

11 April 2017

Ref: L-R1037-0417-04-V3

City of Sydney
456 Kent Street
SYDNEY NSW 2000

Attn: John O'Shea

Gunyama Park Aquatic and Recreation Centre Flood Investigations

Interim Development Scenario

Modified Flood Management Option – Drainage Reserve at George Julius Avenue

Dear John

A letter report reference L-R1037-0117-03 dated 13 January 2017 was prepared by HydroStorm Consulting to revise the flood management option for the interim development scenario. The revised option was to remove the detention basin from the Council Depot site and provide a similar basin in the future George Julius Avenue reserve.

Hydraulic modelling has been undertaken to assess the impact of the revised option. Details of this option along with the model results are presented in this report. The proposed option addresses the Item 16 of the additional information requested by the consent authority.

ITEM 16: FLOODING

A temporary flood detention basin was proposed at the Council depot site to manage the impacts of the proposed Gunyama Park Aquatic and Recreation Centre (GPARC) under an interim development scenario in Epsom Park (HydroStorm, 2016). After review by the consent authority, the proposed basin was deemed to limit the future development potential of the depot site or in case of the development of this site, compromise this flood impact management measure for the GPARC.

A new flood impact management measure is proposed in lieu of the Council Depot flood detention basin to address the above issues. Figure 1 shows the layout of the proposed measure.

A summary of the issues and the concept of this new management measure are presented below:

- The GPARC has an impact on properties to the east by blocking the flow arriving from this direction. An initial solution to remove this impact was achieved by providing a detention basin at the Council Depot site.
- However, provision of a basin on the Council depot site is not suitable as it limits the development potential of this site.

- The proposed basin with associated drainage is located in the future George Julius Avenue.
- The flow which arrives at the basin will be drained via pit and pipe arrangement to the Green Square Trunk Drain (GSTD). The basin is located within an easement along the eastern boundary of GPARC, within the road reserve of the future George Julius Avenue, as shown in Figure 1.
- The basin width is half the width of the road reserve (approximately 11 m). The length of the basin along the George Julius Avenue is approximately 40 m.
- Hydraulic modelling has been undertaken to verify the above size of the basin.
- The modelling has been undertaken as per the interim development layout shown in Figure 1. The future development at Council site has been included along with the easement containing basin/depression and pit/pipe drainage as shown in this figure. The basin in the easement has lower levels than the adjoining ground (to the east) to facilitate the floodwaters to flow into the basin.

MODELLING RESULTS

Hydraulic modelling was undertaken using Council's existing model for the Alexandra Canal catchment. The model is based on a 4m grid and utilises the rainfall-on-grid or direct rainfall approach for modelling of design flood events. Modelling was undertaken for the 100 yr ARI 2-hour flood event.

Figure 2 shows the 100 yr flood depth for the existing conditions and Figure 3 shows the flood depth for the interim development scenario.

Figure 4 shows the difference in flood levels when the interim development scenario is compared with the existing conditions (as per the Council model) without the proposed basin. The results indicate that the interim development scenario increases the 100 yr flood levels by approximately 0.2 m for the properties to the east of GPARC.

Figure 5 shows the difference in flood levels when the interim development scenario is compared with the existing conditions with the proposed basin. The results show that the proposed GPARC development when considered within the interim development scenario of Epsom Park does not have an adverse impact on the surrounding properties. The flood levels in fact reduce by approximately 0.2 m for the properties to the east of the proposed basin.

DRAINAGE DETAILS

The temporary drainage arrangement provided to the east of GPARC has the following features:

- A basin with dimensions 11m x 40m is provided. The basin is 0.5 m below the lowest level of the surrounding ground.
- Fencing and appropriate signage is required for the basin.
- Drainage of the basin to be achieved through pit and pipe arrangement. The discharge pipe to be connected to the GSTD.
- The required pipe size is 600 mm diameter pipe and it carries a peak flow of 0.8 m³/s in a 100 year ARI 2-hour flood event. The flow hydrograph is shown in Figure 6.
- The approximate invert of the pipe in the southern corner of the basin (last pit) is approximately 16 m AHD. The pipe connects to the Sydney Water Trunk Drain at approximately 15 m AHD invert.
- Appropriate number of pits of suitable size to be provided to achieve the peak flow rate of 0.8 m³ in the drainage pipe.
- Blockage of pits should be considered in determining the number and size of the pits.

