Appendix L – Westgate Lakes Discussion

Memorandum

09 January 2019

To	Melbourne Water Corporation		
Copy to	Todd Berry		
From	Nathan Clements; Ryan Brotchie	Tel	
Subject	Stormwater Diversion to Westgate Lakes	Job no.	3136555

1 Introduction

This memorandum summarises the content of email correspondence between GHD, MWC and the Taskforce in early October 2018, discussing the flood mitigation benefits of supplying stormwater to the Westgate Lakes.

2 Background

The community group, Westgate Biodiversity, has been investigating for many years the potential to divert additional water to the Westgate Lakes to achieve environmental benefits. It is also understood this is a concept being considered at the GMH site.

In the Ramboll work, the Westgate Lakes were identified as a cloudburst storage. GHD then modelled this in the distributed storages modelling investigation work in 2018.

As part of the Water Sensitive Drainage Strategy work, GHD was asked to further consider at a high level the potential for diversion of additional stormwater to the Westlake Park waterbodies ("Westgate Lakes"), for flood mitigation benefits. This is discussed below.

3 Distributed Storages Modelling Investigation (GHD, 2018)

The report identified that:

- The existing lakes at Westgate Park North and East … are shown to have a depth of inundation of greater than 1.5m. This depth is not all due to flood storage and has occurred mainly due to how the existing lakes have been represented within the TUFLOW model. The invert of these lakes was set within the model to -1.0mAHD, but as these are existing lakes an initial water level of 0.5mAHD was also adopted, unlike the other cloudburst detention storages, which were assumed to be initially empty. The depth presented on the plan includes this initial depth of 1.5m. The actual depth within the lakes at Westgate Park North and East was modelled to be 1.81m and therefore only 0.31m of this is a result of flood storage (1.81-1.5).
- The Westgate Park North and East lakes are relatively incised, with ground levels around the lakes at generally greater than 3mAHD and therefore it is possible for flood depths

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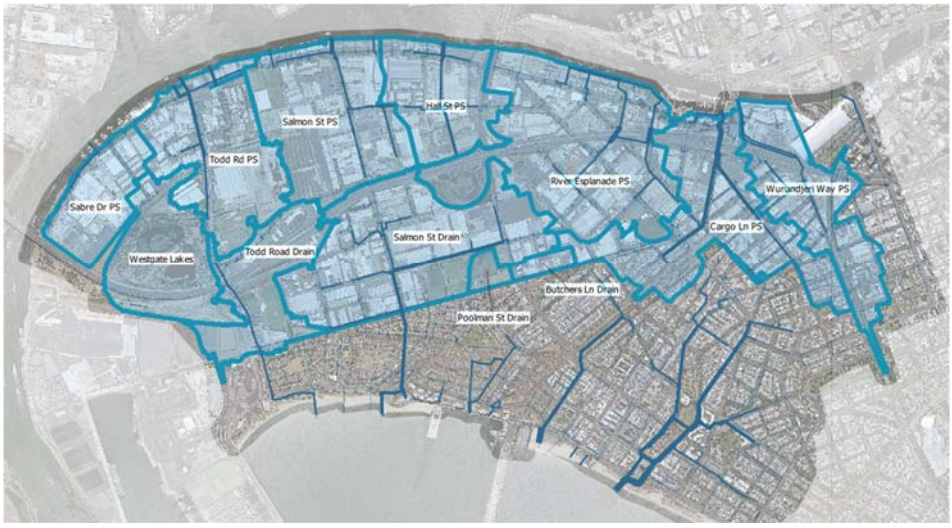
within these lakes to reach up to approximately 4m (based on an invert level of -1mAHD) without potentially flooding occurring in the surrounding areas. Based on this, it would appear that these lakes are currently underutilised as cloudburst detention storages. There is limited catchment upstream from the lakes, and while it is understood that there is an existing drainage pipe connection, further connections may enable the lakes to be better utilised for flood storage.

4 Stormwater Runoff

There is an approximate 1 km^2 catchment that hydraulically may be possible to feed into the lakes, given appropriate stormwater network design. This considered the sub-catchments shown as "Westgate Lakes" and "Todd Rd PS" (which includes the GMH site) in the figure below.



Using some high level assumptions regarding imperviousness, connectivity and average rainfall, this may equate to an approximate 300 ML/yr that may be directed to the lakes.

The catchment area has been derived based on an assumed water elevation in the lakes from lidar (approx. 1.2m AHD), and then an assumed minimum grade (1 in 400) and cover (0.3m) in the local drainage network. This maximum viable area has been used to calculate the supplied runoff volume using the below-mentioned connectivity and imperviousness assumptions. This has also assumed that sending water to the lakes is of greater importance than in-catchment storage for the identified catchment. Should the balance of priorities swing away from sending water to the lakes then this catchment area may reduce to account for the deeper drainage network required. The same will apply to the storage volume within the lakes, should it be deemed insufficient to contain the required runoff.

The current CoPP drainage information does not show any existing stormwater being directed into the lakes, but CoPP have cautioned against using their information as reliant. With this in mind, it is not clear what portion of the 300 ML/yr is additional inflows on top of existing, but it is likely that it will be a substantial portion.

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5 Flood Mitigation Benefits

There are no proposed downstream drainage infrastructure capacity upgrades in the Sabre Dr PS, Todd Rd PS or Westgate Lakes sub-catchments. Therefore there is minimal identified benefit from a flood mitigation perspective.

However, reducing peak flows to the Yarra will reduce the size of the required pump stations, and so would have some benefit. This is not quantified though, but the work on distributed storages demonstrates this is likely to only be a marginal reduction.

Also, the potential to divert flows from the Todd Rd Drain sub-catchment, which does have proposed capacity upgrades, was not considered.

6 Next Steps

Investigate Todd Rd Drain sub-catchment diversion*:* It has been identified that the diversion of stormwater from the Todd Rd Drain catchment could be an alternative to the proposed capacity upgrades to address spills in that catchment. Diversion of this catchment wasn't considered in the above analysis, but could be considered in future work. This would consider the quantity and rate of stormwater that would need to be delivered to avoid triggering the upgrade.

Confirm the existing catchment: There is some uncertainty about the existing drainage catchment for the lakes, and therefore what the potential additional catchment areas are that could be diverted to the lake. This should be considered in more detail.

Confirm environmental and social benefits: Understand what is the environmental/social benefit of sending more water to the lakes and how much water is required to achieve that benefit (i.e. is it X number of flushing cycles per year required to prevent algal blooms)?

Confirm the total water balance: Considering the surface area of the lakes of ~ 46,000m^2, and the local hydraulic conductivity of the soils (TBD), what is an estimate of the rate of infiltration of any water that is received by the lakes? With this rate in mind, is there a limit to how much water we could/should send to the lakes (i.e. as to not overfill them and cause unnecessary backwatering within the drainage network)?

Re-run the flood model with better informed assumptions for the contributing catchment and active flood storage volumes, to enable quantification and potentially monetisation of any flood reduction benefits.

Provide recommendation: Following the above, a recommendation can be made about the effective catchment that should be diverted to the lakes.

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