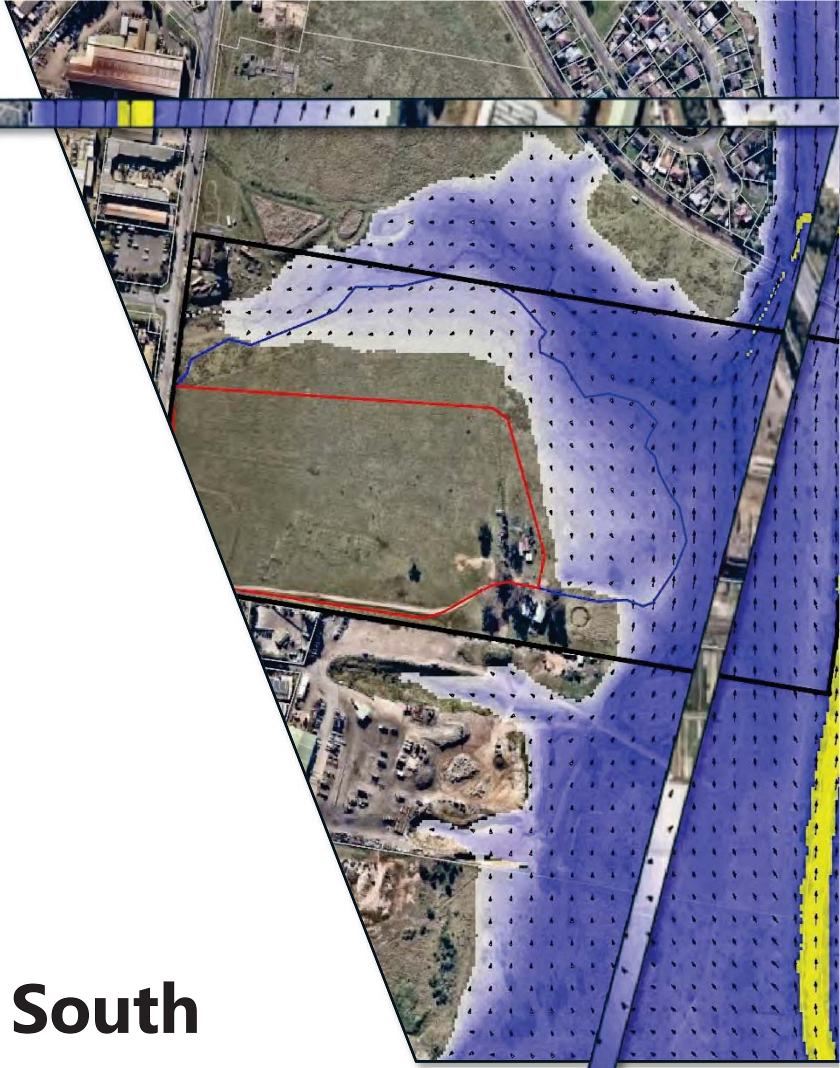

100 Fairey Road, South Windsor

Flood Impact Assessment

October 2020

Level 17, 141 Walker St
North Sydney NSW 2060
Australia

rp311012-00201rg_crt201008-100 Fairey Rd South Windsor (Rev C - Final).docx

Revision C

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Project: 100 FAIREY ROAD, SOUTH WINDSOR
FLOOD IMPACT ASSESSMENT

Rev	Description	Author	Review	Advisian Approval	Date
A	Draft Report (*Issued for Internal Review*)	RG	CRT		6/10/2020
B	Draft Report (*Issued for Client Review*)	RG	CRT	Chris Thomas	7/10/2020
C	Final Report	Roy Golaszewski RG	Chris Thomas CRT	Chris Thomas	8/10/2020

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Appendices

1 Introduction

Andy's Earthworks Pty Ltd is planning to construct a concrete and sandstone crushing facility at 100 Fairey Road, South Windsor. As shown in **Figure 1**, the land on which the development is proposed is located approximately 2.2 kilometres south of the Hawkesbury River. The site is also situated to the west of South-Wianamatta Creek, with the creek forming the eastern site boundary.

Advisian Pty Ltd (*Advisian*) has been engaged by Andy's Earthworks Pty Ltd to undertake the flood related investigations requested by Hawkesbury City Council (*HCC*) following its assessment of the proposed development. Relevant e-mail correspondence between HCC planners and those acting for Andy's Earthworks indicates the following primary areas of contention:

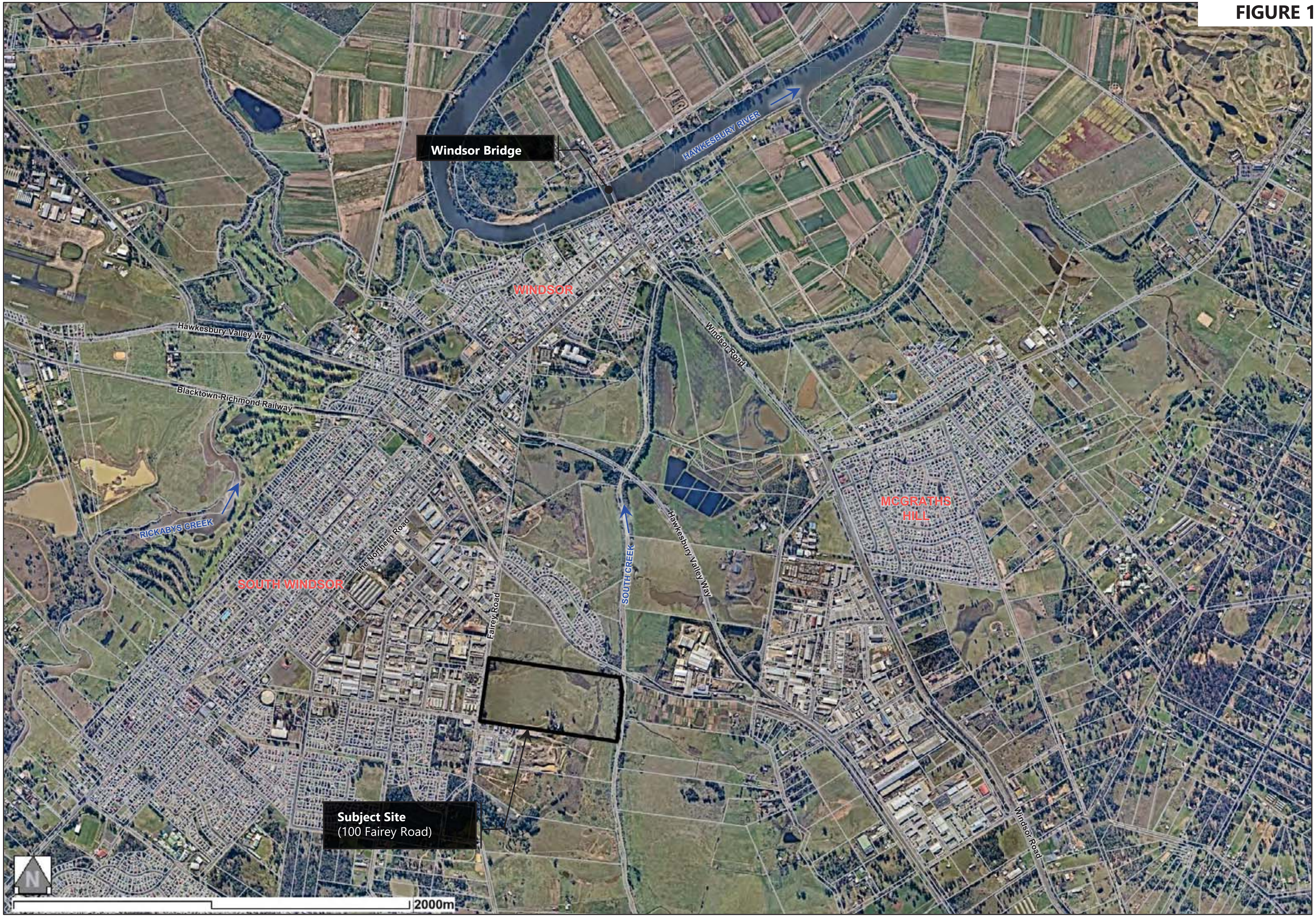
- Although a balance of cut and fill is claimed the application has not demonstrated how this can be achieved.
- Detailed flood modelling and a flood study is required to assess impacts and changes in flood behaviour due to the development.
- The development needs to address and show compliance with Council's *Development of Flood Liable Land Policy* and Clause 6.3 of the Hawkesbury Local Environmental Plan (Hawkesbury LEP).

This report documents the findings of investigations that have been undertaken to assess flood behaviour for pre and post-development terrain for the following two flood mechanisms:

- **Local catchment flooding** originating from rainfall across the South-Wianamatta Creek catchment; including Eastern Creek; and,
- **Regional flooding** caused by Hawkesbury River dominated flooding.

The investigations have been based on modelling of local and regional flooding to quantify the potential impacts of the development on peak flood levels and peak flow velocities. The results of this analysis have been used to assess compliance with Council's *Development of Flood Liable Land Policy* and Clause 6.3 of the Hawkesbury LEP. The report servers as the Flood Impact Assessment (FIA) for the proposed development of 100 Fairey Road, South Windsor and is submitted as supporting documentation for the Environmental Impact Statement that is being prepared by MacroPlan Pty Ltd.

FIGURE 1



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LOCATION OF THE SUBJECT SITE - 100 FAIREY ROAD, SOUTH WINDSOR

2 Assessment of Existing Flood Behaviour

2.1 Site Description

As shown in **Figure 1**, the subject site is located to the south of the Hawkesbury River and on the common floodplains of Rickabys Creek and South-Wianamatta Creek. The site is located approximately 5.5 kilometres upstream of the South-Wianamatta Creek confluence with the Hawkesbury River and 2 kilometres downstream of its confluence with Eastern Creek.

The site is largely undeveloped with the exception of a residential dwelling and outbuildings located along the southern site boundary. Elsewhere, the site is covered in grass with very few trees or other notable features. Two unnamed tributaries of South Creek drain through or adjacent to the site as shown in **Figure 2**.

The existing topography across the site is also represented in **Figure 2**. The terrain has been determined from Light Detection and Ranging (LiDAR) survey that was captured in 2019 and obtained via the ELVIS GeoScience of Australia online portal.

As shown in **Figure 2**, existing elevations across the site vary between 0.6 mAHD and 18.2 mAHD. Elevations are typically lowest in the eastern half of the site near South-Wianamatta Creek and towards the northern site boundary where one of the unnamed tributaries exists.

2.2 Flooding Mechanisms

Flooding of the site can occur as a consequence of the following two flooding mechanisms acting either independently or concurrently:

- **Local catchment flooding** originating from rainfall across the South-Wianamatta Creek catchment; including Eastern Creek; and/or,
- **Regional flooding** caused by Hawkesbury River dominated flooding.

Due to the significant differences in catchment sizes it is considered improbable that flooding from both mechanisms would occur concurrently; that is, it is improbable that peak flows along South-Wianamatta Creek and the Hawkesbury River would occur at the same time.

This is reflected in **Table 1** which shows there is a difference of up to 36 hours in catchment response times between South-Wianamatta Creek and the Hawkesbury River. This means that if rainfall commenced across both catchments concurrently, as is probable for the type of east-coast low weather system that would be required to generate the magnitude of flooding associated with a 1% AEP event, then the peak flood level from the Hawkesbury River would not occur at the site until approximately 36 hours after the arrival of the peak generated by rainfall across the South-Wianamatta Creek catchment.

This is a significant difference in time to peak inundation and indicates that despite the likelihood that rainfall could occur across both catchments simultaneously there is little probability that the peak discharges generated from each catchment / system would coincide.

Based on the above, it is considered appropriate for the purposes of this Flood Impact Assessment (*FIA*) to assess flood behaviour for each flooding mechanisms independently.

FIGURE 2

EXISTING TOPOGRAPHY ACROSS THE SUBJECT SITE BASED ON 2019 LiDAR

Table 1 Summary of South Creek and Hawkesbury River Catchment Characteristics

CATCHMENT	SIZE (*km²*)	CRITICAL DURATION (*hrs*)	RESPONSE TIME (*hrs*)
South-Wianamatta Creek (*Includes Eastern Creek*)	640	36	28^
Hawkesbury River (*upstream of Windsor Bridge*)	22,000	72	64^

^ Catchment response time based on the duration to which peak flood levels would reach the subject site from the onset of the causative rainfall event across the catchment. Response time is based on hydraulic modelling.

2.3 Existing Flood Behaviour

As discussed in **Section 2.2**, it is considered appropriate to assess flood behaviour for local and regional flooding mechanisms independently of one another. The following flood scenarios are therefore to be adopted for modelling:

- 1% Annual Exceedance Probability (*AEP*) local catchment flood caused by rainfall falling across the South-Wianamatta Creek catchment; including Eastern Creek; and,
- 1% AEP regional flooding caused by rainfall falling over the Hawkesbury-Nepean River catchment.

The following sections provide information regarding the hydrologic and hydraulic modelling undertaken, including details of model builds, inputs and assumptions, and results for existing site conditions.

2.3.1 Hydraulic Model

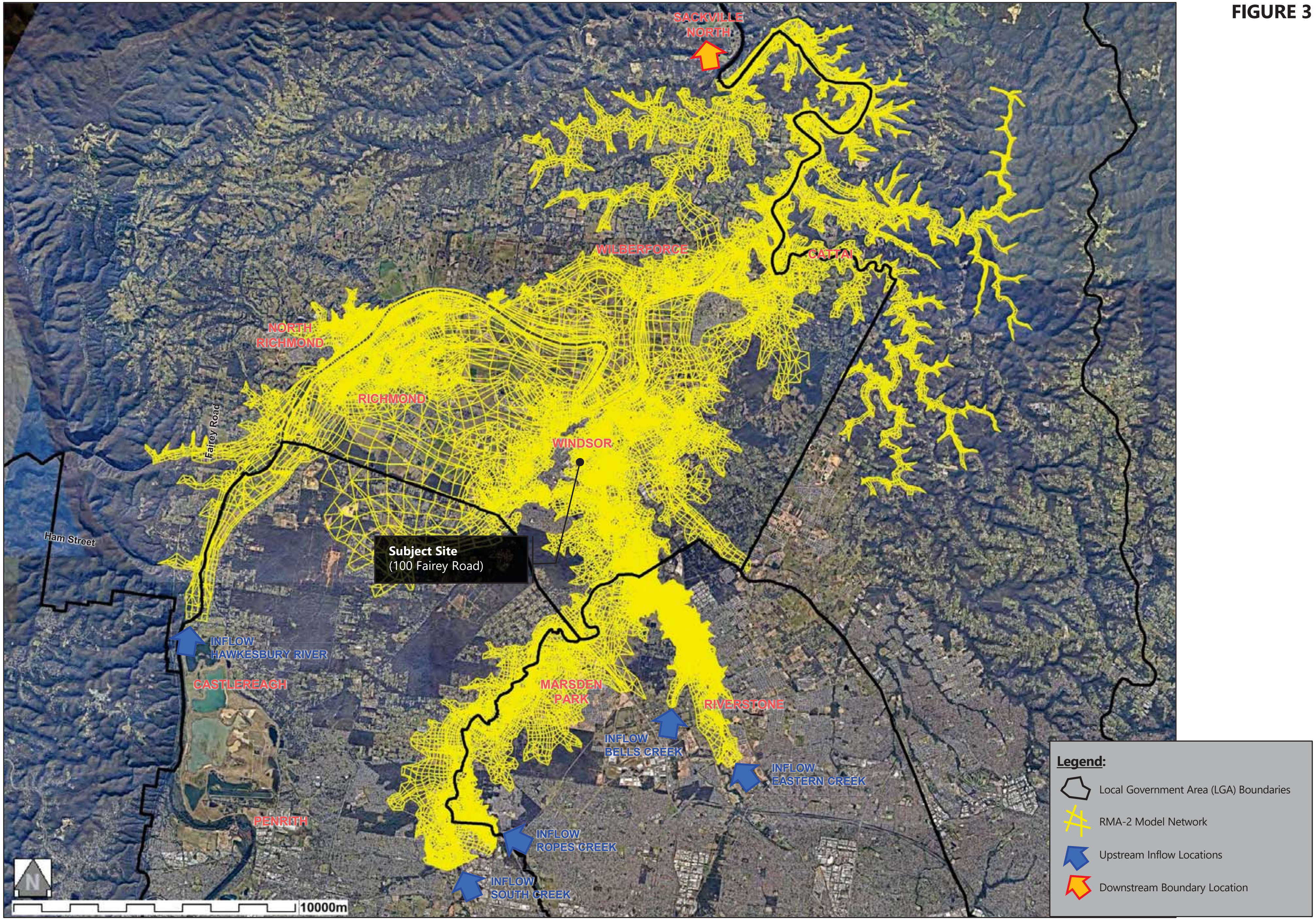
A two-dimensional hydrodynamic model of South-Wianamatta Creek and the Hawkesbury River was developed by Advisian to define flood behaviour in the vicinity of the site. The model was created using the RMA suite of software, and specifically using RMA-2.

The RMA-2 model adopted for these investigations was originally developed as a tool to assess regional flooding only. In that regard, the RMA-2 model was only set-up to model backwater flooding along South-Wianamatta Creek.

The following updates were incorporated into the model as part of these investigations:

- The South Creek RMA-2 model developed as part of the '*Updated South Creek Flood Study*' (*2015*) was merged into the regional model to improve definition along South-Wianamatta Creek. The model was incorporated for the extents bound between Dunheved Road to the north and Richmond Road to the south.
- The entire model was updated to reflect the latest topographic data as defined by Light Detection and Ranging (LiDAR) survey. 2019 LiDAR was available for most of the model domain, with a combination of 2017 and 2011 LiDAR for remaining areas.
- Roughness parameters were updated to reflect recent aerial photography obtained through NearMaps. Further discussions on roughness parameters is provided in **Section 2.2** and **Table 5**.

A schematic of the RMA-2 hydraulic model, showing the location of all upstream and downstream boundaries is provided as **Figure 3**.



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RMA-2 MODEL NETWORK AND BOUNDARY CONDITIONS

2.3.2 Boundary Conditions

Boundary conditions define inflows and outflows at the boundaries of the model domain over the duration of the flood simulation.

For a flood model, the upstream boundary conditions are typically defined by the catchment runoff that enters the area of interest for flood level estimation. Upstream boundary conditions are typically represented by flood hydrographs which are assigned to the upstream end of the hydraulic model.

Downstream boundary conditions are typically defined by either a static or time-varying water level or a stage-discharge relationship.

Upstream Boundary Conditions – Local 1% AEP Event

Hydrodynamic inflows for the 1% AEP local catchment event were established from the XP-RAFTS hydrologic models that were originally developed for the '*Flood Study Report, Eastern Creek*' (*1992*) and the '*Updated South Creek Flood Study*' (*2015*). The combination of these two models allowed inflow hydrographs to be generated for the total catchment upstream of the site; that is, the catchment to the south which includes the catchments of both South Creek and Eastern Creek.

Prior to generating 1% AEP inflow hydrographs, a critical duration assessment was undertaken to determine the combination of South Creek and Eastern Creek events that would lead to the highest combination of peak flows at the site. This was completed by using both hydrologic models to simulate the 1% AEP event for a range of storm durations. The list of adopted durations and the resulting peak flow magnitudes at the site are shown in **Table 2**.

Table 2 1% AEP Critical Duration Assessment for the South Creek Catchment

STORM DURATION (*hrs*)	PEAK FLOW AT THE SITE ^ (*m³/s*)	TIME TO PEAK AT THE SITE (*hrs*)
6	1,150	6.5
9	1,324	8.5
12	1,346	12.0
18	1,389	14.0
24	1,567	22.0
36	1,814 ^^	24.5

^ Hydrologic modelling is based on Intensity-Frequency-Duration (IFD) data and temporal patterns in accordance with Australian Rainfall and Runoff 1987 (ARR87).

^^ Peak flow does not take into consideration hydraulic controls present downstream of Richmond Road. Hydraulic controls can lead to dampening of the flood peak through the backing-up of floodwaters, which could lead to lower peak flows at the subject site and further downstream. This effect is accounted for within the hydraulic modelling.

Table 2 shows that a 36 hour duration storm will produce the highest peak 1% AEP flow along South-Wianamatta Creek at the site. Accordingly, a 36 hour duration 1% AEP event has been adopted for simulation of local catchment conditions.

Predicted peak inflows for the 1% AEP event are listed in **Table 3** for the locations that define the upstream boundaries of the RMA-2 flood model. Due to the differences in catchment response times these peak flows do not occur at the same time.

As shown in **Table 3**, a low baseflow was adopted for the Hawkesbury River for the local catchment flood scenario with a constant flow of 50 m^3/s assumed for the duration of the event. This is consistent with the adopted position that local and regional flooding will occur independently.

Table 3 1% AEP Local Catchment Hydraulic Model Inflows

LOCATION OF MODEL INFLOW (*refer* Figure 3)	PEAK 1% AEP FLOOD DISCHARGE (*m^3/s*)
Hawkesbury River – 7 kilometres upstream of the Richmond Road Bridge	50
South Creek – At Dunheved Road	1,202
Ropes Creek – At Ropes Crossing Boulevard	235
Eastern Creek – 2 kilometres downstream of the Westlink M7	501
Bells Creek – 600 metres downstream of South Street	95

Upstream Boundary Conditions – Regional 1% AEP Event

Inflows for the 1% AEP regional flood event were extracted from results derived from modelling undertaken using a RUBICON flood model of the Hawkesbury-Nepean that was developed in 1999 for the Public Works Department as part of the '*Warragamba Dam Auxiliary Spillway EIS Flood Study*'. These inflows are also consistent with those that were adopted for the RMA-2 flood model that was developed as part of the '*Nepean River Flood Study*' (*2018*) which was prepared by Advisian for Penrith City Council.