Figure 7 presents cross-sections for the proposed basin. The levels along the boundary of the basin vary. A minimum depth of 0.5 m is required.

CONCLUSIONS

The proposed flood management measure of a basin with pipe drainage along the eastern boundary of Gunyama Park provides a concept to manage the impact of GPARC under the interim development scenario. The modelling has been undertaken for the 100yr 2-hour flood event. Modelling for other durations of the 100yr event should also be undertaken after the design of the basin is finalised.

HydroStorm Consulting



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REFERENCES:

HydroStorm Consulting, 2016, "*Gunyama Park Aquatic and Recreation Centre – Hydrological Assessment and Flood Analysis*" Report-RJ1037-V5-0616, Version 5, dated 3 June 2016. A report prepared for City of Sydney.

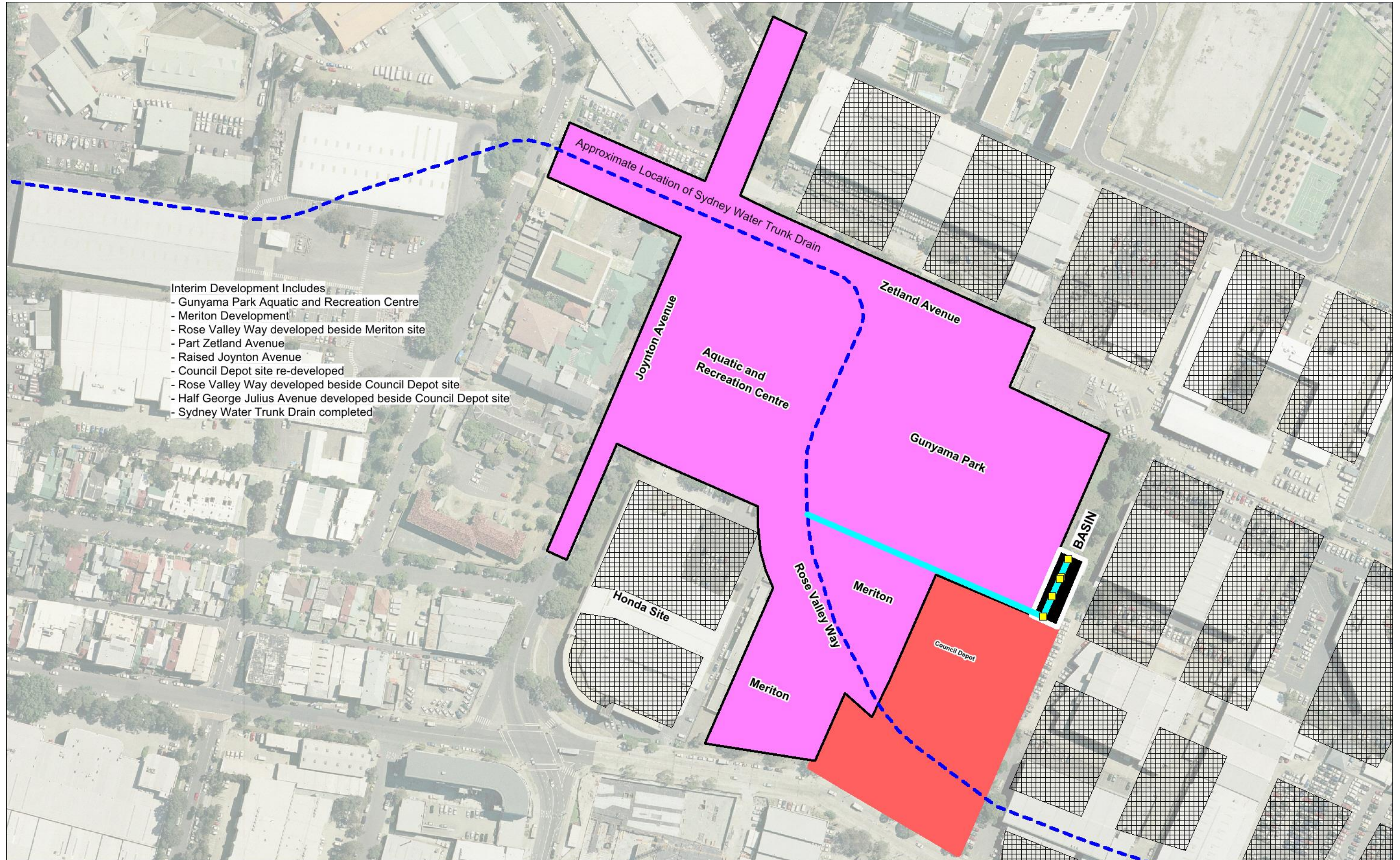


Figure 1. Proposed concept of the Flood Management Measure for managing impact of GPARC under the Interim Development Scenario

