

2 and 2a Bullecourt Avenue, Milperra Flood Impact and Risk Assessment

Client

Mirvac Residential (NSW) Development Pty Ltd

Issued

14/11/2025



Western Sydney Office
Level 4, LPC House,
Suite 4.05, 3 Fordham Way
Oran Park, NSW 2570
Tel: (02) 4625 5055

beveridgewilliams.com.au

BW
Beveridge Williams

Client: Mirvac Residential (NSW)
Development Pty Ltd

Issued: 14/11/2025

Version: D

Prepared by: Yanzhe Li

Checked by: Frank Guo

Project Manager: Shane Gray

Project Number: 2301879

Surveying
Asset Recording
Civil Engineering
Infrastructure Engineering
Traffic & Transport Engineering
Environmental Consulting
Water Resource Engineering
Strata Certification (NSW)
Town Planning
Urban Design
Landscape Architecture
Project Management

Revision Table

REV	DESCRIPTION	DATE	AUTHORISED
A	Issued for DA	22/08/2025	SG
B	Update per Client Comments & Issued for DA	27/08/2025	SG
C	Issued for SSDA	28/10/2025	SG
D	Issued for former SSDA Lodgement	14/11/2025	SG

Copyright Notice

© Copyright – Beveridge Williams & Co P/L

Users of this document are reminded that it is subject to copyright. This document should not be reproduced, except in full and with the permission of Beveridge Williams & Co Pty Ltd

Contents

1	INTRODUCTION	5
2	RELEVANT SEARS	5
3	SITE OVERVIEW	6
3.1	The proposed Development	6
3.2	Background, Rationale and Objectives of the Flood Impact Assessment	7
4	METHODOLOGY	9
5	AVAILABLE DATA	11
6	HYDRAULIC MODEL	11
7	MODEL RESULTS	16
7.1	Flow Behaviour	16
7.1.1	Flow Path	16
7.1.2	Flood Depth	16
7.1.3	Flood Velocities	16
7.1.4	Hazard Category	16
7.1.5	M5 Culverts	16
7.2	Model Limitation	17
8	FLOOD RISK ASSESSMENT AND MANAGEMENT	18
8.1	Flood Impact Assessment and Management	18
8.1.1	Existing Western Residential Area	18
8.1.2	To M5 Crossings	19
8.1.3	Flood Impacts on the Downstream Floodplain i.e. Kelso Park / Swamp	21
8.2	Flood Evacuation Route	22
8.3	Climate Change Scenario	22
8.4	Other Flood Risk	22
9	CONCLUSIONS	25

Figures

Figure 1 Locality Map	10
Figure 2 Existing model setup (Overall View)	12
Figure 3 Proposed model setup (Overall View).....	13
Figure 4 Existing Hydraulic Model Roughness	14
Figure 5 Proposed Hydraulic Model Roughness.....	15
Figure 6 M5 Motorway Culverts Location	19
Figure 7 100-Year flow in M5 Motorway Culverts-Cul_001b between Existing scenario and Proposed Scenario	20
Figure 8 100-Year flood velocity in M5 Motorway Culverts-Cul_001b between Existing scenario and Proposed Scenario	20
Figure 9 100-Year flood Flow in M5 Motorway Culverts-C1613A between Existing scenario and Proposed Scenario	21
Figure 10 100-Year flood velocity in M5 Motorway Culverts- C16134A between Existing scenario and Proposed Scenario	21

Figure 11 Water Level Difference-1% AEP- Proposed Climate Change Case Less Proposed Base Case	23
Figure 12 Evacuation Route in PMF.....	24

Appendix

APPENDIX A: SITE SURVEY

APPENDIX B: BASE CASE EXISTING FLOOD MAPS

APPENDIX C: BASE CASE PROPOSED FLOOD MAPS

APPENDIX D: SENSITIVITY TEST 100-YEAR WATER LEVEL DIFFERENCE

1 INTRODUCTION

This Flood Impact and Risk Assessment is submitted to the Department of Planning, Housing and Infrastructure (the Department) on behalf of Mirvac Residential (NSW) Pty Ltd (the Applicant) in support of a State Significant Development Application (SSDA) for a staged residential development at 2 and 2A Bullecourt Avenue (the site).

2 RELEVANT SEARS

This Flood Impact and Risk Assessment addresses the following relevant Secretary's Environmental Assessment Requirements (SEARs) set out in the table below.

