

2 August 2011
Ref: J1115_L1.doc

Australian Turf Club Ltd
Royal Randwick Racecourse
Alison Road
Randwick NSW 2031

Attention: Jonathan Seward
Head of Properties

Dear Jonathan,

ATC Landholdings at Warwick Farm Munday Street Flood Storage

I refer to your request for advice concerning issues raised by Council in regard to the proposed filling of the Munday Street site at Warwick Farm. Three issues were raised by Council:

- i) that compensatory flood storage can be provided off site (within the ATC Landholdings);
- ii) whether filling of the Munday Street site will affect overland flows; and
- iii) that there will be no adverse impact on flood behaviour.

A response to each of the issues is provided below.

1 Compensatory Flood Storage

There are a number of activities recently undertaken or proposed within the ATC landholdings at Warwick Farm that will have an impact on the flood storage within the floodplain. A summary of these activities is included in Table 1.

Filling of the Munday Street site was originally estimated to result in a loss of floodplain storage of 13,500m³. In conjunction with the other activities (shown in Table 1) the total compensatory storage required to ensure no loss in flood storage volume is 11,400m³. There are two locations that could be considered for providing the compensatory storage.

The first location, shown on Figure 1, is to the north of the Coopers Paddock rezoning site. The site is already low-lying, and there would be little opportunity to develop this site in the future due to its susceptibility to flooding. An oval shaped sand track is located in this area, and the compensatory storage volume of 11,400m³ would be obtained through excavation within the perimeter of this of this track. The area that could be excavated whilst avoiding any significant vegetation within the site is approximately 21,500m². The average excavation depth over this area is just over 0.5m.

Table 1
Flood Storage Volume Changes

Description	Change in Flood Storage (m3)	Comment
2008 Activities	+7,800 (gain)	Surplus excavation from equine Tunnel; and synthetic race track
Munday St site (Area G) filling	-13,500 * (loss)	Previous estimate from rezoning assessment
Coopers Paddock filling	-5,700 (loss)	Previous estimate from rezoning assessment
Net Change (before compensatory excavation)	-11,400 (loss)	Compensatory excavation required.
Required Compensatory Storage	+11,400 (gain)	
Change in Flood Storage	0 (Balanced)	

* Revised estimate based on 2011 proposal and detailed site survey = 13,200m³

The site is particularly low lying, with a site survey identifying the eastern portion of this site as 'swampy land', with levels as low as RL 2.0 to 3.0m AHD. This area drains in a south-east direction to the Georges River through a heavily vegetated area. Excavation would therefore mainly need to be limited to higher ground to the south and west so that the site can continue to drain to the Georges River and to minimise any potential environmental issues. Four cross sections showing indicative excavation depths, and providing a total storage volume of 11,400m³, are provided on Figures 2 and 3.

The second site that could be considered to provide the necessary compensatory storage is within the perimeter of the main racetrack, as shown on Figure 4. The storage could be provided by excavating an area of approximately 12,700m² adjacent to the existing northern pond by an average depth of 0.9m to RL 5.4m. This is just above the maintained top water level of the existing pond (understood to be RL 5.3m AHD). Alternatively the site could be excavated further and incorporated in an expanded pond. However, any excavation below the usual top water level within the pond can not be considered as additional flood storage volume. Two typical cross sections through the site are shown on Figure 5.

Excavation of an alternative, separate pond has also been identified within the racetrack to provide the nominated storage volume of 11,400m³. The advantage of separating this area from the main pond is that the maintained top water level in the pond can be lowered to reduce the footprint of the excavation. The alternative pond involves an area of approximately 7,900m² which would be excavated by an average depth of 1.5m to RL 5.15m AHD. Additional excavation could be undertaken to provide permanent water within the site, with a maintained top water level of RL 5.15m AHD.

2 Impact on Overland Flows

Potential overland flow paths have been identified with the aid of a terrain surface model in the vicinity of Warwick Farm (based on LIDAR survey acquired in 2008) and through a review of the stormwater pipe network provided by Council. A thematic representation of the terrain surface is shown on Figure 6. Shades of blue indicate low points within the catchment, and shades of orange to red indicate higher elevations. Contours at 0.25m intervals were also extracted from the terrain surface and used to delineate catchment boundaries. Potential overland flow paths are identified on Figure 6.

The Munday Street site is located in a small catchment area of 32Ha that drains to a depression known as the Horseshoe Pond within land owned by Sydney Water. The site is at the very top end of this small catchment, and there is little, if any, contributing catchment

area that drains to the site. The Hume Highway (to the north) and Governor Macquarie Drive (to the east) effectively form the boundary of the catchment.