The peak 1% AEP flow adopted along the Hawkesbury River for the regional simulation is 13,314 m^3/s.

It is noted that revised hydrographs have been developed as part of more recent analysis that was completed as part the '*Hawkesbury-Nepean Valley Regional Flood Study*' (*WMAwater, 2019*). Although these hydrographs are not available, information within the report indicates the following:

- The updated hydrologic modelling results in a reduction in the peak flow magnitude for the 1% AEP event in the order of 15%; and,
- Flow volumes for the 1% AEP event appear to have remained similar leading to no change in the predicted peak 1% AEP flood level at Windsor of 17.3 mAHD.

Downstream Boundary Conditions – Local and Regional 1% AEP Event

Downstream boundary conditions for the 1% AEP local and regional flood simulations are listed in **Table 4**. The time-varying tailwater condition adopted for simulation of the 1% AEP regional event is based on flood levels extracted from the '*Sackville*' cross-section within the RUBICON flood model as per the 1999 Public Works Department study.

Table 4 Adopted Downstream Boundary Conditions

FLOOD SCENARIO AND EVENT (*AEP*)	DOWNSTREAM BOUNDARY CONDITION	
	TYPE	PEAK LEVEL (*mAHD*)
Local 1% AEP event	Static Level	3.0
Regional 1% AEP event	Time-Varying Level	12.6

Channel and Floodplain Roughness

The roughness parameters that were adopted in the RMA-2 model are listed in **Table 5**. The roughness parameters are within the range of values prescribed in the literature and are largely consistent with values adopted for RMA-2 models of nearby river systems including those developed as part of the '*Updated South Creek Flood Study*' (*2015*) and the '*Lower Nepean River Flood Study*' (*2018*).

Table 5 RMA-2 Model Roughness Parameters

ELEMENT TYPE	DESCRIPTION	ROUGHNESS VALUE
1	River channel	0.025
2	Creek channel with light vegetation	0.055
3	Creek channel with dense vegetation	0.100
4	Grassed floodplain areas	0.035
5	Grassed floodplain areas with pockets of light scrub and trees	0.055
6	Overbank areas and floodplain with dense vegetation	0.090
7	Urban floodplain areas	0.060
8	Rural residential areas	0.060
9	Roadways	0.015

2.3.3 1% AEP Local Catchment Flood

The RMA-2 model was used to simulate flooding in the vicinity of the subject site for the 1% AEP local catchment event. As discussed in **Section 2.3.2**, a 36 hour critical storm duration was found to apply to the South-Wianamatta Creek catchment. The findings from this modelling are presented in the following.

Peak Flood Levels and Extents

The variation in peak flood levels across the site is shown in **Figure 4** for the 1% AEP local catchment event. The modelling predicts peak 1% AEP flood level will range between 9.98 and 10.03 mAHD across the site leading to inundation of approximately 40% of the site.

Depths & Velocities

Peak flood levels and velocity vectors were extracted from the flood modelling and are presented in **Figure 5**. The mapping indicates flood depths are predicted to reach up to 9.4 metres at the lowest point which is located along the eastern boundary and adjacent to the South-Wianamatta Creek channel. Typical depths are closer to 7 to 8 metres but do reduce to zero towards the centre and south-west corner of the site.

Velocity vectors give an indication of the flow direction and speed of flow at the timestep (*a single point in time across the entire flood cycle*) when they are largest during the flood; i.e., not at the timestep when peak flood levels occur.

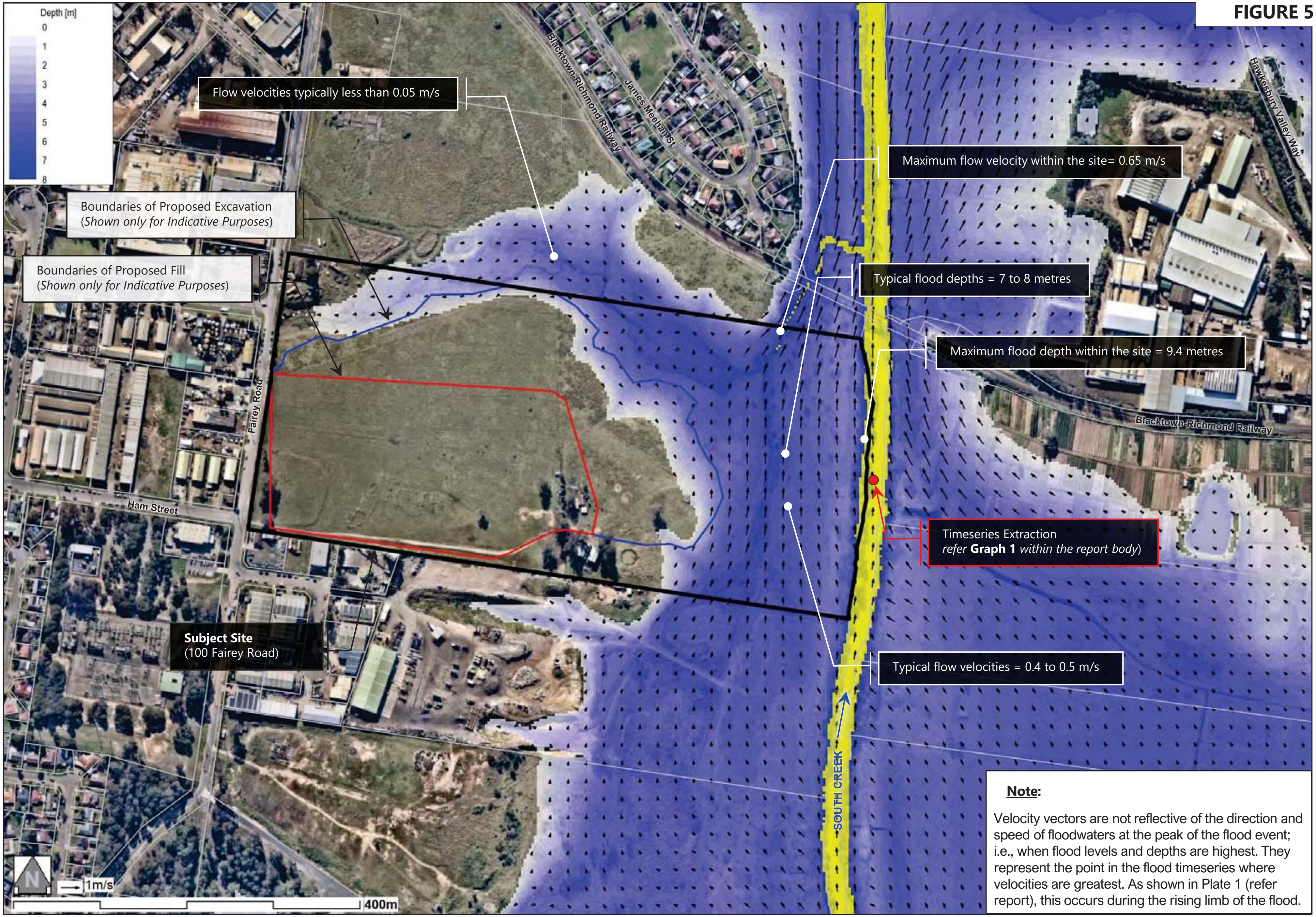
As shown in the timeseries plot provided as **Figure 6**, peak flow velocities are predicted to occur during the rising limb of the event approximately 17 hours prior to the peak flood level occurring.

At the time that peak flood levels are reached, flow velocities are considerably lower. This is because the outlet capacity of South-Wianamatta Creek and the Blacktown-Richmond Railway crossing is exceeded causing floodwaters to "back-up". This backing-up of floodwaters explains the small floodwater gradient predicted across the site as shown in **Figure 4**; i.e., a change in levels across the site of less 0.05 metres.

The velocity vectors indicate that a maximum flow velocity of 0.65 m/s is predicted within the site occurring along the northern boundary. Elsewhere, velocities typically range between 0.4 and 0.5 m/s, with the exception of the area of flood storage to the north of the site where the modelling indicates that floodwaters do not travel any faster than 0.05 m/s at any time during the flood (*refer* **Figure 5**).

PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP LOCAL CATCHMENT FLOOD FOR EXISTING CONDITIONS

FIGURE 5



Note:

Velocity vectors are not reflective of the direction and speed of floodwaters at the peak of the flood event; i.e., when flood levels and depths are highest. They represent the point in the flood timeseries where velocities are greatest. As shown in Plate 1 (refer report), this occurs during the rising limb of the flood.

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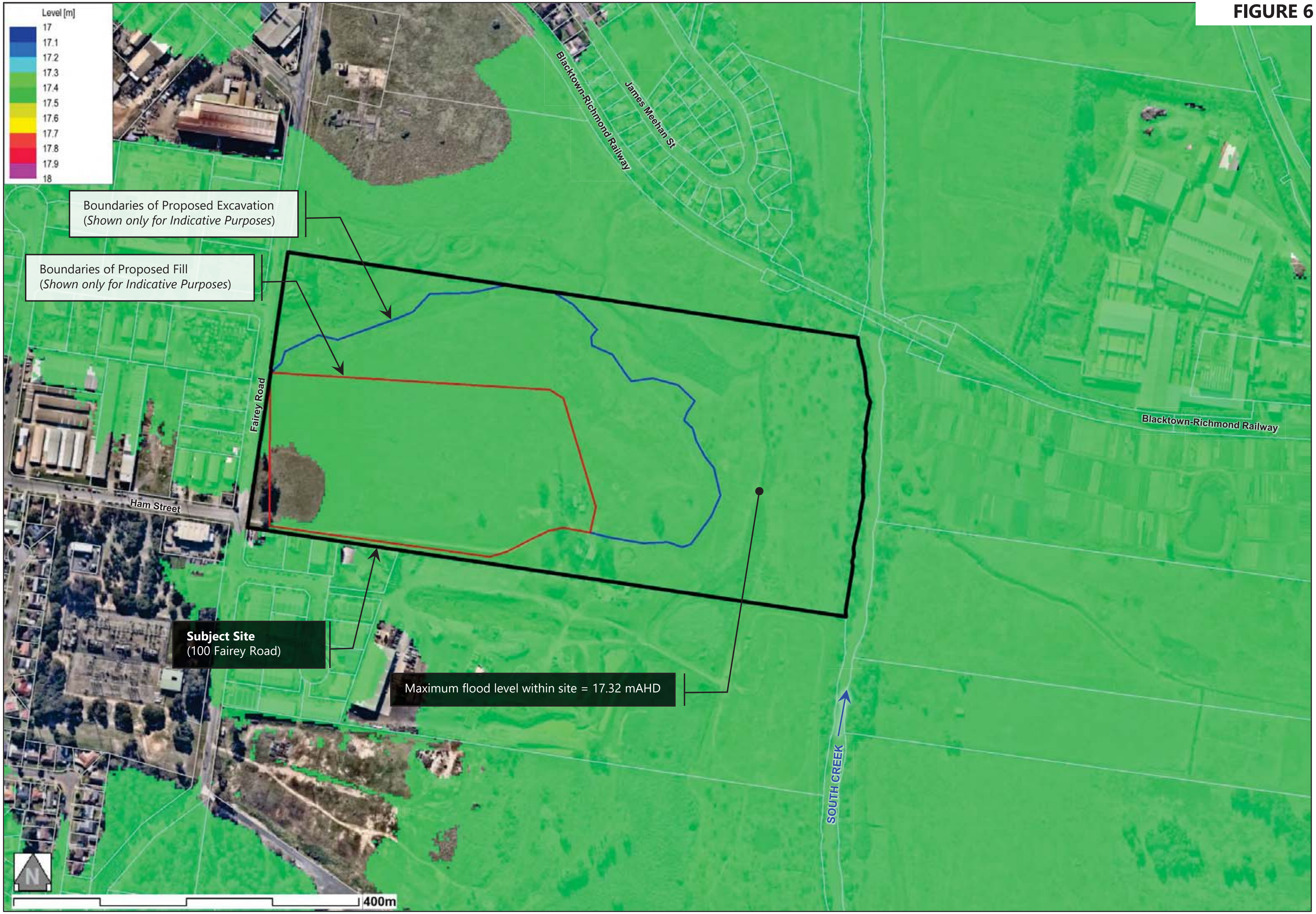
PREDICTED DEPTHS AND FLOW VELOCITIES AT THE PEAK OF THE 1% AEP LOCAL CATCHMENT FLOOD FOR EXISTING CONDITIONS

FIGURE 6



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PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP REGIONAL FLOOD FOR EXISTING CONDITIONS

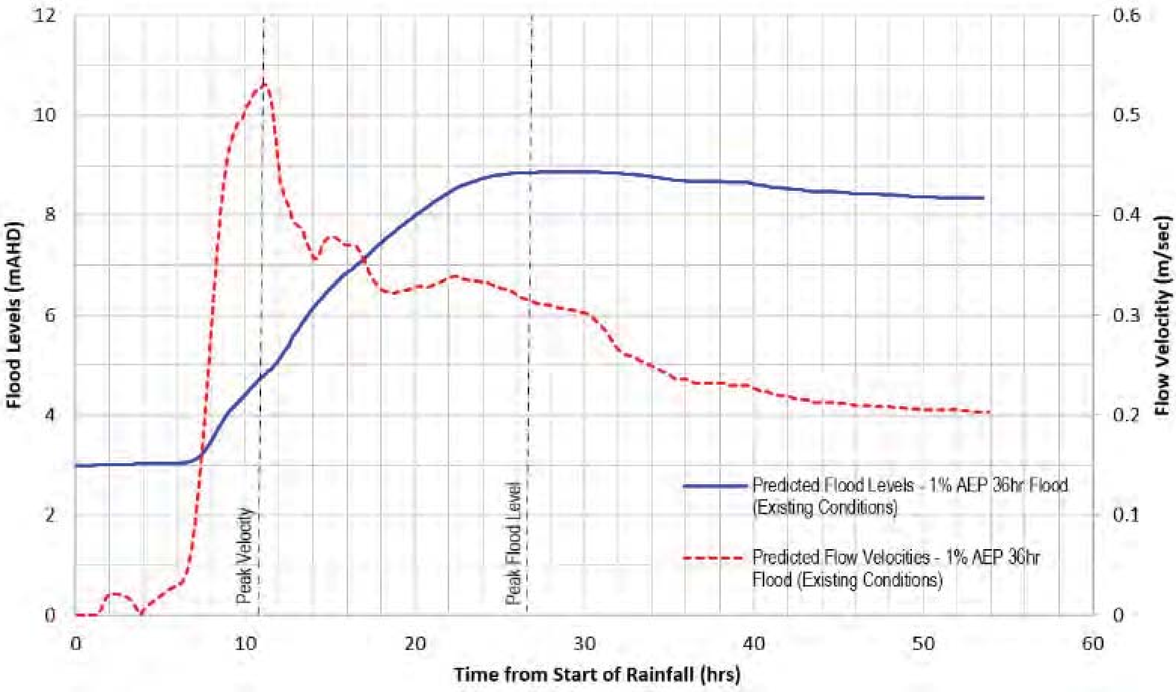


Figure 6 **Time Series Plot of flood levels and flow velocities for the 1% AEP Local Catchment Event**

2.3.4 1% AEP Hawkesbury River Regional Flood

The RMA-2 flood model was also used to simulate flooding in the vicinity of the site for the 1% AEP Hawkesbury River regional event. The findings from this modelling are presented in the following.

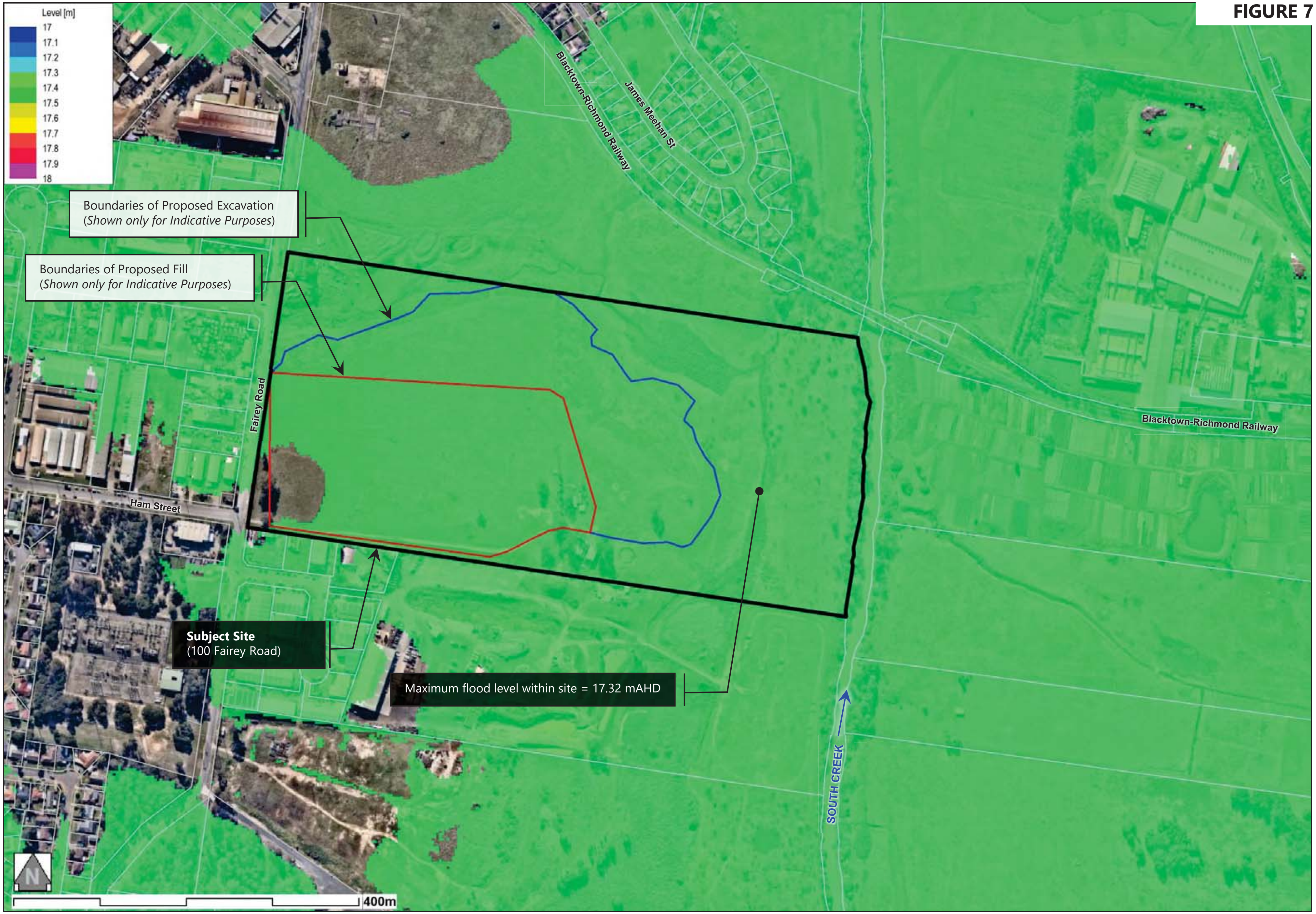
Peak Flood Levels and Extents

Peak flood levels and flood extents across the site are shown in **Figure 7** for the 1% AEP regional event. The modelling predicts a peak flood level of 17.32 mAHD across the entire site and the wider South-Wianamatta Creek floodplain. A peak flood level of 17.32 mAHD leads to inundation of approximately 95% of the site with only the north-western corner of the site predicted to remain dry.

Depths & Velocities

Peak flood levels and velocity vectors were extracted from the flood modelling and are presented in **Figure 8**. The mapping indicates flood depths are predicted to reach up to 16.7 metres at the lowest point within the site adjacent to the South-Wianamatta Creek channel (*and the eastern boundary*). Typical depths are closer to 14 to 15 metres across the eastern parts of the site and generally less than 3 metres to the west.

Similar to the 1% AEP local event, the velocity vectors mapped on **Figure 8** are representative of a timestep that occurs during the rising limb of the event during which floodwaters escape the confines of the Hawkesbury River and start to discharge into the South-Wianamatta Creek floodplain. This is reflected in **Figure 9** which shows peak flow velocities occurring approximately 26 hours prior to the peak flood level being reached.