Table 1 SEARs Compliance Table

SEARS Request		Response / Location in Report
The flood extent and velocity up to the Probable Maximum Flood and risk on-site having regard to adopted flood studies and, floodplain risk management studies and plans		Appendix B and Appendix C show the flood depth, flood velocity and flood hazard category up to PMF.
Evacuation and egress routes		Section 8.2 and Figure 12
The potential effects of climate change		Section 8.3
any relevant provisions of the NSW Flood Risk Management Manual, and any other relevant guidelines	Canterbury-Bankstown Development Control Plan Chapter 2.2, Schedule 3 Habitable floor levels to be no lower than the 100-Year flood level plus freeboard.	Section 3.2 Refer to DCP chapter 2.2 schedule 3, there is no planning considerations required for subdivision except flood effects, however, the subdivision of 2 and 2A Bullecourt Avenue meets the minimum floor level requirements for residential.
	Canterbury-Bankstown Development Control Plan Chapter 2.2, Schedule 3 Flood impacts to be considered in the case of major development if Council advise that the development may generate flood impact, such as significant loss of storage or conveyance. Any assessment may also be asked to demonstrate that the proposed development is structurally sound.	Section 8.1

3 SITE OVERVIEW

The site is currently owned by Western Sydney University and is located within the Canterbury Bankstown LGA at 2 and 2A Bullecourt Avenue, Milperra, being legally described as Lot 2 in DP1291984 and Lot 1 in DP101147 (refer Figure 1)

The total site has an area of approximately 19.64ha and is the subject of numerous easements affecting the site, including two easements to drain water, easements for electricity and other purposes, and a right of carriageway.

Since the demolition of the previous buildings on the site, the site currently comprises:

- Existing at-grade car park (within Zone 4) repurposed as parking and hardstand area for the temporary sales office.
- Existing at-grade car park for the Childcare Centre (generally within the location of the future Road 2B).
- At-grade roads off Bullecourt Avenue.
- A large oval to the south.
- The Western Sydney University Early Learning Centre (Child-care centre).
- Vegetation of varying significance, including Cumberland Plain Woodland.

The site is bound by the M5 Motorway to the south, Ashford Avenue / existing residential dwellings to the west, Bullecourt Avenue / existing industrial development to the north, and Horsley Road / existing industrial development to the east. Adjoining the site along the southeastern boundary is Mount St Joseph Catholic College.

A substantial number of bus stops are located along Bullecourt Avenue and Horsley Road, servicing routes that connect passengers both within and beyond the LGA, including direct links to Bankstown Central (approximately 8.5km drive from the site), Westfield Burwood, and Westfield Miranda. While the nearest train line is the T8, accessible via East Hills, Panania, and Revesby stations, the T6 line at Bankstown Station can also be reached via bus services operating near the site.

3.1 The proposed Development

The project will be delivered in stages and across two separate SSDA Projects, and comprises the construction of up to 430 dwelling houses, dual occupancies and attached dwellings, three (3) public parks, new roads and shared paths, civil infrastructure, a car park, and the management of conservation land.

Specifically, across the two SSDAs, consent is sought for:

- Tree removal
- Site remediation (excluding works carried out as category 2 remediation works)
- Construction of bulk earthworks, public roads and landscaping, and services
- Augmentation of existing services and road infrastructure
- Construction of three (3) public parks
- Construction of up to 430 dwelling houses
- Construction of a carpark to service the existing childcare centre and E1 Local Centre zoned land
- Subdivision resulting in up to 430 residential lots, infrastructure lots, and creation of community title lot for land zoned C2 Environmental Conservation and E1 Local Centre
- Conservation works including the management of >2Ha Cumberland Plain Woodland Species.