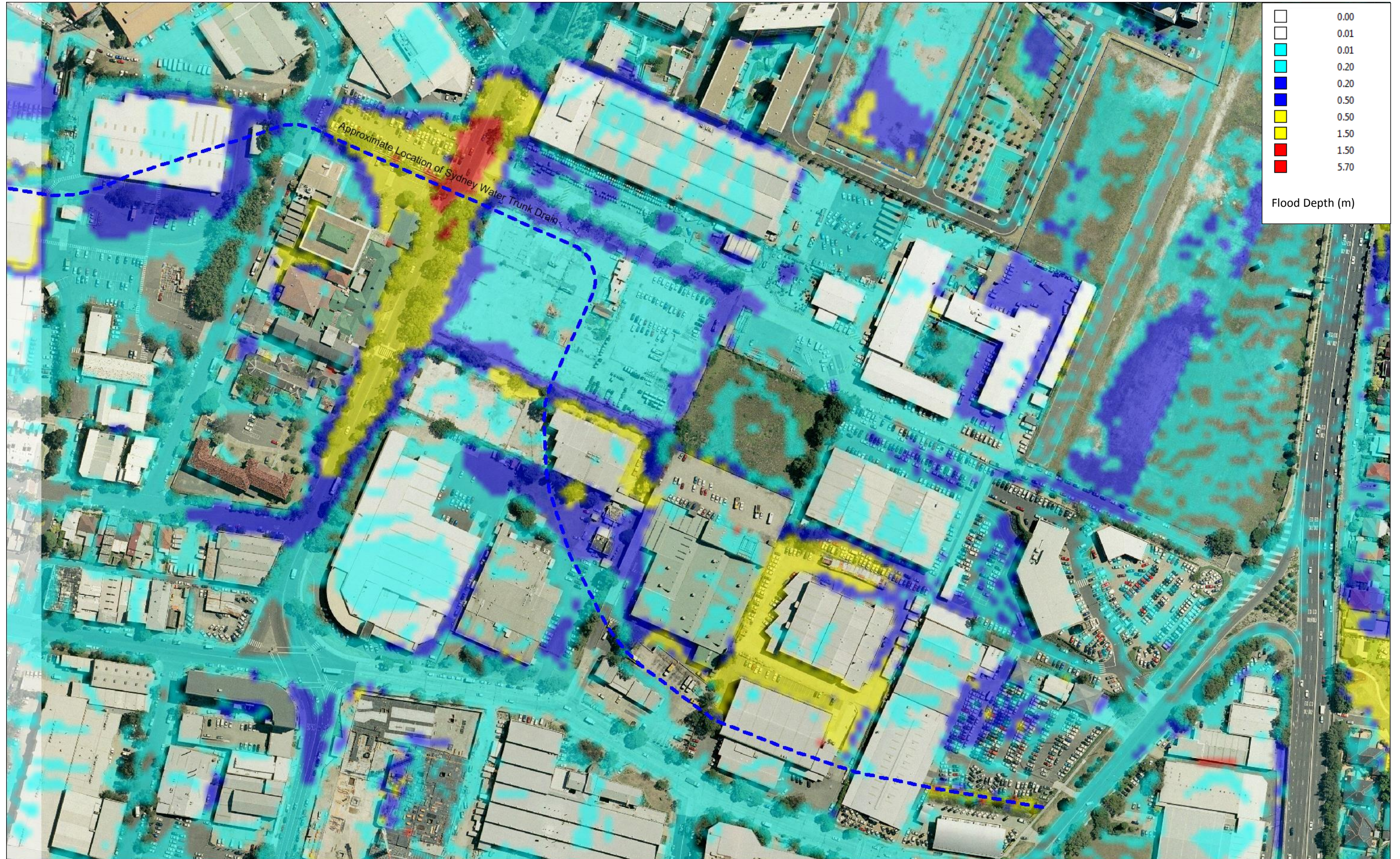


Figure 2. 100 yr 2hr Flood Depth – Existing Conditions

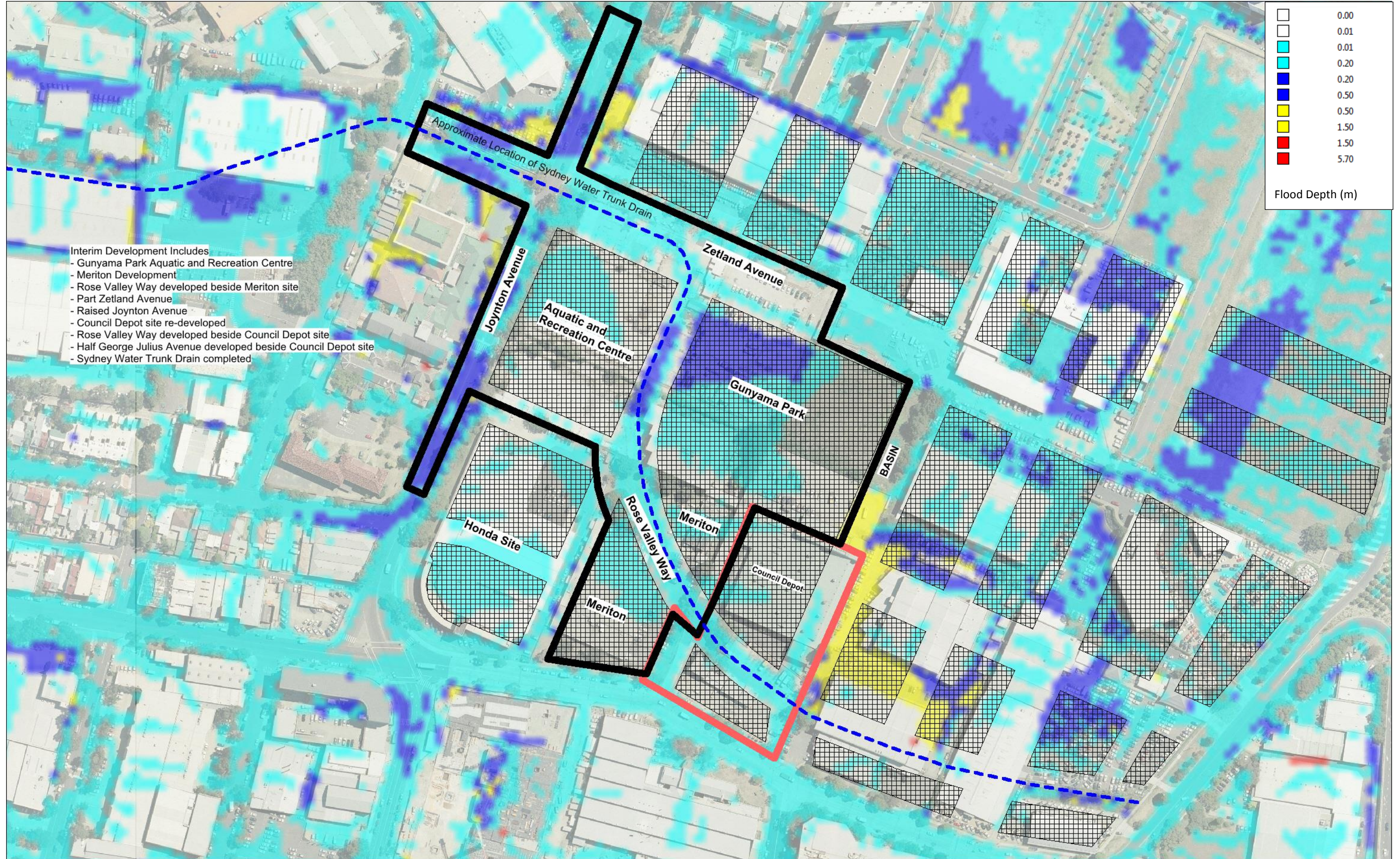