The stormwater pipe system mainly starts at Munday Street, on the downstream side of the site, and conveys stormwater in a south-easterly direction towards the Horseshoe Pond. There are no stormwater pipes or drainage easements through the site.

A small amount of surface flow appears to flow down Warwick Street, along the northern boundary of the site. The flow along the road corridor is intercepted by a 375mm stormwater pipe, and presumably feeds into the drainage system provided along the Hume Highway (no details are provided in Council's drainage plans).

As the site is located at the very top end of this relatively small catchment area, and there are no surface flow paths through the site, filling of this site is anticipated to have no impact on overland flow paths.

3 Impact on Flood Behaviour

A computer model (TUFLOW) of the floodplain at Warwick Farm was developed by Bewsher Consulting for the AJC in 2006. Since this time the model has been used on a number of occasions to test the impact of various development scenarios on flood behaviour. The impact of filling both the Munday Street site (13,500m³) and the Coopers Paddock site (5,700m³) was shown to have no adverse impact on flood behaviour in the 100 year flood (within ± 20 mm) and provided some small flood level reductions of up to 50mm near the intersection of the Hume Highway and Governor Macquarie Drive (Bewsher Consulting, June 2009). These results do not include the compensatory storage which has been proposed to ensure that there is no overall loss in floodplain storage volume. The compensatory storage is a requirement of Council and provides further guarantee that there will be no impact on flood behaviour.

A flood assessment report was also prepared for Hydrox Nominees Pty Ltd in April 2001, which deals specifically with the development of the Munday Street site (FloodMit, 2011). The report confirms that filling this site will not have a detrimental impact on flood behaviour.

If you have any questions on the above, please don't hesitate to contact me.

Yours sincerely,

A handwritten signature in cursive script, appearing to read 'J Maddocks', written in dark ink.

John Maddocks
Director

SHEET 7

SHEET 8

Compensatory Storage
11,400m³

Section 1

Section 2

Section 3

Section 4

GEORGES RIVER



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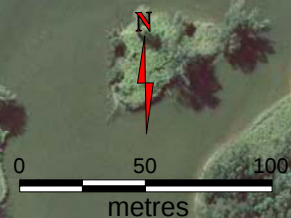