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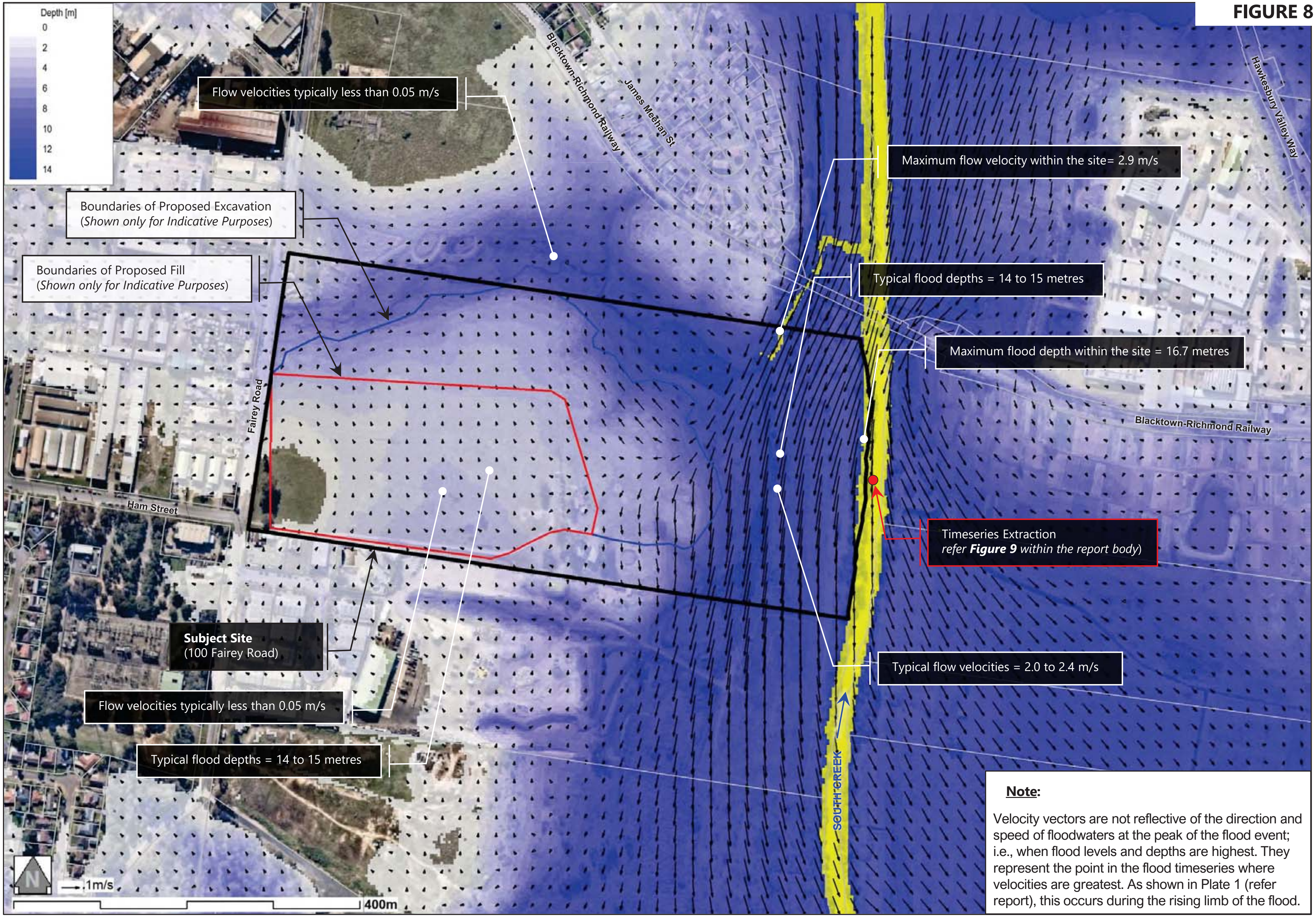
PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP REGIONAL FLOOD FOR EXISTING CONDITIONS

FIGURE 8



Note:

Velocity vectors are not reflective of the direction and speed of floodwaters at the peak of the flood event; i.e., when flood levels and depths are highest. They represent the point in the flood timeseries where velocities are greatest. As shown in Plate 1 (refer report), this occurs during the rising limb of the flood.

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PREDICTED DEPTHS AND FLOW VELOCITIES AT THE PEAK OF THE 1% AEP LOCAL CATCHMENT FLOOD FOR EXISTING CONDITIONS

Figure 9 indicates that flow velocities are negligible near the peak of the flood. This supports classification of this area as flood storage.

The location at which the time series plots shown in **Figure 9** have been extracted is shown on **Figure 8**.

The velocity vectors indicate that a maximum flow velocity of 2.9 m/s is predicted within the site, occurring along the northern boundary. Velocities elsewhere vary greatly depending on whether they occur across the eastern or western half of the site. In that regard, typical velocities to the east are in the range of 2.0 to 2.4 m/s, compared to typical velocities of 0.05 m/s in the western section of the site (*refer* **Figure 8**).

The higher velocities to the west occur due to a combination of:

- Narrowing in the floodplain at the Blacktown-Richmond Railway crossing to the north-east of the site; and,
- Lower topographic elevations (*refer* **Figure 2**).

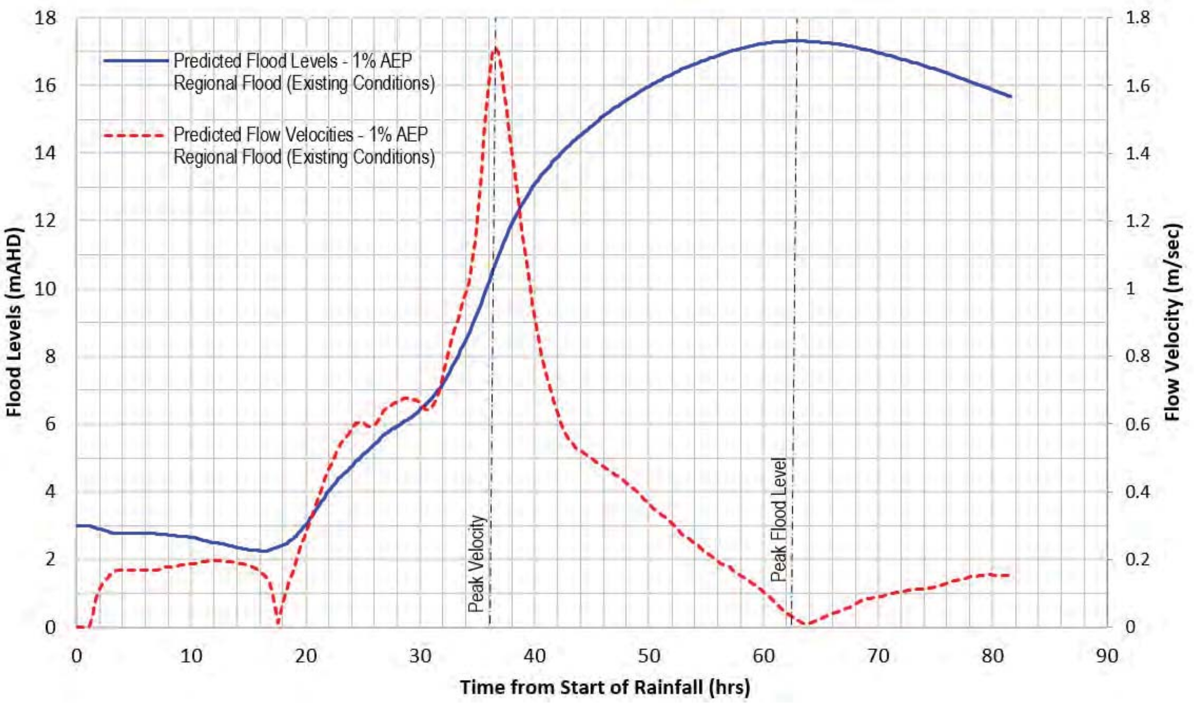


Figure 9 Timeseries Plot of flood levels and flow velocities for the 1% AEP Regional Event

3 Assessment of Post Development Flood Impacts

3.1 Description of Proposed Works

Andy's Earthworks plans to construct a concrete and sandstone crushing facility at the site. Plans showing the development proposal and the associated civil works are enclosed within **Appendix A**. These indicate that the concrete and sandstone crushing facility is to be located to the south-west of the site on a fill pad covering approximately 62,300 m^2 of the site; that is, approximately 28% of the site.

Compensatory cut is proposed around the perimeter of the fill pad to offset any loss in floodplain storage. The extent and magnitude of cut and fill earthworks are shown in **Figure 10**. As shown, maximum depths of cut and fill of 5.3 and 4.2 metres are proposed, respectively.

Elevations across the fill pad of at least 17.3 mAHD are proposed in order to ensure the pad is above the predicted peak level of the 1% AEP flood.

3.2 Review of Earthworks and Cut/Fill Balance

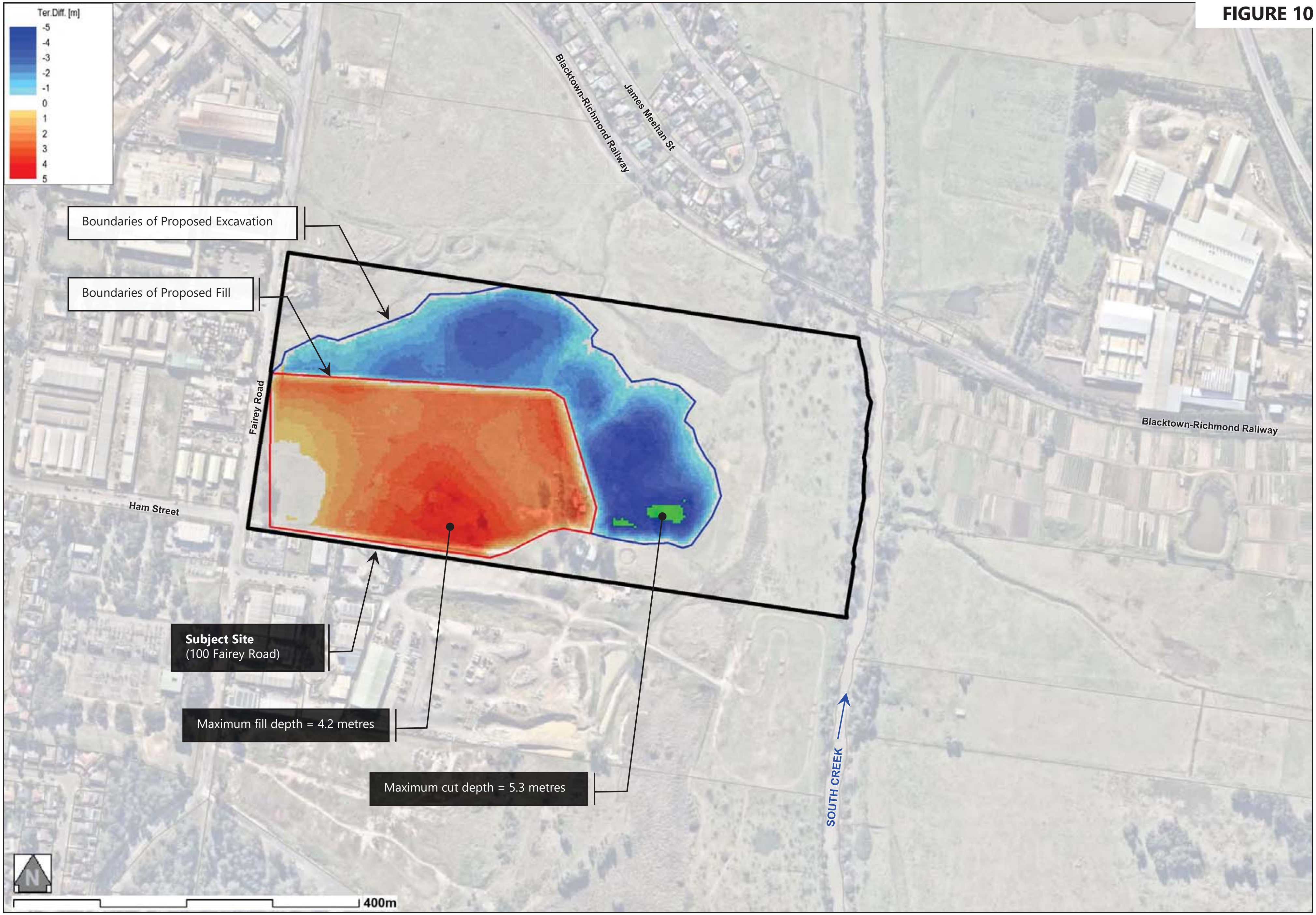
The compensatory cut has been designed around the perimeter of the fill pad to offset any potential loss in floodplain storage; i.e., to achieve a balance of cut and fill. Although the target event for this 'balance' would likely be the 1% AEP flood, it is important to consider other events where flood levels are predicted to be lower and could result in a different cut and fill balance.

A volumetric analysis of pre and post-development topographic elevations has been undertaken to determine the balance of cut and fill volumes below a range of flood levels for Hawkesbury River design floods. **Table 6** shows that the proposed cut and fill earthworks will achieve no net loss in storage for all Hawkesbury River events up to and including the 1% AEP regional flood.

Table 6 Review of Cut and Fill Balance for a Range of Hawkesbury River Flood Events

EVENT (% AEP)	**PEAK FLOOD LEVEL PREDICTED AT THE SITE ^** (mAHD)	**BALANCE OF CUT AND FILL BELOW PREDICTED PEAK FLOOD LEVEL** (m^3)
20	9.9	- 54,275
10	11.9	- 107,190
5	13.7	- 131,835
2	16.1	- 59,100
1	17.3	- 1,340

^ *Peak flood levels have been extracted from the 'Hawkesbury-Nepean Valley Regional Flood Study – Final Report' (WMAwater, 2019).*



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PROPOSED EXTENT AND MAGNITUDE OF CUT AND FILL

3.3 Post-Development Flood Behaviour

A post-development version of the RMA-2 flood model was created to allow simulation of flooding with the proposed development in place. This involved modifying the elevations of nodes within the model grid to reflect any changes to surface elevations proposed as part of the development.

The post-development model was then used to simulate the same flood scenarios adopted for existing conditions; that is, the following events:

- the 1% Annual Exceedance Probability (*AEP*) local catchment flood caused by rainfall falling across the South-Wianamatta Creek catchment; including Eastern Creek; and,
- the 1% AEP regional flood caused by rainfall falling over the entire Hawkesbury-Nepean River catchment.

The following sections document flood extents, depths and velocities for both scenarios, as well as any predicted impacts on peak flood levels and flow velocities associated with the proposed development.

3.3.1 1% AEP Local Catchment Flood – Post-Development

Depths & Velocities

The results for post-development conditions are shown in **Figure 11** as depth and velocity mapping. The mapping shows the proposed fill pad to be flood free with partial flooding across the cut areas.

Comparison of the velocity vectors in **Figure 11** to those shown in **Figure 5** for existing conditions indicates very similar flow patterns within and outside of the site. Minor re-directions in flow are predicted in the vicinity of the cut which would be expected given the additional conveyance capacity provided by the cut.

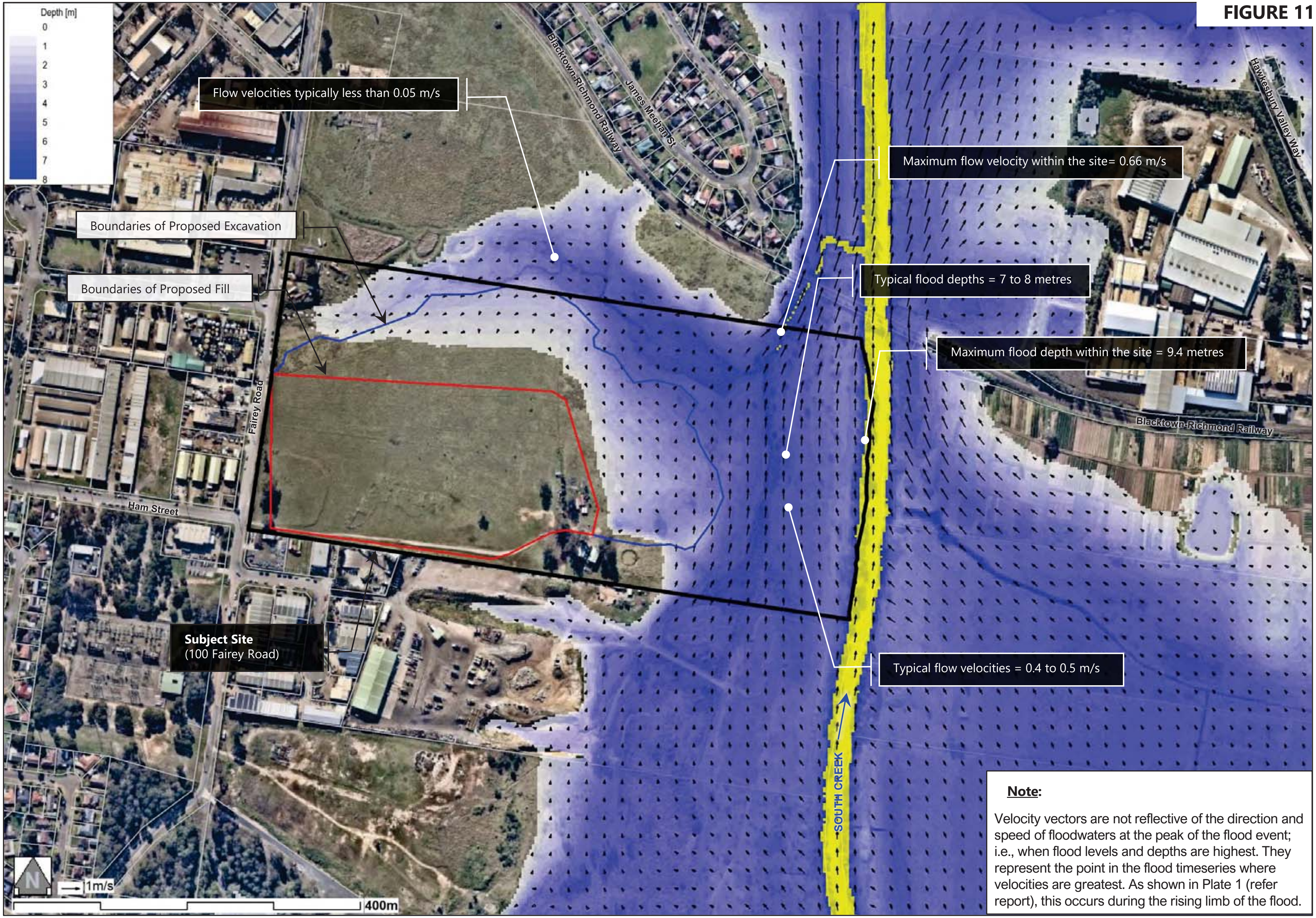
Changes to Peak Flood Levels

Flood level difference mapping was prepared from the modelling results to quantify any changes to flood levels that could impact adjoining properties. Difference maps are created by comparing peak flood level estimates at each node in the flood model from the results of simulations undertaken for both existing and post-development conditions. This effectively creates a contour map of predicted changes in peak flood levels (*i.e., increases and decreases*) and allows visual assessment of the impact of the filling on existing peak flood levels.

Flood level difference mapping for the 1% AEP local catchment event is shown in **Figure 12**. The mapping shows that the proposed development will not lead to any changes in peak flood levels outside of the site.

A minor and very localised increase in flood levels of up to 0.01 metres (*10 mm*) is predicted to occur within the site and within the proposed extent of excavation (*refer* **Figure 12**).

FIGURE 11



Note:

Velocity vectors are not reflective of the direction and speed of floodwaters at the peak of the flood event; i.e., when flood levels and depths are highest. They represent the point in the flood timeseries where velocities are greatest. As shown in Plate 1 (refer report), this occurs during the rising limb of the flood.

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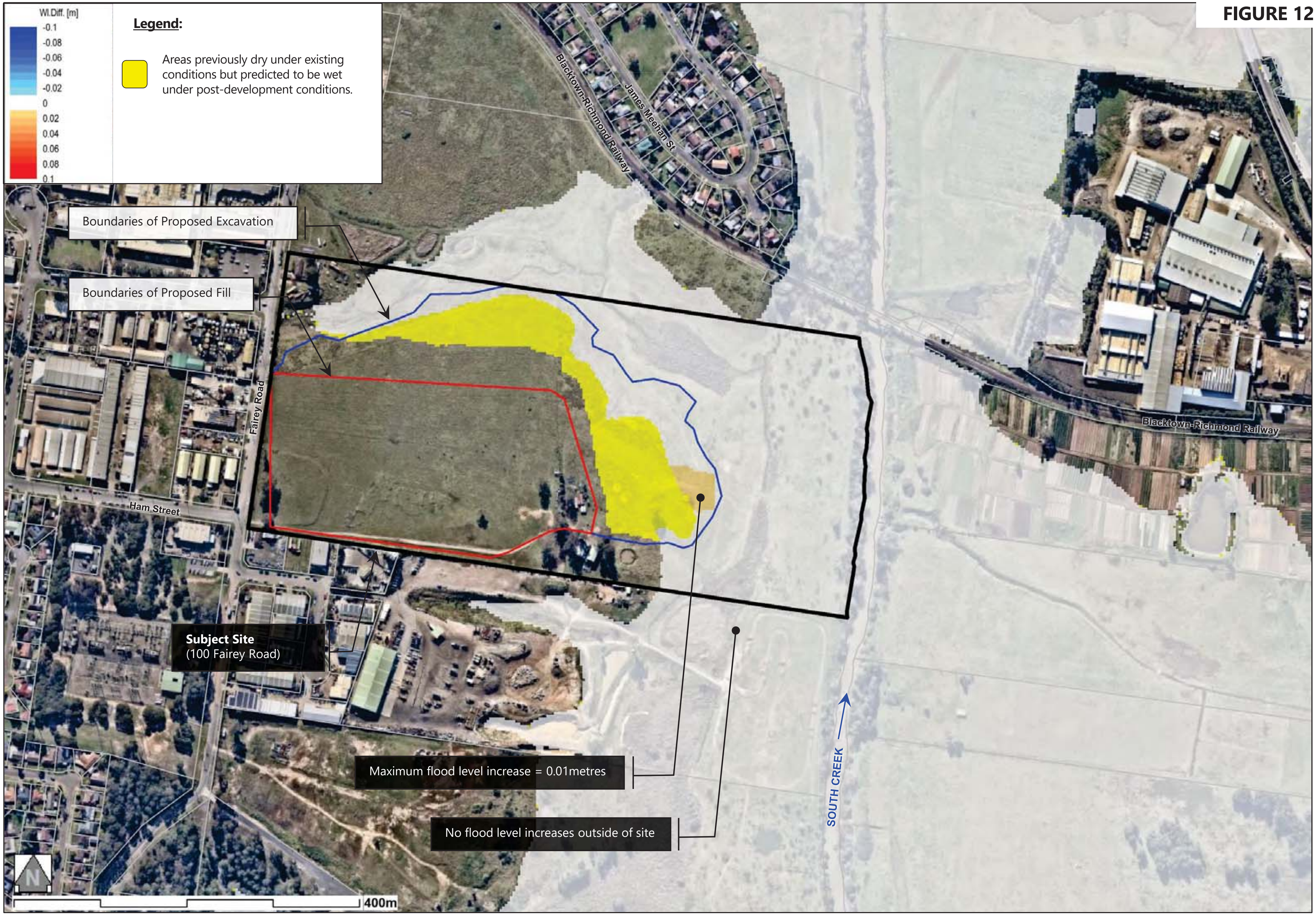
PREDICTED DEPTHS AND FLOW VELOCITIES AT THE PEAK OF THE 1% AEP LOCAL CATCHMENT FLOOD FOR EXISTING CONDITIONS



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PREDICTED CHANGES TO PEAK FLOOD LEVELS AS A RESULT OF THE PROPOSED DEVELOPMENT – 1% AEP LOCAL CATCHMENT EVENT

Changes to Peak Flow Velocities

A difference map was also created to quantify any changes in peak flow velocities associated with the proposed development.

