will need to incorporate a bypass capability to safely divert the larger flows around them. The reduced scale wetland may enable a reduction in the total site area from 2Ha to say 1.5Ha. Clearly a smaller scale wetland will have a smaller throughput capacity, taking longer to replenish the depleted storage. There are some economies available through reducing the size of the treatment systems, ie. reduced earthworks, less plants etc.

Smaller scale wetlands are feasible, however they can be more susceptible to the extremes of seasonal impacts, ie. wetting and drying. They are also more susceptible to pollution damage and single species domination. However with appropriate management strategies this can be overcome. There are potential economies in the pump station costs if we reduced the pumping capability from 10L/sec to say 5L/s. This needs to be verified with suppliers. See below a comparison of the whole of catchment cost and the reduced scale cost, based upon preliminary cost estimates only.

<i>Description</i>	<i>Whole of Catchment Cost</i>	<i>Reduced Scale Cost</i>
1.0 Preconstruction Phase	\$205,000	\$120,000
2.0 Construction Phase		
2.1 Preliminaries	\$30,000	\$15,000
2.2 Civil Works	\$135,000	\$100,000
2.3 Water Storage & Wetland	\$155,000	\$100,000
2.4 Wetland Development (Aquatics)	\$40,000	\$27,000
2.5 Terrestrial Landscaping	\$20,000	\$20,000
2.6 Water Reuse Systems	\$380,000	\$350,000
Total exc' GST	\$965,000	\$732,000

Summary

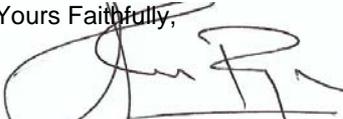
We can readily conclude from the above that a smaller scale stormwater treatment and water reuse system is feasible. Care needs to be taken to ensure that the wetlands are not allowed to deteriorate, otherwise the system simply becomes a dam with a pump. From an environmental point of view this approach may be seen as a cheap device to capture water, ie. to allow majority of the flow (untreated water) to bypass the wetland into Creswick Creek.

Please see attached the following items for your attention/consideration/review;

- Engineers Estimates (2 sheets)
- Stormwater Treatment System Schematic

Should you require any further information on this subject please contact the undersigned.

Yours Faithfully,



Glen M. Ryan
for **GMR Engineering Services**