



2 March 2018

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Dear Justin

## **Walkerville Basin Volume Assessment**

### **1 Introduction**

GHD Pty Ltd (GHD) was engaged by South Gippsland Shire Council (SGSC) to undertake a volume assessment of the Walkerville Basin, located in Walkerville, southern Victoria. The work was undertaken at the request of Justin Taylor and John Moylan of SGSC following a project briefing at GHD Traralgon on 9 January 2018.

### **2 Scope of work**

The scope for this assessment was based on GHD's proposal,<sup>1</sup> and included the following works items:

1. Review existing data provided by SGSC.
2. Site inspection of the basin and surrounding area.
3. Staged volume assessment of the basin using survey data provided by SGSC.
4. Report presenting the findings of the assessment.

#### **2.1 Limitations**

This report has been prepared by GHD for SGSC and may only be used and relied on by SGSC for the purpose agreed between GHD and SGSC. GHD otherwise disclaims responsibility to any person other than SGSC arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible. The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

GHD has prepared this report on the basis of information provided by SGSC, which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report, which were caused by errors, or omissions in that information.

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<sup>1</sup> GHD 2018, *Walkerville Basin – Volume Assessment: Proposal and Fee Estimate*, 17 January 2018.

### 3 Project background

Walkerville Basin is located off Panoramic Drive, Walkerville, approximately 200 m north of the local CFA building. The basin was constructed in 1988 as part of the drainage scheme for the nearby Promontory Views Estate. The basin was designed with floor dimensions of 140 m by 60 m and a nominal storage capacity of 13.5 ML. Table 1 summarises the key design features taken from the drawings provided by SGSC.

It is understood there is an historical agreement between SGSC and an adjacent property owner, whereby the property owner has access to water in the basin for stock use via a number of mobile pumps. It is further understood that there are no records of the amount of water that is supplied to the property owner.

This purpose of this assessment was to determine the current storage capacity of the basin and investigate conditions that may be affecting the yield of the basin. Such conditions may include: leakage through the embankments, basin floor and/or overflow structure (spillway), sedimentation on the floor of the basin, restricted inflows, and settlement of the embankments and/or overflow structure.

**Table 1 Walkerville Basin design features**

Item	Description
Type	Off-stream turkeys nest – regular in plan with earthen embankments on all sides
Nominal storage capacity	13.5 ML
Year constructed	1988
Purpose	Retarding basin for residential estate stormwater. Stored water used as stock water for adjacent farm
Current owner	South Gippsland Shire Council
Floor dimensions	140 m x 60 m
Floor level	RL 94.5 m
Crest level (ave.)	RL 96.5 m
Crest width (ave.)	4 m
Batter slopes	2.5H:1V
Spillway	
Type	Concrete overflow intake pit and dia. 375 mm concrete overflow pipe through embankment
Location	Northwest corner

Item	Description
Level	Design level unknown (RL 96.06 m at 27-Jan-16)
Inlet	
Type	Dia. 675 mm pipe through embankment
Location	Southeast corner
Level	Pipe invert RL 94.6 m

### 3.1 Available data

The following information was provided to GHD for the purpose of this assessment:

- Feature and level survey of basin and upstream drainage (CAD files), 27 January 2016.
- Drainage scheme drawings for Promontory Views Estate, February 1988.

## 4 Observations from site inspection

The following observations and comments have been derived from the site inspection:

- The water level at the time of the inspection was not provided, but was well below full supply level.
- The condition of the embankments and crest were generally good. Some minor depressions were observed, however, all areas of the crest were accessible and trafficable using a regular light vehicle (Photo 01).
- There were a number of mature trees growing through the embankments. It is recommended trees and shrubs be removed from the embankments to prevent the development of piping pathways via root zones (Photo 02).
- Heavy reed growth was observed around the basin rim (Photo 03). Vegetation should be managed as it can restrict inflows and outflows.
- Minor cracking and spalling of the concrete overflow structure (spillway) was observed, however the overall condition was generally sound (Photo 04). No visible signs of settlement or leakage around the structure could be observed. However, it was understood that water levels have been low for some time, as such, any possible leakage pathways were difficult to identify.
- Despite minor concrete spalling, the general condition of the overflow outlet pipe was sound and clear of blockages (Photo 05).
- Backfilling around the overflow pit was sporadic and not tight against the pit (Photos 06 and 07). This is likely to be affecting the performance of the structure and foundation and may be providing pathways for leakage when water levels are higher than at present.
- Downstream, the spillway outlet should be cleared so any flow can pass unimpeded (Photo 08).
- The inlet was below the water line and could not be observed.