This SSDA comprises of all Civil works across the entirety of the site as well as the construction of all 62 dwellings in Stages 1 and 2 only, which are as follows:

- Stage 1 – Commencement of site-wide tree removal and land remediation, creation of two (2) super lots and total of 22 residential lots, and construction of 22 dwelling houses fronting Ashford Avenue. This will be the first stage to be delivered and will connect into the existing infrastructure that located within Ashford Avenue.
- Stage 2 – Creation of four (4) super lots, a new lot (Lot 25) across the RE1 Public Recreation zoned land, and 40 residential lots. This stage also involves the construction of 40 dwellings within Stage 2, and the construction of new roads and the new public park referred to in the Civil Plans as the 'Central Park'.
- Stage 3a – Creation of a new super lot, and the construction of perimeter roads surrounding the existing childcare centre, construction of a new car park to service the childcare centre and C2 Environmental Conservation zoned land. It is proposed all associated civil works required to enable the operation of the existing childcare centre will be delivered under this stage. The new traffic intersections at both Bullecourt Avenue and Horsley Road will be constructed.
- Stage 3b – Creation of three (3) lots to be delivered under a Community Title Scheme for the E1 Local Centre zoned land.

- Stage 4 – Creation of eight (8) super lots, a new lot (Lot 50) across the RE1 Public Recreation zoned land, and a new lot (Lot 49) across the SP2 Infrastructure zoned land. This stage also involves the construction of new roads, the stormwater infrastructure Basin 1 and Basin 2, and the new public park referred to in the Civil Plans as the 'Southern Park', all to be dedicated to Council.
- Stage 5 – Creation of six (6) super lots and construction of new roads and civil works.
- Stage 6 – Creation of nine (9) super lots and a new lot (70) across the RE1 Public Recreation zoned land. This stage also involves the construction of new roads and civil works, and the new public park referred to in the Civil Plans as the 'Northern Park', all to be dedicated to Council.
- Stage 7 – Creation of six (6) super lots and construction of road and civil works.

The second SSDA will seek consent for all outstanding works in stages 3 to 7, which are as follows:

- Stage 3 – Construction of the Childcare Alterations and Additions and Construction of a permanent structure for Commercial use.
- Stage 4, 5, 6 & 7 – Creation of the subsequent subdivision into residential lots and construction of dwellings.

3.2 Background, Rationale and Objectives of the Flood Impact Assessment

As part of the original Development Applications lodged for Stages 1 and 2, a flood verification letter prepared by BW was lodged which supported the development. The letter referred to the original J. Wyndham Prince flood and risk impact assessment 2023 (JWP report) that was accepted by Council/DPIE in support of the rezoning of the site. The JWP report identifies that there will be no detrimental offsite impacts as a result from the proposed development.

The JWP report calculated a regional 1%AEP flood level for the site of RL5.55m which is more conservative than Council's adopted 1%AEP flood levels from the Brewsher 2004 report or from the Kelso Park/Swamp report. The flood verification letter assessed the proposed development against the conservative 1%AEP flood level of RL5.55 and verified that the future finished floor levels of the houses would be above the Flood Planning Level based on the JWP Report (i.e. 5.55m+0.5m=6.15m).

In addition, the flood verification letter also verified that the change in landform in the southern area of the site as a result of proposed cut and fill operations to support the future residential development provided additional flood storage than what was available under existing conditions in both the temporary and ultimate scenarios. The temporary scenario being the temporary sediment basin/temporary raingarden (in stage 1) and the permanent basins 1 and 2 along the southern boundary.

As part of further requests for information for the previous Development Applications, Council requested that a Stormwater Systems Report is to be provided. An original Stormwater System Report (SSR) for the site was issued by Council on 22/04/2025. This SSR identified that a Flood Study is Required.

During a meeting with Council staff on 18/06/2025 following the withdrawal of the original Development Applications lodged for Stages 1 and 2, Council requested a Flood Impact Assessment be submitted with any future Development Applications. Council advised that the flood impact assessment is required to investigate:

- the flood behaviour in the southern portion of Ashford Avenue and how any change to the overland flow from Ashford Avenue and Flanders Avenue into the site may impact adjacent residential properties;
- any increase in flows into the M5 culverts, and;
- any adverse flood impacts on downstream floodplain i.e. Kelso Park / Swamp.

Council confirmed within the meeting that they are not concerned with compensatory storage during flood events or overland flows internally to the site as the Water Cycle Management Plan and Flood verification letter previously supplied were adequate to show that the proposed development mitigates these issues. Council also confirmed that they accept the more conservative flood planning level of 0.5m above the regional Flood level RL5.55m identified in the JWP Report.

A new Stormwater Systems Report issued by Council for the site dated 09/07/2025 revised the original conclusion and confirmed that a Flood Impact Assessment is not required. Despite this, in further discussions with Council, Council

requested that a Flood Impact Assessment still be completed to address the items above which relate to areas external to the development.