Figure 3. 100yr 2hr Flood Depth – Interim Development Scenario

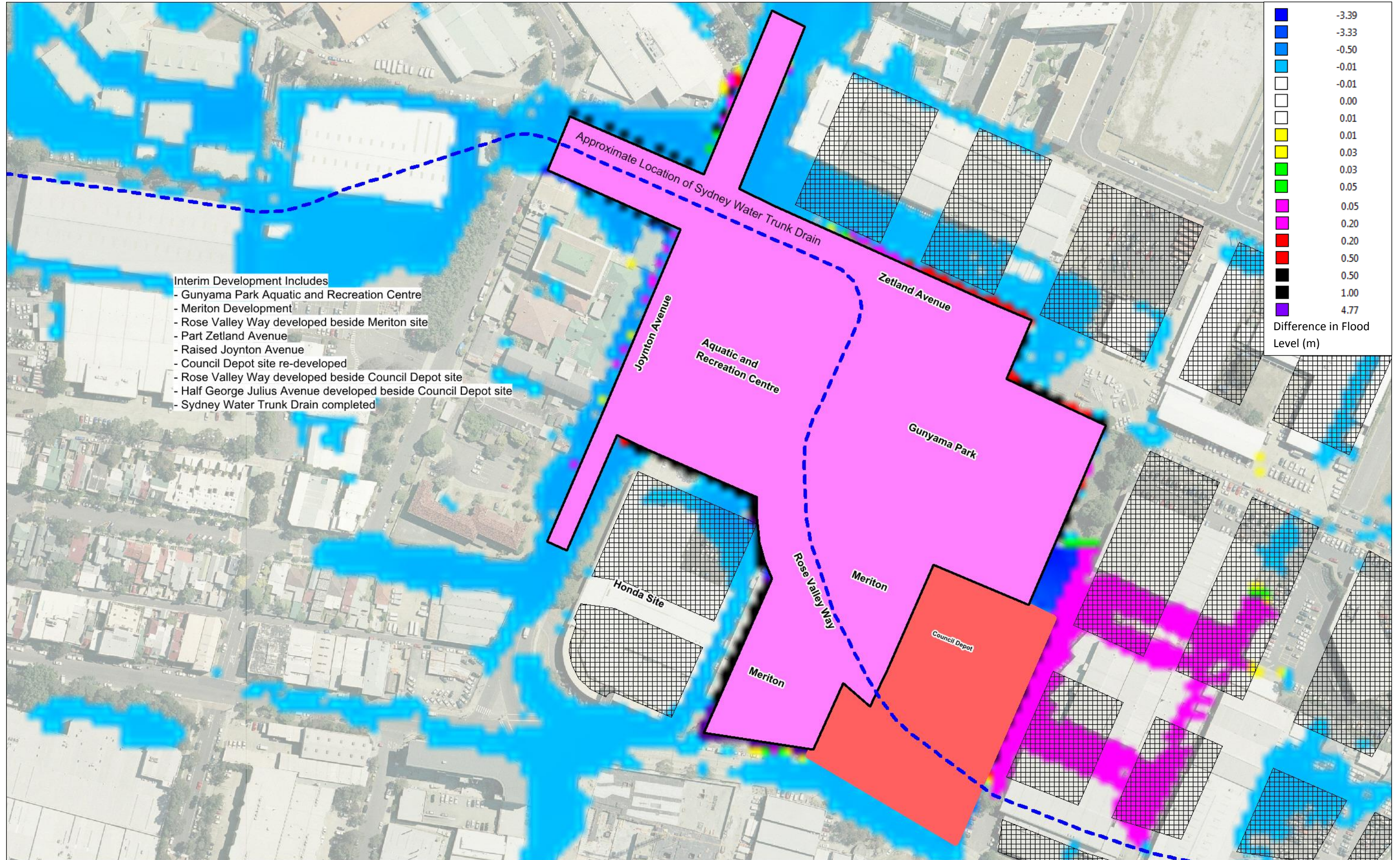


Figure 4. Impact of the Interim Development Scenario – WITHOUT BASIN – Difference in Flood Levels between Interim Development and Existing Conditions – 100 yr 2hr Flood Event