## 5 Staged volume calculation

GHD have completed a three-dimensional assessment of basin volume at various water levels using the survey data provided. The results show that at full supply level (FSL) of RL 96.06 m (current overflow level) the maximum storage volume is 13.2 ML (Table 2). Figure SK-01 is a schematic showing basin conditions.

**Table 2 Storage volumes**

Water Level	Storage Volume (ML)
RL 94.95 m (water level at 27-Jan-16)	3.0
Overflow (spillway) level RL 96.06 m	13.2
RL 96.09 m	13.5
RL 96.28 m (overtopping level)	15.3

## 6 Discussion and conclusions

The following comments are based on the results of the site inspection and volume assessment:

- As the basin was constructed 30 years ago, and no design storage capacity, spillway level or design freeboard has been provided, the design storage capacity cannot be conclusively determined. Furthermore, without the design spillway level, it cannot be concluded that settlement of the overflow structure significant enough to reduce basin volumes has occurred.
- Based on the current overflow level of RL 96.06 m, the maximum storage volume is 13.2 ML.
- Comparison of the design floor level of RL 94.5 m against the survey data from January 2016 shows basin floor levels remain very close to design levels and sedimentation on the floor has been minimal.
- Backfilling immediately around the overflow structure was sporadic and is likely to be affecting the performance of the structure and foundation. This may lead to leakage around the structure when water levels are higher than observed during the site inspection (hence, a lower full supply level).
- Silt laden or highly turbid water was not observed in the basin during the site inspection. However, no water quality testing was undertaken, nor have any water quality test results been provided.
- It is understood SGSC have been instructed by the relevant water licencing authority to undertake some minor works to improve the general safety of the basin. These works are to include removal of trees and shrubs from the embankments, placement of road base along the crest to maintain access in all seasons and upgrading the outlet structure to be in line with maximum inflows. These works will also address a number of the items raised in Section 4.
- Using select clay fill and proper construction methods (i.e. material specification and compaction control), any settlement of the embankments would likely occur within the first one to two years of placement, and generally be in the range of 25 to 50 mm. Any long-term consolidation of the embankments (and foundation) after this is difficult to quantify as it relates to material type and the

seasonal shrink-swell cycles that are influenced by local climatic conditions (i.e. periods of drought and/or prolonged wet periods).

- In addition to possible leakage around the overflow structure, other possible explanations for the alleged reduction in storage yield may be due to leakage through the basin floor or reduced inflows. Reduced inflows may be due to blockages upstream, water loss through the open drainage throughout the estate and the numerous water tanks collecting stormwater from houses within the estate.

We trust this report meets your requirements. If you have any queries, or require clarification, please don't hesitate to be in contact.

Sincerely  
GHD



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**Attachments**

Site inspection photos

SK-01 – Schematic diagram showing basin condition



Photo 01



Photo 02



Photo 03



Photo 04



Photo 05



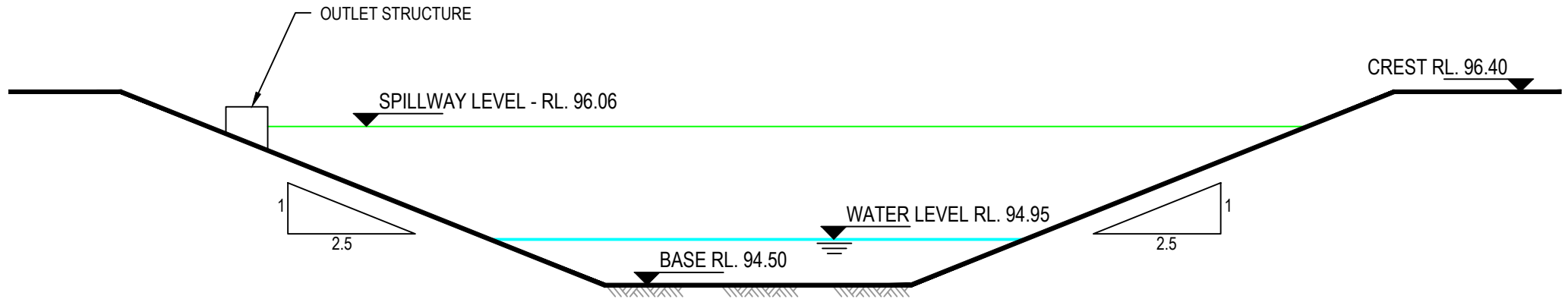
Photo 06



Photo 07



Photo 08



NOTES:

1. ALL EXISTING BASIN SURFACE LEVELS ARE AVERAGE VALUES.
2. WATER LEVEL SHOWN WAS AT 27/1/16.
3. ALL LEVELS IN mAHD

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