On the 29/07/2025 BW received the 'Kelso Stormwater catchment flood modelling' from Council. The model was created by BMT WBM Pty Ltd dated 2009,

Council confirmed on 31/07/2025 that "*the 2020 model referred to by JWP in their report is the 2020 Georges River Flood Study not the Kelso Swamp Flood Study*" and the 2009 BMT Flood Study Model provided by Council is "*the one used by Council for its mapping for the Kelso Swamp catchment*" and should be used. During the meeting with Council, Council asked that we use Council's Tuflow model so that any amendments can be integrated back into Council's model at a later date.

BW has utilised this model with minor refinements to assess the flooding affectation under and existing and proposed scenarios to the:

- western existing residential area,
- M5 culverts, and
- downstream area of the Kelso Swamp Catchment for the 1% AEP and PMF Flood Events.

Furthermore, it is noted that the Kelso Park/Swamp has a significantly smaller 1%AEP Flood Level. As such, a sensitivity analysis has also been completed. For the sensitivity analysis, the model was updated with a tailwater condition of 5.55 m AHD for both the existing and proposed scenarios, as to align with the JWP report.

This report is to be read in conjunction with the Water Cycle Management Plan which addresses Water Quantity/OSD modelling, Water Quality/WSUD modelling, Compensatory Storage, and the assessment of increased rainfall data as a result of climate change to the year 2090 in accordance with the recent AR&R changes.

For this report 1%AEP and 1:100 year ARI or 100-year are interchangeable and mean the same thing.

4 METHODOLOGY

As mentioned above Council confirmed on 31/07/2025 that “*the 2020 model referred to by JWP in their report is the 2020 Georges River Flood Study not the Kelso Swamp Flood Study*” and the 2009 BMT Flood Study Model provided by Council is “*the one used by Council for its mapping for the Kelso Swamp catchment*” and should be used. During the meeting with Council, Council asked that we use Council’s Tuflow model so that any amendments can be integrated back into Council’s model at a later date.

The Flood impact and Risk assessment was conducted in accordance with Guidelines for Development in Flood Affected Areas (DELWP, 2019) and Flood Risk Management Manual, Department of Planning and Environment (June 2023).

The following methodology was used to investigate the existing flooding conditions for the site and facilitate assessment of potential flooding impacts to the adjoining areas:

- Review the received Kelso Stormwater catchment flood model
- Update the flood model with the actual topographic survey for the site (as opposed to Lidar) and create a proposed scenario with the proposed Finished Surface levels of the site, (other details of changes are list in Section 6 below.
- Simulate the 1% AEP and PMF storm events and assess the resultant flood behaviour and conveyance of water surrounding the subject site.
- Compare existing and proposed scenarios to assess adverse impacts to the western existing residential area, M5 culverts and downstream area of it by comparing existing and proposed scenarios.
- Document in a final report.



5 AVAILABLE DATA

The following data was available and obtained for the flood impact and Risk assessment.

- Rainfall on grid TUFLOW model of Kelso Stormwater Catchment provided by Council
- Detailed Survey conducted by BW on 28th February 2024 at the subject site
- Design surface from BW for the proposed development.

6 HYDRAULIC MODEL

TUFLOW is robust and widely accepted unsteady-state flood simulation software with combined 1D and 2D design capabilities. The flood modelling processes consider guidance provided in ARR 2019 and floodplain development manual 2023.

BW has utilised the Kelso Stormwater Catchment Flood Model (originally developed by BMT WBM Pty Ltd in 2009 and provided by Canterbury Bankstown Council) as the basis for this assessment. The model was updated to evaluate flooding at the subject site for the following Annual Exceedance Probability (AEP) events:

- 1% AEP
- PMF

The updated of the model includes:

- Software Version:
 - o Upgraded TUFLOW engine from 2008-08-DB to 2023-03-A
- Existing scenario
 - o Incorporated latest site survey data conducted by BW, date on 28th February 2024 refer Section 5 this is because the original data was based on Lidar and not on actual Topographic survey data
- Proposed Scenario refer section 3
 - o Integrated BW's design surface for the proposed development
 - o Updated material layers to reflect proposed changes
 - o Site inflow adjustments to match the proposed drainage network and earthworks.
- Sensitivity test
 - o Updated the initial water level and tailwater condition to 5.55 mAHD for both existing and proposed scenarios, as to align with flood and risk impact assessment WSU Campus Milperra Planning proposal prepared by J. Wyndham Prince in 2023