As shown in **Figure 13**, the development is predicted to cause increased peak flow velocities at two locations outside of the site. The change in flow magnitude at both locations is considered minor with a maximum increase of 0.02 m/s predicted. Existing velocities in the vicinity of the larger of these impacts are predicted to be about 1.7 m/s, indicating that the impact at this location is a change in peak velocities from 1.7 to 1.72 m/s. This is considered negligible.

Velocity increases and decreases are predicted to occur within the site in areas close to the proposed excavation. A maximum increase of up to 0.2 m/s is predicted (*refer* **Figure 13**).

3.3.2 1% AEP Regional Flood – Post-Development

Depths & Velocities

The results for post-development conditions in the 1% AEP regional flood are shown in **Figure 14** as depth and velocity mapping. The mapping shows the proposed fill pad to be flood free with the exception of some very shallow inundation of up to 0.02 m (*20mm*) across the eastern section of the site.

Comparison of the velocity vectors in **Figure 14** to those shown in **Figure 8** for existing conditions indicates very similar flow patterns. Some minor flow re-distribution appears to occur near the cut and fill extents.

Changes to Peak Flood Levels

Flood level difference mapping was prepared for the 1% AEP regional event. The mapping shows that the development is not predicted to cause any change to peak flood levels within or outside of the site (*refer* **Figure 15**). This is to be expected given the earthworks proposed have been designed to ensure no net loss in flood storage below the peak 1% AEP flood level; i.e., a balance of cut and fill.

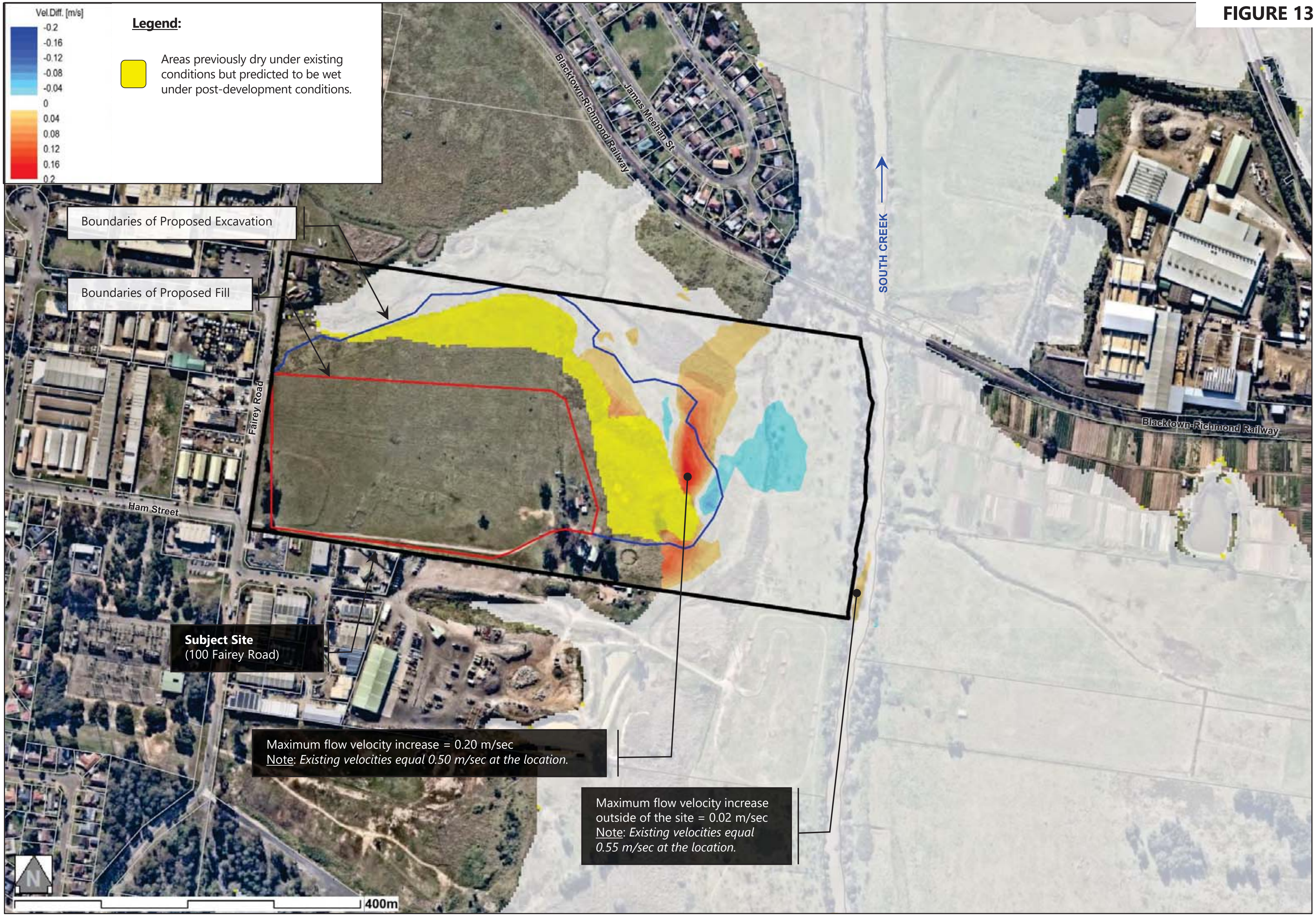
Changes to Peak Flow Velocities

A difference map was also created to quantify any changes in peak flow velocities associated with the proposed development. As shown in **Figure 16**, the development is predicted to lead to changes in peak flow velocities in areas to the east of the proposed fill pad.

Although most impacts are contained within the site, some velocity increases are predicted to extend outside of the site boundaries. The largest impacts outside of the site are predicted to occur across the property to the south where a maximum increase of up to 0.25 m/s is predicted.

As shown in **Figure 16**, this maximum increase occurs along the property boundary, reducing to 0.1 m/s a short distance inside the adjoining property. Maximum flow velocities across these areas under existing conditions are predicted to range between 1.15 and 1.3 m/s. This indicates the potential change to peak flow velocities will be up to 22%.

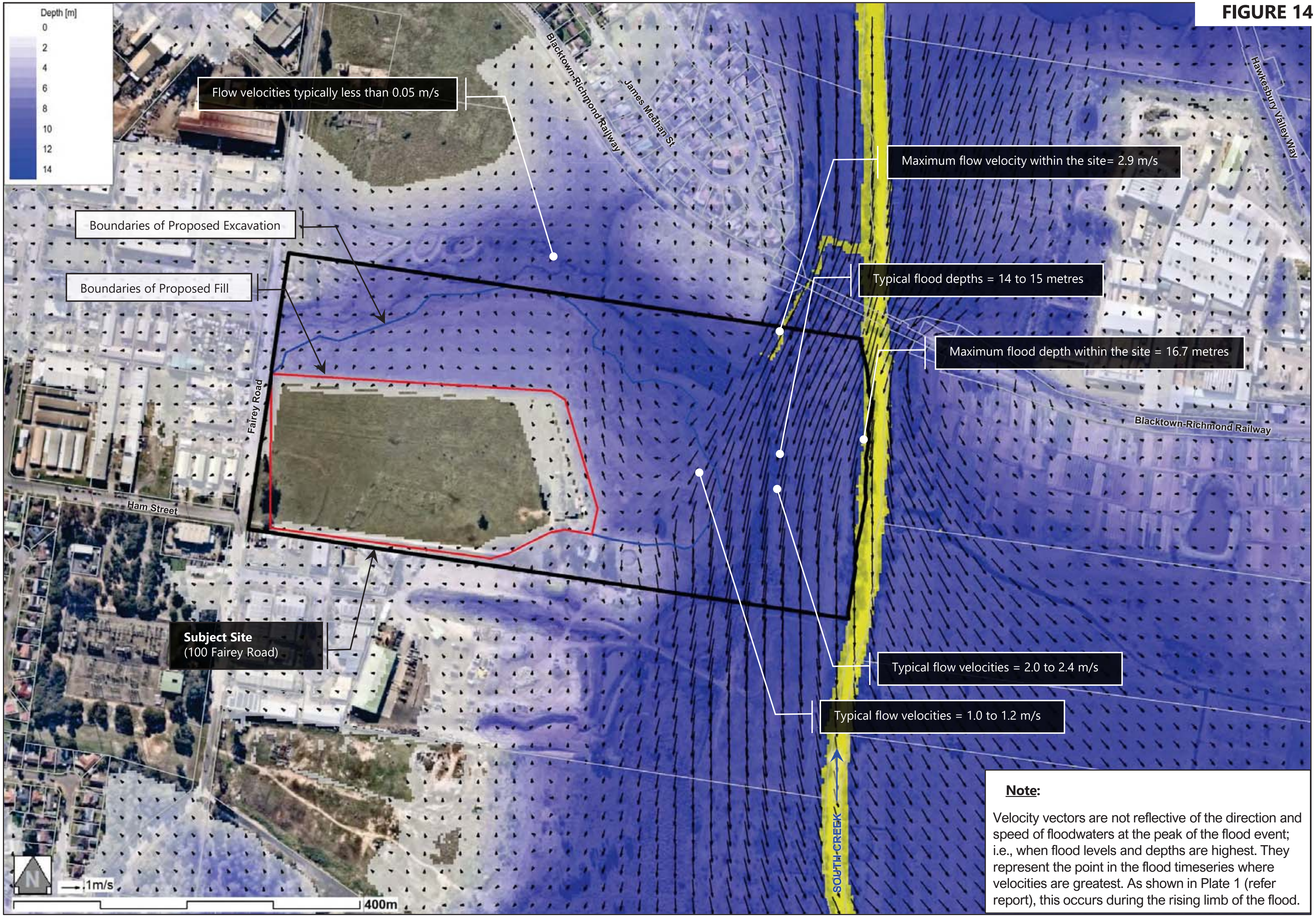
A comparison of pre and post-development velocities for the 1% AEP regional event is shown in **Figure 17**. The figure indicates that although the proposed development causes



Advisian
Worley Group

311012-00201 – 100 Fairey Rd, South Windsor
201001_100 Fairey Rd - FIA.pptx

PREDICTED CHANGES TO PEAK FLOW VELOCITIES AS A RESULT OF THE PROPOSED DEVELOPMENT – 1% AEP LOCAL CATCHMENT EVENT



Advisian
Worley Group

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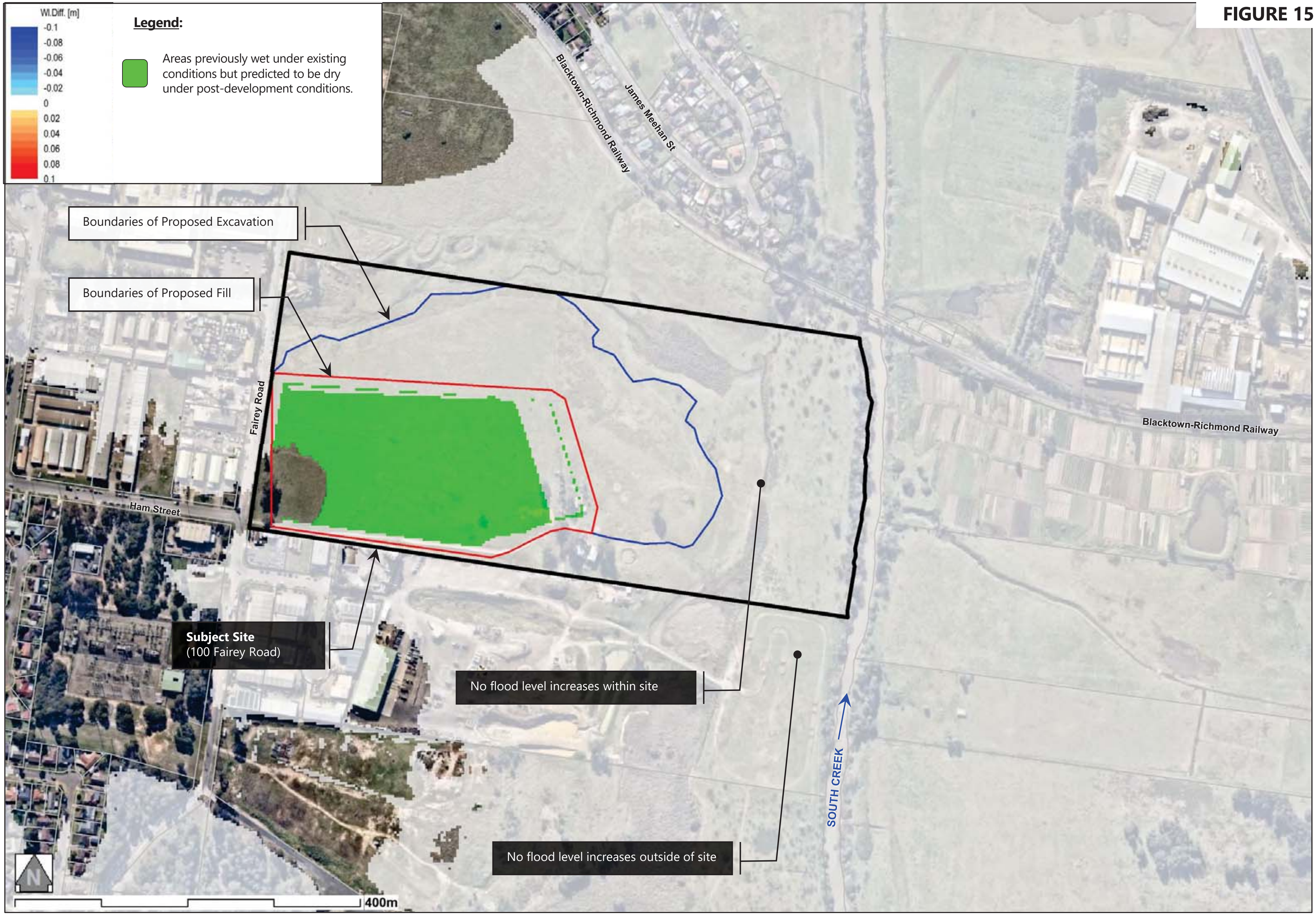
PREDICTED DEPTHS AND FLOW VELOCITIES AT THE PEAK OF THE 1% AEP LOCAL CATCHMENT FLOOD FOR EXISTING CONDITIONS



Advisian
Worley Group

311012-00201 – 100 Fairey Rd, South Windsor
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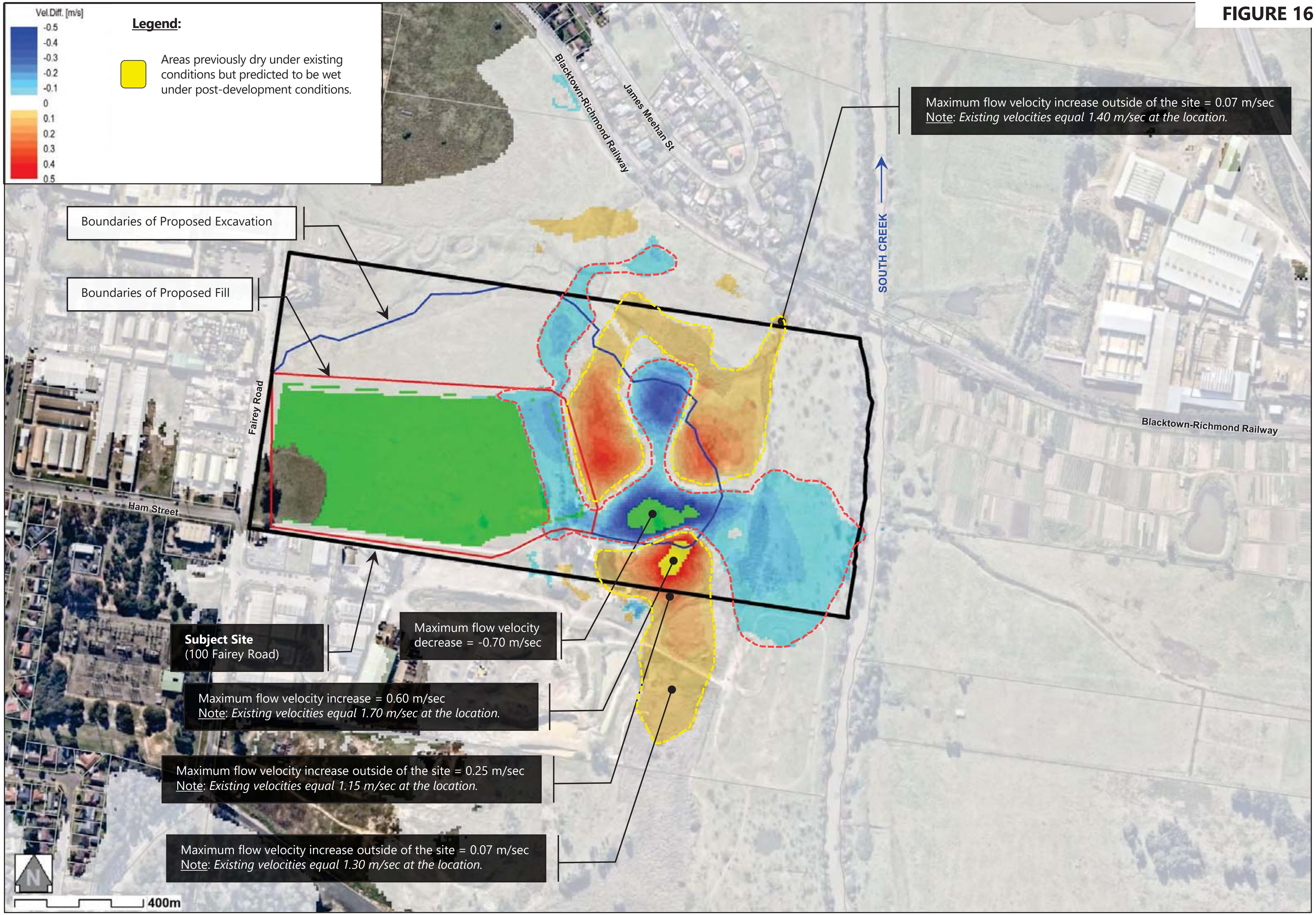
PREDICTED CHANGES TO PEAK FLOOD LEVELS AS A RESULT OF THE PROPOSED DEVELOPMENT – 1% AEP REGIONAL EVENT

FIGURE 16



Advisian
Worley Group

311012-00201 – 100 Fairey Rd, South Windsor
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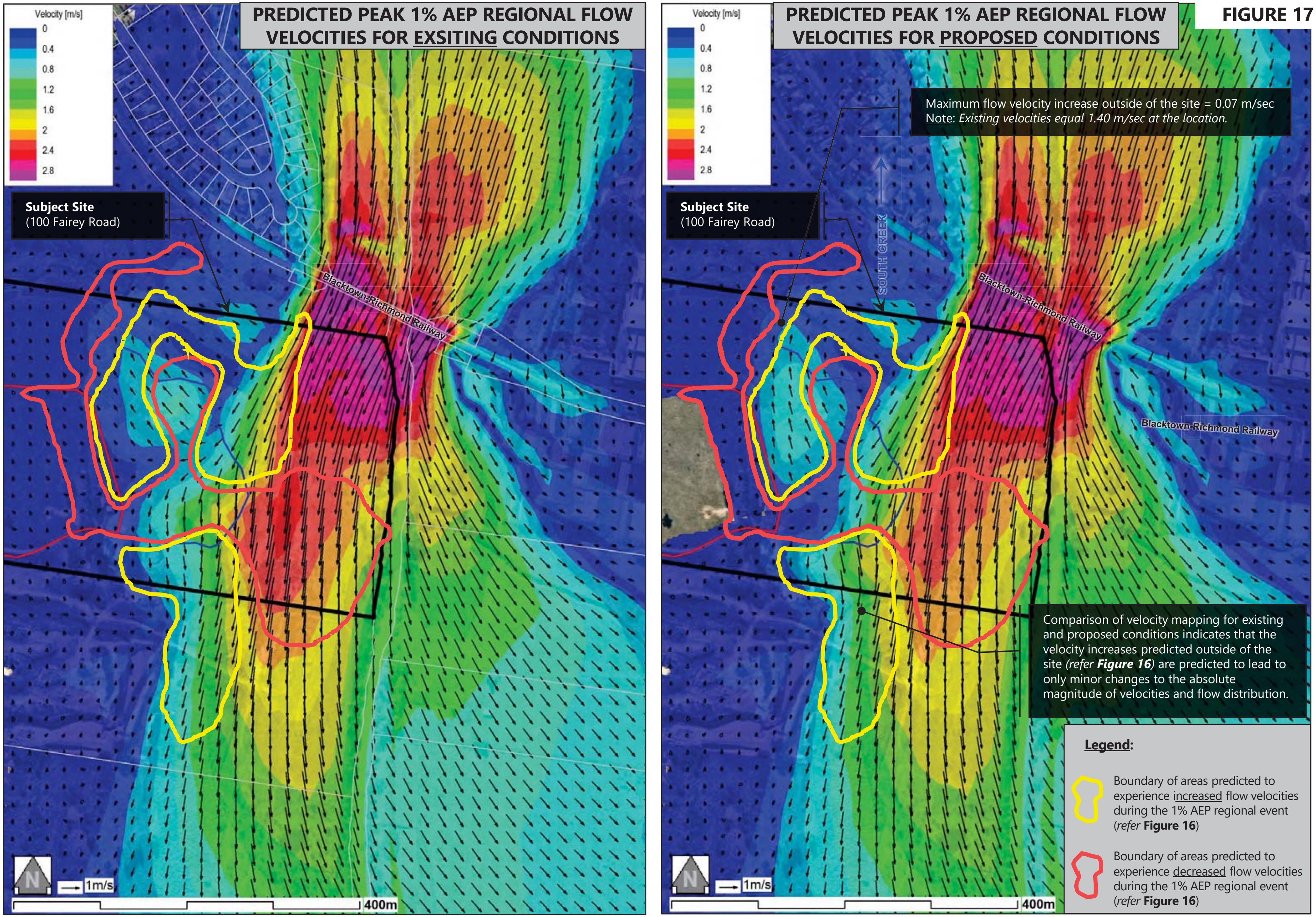
PREDICTED CHANGES TO PEAK FLOW VELOCITIES AS A RESULT OF THE PROPOSED DEVELOPMENT – 1% AEP REGIONAL EVENT

FIGURE 17



COMPARISONOF PEAK 1% AEP REGIONAL FLOW VELOCITIES FOR PRE AND POST-DEVELOPMENT CONDITIONS

localised changes in flow velocity, peak flow magnitudes and velocity distributions remain very similar across most of the area with any differences difficult to differentiate. The maximum increase outside of the site of up to 0.25 m/s is shown to cause only a minor east to west shift in velocity magnitudes, with a commensurate decrease to the east.