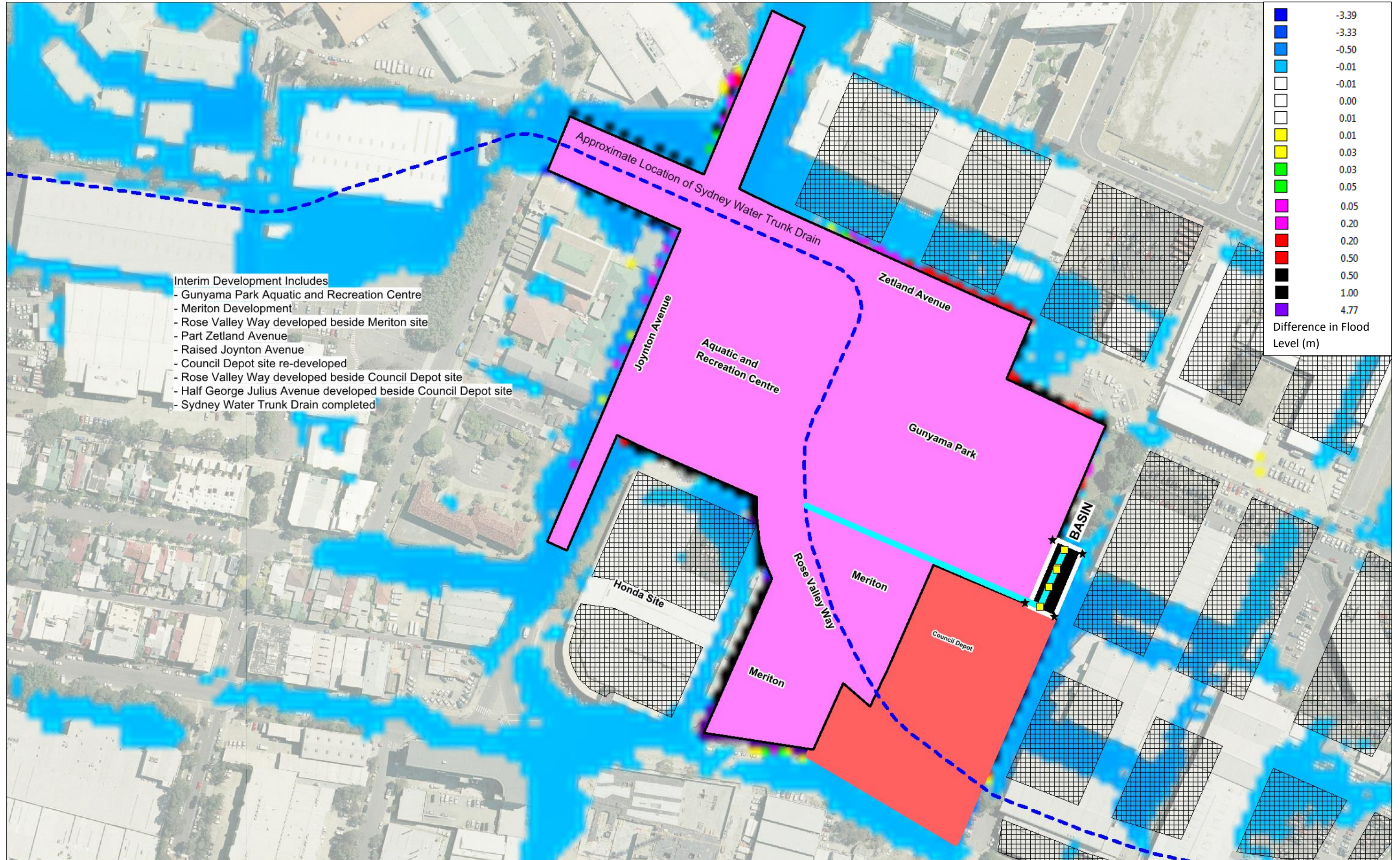


Figure 5. Impact of the Flood Management Measure for the Interim Development Scenario – WITH BASIN – Difference in Flood Levels – 100 yr Flood Event