Figure 1
Compensatory Storage - Option 1
North of Coopers Paddock

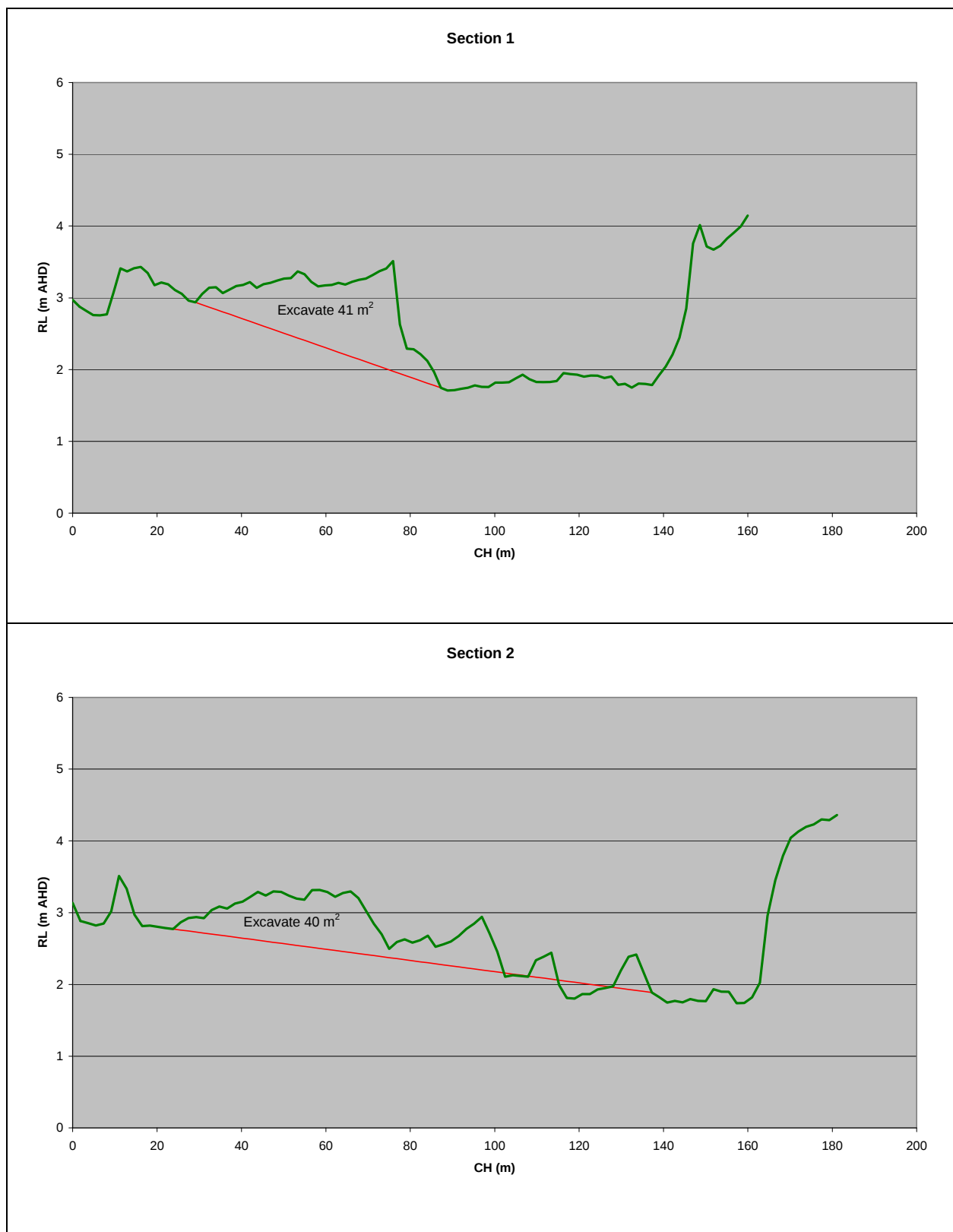


Figure 2

Sections through site north of Coopers Paddock (1 of 2)