Accordingly, the comparison provided in **Figure 17** shows that the predicted impacts across the adjoining property to the south will not manifest as any material change in the direction or magnitude of peak flow velocities. On this basis, the predicted impacts are considered minor.

The timing over which the change in velocities is predicted to the south of the site is shown in **Figure 18**. The graph shows that the change in flow velocities will occur during the rising limb of the 1% AEP regional event at a time when peak flood levels are over 5 metres below the peak; i.e., the change in velocities will occur while flood levels are around 12 mAHD. As flood levels near the peak of 17.3 mAHD there is predicted to be no change in velocities.

Flow velocity increases and decreases are predicted within the site to maximum magnitudes of 0.6 m/s and 0.7 m/s, respectively (*refer* **Figure 16**). The timing and duration of these impacts are generally consistent with **Figure 18**.

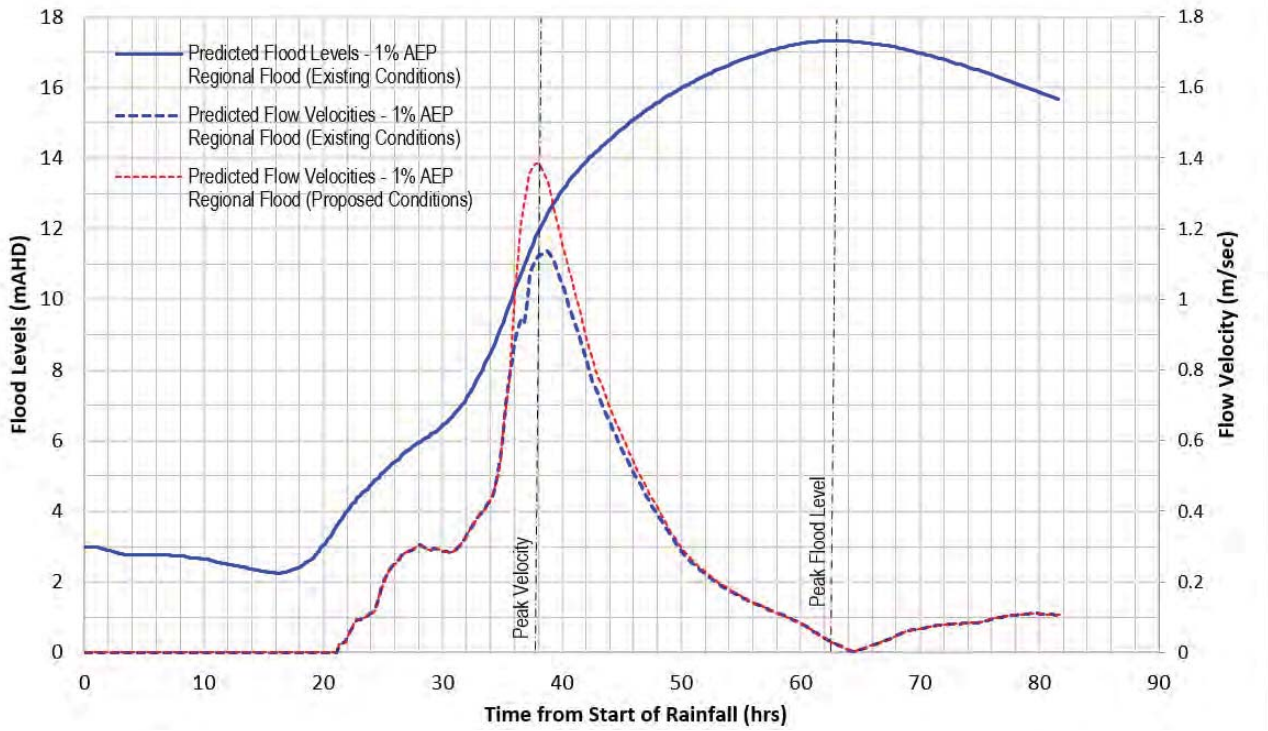


Figure 18 Time Series Plot Comparing Pre and Post-Dev Flow Velocities during a 1% AEP Regional Event

4 Consideration of Council Planning Instruments

The preceding sections document the predicted flood behaviour across the site for pre and post-development conditions for local and regional flooding. The modelling indicates that the development will result in:

- No change to peak 1% AEP flood levels outside of the site for both local South Creek flooding and regional Hawkesbury-Nepean River flooding, and,
- Changes to peak 1% AEP flow velocities outside of the site of up to 0.25 m/s, which is equivalent to a 22% increase.

In order to assess the proposed development, it is necessary to consider the significance of the predicted flood impacts against the relevant guidelines contained within the following Hawkesbury City Council (*HCC*) planning instruments:

- Hawkesbury City Council's *Development on Flood Liable Land Policy* (*2012*), and
- Clause 6.3 of the Hawkesbury Local Environmental Plan 2012 (*LEP*).

4.1 HCC Development on Flood Liable Land Policy (2012)

Council's *Development on Flood Liable Land Policy* (*2012*) outlines a number of '*matters which are to be applied when assessing an application on flood affected land*'. These matters are provided below with commentary included specific to this development proposal.

> 1. A building shall not be erected on any land lying at a level lower that 3 metres below the 1:100 ARI (average recurrent interval) flood event level for the area in which the land is situated, except as provided by subclauses (3) and (5).

Advisian Comment: The proposed development meets this criteria.

> 2. Each habitable room in a building situated on any land to which this Policy applies shall have a floor level no lower than the 1:100 ARI (average recurrent interval) flood event level for the area in which the land is located.

Advisian Comment: The proposed development involves construction of all buildings on a fill pad with minimum surface elevations at or above the predicted peak 1% AEP flood level (*1:100 year ARI level*). The proposed development meets this criteria.

> 3. Notwithstanding subclauses (1), (2), (7) and (8), a building that was lawfully situated on any land at 30 June 1997 may be extended, altered, added to or replaced if the floor level of the building, after the building work has been carried out, is not more than 3 metres below the floor height standard for the land immediately before the commencement day.

Advisian Comment: Not relevant to this development proposal.

4.	The assessment of a development application must consider the flood liability of access to the land and, if the land is within a floodway area, the effect of isolation of the land by flooding, notwithstanding whether other aspects of this Policy have been satisfied. In this regard the access to, and egress from, the land should not result in a travel path through areas of higher flood hazard risk and the development should not result in the occupants/users of the development being isolated and requiring rescue.

Advisian Comment: The following points are made in response to this item.

- The proposed fill pad is located within the South-Wianamatta Creek flood storage arm of the Hawkesbury River. The fill pad is located to the west of the site away from areas predicted to experience higher velocities during the rising limb of a 1% AEP flood (local and regional).
- Modelling of the local and regional 1% AEP event shows that the proposed fill pad will remain flood free over the duration of these events; refer **Figures 11** and **14**. Dry evacuation will be possible from the site onto Ham Street during floods up to and including a 1% AEP event.
- The entire site and its surrounds will be submerged during a Hawkesbury River Probable Maximum Flood (PMF) during which peak flood levels will reach 26.7 mAHD (*HNV Regional Flood Study, 2019*).
- It is recommended that a Flood Emergency Response Plan (FERP) be prepared to establish protocols for those working at the site to respond in a safe manner to any flood emergency. The FERP should provide details of warning times, trigger levels related to the Windsor Bridge Gauge and actions for site preparation, evacuation and recovery.

5.	Minor (Non-Habitable) structures such as Farm Buildings, Outbuildings, Sheds, Garages and other Ancillary Structures may be erected on land below the 1:100 ARI (average recurrent interval) flood event level. However, the assessment of a development application for such a structure must consider the likely frequency of flooding, the potential flood damage (to both the subject structure and to other surrounding property should the structure be washed away) and measures to be taken for the evacuation of the property. In this regard the access to, and egress from, the land should not result in a travel path through areas of higher flood hazard risk.

Advisian Comment: Not relevant.

6.	Any part of a building below the 1:100 ARI (average recurrent interval) flood event level is to be constructed of flood compatible materials.

Advisian Comment: Not relevant as no buildings are proposed below the predicted peak 1% AEP flood level (*1:100 year ARI level*).

7.	Despite subclauses (1) and (2) but subject to subclause (3), a dwelling must not be erected on land lying below the 1:100 ARI (average recurrent interval) flood event level if the allotment of land on which it is to be erected was created by a subdivision approved under clause 11 of Hawkesbury Local Environmental Plan 1989 on or after the commencement day.

Advisian Comment: Not relevant as no dwellings are proposed below the predicted peak 1% AEP flood level (*1:100 year ARI level*).

8. Despite subclauses (1) and (2) but subject to subclause (3), a dwelling must not be erected on land lying below the floor height standard for the land immediately before the commencement day if the allotment of land on which it is to be erected was created by a subdivision approved under clause 11 of Hawkesbury Local Environmental Plan 1989 before the commencement day.

Advisian Comment: Not relevant.

9. All proposed variations to this Policy, greater than 10% are to be reported to, and determined by, Council.

Advisian Comment: Not relevant.

4.2 Clause 6.3 of the HCC Local Environment Plan (2012)

Clause 6.3 of the *Hawkesbury LEP 2012* provides the relevant guidelines for flood planning within the Hawkesbury Local Government Area (*LGA*). The following comments are provided in relation to Clause 6.3.3.

(3) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the development—

(a) is compatible with the flood hazard of the land, and

(b) is not likely to significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and

(c) incorporates appropriate measures to manage risk to life from flood, and

(d) is not likely to significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and

(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.

Advisian Comment: The modelling results presented in **Section 3** show that the proposed development will not lead to impacts on adjoining properties and the surrounding environment that:

- '*significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties*', or,
- '*significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses*'.

The development is predicted to cause a maximum change in peak flow velocity outside of the site of up to 0.25 m/s. As shown in **Figure 16**, this maximum increase is predicted to affect the adjoining property to the south, with the area of affectation concentrated along the shared boundary.

The comparison of pre and post-development velocities presented in **Figure 17** shows that the predicted changes across the adjoining property to the south will lead to only a localised east-to-west shift in the area of higher flow velocity; that is, a minor increase in velocity magnitude to the west combined with a commensurate decrease to the east. Peak velocity magnitudes will therefore remain very similar resulting in no material impact and negligible change to flood hazard.

Therefore, the proposed development is not predicted to lead to any impacts that could be considered to '*significantly adversely affect*' adjoining properties.

5 Conclusions

The proposal by Andy's Earthworks to construct a concrete and sandstone crushing facility at 100 Fairey Road, South Windsor, has been assessed by Advisian with reference to the relevant Hawkesbury City Council guideline documents and policies. The assessment has been informed by the results of two-dimensional flood modelling undertaken for pre and post-development conditions for a '*local*' 1% Annual Exceedance Probability (*AEP*) South-Wianamatta Creek flood and the '*regional*' 1% AEP Hawkesbury River flood.

The following conclusions are made as an outcome of the assessment:

(i) The proposed cut and fill earthworks will provide additional floodplain storage during Hawkesbury River flood events up to, and including, the 1% AEP flood (*refer* **Table 6**). Accordingly, the earthworks will provide a better outcome than the target '*balance*' of cut and fill.

(ii) The proposed development will not lead to any increases to peak flood levels across adjoining properties for the 1% AEP local and regional events (*refer* **Figures 12** *and* **15**).

(iii) The proposed development will lead to increases in peak 1% AEP flow velocities outside of the site of up to 0.25 m/s; which corresponds to an increase in velocity of 22% in some areas (*refer* **Figure 16**). A comparison of pre and post-development velocities shows that the proposed development will only cause a localised east-to-west shift in flow velocity magnitudes and will not result in any material changes to the overall flow direction (*refer* **Figure 17**). On this basis, the predicted changes in peak flow velocities are considered minor.

(iv) The development meets the performance and assessment criteria outlined within the Hawkesbury City Council's *Development on Flood Liable Land Policy* (*2012*) and within Clause 6.3 of the *Hawkesbury Local Environmental Plan 2012*; refer **Section 4**.

6 References

- Australian Institute for Disaster Resilience (*2017*), '*Australian Disaster Resilience Handbook 7 Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia*'; © Commonwealth of Australia 2017 third edition.
- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), (2019), *'Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia'*
- Department of Water Resources (*1990*), *'Flood Study Report, South Creek'*
- Department of Water Resources (*1991*), *'South Creek Floodplain Management Study - Volume 1 Report'*; prepared by Willing and Partners
- Department of Water Resources (*1991*), *'South Creek Floodplain Management Study - Volume 2: Appendices'*; prepared by Willing and Partners
- Infrastructure NSW (*2019*), '*Hawkesbury-Nepean Valley Regional Flood Study – Volume 1: Main Report*', prepared by WMAwater.
- NSW Government (*April 2005*), '*Floodplain Development Manual: The Management of Flood Liable Land*'; ISBN 0 7347 5476 0
- NSW Government (*2007*), '*Floodplain Risk Management Guideline – Floodway Definition*'; prepared by NSW Office of Environment & Heritage
- Office of Environment & Heritage (*2019*), '*Review of ARR Design Inputs for NSW*', prepared by WMAwater.
- Penrith City Council (*2015*), *'Updated South Creek Flood Study'*, (Issue No. 4) prepared by WorleyParsons Pty Ltd
- Penrith City Council (*2020*), *'South Creek Floodplain Risk Management Study'*, prepared by Advisian Pty Ltd
- Thomas C R & Golaszewski, R (*2012*), *'Refinement of Procedures for Floodway Definition'*; Proceedings of 52nd Annual Floodplain Management Authorities Conference, Narooma, February 2012
- Thomas C R, Golaszewski R & Cox R (*2018*), *'Methodology for Determining Floodway / Flow Conveyance Extent in Australian Floodplains'*, Proceedings of Hydrology and Water Resources Symposium, Melbourne, December 2018
- Hawkesbury City Council (*2012*), *'Development on Flood Liable Land Policy'*
- Hawkesbury City Council (*2012*), *Hawkesbury Local Environmental Plan 2012*

Appendix A

Proposed Development Plans

Source: Sparks and Partners

100 FAIREY RD, SOUTH WINDSOR
CIVIL WORKS

SITE WORKS – GENERAL

1. ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH LOCAL COUNCIL, AUSTRALIAN AND AUTHORITY STANDARDS.
2. ALL TRENCHING WORKS ARE TO BE RESTORED TO ORIGINAL CONDITION.
3. THE INTEGRITY OF ALL EXISTING AND NEW SERVICES IS TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
4. ALL PLANS ARE TO BE READ IN CONJUNCTION WITH APPROVED ARCHITECTS, STRUCTURAL ENGINEERS AND OTHER CONSULTANT'S PLANS. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER FOR CLARIFICATION.

SEDIMENT AND EROSION CONTROL

1. THE CONTRACTOR SHALL INSTIGATE ALL SEDIMENT AND EROSION CONTROL MEASURES IN ACCORDANCE WITH THE HILLS SHIRE COUNCIL REQUIREMENTS AND THE "BLUE BOOK" (MANAGING URBAN STORMWATER SOILS AND CONSTRUCTION, PRODUCED BY THE DEPARTMENT OF HOUSING). THESE MEASURES ARE TO BE REGULARLY INSPECTED AND MAINTAINED.
2. THE SEDIMENT & EROSION CONTROL PLAN PRESENTS CONCEPTS ONLY, THE CONTRACTOR SHALL AT ALL TIMES BE RESPONSIBLE FOR THE ESTABLISHMENT & MANAGEMENT OF A DETAILED SCHEME MEETING COUNCIL'S DESIGN, AND ALL OTHER REGULATORY AUTHORITY REQUIREMENTS.
3. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHALL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   a. INSTALL ALL TEMPORARY SEDIMENT FENCES AND BARRIER FENCES. WHERE FENCES ARE ADJACENT TO EACH OTHER THE SEDIMENT FENCE CAN BE INCORPORATED INTO THE BARRIER FENCE.
   b. CONSTRUCT TEMPORARY STABILISED SITE ACCESS. INCLUDING SHAKE DOWN AND WASH PAD.
   c. INSTALL SEDIMENT CONTROL MEASURES AS OUTLINED ON THESE SEDIMENT AND CONTROL PLANS (ONCE APPROVED)
4. THE CONTRACTOR SHALL UNDERTAKE SITE DEVELOPMENT WORKS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF MINIMUM WORKABLE SIZE.
5. AT ALL TIMES AND IN PARTICULAR DURING WINDY AND DRY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL. TACIFIERS MAY BE USED TO CONTROL DUST DURING EXTENDED PERIODS OF DRY WEATHER.
6. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) SHALL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
7. WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS THE CATCHMENT AREA HAS BEEN STABILISED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED OUT.
8. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED / REHABILITATED.
9. THE CONTRACTOR SHALL ALLOW FOR THE ESTABLISHMENT OF ANY OTHER EROSION PROTECTION MEASURES. (IF APPLICABLE).
10. THE CONTRACTOR SHALL REGULARLY INSPECT (MINIMUM TWICE PER WEEK) ALL EROSION AND SEDIMENT CONTROL MEASURES TO ENSURE THEY ARE OPERATING EFFECTIVELY. REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN REGULARLY AND AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.
11. ACCEPTABLE RECEPTORS SHALL BE USED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER. WASTE FROM THESE RECEPTORS SHALL BE DISPOSED OF IN ACCORDANCE WITH REGULATORY AUTHORITY REQUIREMENTS. PAY ALL FEES AND PROVIDE EVIDENCE OF SAFE DISPOSAL.

SITE WORKS – ACCESS AND SAFETY

1. ALL WORKS ARE TO BE UNDERTAKEN IN A SAFE MANNER IN ACCORDANCE WITH ALL STATUTORY AND INDUSTRIAL RELATION REQUIREMENTS.
2. ACCESS TO ADJACENT BUILDINGS AND PROPERTIES SHALL BE MAINTAINED AT ALL TIMES.
3. WHERE NECESSARY SAFE PASSAGE SHALL BE PROVIDED FOR VEHICLES AND PEDESTRIANS THROUGH OR ADJACENT TO THE SITE.