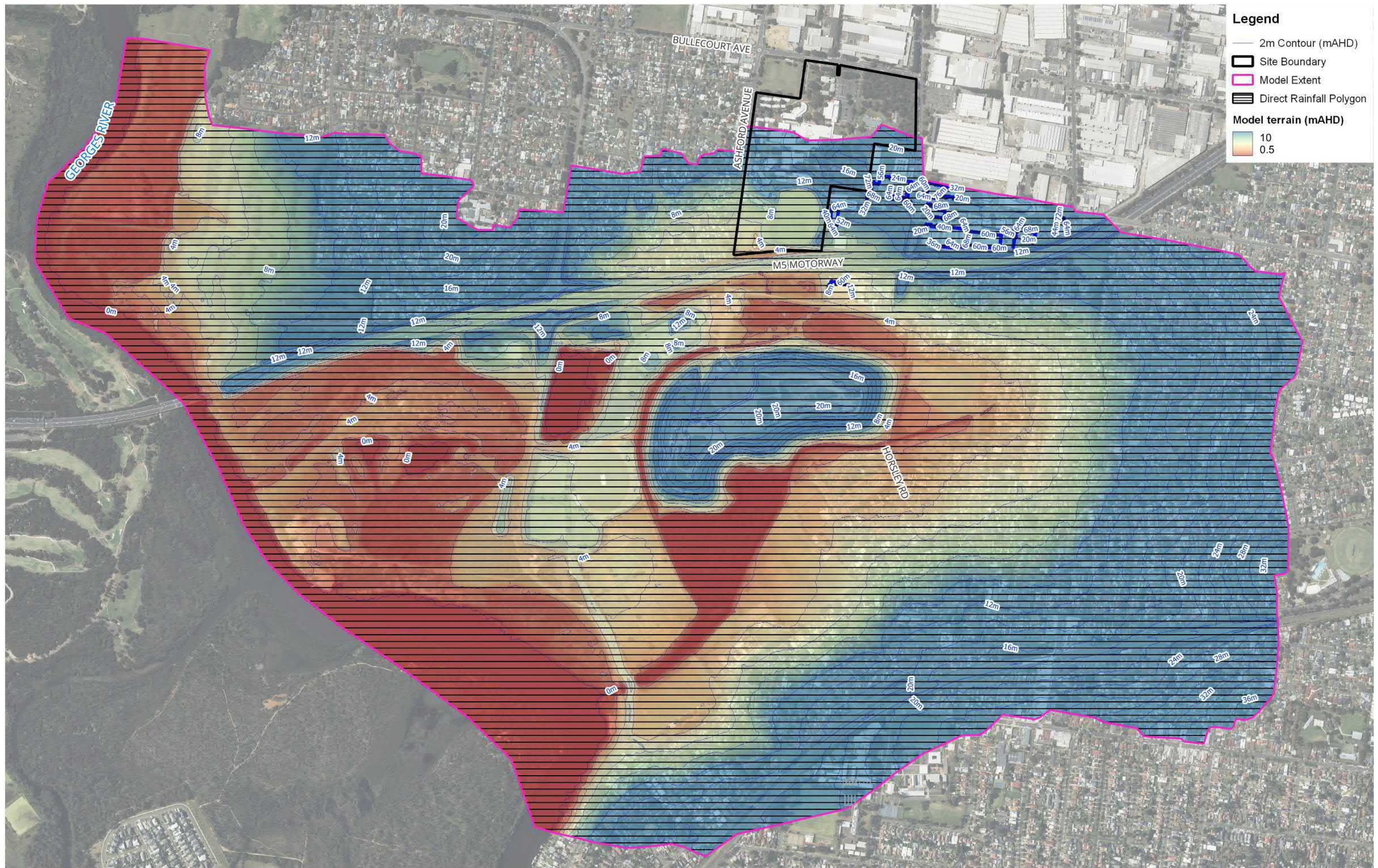
Below are the details that have been retained from the 2009 model:

- Rainfall data
- Grid Resolution: 5m x 5m (it is noted that this is a large grid size and doesn't necessarily pick up abrupt changes in level like kerbs, retaining walls etc.)
- DEM offsite
- Roughness zone offsite
- The culverts and drainage networks

The model extents can be found in Figure 2 and Figure 3, The existing and proposed topography is shown in Figure 2 and Figure 3, with different 2D inflows applied for existing and proposed scenario, as shown in Figure 2 and Figure 3. The hydraulic roughness for both existing and proposed scenarios are shown in Figure 4 and Figure 5, respectively. Hydraulic roughness associated with buildings has been incorporated into the urban block to replicate the increased flow impedance within developed areas.