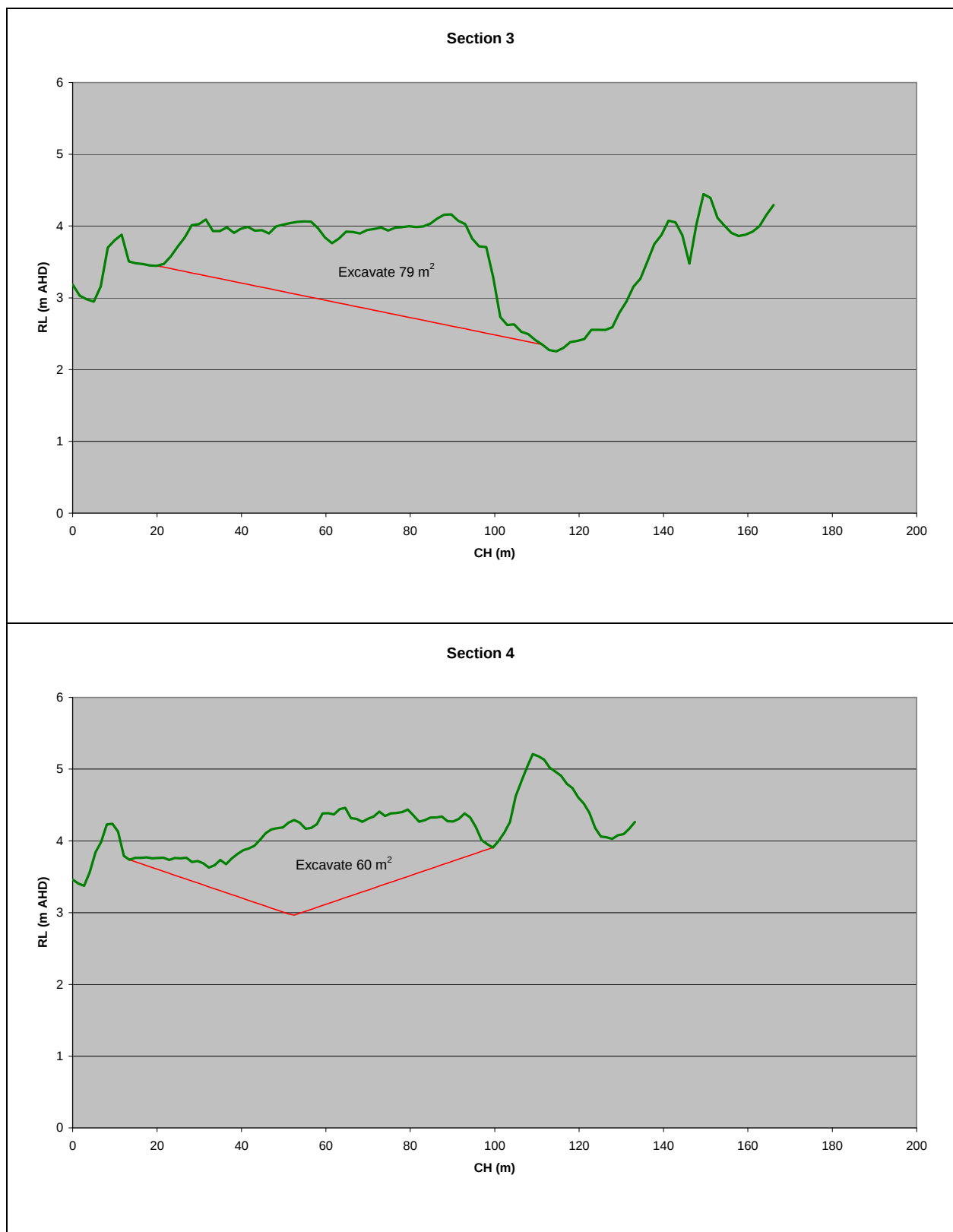


Figure 3

Sections through site north of Coopers Paddock (2 of 2)