STORMWATER

1. ALL WORKS ARE TO BE UNDERTAKEN IN ACCORDANCE WITH THE FOLLOWING AUSTRALIAN STANDARDS AS2032, AS3500 AND AS3725 AS A MINIMUM.
2. ALL PIPES LESS THAN OR EQUAL TO Ø300mm IN SIZE ARE TO BE SOLVENT WELD-JOINTED UPVC CLASS SN6 U.N.O.
3. ALL PIPES Ø375mm OR GREATER IN SIZE ARE TO BE MIN. CLASS 2 REINFORCED CONCRETE PIPE (RCP) WITH SPIGGOT AND SOCKETED JOINT OR VANTAGE PIPE PLUS (VPIPE+) FIBRE REINFORCED CONCRETE (FRC) WITH VANTAGE PIPE PLUS JOINT U.N.O.
4. ALL PIPES ARE TO BE LAID AT MIN. 1.0% GRADE U.N.O.
5. PIPE BEDDING IS TO BE HS2 UNDER ROADS AND TRAFFICKED AREAS AND SHALL BE H2 IN LANDSCAPED AND PEDESTRIAN TRAFFICKED AREAS U.N.O.
6. ALL PIPE BENDS AND JUNCTIONS ARE TO BE MADE WITH EITHER PURPOSE MADE FITTINGS OR STORMWATER DRAINAGE PITS.
7. MINIMUM COVER FROM THE OBVERT OF THE STORMWATER PIPE OF 300mm IS TO BE PROVIDED IN LANDSCAPED AREAS AND 600mm IN VEHICULAR TRAFFICKED AREAS U.N.O.
8. WHERE MINIMUM COVER CANNOT BE ACHIEVED CONCRETE ENCASEMENT OF THE AFFECTED PIPE IS MAY BE UNDERTAKEN WITH 20MPa CONCRETE WITH A MIN. COVER OF 150mm TO ALL SIDES OF THE PIPE. THE CONTRACTOR SHALL CONFIRM THIS REQUIREMENT WITH THE ENGINEER OR SUPERINTENDENT.
9. LAID PIPELINES ARE TO HAVE THE FOLLOWING CONSTRUCTED TOLERANCES:
   a. HORIZONTAL-1:300 ANGULAR DEVIATION FROM REQUIRED ALIGNMENT;
   b. VERTICAL-1:300 ANGULAR DEVIATION FROM REQUIRED ALIGNMENT.
10. ALL DRAINAGE PITS ARE TO BE CAST IN-SITU, PRECAST DRAINAGE PITS MAY BE USED WITH APPROVAL FROM THE ENGINEER. THE CONTRACTOR SHALL SUBMIT A PRECAST PIT INSTALLATION WORK METHOD STATEMENT FOR ASSESSMENT BY THE ENGINEER FOR APPROVAL.
11. DRAINAGE PIT COVERS ARE TO BE EITHER GALVANISED STEEL OR CAST IRON CLASS 'B' IN LANDSCAPED AND PEDESTRIAN TRAFFICKED AREAS AND CLASS 'D' IN ALL VEHICULAR TRAFFICKED AREAS U.N.O.
12. DRAINAGE PIT COVERS ARE TO BE 'HEELSAFE' TYPE IN ALL PEDESTRIAN TRAFFICKED AREAS U.N.O.
13. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED PRIOR TO COMMENCING WORKS ON SITE.
14. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
15. DOWN PIPES CONNECTED DIRECT TO PIPES TO BE CONNECTED AT 45° TO THE FLOW DIRECTION WITH A CLEANING EYE PROVIDED AT GROUND LEVEL.

FINISHED LEVELS

1. LEVELS BASED ON SURVEY PREPARED BY McKINLAY MORGAN & ASSOCIATES PTY. LTD.. THE CONTRACTOR SHALL VERIFY LEVELS PRIOR TO CONSTRUCTION COMMENCEMENT, ANY DISCREPANCIES SHALL BE NOTIFIED TO THE ENGINEER OR SUPERINTENDENT FOR CLARIFICATION.
2. FINISHED LEVELS SHOWN ARE CONCEPTUAL ONLY AND SUBJECT TO DETAILED DESIGN PRIOR TO CONSTRUCTION CERTIFICATE APPLICATION. FINAL FINISHED LEVELS TO BE +/- 0.5m FROM LEVELS SHOWN.
3. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
4. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:4H.

DRAWING SCHEDULE

Sheet Number	Sheet Title
DA1.01	COVER SHEET, LOCALITY PLAN AND DRAWING SCHEDULE
DA2.01	SEDIMENT AND EROSION CONTROL PLAN & DETAILS
DA3.01	BULK EARTHWORK CONTOUR PLAN
DA3.05	BULK EARTHWORK DEPTH CUT TO FILL PLAN
DA3.11	BULK EARTHWORK SECTIONS
DA4.01	SITEWORKS AND GRADING PLAN
DA4.05	EXISTING AND PROPOSED FLOODING PLAN
DA4.11	SEDIMENT BASIN PLAN & DETAILS SHEET
DA4.12	DEMOUNTABLE OFFICE AND AMENITIES DETAIL SHEET

LOCALITY PLAN
NOT TO SCALE – COURTESY OF SIX MAPS

DA APPROVAL

1. DO NOT SCALE OFF THIS DRAWING. USE DIMENSIONS & ARCHITECTURAL DRAWINGS ONLY
2. DRAWINGS TO BE READ IN CONJUNCTION WITH SPECIFICATION.
3. LEVELS ARE INDICATIVE ONLY AND ARE TO BE CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS
4. AUTHORITIES MAINS AND/OR EXISTING SERVICES ARE TO BE LOCATED AND CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS
5. COMPLETION OF THE QUALITY RECORD IS EVIDENCE THAT THE DESIGN AND DRAWING HAVE BEEN VERIFIED.

VERIFICATION
COMPLETION OF THE DRAWING STATUS IS EVIDENCE THAT THE DESIGN HAS BEEN VERIFIED AS CONFORMING TO THE REQUIREMENTS OF THE PROJECT QUALITY PLAN

DRAWING STATUS	INITIAL	DATE
PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE: B1 | PLOT DATE: January 31, 2019

NORTH POINT

SCALE: NOT TO SCALE

DATE	No	AMENDMENT	INIT	REV
12.11.18		ISSUED FOR DA APPROVAL	MW	1
31.01.19		ISSUED FOR DA APPROVAL	MW	2

DATE	No	AMENDMENT	INIT	REV

CLIENT: AD+E

PLANNER: MACRO PLAN

PROJECT: 100 FAIREY RD, SOUTH WINDSOR

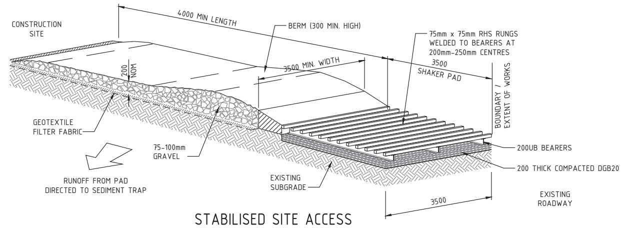
DRAWING TITLE: CONCEPT
COVER SHEET, LOCALITY PLAN
AND DRAWING SCHEDULE

SPARKS+PARTNERS
CONSULTING ENGINEERS
HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au

DATE: OCT 2018 | DESIGNED: LC
SCALE: N.T.S. | DRAWN: LC
AHSCA CORPORATE MEMBER
JOB No: 17208 | DWG No: DA1.01 | No IN SET: ---- OF | REV: 2

LEGEND

— / — / —	SITE SECURITY FENCE
— + — + —	SEDIMENT FENCE
(hatched)	STABILISED SITE ACCESS
(hatched)	SITE STOCKPILE

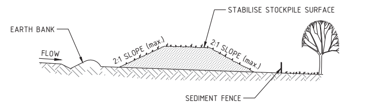


STABILISED SITE ACCESS

NOT TO SCALE

MAINTENANCE

1. THE TEMPORARY ACCESS SHALL BE MAINTAINED IN A CONDITION THAT PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY,
2. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL GRAVEL AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT,
3. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.
4. INSTALL BARRIER ON EITHER SIDE OF SHAKER PAD
5. TO ENSURE VEHICLES ARE GUIDED ON TO THE PAD.
6. INVERT OF SHAKER PAD TO BE DRAINED VIA AGRICULTURAL PIPE WRAPPED IN GEOTEXTILE FABRIC.

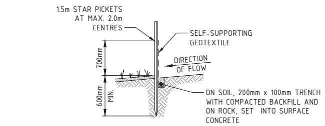


STOCKPILE

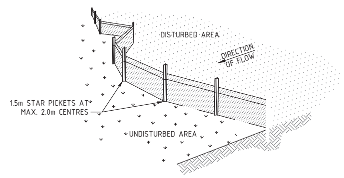
NOT TO SCALE

NOTES:

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT. 4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.



SECTION DETAIL



SEDIMENT FENCE

NOT TO SCALE

NOTES:

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50L/s IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 200mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND AT 2.0m INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

CONSTRUCTION CERTIFICATE

DATE	No	AMENDMENT	INIT	REV
12.11.18		ISSUED FOR DA APPROVAL	MW	1
15.11.18		ISSUED FOR DA APPROVAL	MW	2

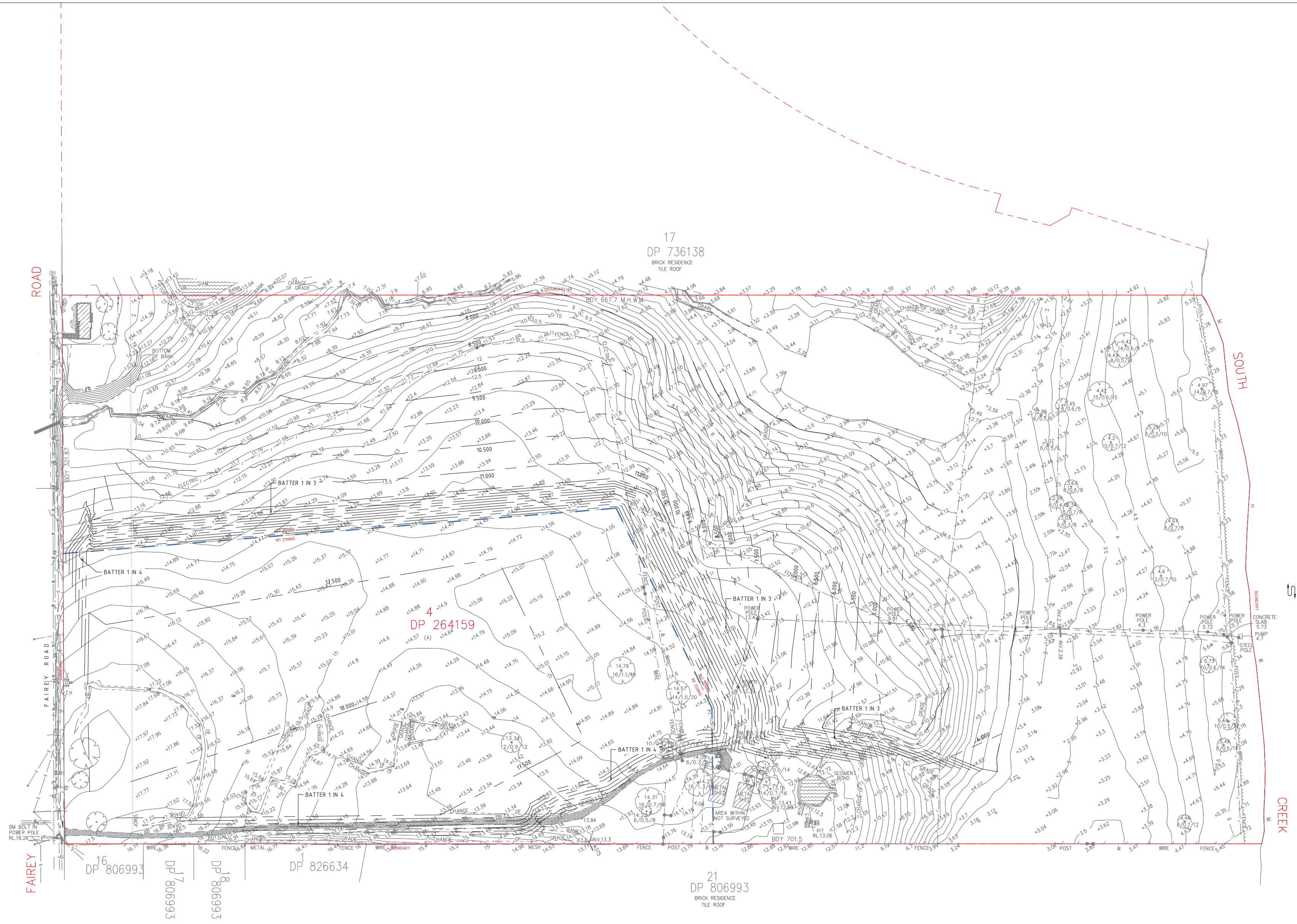
PAGE: B1 — PLOT DATE: November 14, 2018

PROJECT: PROPOSED RESIDENTIAL FLAT BUILDING 18-20 CLIFF ROAD, EPPING

DRAWING TITLE: CONCEPT SEDIMENT AND EROSION CONTROL PLAN & DETAILS

SPARKS+PARTNERS CONSULTING ENGINEERS HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au

DATE	DESIGNED	SCALE	DRAWN	JOB No	DWG No	No IN SET	REV
JULY 2018	BB	1:500	DD	18126	DA2.01	---- OF	2



LEGEND

17.50	BULK EARTHWORKS SURFACE MAJOR CONTOUR LINE
8.00	BULK EARTHWORKS SURFACE MINOR CONTOUR LINE
21.10	EXISTING SURFACE CONTOUR LINE

1. DO NOT SCALE OFF THIS DRAWING. USE DIMENSIONS & ARCHITECTURAL DRAWINGS ONLY
2. DRAWINGS TO BE READ IN CONJUNCTION WITH SPECIFICATION.
3. LEVELS ARE INDICATIVE ONLY AND ARE TO BE CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS
4. AUTHORITIES MAINS AND/OR EXISTING SERVICES ARE TO BE LOCATED AND CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS
5. COMPLETION OF THE QUALITY RECORD IS EVIDENCE THAT THE DESIGN AND DRAWING HAVE BEEN VERIFIED.

VERIFICATION
COMPLETION OF THE DRAWING STATUS IS EVIDENCE THAT THE DESIGN HAS BEEN VERIFIED AS CONFORMING TO THE REQUIREMENTS OF THE PROJECT QUALITY PLAN

DRAWING STATUS	INITIAL	DATE
PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE B1 | PLOT DATE November 14, 2018

NORTH POINT

SCALE 0 10 20 30 40 50 60 70 80 METERS

DATE	No	AMENDMENT	INIT	REV
10.10.18		ISSUE FOR INFORMATION	MW	1
12.11.18		ISSUE FOR DA APPROVAL	MW	2
15.11.18		ISSUE FOR DA APPROVAL	MW	3

DA APPROVAL

CLIENT: AD+E
PROJECT: 100 FAIREY RD, SOUTH WINDSOR

SPARKS+PARTNERS
CONSULTING ENGINEERS
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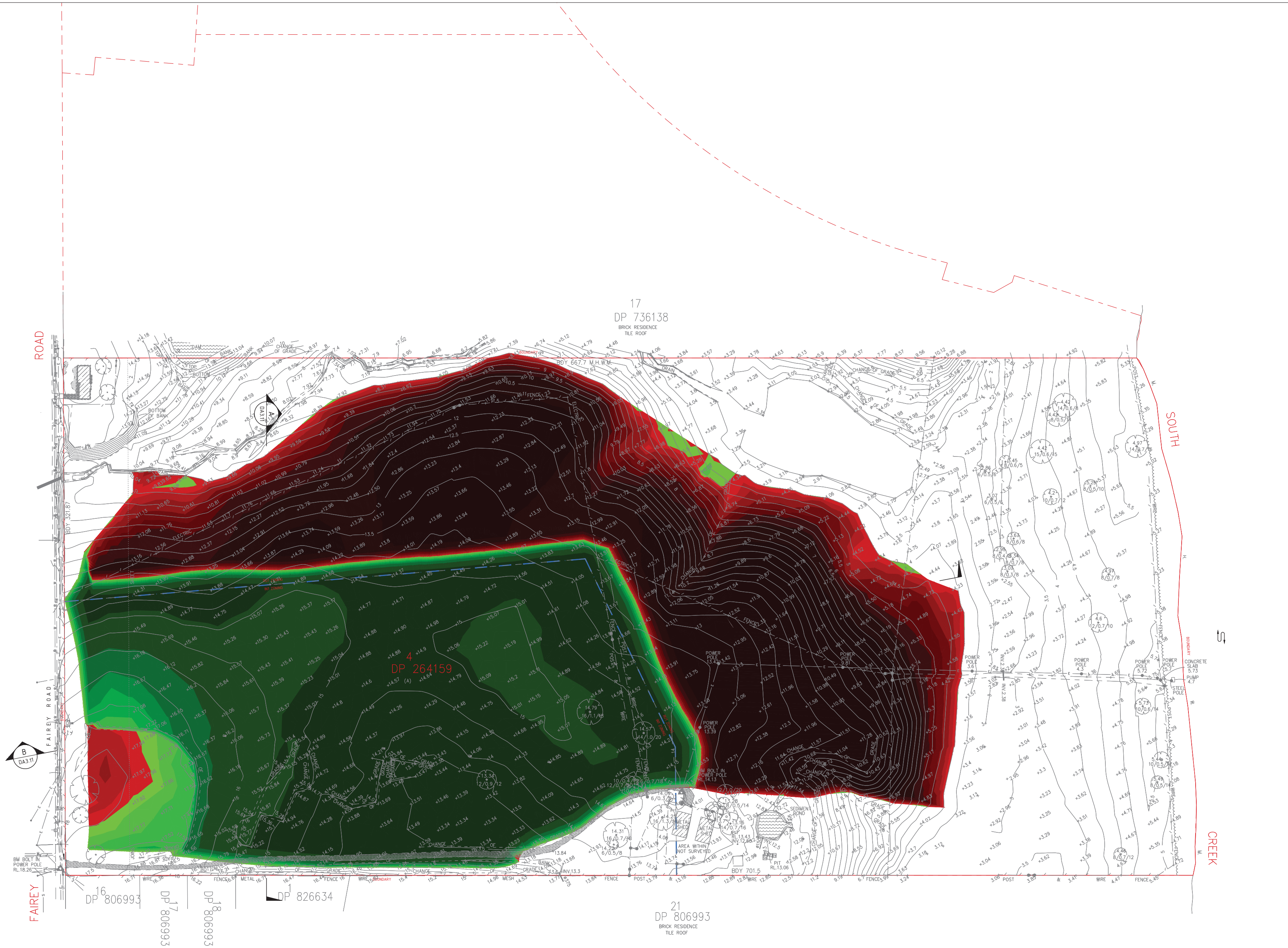
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au

PLANNER: MACRO PLAN
DRAWING TITLE: CONCEPT BULK EARTHWORK CONTOUR PLAN

DATE: OCT 2018 | DESIGNED: LC
SCALE: 1:1000 | DRAWN: LC
JOB No: 17208 | DWG No: DA3.01 | No IN SET: ---- OF | REV: 3



LEGEND

CUT:	FILL:
-5.0 TO -2.5m	0.0 TO 0.1m
-2.5 TO -1.5m	0.1 TO 0.25m
-1.5 TO -1.0m	0.25 TO 0.5m
-1.0 TO -0.75m	0.5 TO 0.75m
-0.75 TO -0.5m	0.75 TO 1.0m
-0.5 TO -0.25m	1.0 TO 1.5m
-0.25 TO -0.1m	1.5 TO 2.5m
-0.1 TO 0.0m	2.5 TO 5.0m

NOTES

1. CUT TO FILL DEPTHS SHOWN ARE BASED ON LEVEL SHOWN ON SURVEY PREPARED BY McKINLAY MORGAN & ASSOCIATES SURVEYORS, REF: 94026D3, DATED 05/10/2018
2. VOLUMES DETAILED BELOW DO NOT TAKE INTO ACCOUNT BULKING & COMPACTION OF THE MATERIAL, DETAILED EXCAVATION FOR ALL SERVICES TRENCHING & FOUNDATIONS, AND BACKFILL FOR RETAINING WALL CONSTRUCTION. CONTRACTOR TO CONFIRM VOLUMES BASED ON WORKS METHODOLOGY EMPLOYED.