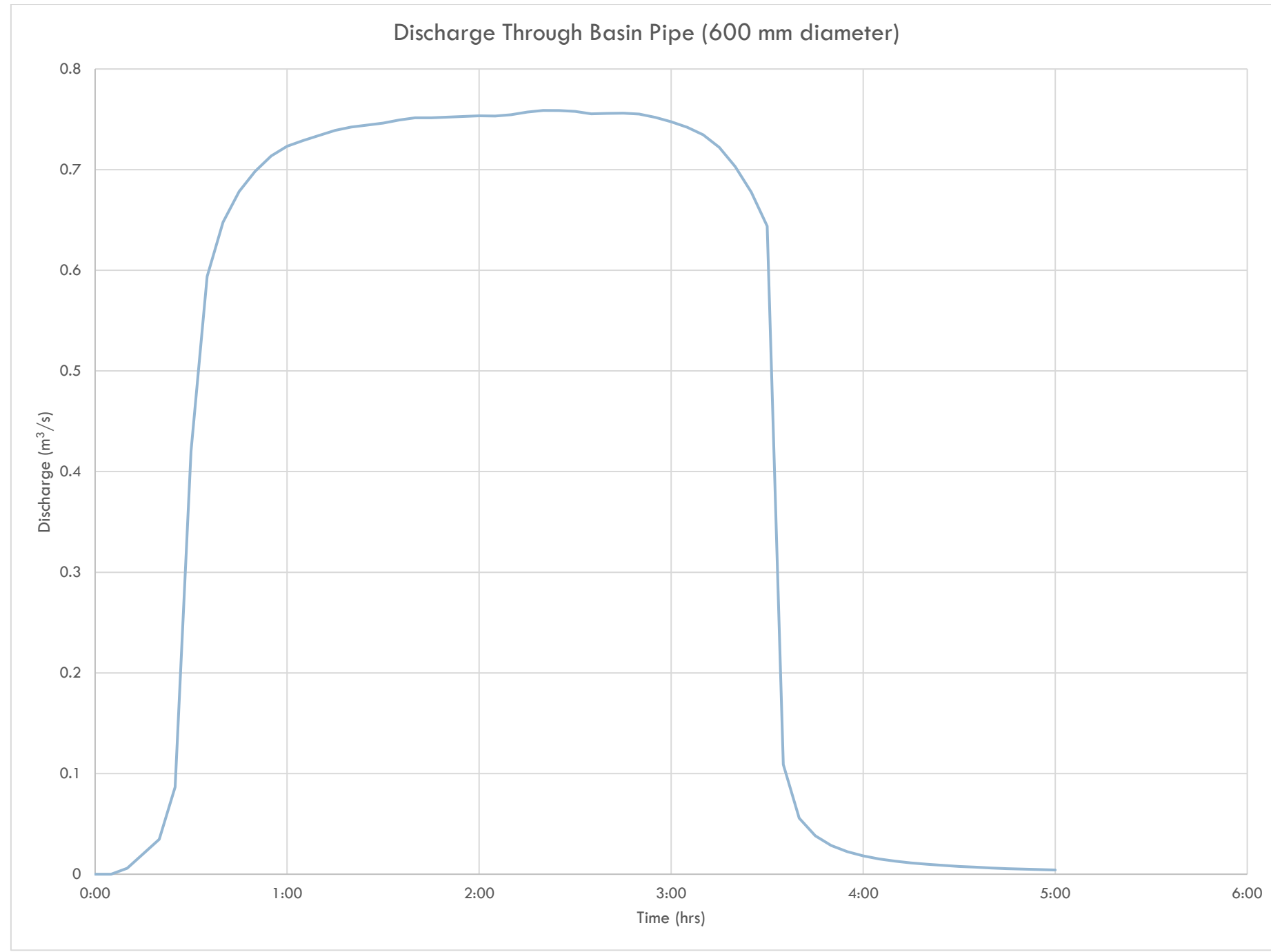


Figure 6. Discharge from Basin to Green Square Trunk Drain