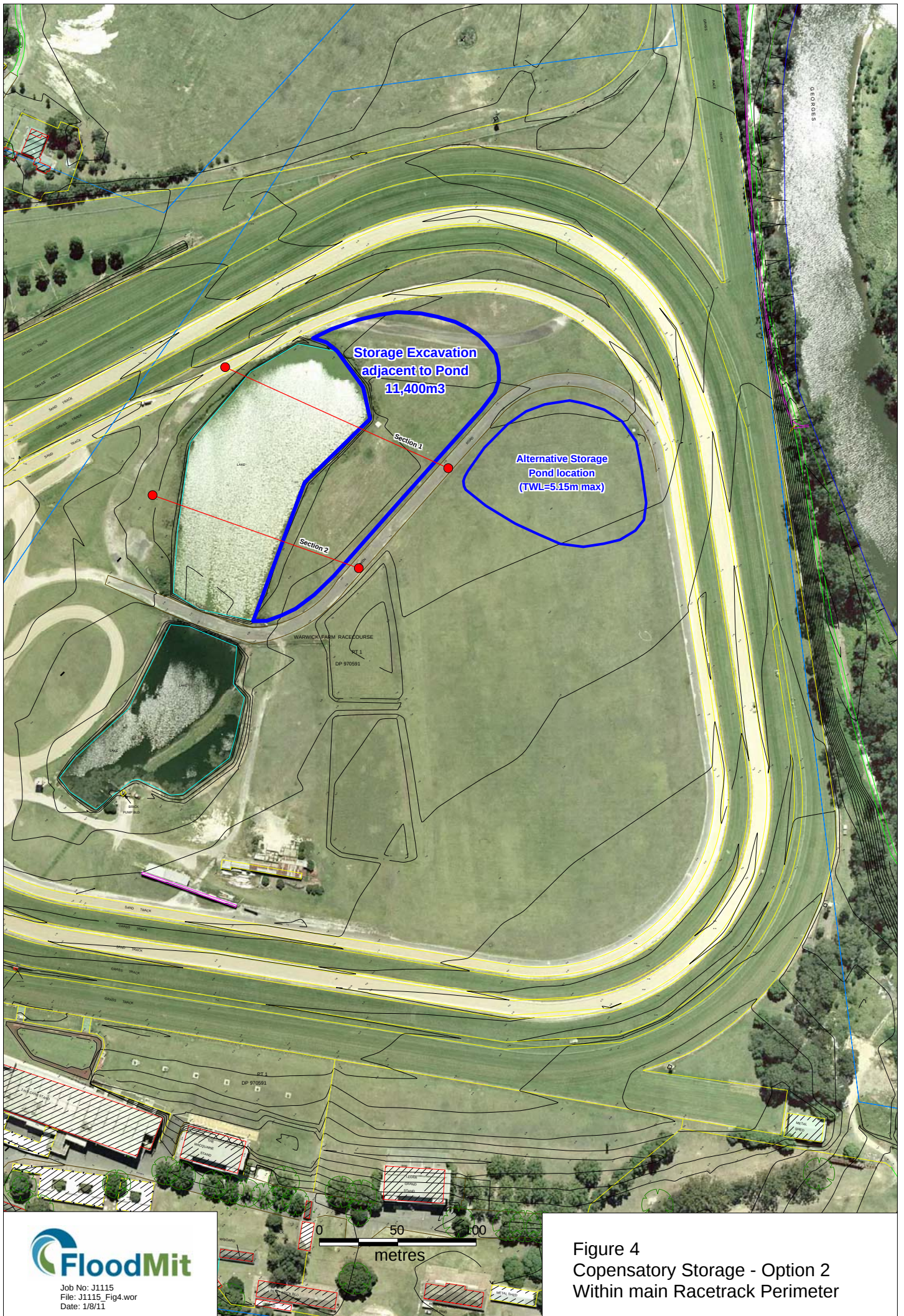


Figure 4
Compensatory Storage - Option 2
Within main Racetrack Perimeter

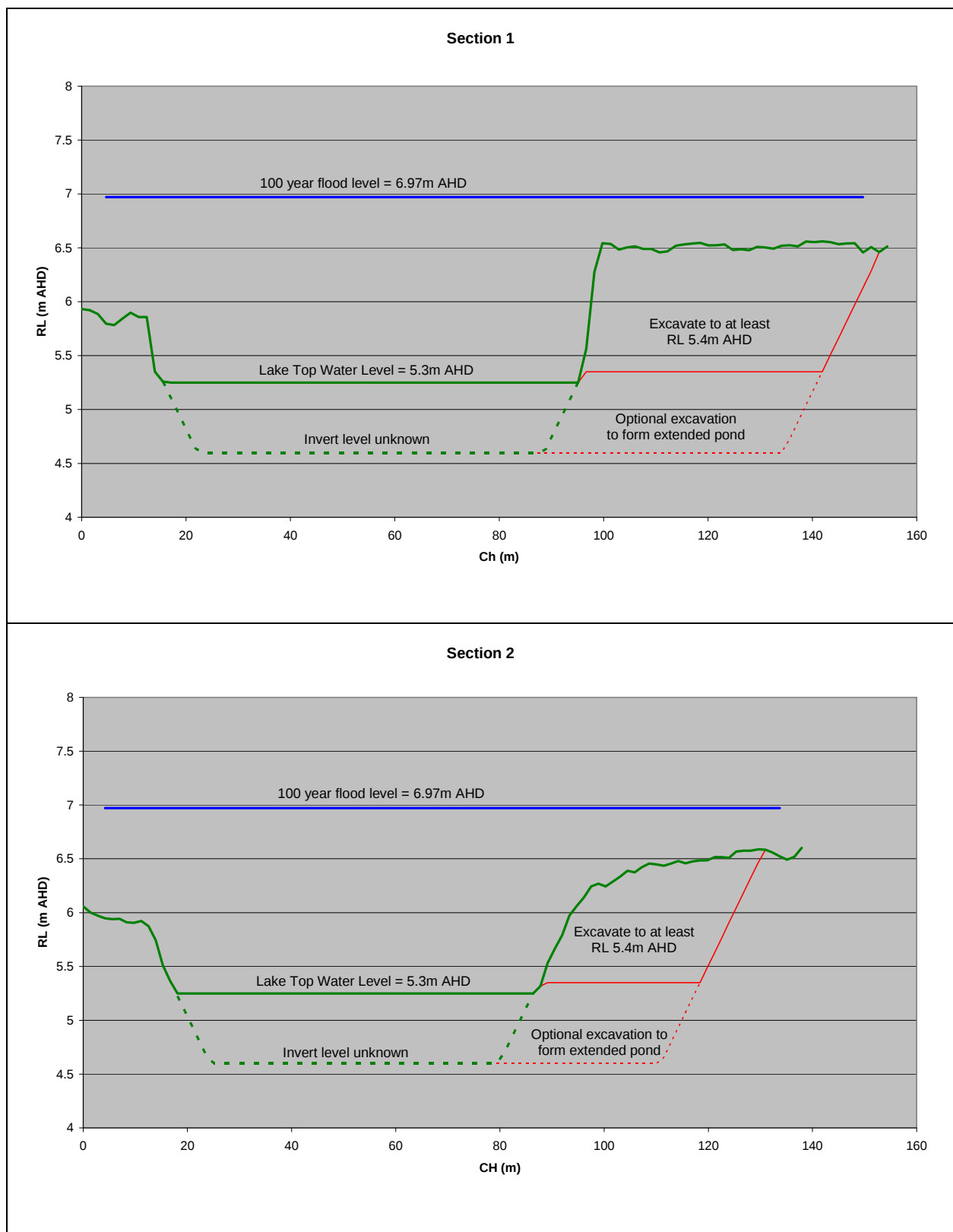


Figure 5
Sections through Racetrack Pond Storage Area