   FLOOD FILL VOLUME - 124,350m^3
   SITE BE FILL VOLUME - 3626m^3
   PAVEMENT THICKNESS VOLUME - 35,540m^3

   TOTAL CUT VOLUME - 127,976m^3
   TOTAL FILL VOLUME - 127,976m^3

   TOTAL IMPORT - 0m^3
   (EXCLUDES TRENCHING FOR OTHER SERVICES)
3. REFER DRAWING SK06 FOR TYPICAL BULK EARTHWORK SCHEMATIC DIAGRAM

DA APPROVAL

DATE	No	AMENDMENT	INIT	REV
10.10.18		ISSUE FOR INFORMATION	MW	1
12.11.18		ISSUE FOR DA APPROVAL	MW	2
15.11.18		ISSUE FOR DA APPROVAL	MW	3

CHECKED | DATE
APPROVED | DATE
PAGE B1 | PLOT DATE November 14, 2018

CLIENT: AD+E

PROJECT: 100 FAIREY RD, SOUTH WINDSOR

PLANNER: MACRO PLAN

DRAWING TITLE: CONCEPT BULK EARTHWORK DEPTH CUT TO FILL PLAN

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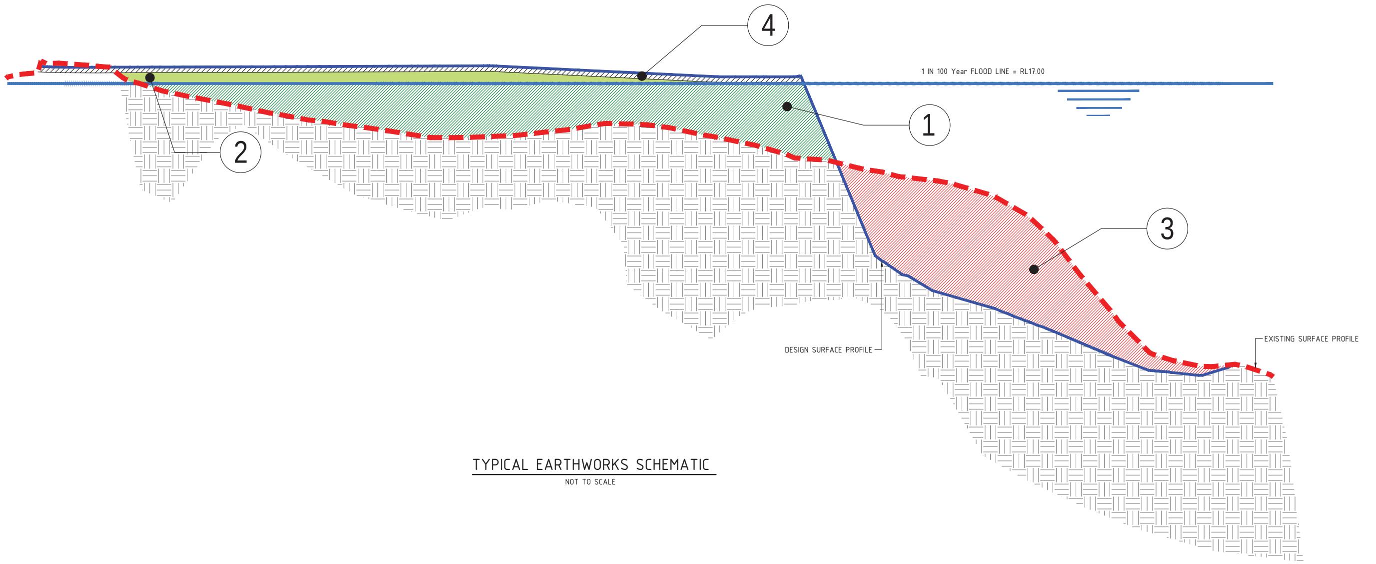
DATE	DESIGNED	SCALE	DRAWN	JOB No	DWG No	No IN SET	REV
OCT 2018	LC	1:1000	LC	17208	DA3.05	---- OF	3



LEGEND

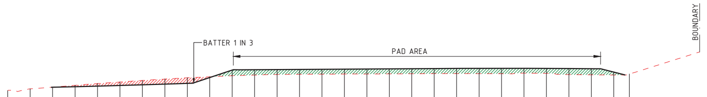
FLOOD FILL VOLUME	1	
SITE BE FILL VOLUME	2	
TOTAL CUT VOLUME	3	= 1 + 2
PAVEMENT THICKNESS (500mm)	4	

TYPICAL EARTHWORKS SCHEMATIC

NOT TO SCALE

LEGEND

- CUT AREA
- FILL AREA

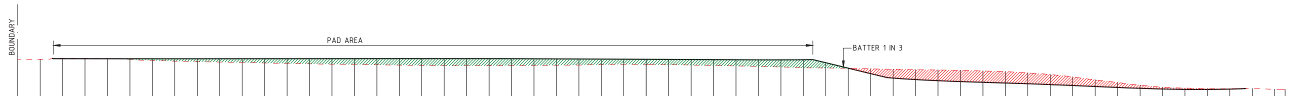


DATUM R.L. -4.000

DESIGN SURFACE LEVEL			9.516	9.776	10.049	10.320	10.631	10.942	11.250	13.844	17.166	17.339	17.402	17.466	17.529	17.591	17.654	17.716	17.778	17.840	17.901	17.961	17.985	17.941	17.899	17.842	17.786	16.286	
EXISTING SURFACE LEVEL	8.218	8.793	9.555	10.382	11.180	11.856	12.535	13.172	13.725	14.192	14.644	14.953	15.215	15.303	15.354	15.408	15.414	15.477	15.509	15.586	15.602	15.578	15.533	15.810	15.718	15.164	15.049	14.981	15.389
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	276.957

BULK EARTHWORKS SECTION (A / DA3.05)

HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:1000



DATUM R.L. -4.000

DESIGN SURFACE LEVEL			17.743	17.723	17.726	17.728	17.731	17.734	17.737	17.740	17.744	17.747	17.751	17.754	17.758	17.762	17.766	17.770	17.775	17.780	17.784	17.789	17.772	17.723	17.675	17.627	17.578	17.530	17.482
EXISTING SURFACE LEVEL	17.237	17.446	17.896	17.859	17.779	17.420	16.983	16.663	16.453	16.258	16.066	15.851	15.652	15.466	15.330	15.172	15.043	14.898	14.737	14.591	14.591	14.617	14.658	14.721	14.833	14.942	15.110	15.215	15.194
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000

DESIGN SURFACE LEVEL	17.433	17.385	17.336	17.300	17.300	17.300	17.300	15.933	13.515	11.096	9.124	8.474	7.945	7.571	7.282	6.994	6.595	6.220	5.826	5.403	4.979	4.581	4.218	4.124	4.029	4.213			
EXISTING SURFACE LEVEL	15.105	14.938	14.723	14.540	14.330	14.072	13.746	13.627	13.484	13.235	13.068	12.832	12.721	12.570	12.292	11.988	11.422	10.681	9.625	8.320	7.146	5.981	4.993	4.661	4.452	4.413	4.443	4.142	3.941
CHAINAGE	290.000	300.000	310.000	320.000	330.000	340.000	350.000	360.000	370.000	380.000	390.000	400.000	410.000	420.000	430.000	440.000	450.000	460.000	470.000	480.000	490.000	500.000	510.000	520.000	530.000	540.000	550.000	560.000	564.625

BULK EARTHWORKS SECTION (B / DA3.05)

HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:1000

DA APPROVAL

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DRAWING STATUS	INITIAL	DATE
PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE B1 | PLOT DATE November 14, 2018

NORTH POINT

SCALE 0 10 20 30 40 50 60 70 80 METRES

DATE	No	AMENDMENT	INIT	REV
10.10.18		ISSUE FOR INFORMATION	MW	1
12.11.18		ISSUED FOR DA APPROVAL	MW	2
15.11.18		ISSUE FOR DA APPROVAL	MW	3

DATE	No	AMENDMENT	INIT	REV

CLIENT: AD+E

PROJECT: 100 FAIREY RD, SOUTH WINDSOR

PLANNER: MACRO PLAN

DRAWING TITLE: CONCEPT BULK EARTHWORK SECTIONS

SPARKS +PARTNERS
CONSULTING ENGINEERS
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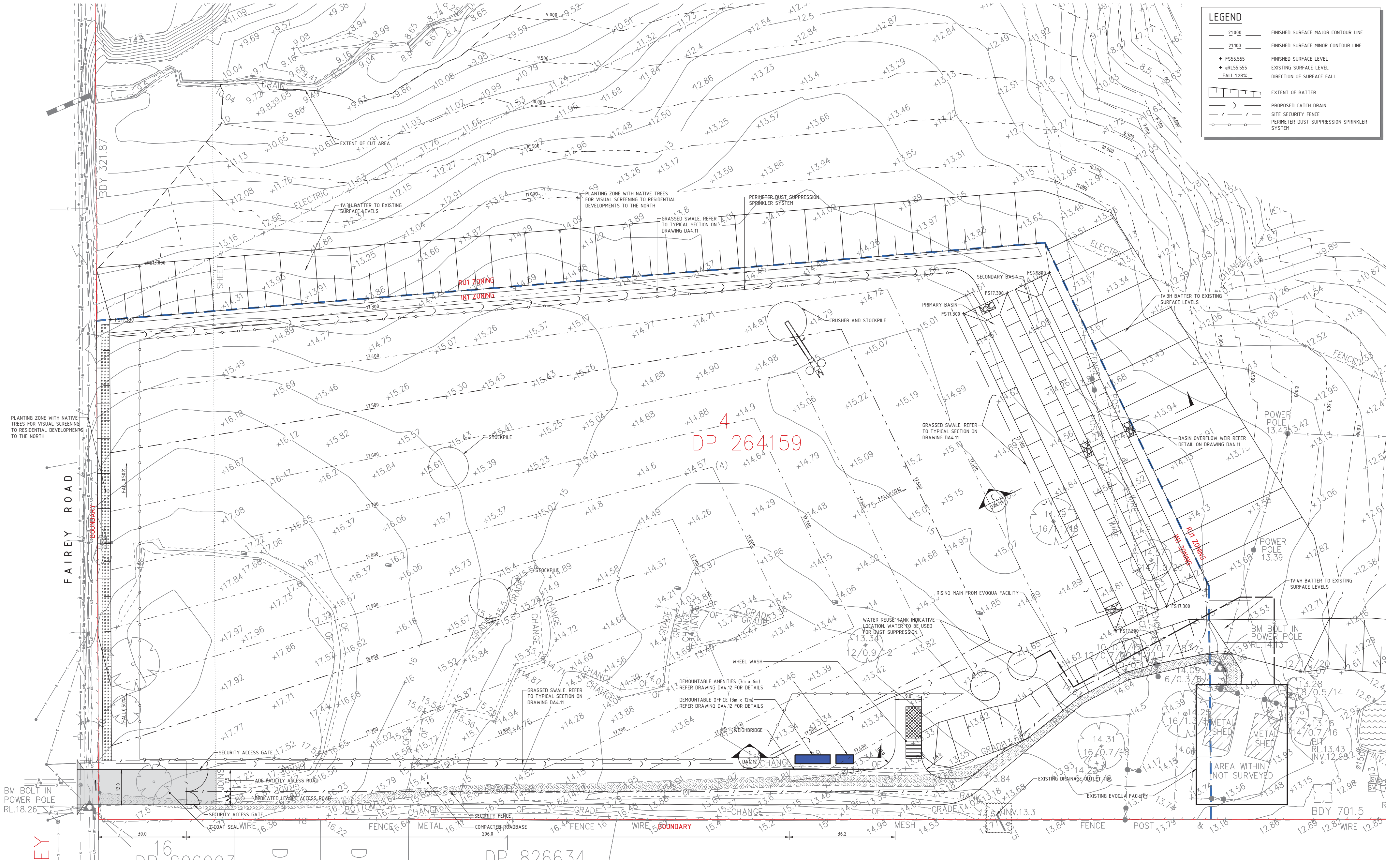
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au

DATE: OCT 2018 | DESIGNED: LC
SCALE: 1:1000 | DRAWN: LC

AHSCA CORPORATE MEMBER

JOB No 17208 | DWG No DA3.11 | No IN SET ---- OF | REV 3



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DRAWING STATUS	INITIAL	DATE
PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE B1 | PLOT DATE January 31, 2019

NORTH POINT

SCALE 0 5 10 15 20 25 30 35 40

DATE	No	AMENDMENT	INIT	REV
26.09.17		FOR INNFORMATION	SF	1
26.10.17		ISSUED FOR COORDINATION	DL	2
12.11.18		ISSUED FOR DA APPROVAL	MW	3
15.11.18		ISSUED FOR DA APPROVAL	MW	4
31.01.19		ISSUED FOR DA APPROVAL	MW	5

CLIENT: AD+E

PROJECT: 100 FAIREY RD, SOUTH WINDSOR

PLANNER: MACRO PLAN

DRAWING TITLE: CONCEPT SITEWORKS AND GRADING PLAN

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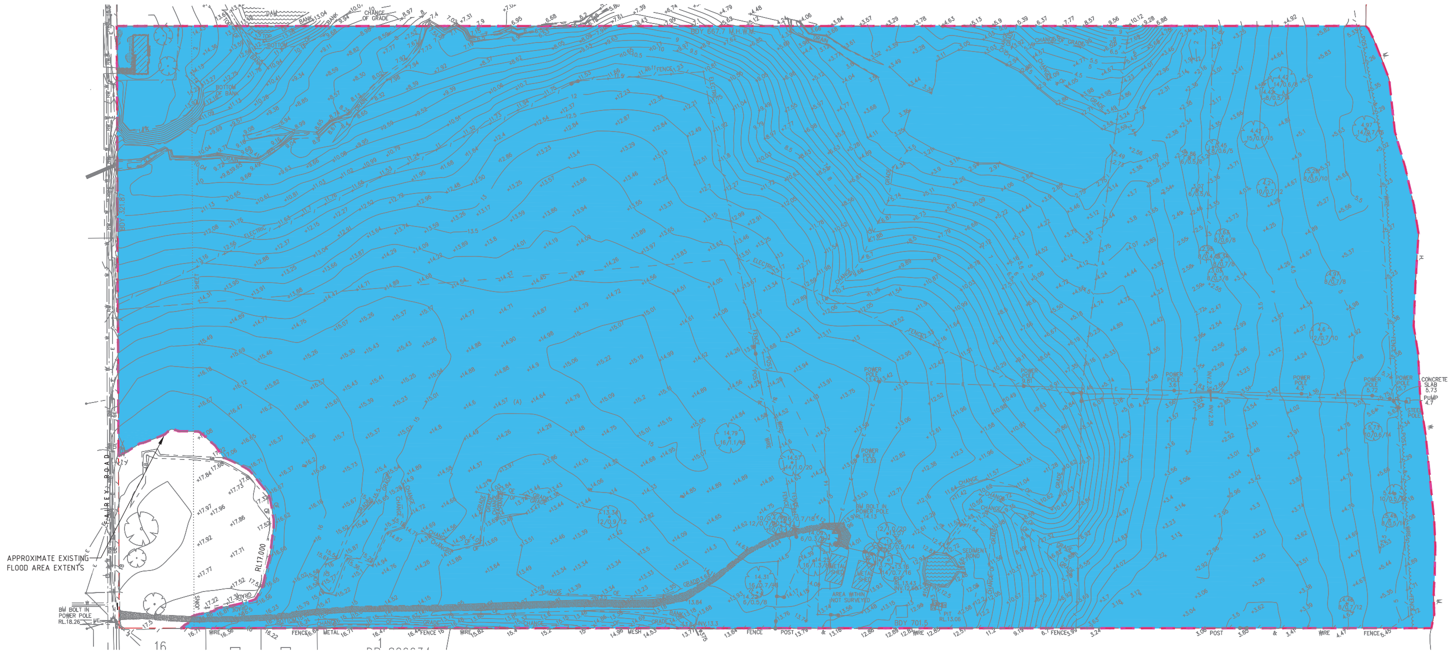
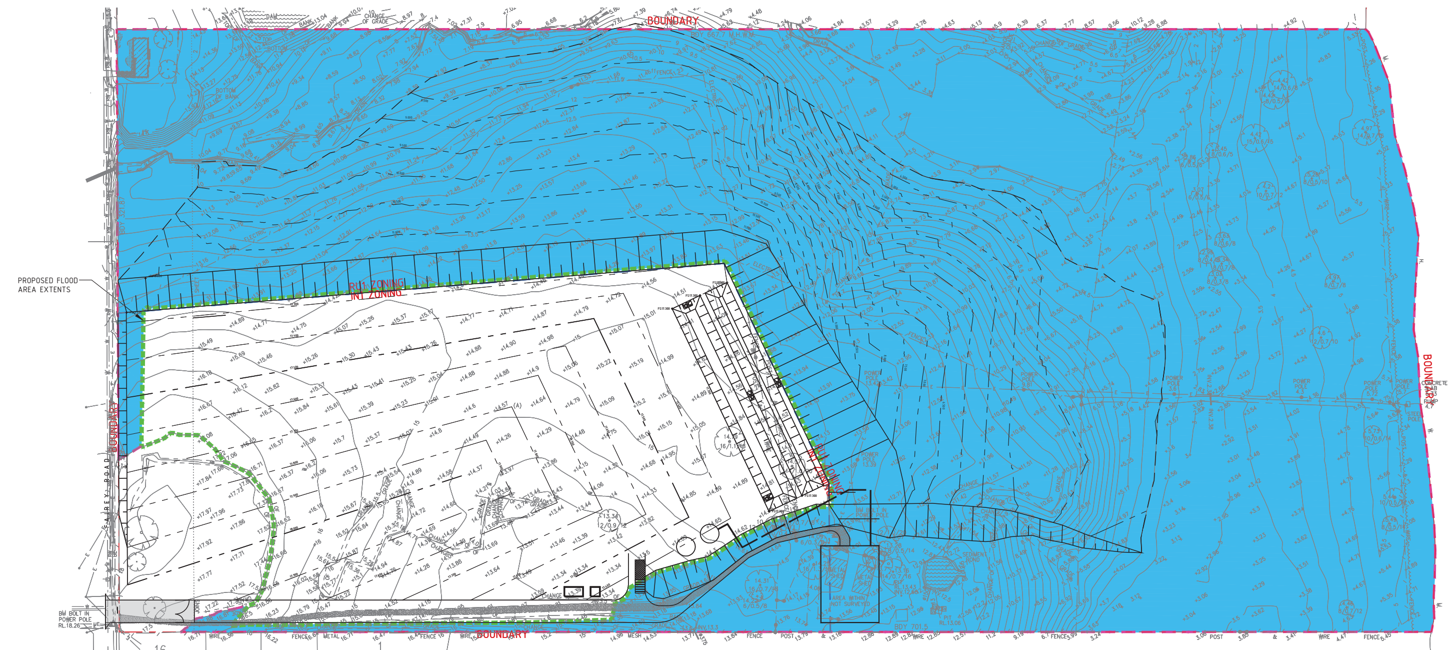
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au

AHSCA — The Association of Hydraulic Services Consultants Australia (NSW) Inc. CORPORATE MEMBER

DATE: OCT 2018 | DESIGNED: LC
SCALE: 1:500 @ B1 | DRAWN: LC
JOB No: 17208 | DWG No: DA4.01 | No IN SET: ---- OF | REV: 5



EXISTING FLOOD EXTENTS (1:100 Year)



PROPOSED FLOOD EXTENTS (1:100 Year)

DA APPROVAL

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DRAWING STATUS	INITIAL	DATE
PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE: B1 | PLOT DATE: November 14, 2018

SCALE: SCALE AS SHOWN ON PLAN

NORTH POINT

DATE	No	AMENDMENT	INIT	REV
12.11.18		ISSUED FOR DA APPROVAL	MW	1
15.11.18		ISSUED FOR DA APPROVAL	MW	2

DATE	No	AMENDMENT	INIT	REV

CLIENT: AD+E
PROJECT: 100 FAIREY RD, SOUTH WINDSOR
PLANNER: MACRO PLAN
DRAWING TITLE: CONCEPT EXISTING AND PROPOSED FLOODING PLAN

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HYDRAULIC | CIVIL | FIRE
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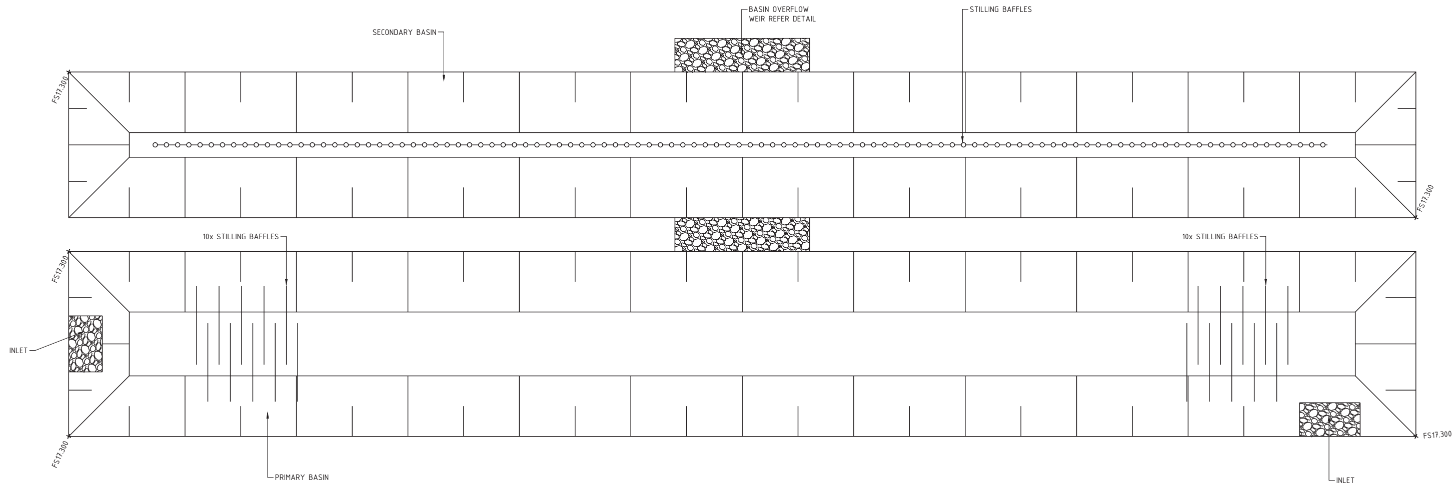
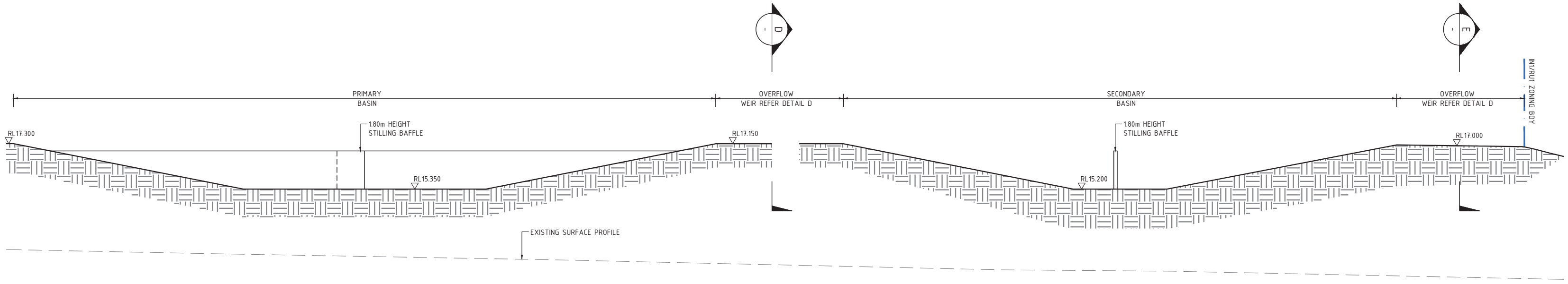
DATE: OCT 2018 | DESIGNED: LC
SCALE: 1:1200 | DRAWN: LC
ISO 9001 : 2000 QUALITY ASSURED COMPANY
AHSCA The Association of Hydraulic Services Consultants Australia (NSW) Inc. CORPORATE MEMBER
JOB No 17208 | DWG No DA4.05 | No IN SET ---- OF | REV 2