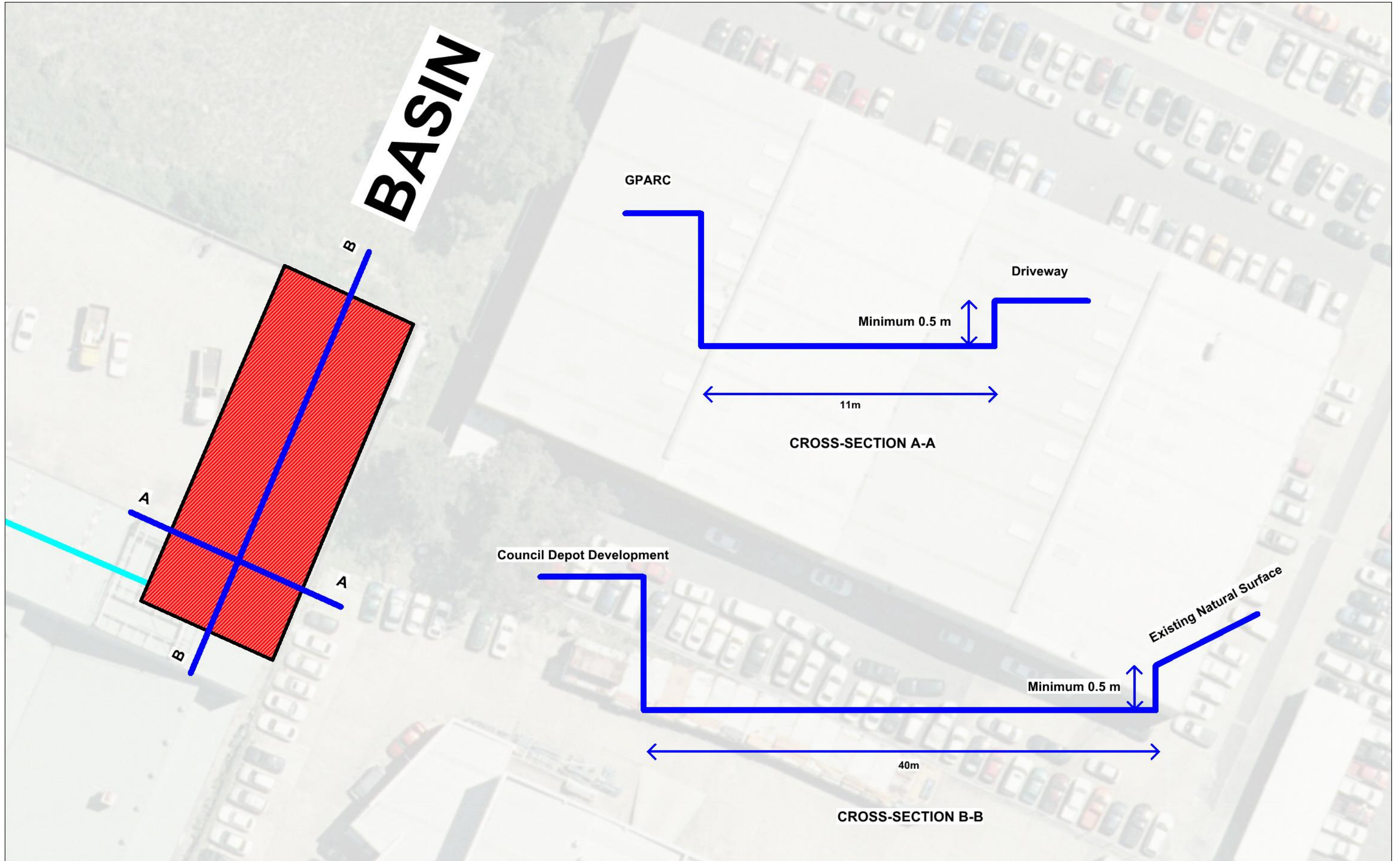


Figure 7. Proposed Basin at George Julius Avenue – Cross-Sectional Details