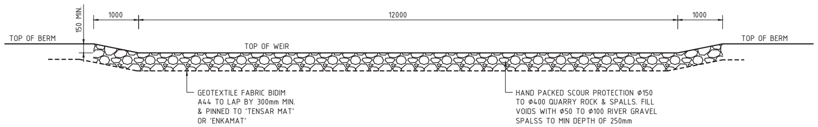
SEDIMENT BASIN PLAN

SCALE 1:200



TYPICAL SECTION THROUGH BASINS (C)

SCALE HOR 1:50, VERT 1:100



TYPICAL SECTION THROUGH OVERFLOW WEIR (D) (E)

HORIZONTAL SCALE 1:50
VERTICAL SCALE 1:50

GRASS SWALE

NOT TO SCALE

DA APPROVAL

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DRAWING STATUS	INITIAL	DATE
PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE B1 | PLOT DATE November 12, 2018

NORTH POINT

SCALE: SCALE AS SHOWN ON PLAN

DATE	No	AMENDMENT	INIT	REV
12.11.18		ISSUED FOR DA APPROVAL	MW	1

DATE	No	AMENDMENT	INIT	REV

CLIENT: AD+E

PROJECT: 100 FAIREY RD, SOUTH WINDSOR

PLANNER: MACRO PLAN

DRAWING TITLE: CONCEPT SEDIMENT BASIN PLAN & DETAILS SHEET

SPARKS+PARTNERS
CONSULTING ENGINEERS
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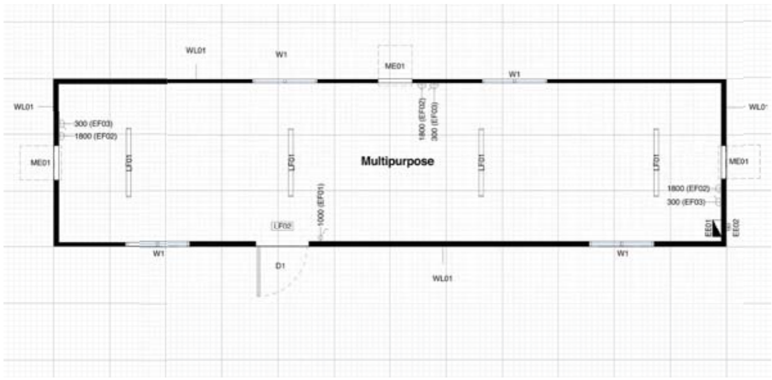
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au

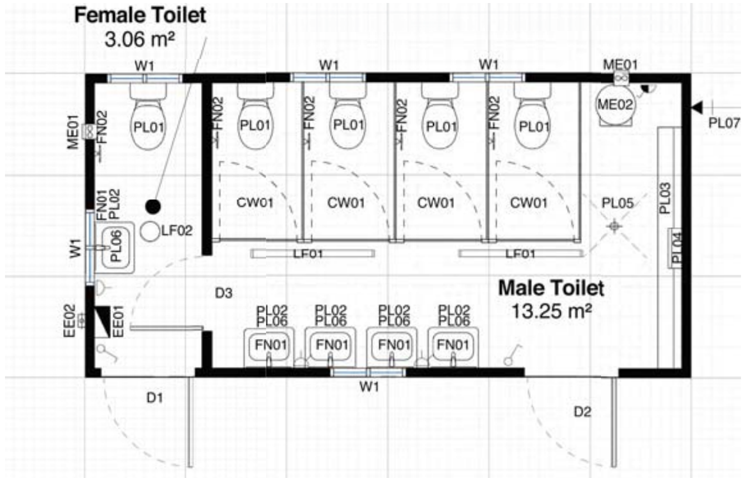
AHSCA

DATE: OCT 2018 | DESIGNED: LC | SCALE: AS SHOWN | DRAWN: LC

JOB No 17208 | DWG No DA4.11 | No IN SET ---- OF | REV 1



DEMOUNTABLE OFFICE 12.0m X 3.0m PLAN
SCALE 1:40



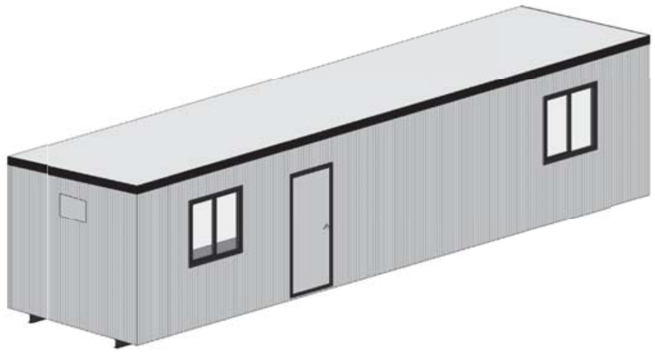
DEMOUNTABLE AMENITIES 6.0m X 3.0m PLAN
SCALE 1:40

Demountable office 12.0mx3.0m Specification List

Standard Inclusions	Standard Finishes
1 External plain metal door 2043 x 886	Exterior:
4 Windows 1075 x 1155 with flyscreens	Trimdeck roof cladding (Surfmist)
3 Cut-outs for Air Conditioner, framed and clad over	CCS Mesa cladding to exterior walls (Merino)
4 Diffused LED batten lights, 38W	R2.0 glasswool batts
3 Single socket GPO for AC's. 10Amps	Interior:
3 Double socket GPO's, 10 Amps	Pre-finished polyester plywood linings to ceilings (Mirage Pearl)
1 Load centre & power entry box	Pre-finished polyester plywood linings to walls (White Smoke)
	Seamless vinyl floor coverings
	D Mould skirting & cornice throughout

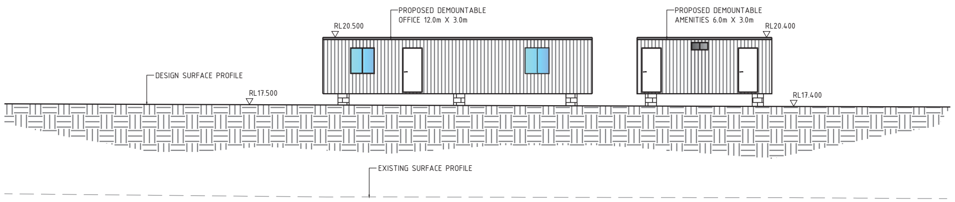
Demountable Amenities 6.0mx3.0m Specification List

Standard Inclusions	Standard Finishes
2 External plain metal door 2043 x 886	Exterior:
5 Windows 350 x 755 with flyscreens and obscured glazing	Trimdeck roof cladding (Surfmist)
2 Diffused LED batten lights, 38W	CCS Mesa cladding to exterior walls (Merino)
1 Diffused LED dome light, 15W	R1.5 glasswool batts (ceiling)
2 Double socket GPO's, 10 Amps	Interior:
1 Single socket GPO, 10 Amps	Pre-finished polyester plywood linings to ceilings (Mirage Pearl)
1 Load centre & power entry box	Pre-finished polyester plywood linings to walls (White Smoke)
1 50L 3.6kw Hot Water System	Non slip vinyl floor coverings (Sand Grey)
4 Full height (1550 x 900) sanitary partitions	100mm non slip vinyl skirtings
5 Vitreous china toilet suites	D Mould cornice throughout
5 Chrome toilet roll holders	
1 Urinal, 2400mm long	
5 Stainless steel basins w/flick mixer (H&C) and 250mm acrylic	



DEMOUNTABLE OFFICE 12.0m X 3.0m PERSPECTIVE VIEW
SCALE 1:40

DEMOUNTABLE AMENITIES 6.0m X 3.0m PERSPECTIVE VIEW
SCALE 1:40



TYPICAL SECTION THROUGH DEMOUNTABLES (1 / -)
HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:100

DA APPROVAL

1. DO NOT SCALE OFF THIS DRAWING. USE DIMENSIONS & ARCHITECTURAL DRAWINGS ONLY
2. DRAWINGS TO BE READ IN CONJUNCTION WITH SPECIFICATION.
3. LEVELS ARE INDICATIVE ONLY AND ARE TO BE CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS
4. AUTHORITIES MAINS AND/OR EXISTING SERVICES ARE TO BE LOCATED AND CHECKED PRIOR TO COMMENCEMENT OF ANY WORKS
5. COMPLETION OF THE QUALITY RECORD IS EVIDENCE THAT THE DESIGN AND DRAWING HAVE BEEN VERIFIED.

VERIFICATION
COMPLETION OF THE DRAWING STATUS IS EVIDENCE THAT THE DESIGN HAS BEEN VERIFIED AS CONFORMING TO THE REQUIREMENTS OF THE PROJECT QUALITY PLAN

DRAWING STATUS	INITIAL	DATE
PRELIMINARY		
FOR INFORMATION ONLY		
FOR CLIENT APPROVAL		
FOR TENDER		
FOR CONSTRUCTION		

CHECKED | DATE
APPROVED | DATE
PAGE: B1 | PLOT DATE: January 31, 2019
NORTH POINT

SCALE: SCALE AS SHOWN ON PLAN

DATE	No	AMENDMENT	INIT	REV
31.01.19		ISSUED FOR DA APPROVAL	MW	01

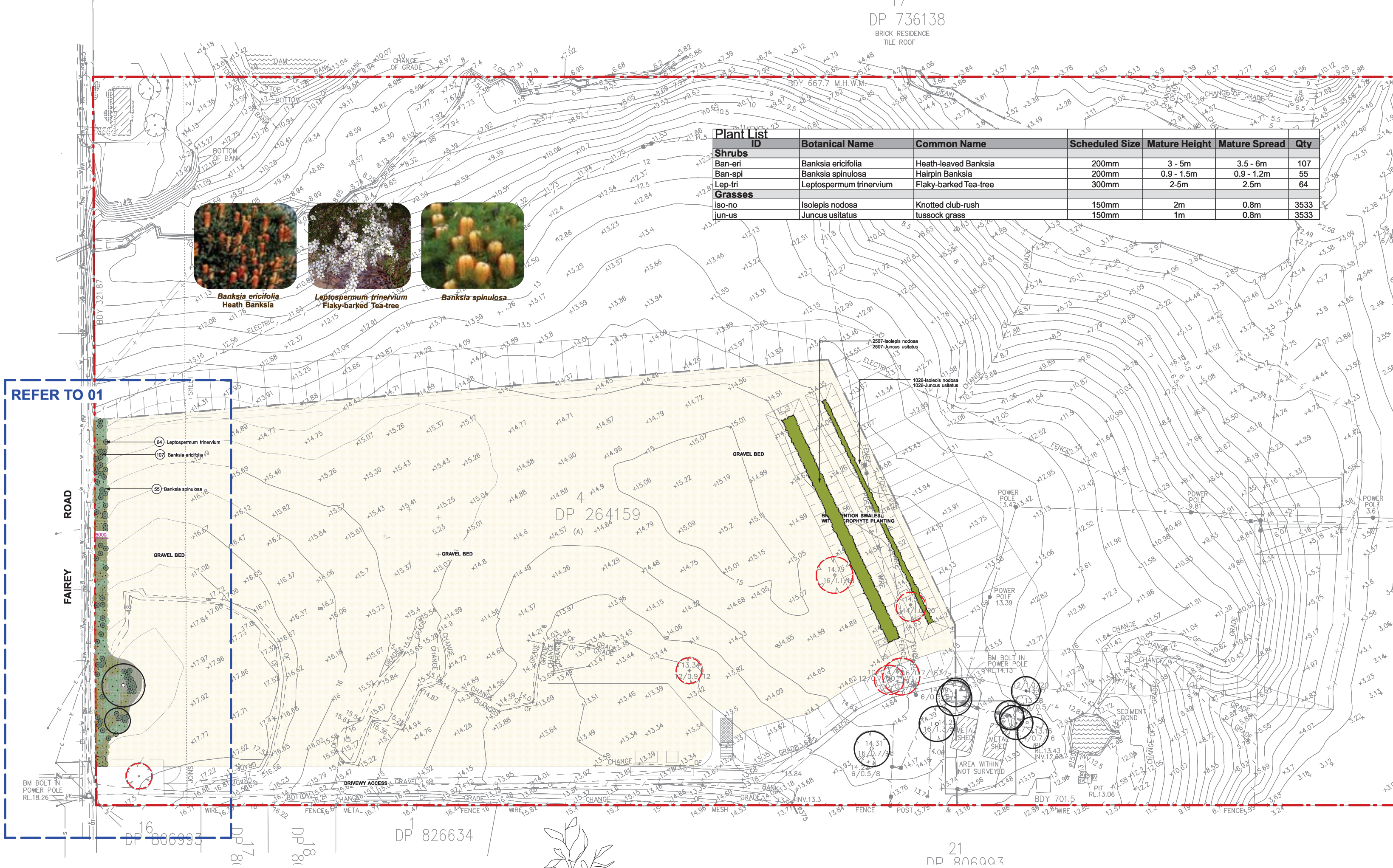
DATE	No	AMENDMENT	INIT	REV

CLIENT: AD+E
PROJECT: 100 FAIREY RD, SOUTH WINDSOR
PLANNER: MACRO PLAN
DRAWING TITLE: CONCEPT DEMOUNTABLE OFFICE AND AMENITIES DETAIL SHEET

SPARKS +PARTNERS
CONSULTING ENGINEERS
HYDRAULIC | CIVIL | FIRE
Level 1, 91 George Street | Parramatta | NSW 2150
P 02 9891 5033 | F 02 9891 3898 | E admin@sparksandpartners.com.au

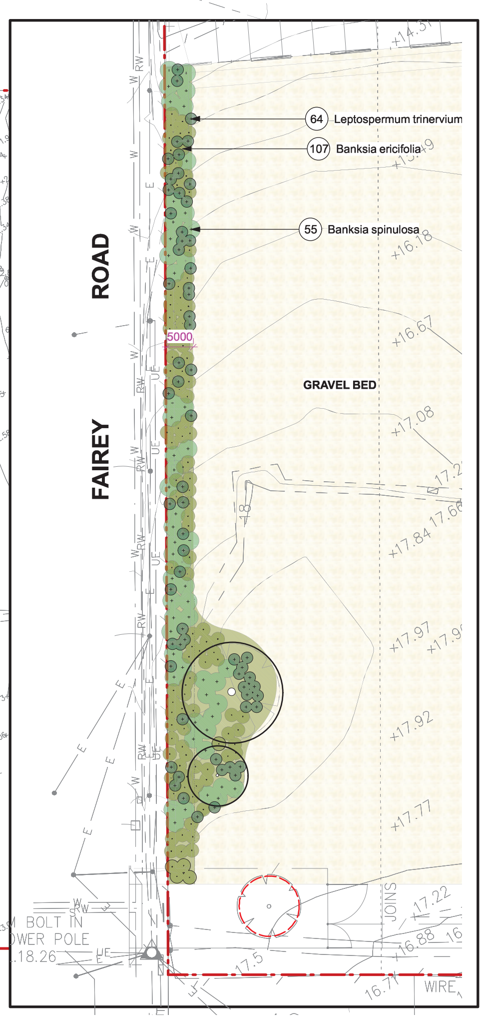
DATE: OCT 2018 | DESIGNED: LC
SCALE: AS SHOWN | DRAWN: LC
JOB No: 17208 | DWG No: DA4.12 | No IN SET: ---- OF | REV: 01

AHSCA CORPORATE MEMBER



Plant List

ID	Botanical Name	Common Name	Scheduled Size	Mature Height	Mature Spread	Qty
Shrubs						
Ban-eri	Banksia ericifolia	Heath-leaved Banksia	200mm	3 - 5m	3.5 - 6m	107
Ban-spi	Banksia spinulosa	Hairpin Banksia	200mm	0.9 - 1.5m	0.9 - 1.2m	55
Lep-tri	Leptospermum trinervium	Flaky-barked Tea-tree	300mm	2-5m	2.5m	64
Grasses						
iso-no	Isolepis nodosa	Knotted club-rush	150mm	2m	0.8m	3533
jun-us	Juncus usitatus	tussock grass	150mm	1m	0.8m	3533

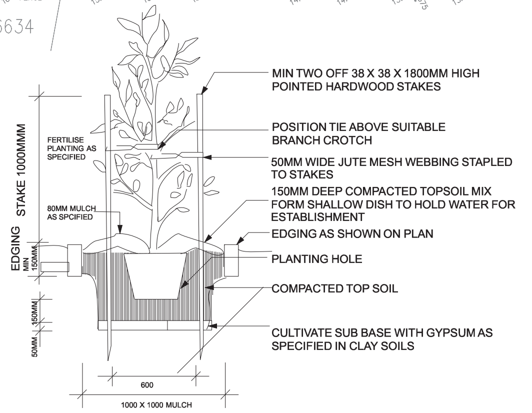


Front Boundary Planting
Scale: 1:500

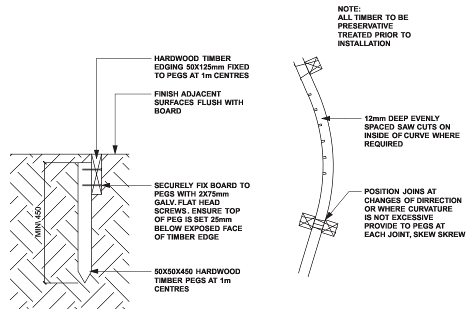
LANDSCAPE MAINTENANCE NOTES

MONTH	MOWING EDGING BLOWING	FERTILISING (SEASOL)	CHECK IRRIGATION	HAND WEED REMOVAL	PRUNING	WEED SPARAYING	WATERING/ IRRIGATION	PLANT REPLACEMENT IF REQUIRED
DEC	W	M	M	W	F	M	D	W
JAN	W	M	M	W	F	M	D	W
FEB	W	M	M	W	F	M	D	W
MAR	F	M	M	F	M	M	D	W
APR	F	N/A	M	F	M	M	D	W
MAY	F	N/A	M	M	M	M	D	W
JUNE	M	N/A	M	M	N/A	N/A	2ND D	W
JULY	M	N/A	M	M	N/A	N/A	2ND D	W
AUG	M	N/A	M	M	N/A	N/A	2ND D	W
SEP	M	M	M	M	N/A	N/A	2ND D	W
OCT	F	F	M	F	M	M	D	W
NOV	F	F	M	F	M	M	D	W

PLANTING ESTABLISHMENT PERIOD - 12 MONTHS
LANDSCAPE MATERIAL ESTABLISHMENT - 12 MONTHS
KEY D-DAILY, W-WEEKLY, F-FORTNIGHT, M-MONTHLY, 2ND DAY,



TYPICAL TREE PLANTING DETAIL



TIMBER EDGE
NTSual Size

LEGEND

- DRIVEWAY
- DEEP SOIL GARDENS
- GRAVEL BED
- BOUNDARY
- HYDROMULCH BATTER

LEGEND

- Existing Trees to be Retained
- Existing Trees to be Removed

ISSUE	DATE	COMMENT
B	6/2/19	For Approval

AMENDMENTS

GENERAL NOTES
All work to be carried out in accordance with the Building Code of Australia, all Local and State Government Ordinances, relevant Australian Standards, Local Authorities Regulations and all other relevant Authorities concerned.
All structural work and site drainage to be subject to Engineer's details or certification where required by Council. This shall include r.c. slabs and footings, r.c. and steel beams & columns, wind bracing to AS 1170
and AS4055, anchor rods or bolts, tie downs, fixings etc., driveway slabs and drainage to Council's satisfaction. All timbers to be in accordance with SAA Timber Structure Code AS1720 and SAA Timber Framing Code AS 1684. All work to be carried out in a professional and workman- shiplike manner according to the plans and specification.
NOTE
Do not scale off the drawings unless otherwise stated and use figured dimensions in preference.
All dimensions are to be checked and verified on site before the commencement of any work, all dimensions and levels are subject to final survey and set-out
No responsibility will be accepted by Sitedesign for any variations in design, builder's method of construction or materials used, deviation from specification without permission or accepted work practices resulting in inferior construction. Locate and protect all services prior to construction.
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www.sdstudios.com.au

Project	PROPOSED LANDSCAPE PLAN
Address	100 Fairey Road South Windsor
Drawing Title	LANDSCAPE PLAN
Client	MACROPLAN

Scale 1:1000@A1
Drawing No. 1176

Page **L-01 B**