To maintain the most conservative outcome, as part of this assessment the "drainage network and culverts with no blockage" has been selected in the model.

The initial results identify that the critical duration is 120min and 60min for the 100-Year and PMF storm events, respectively. So only these storm events are selected for all modelling to speed up the modelling process.

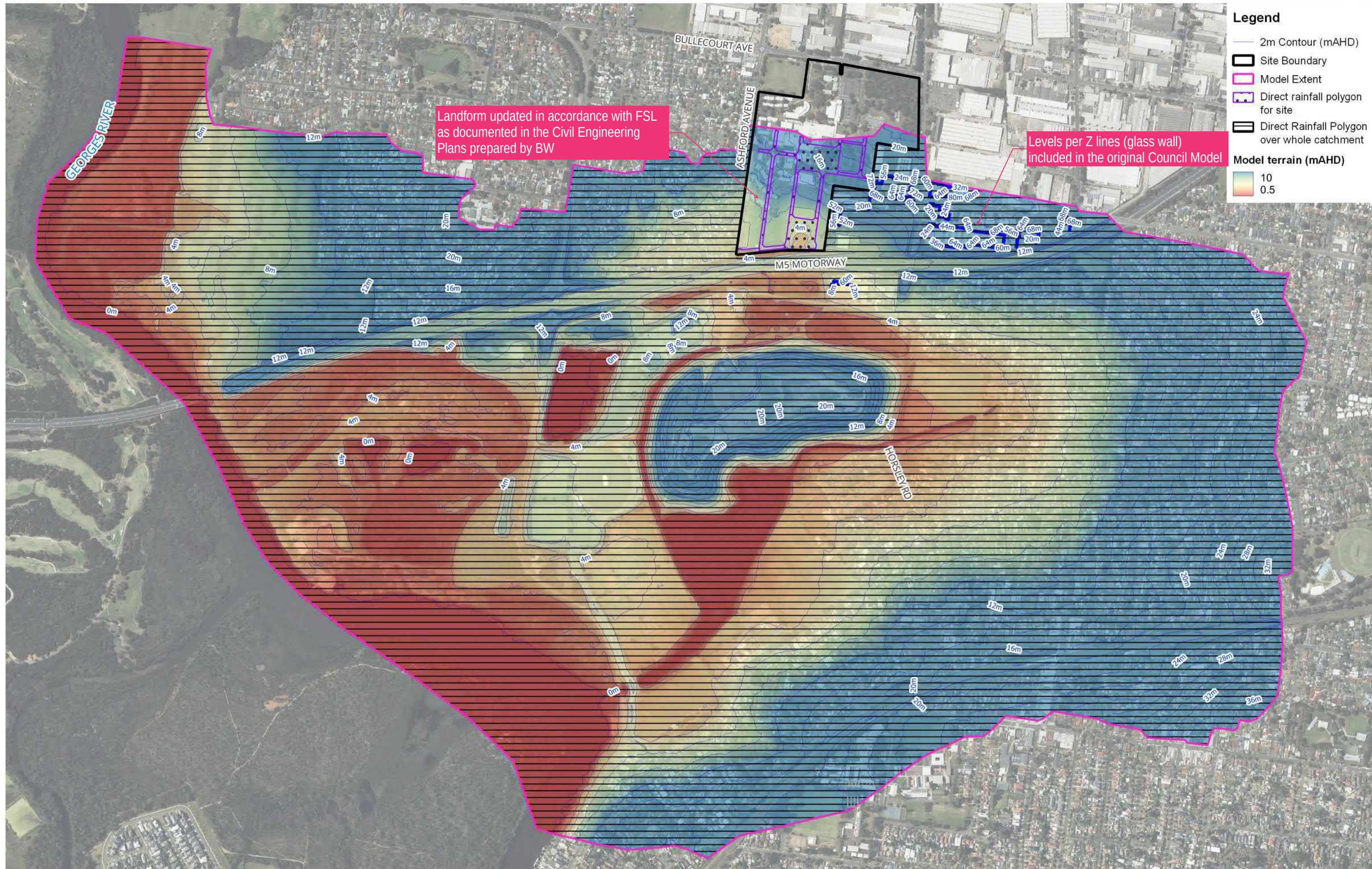


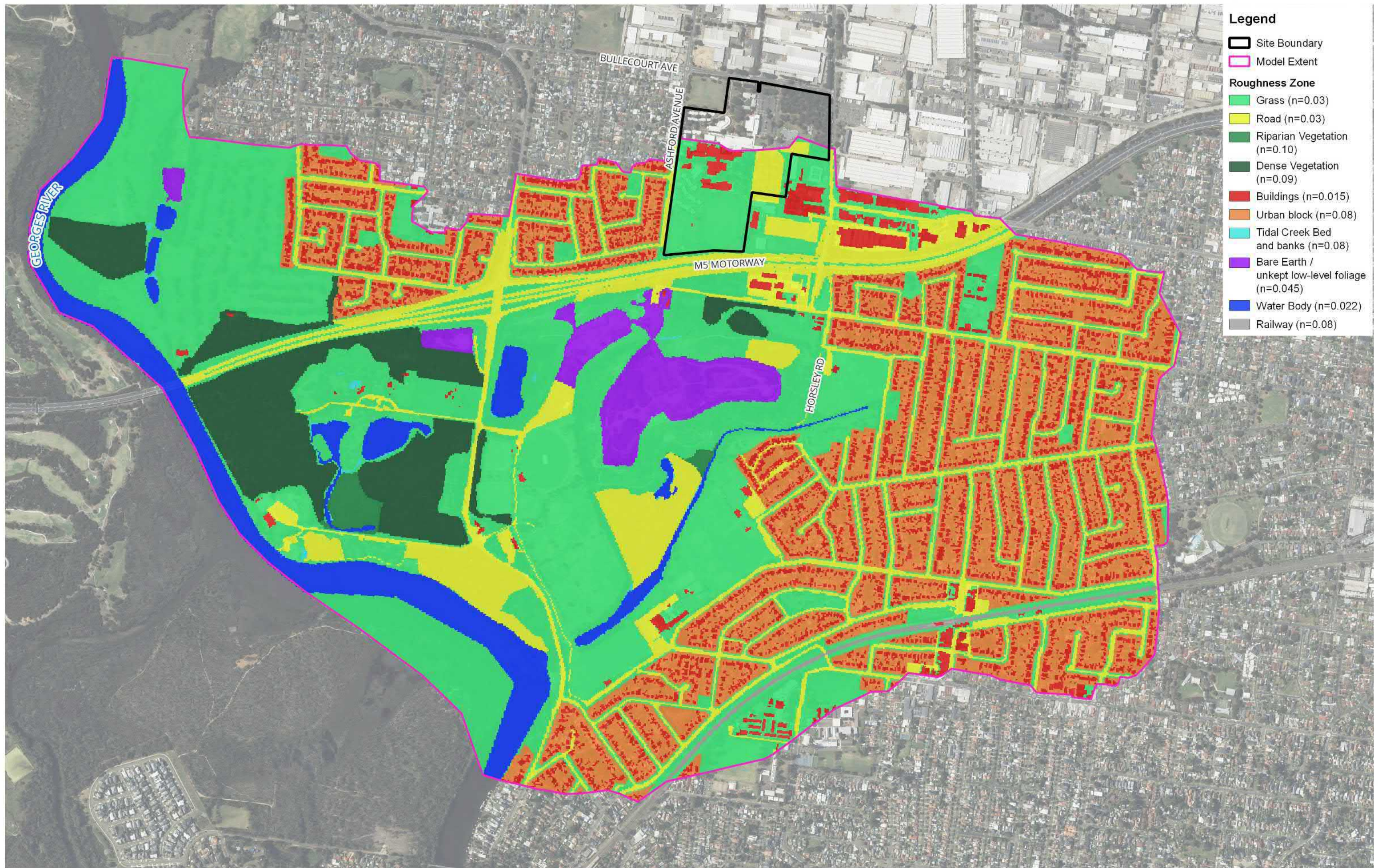
Legend

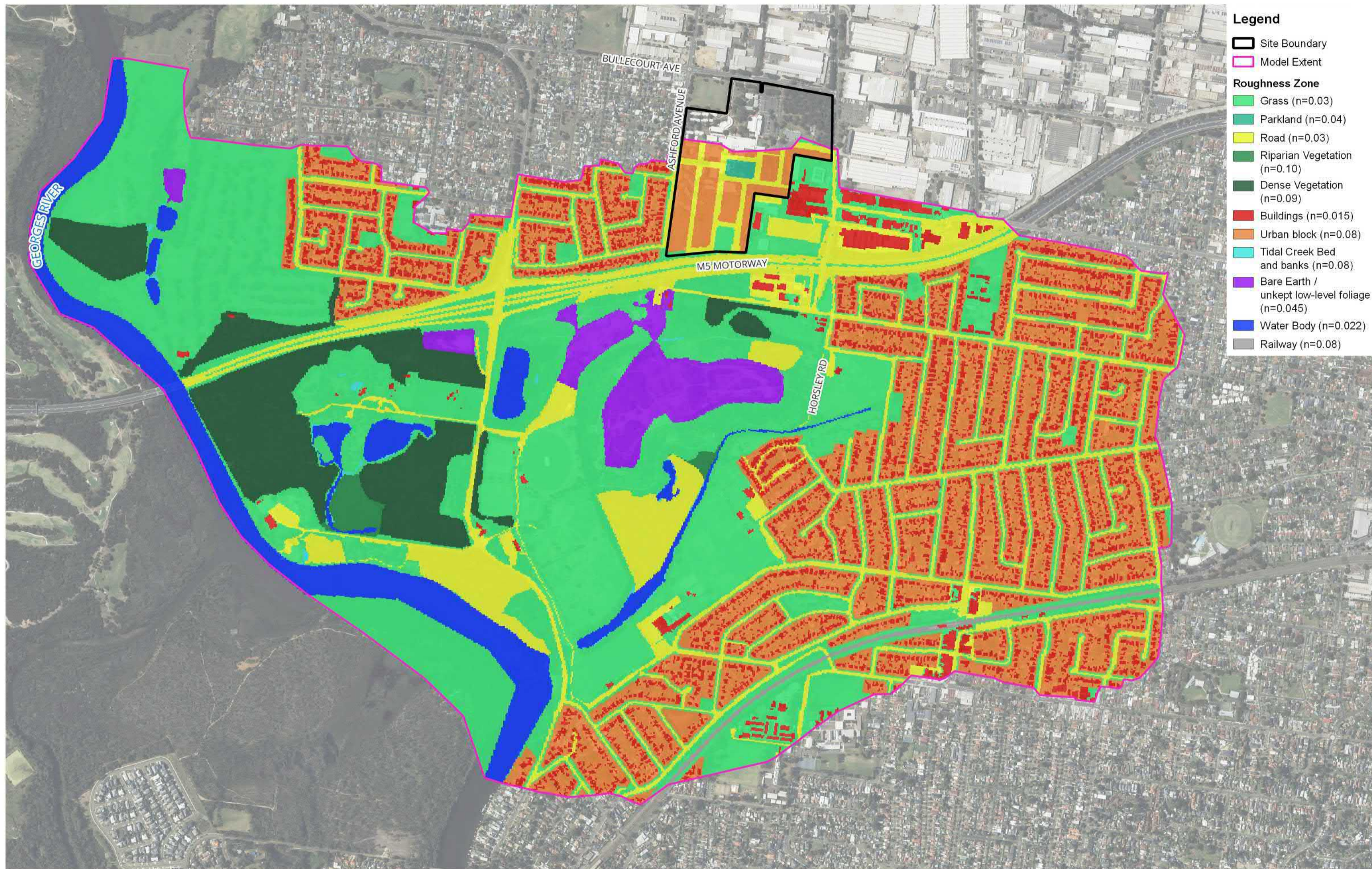
- 2m Contour (mAHd)
- ▭ Site Boundary
- ▭ Model Extent
- ▨ Direct Rainfall Polygon

Model terrain (mAHd)

10
0.5







7 MODEL RESULTS

7.1 Flow Behaviour

The model was simulated for the critical duration of 1% AEP and PMF. Flood maps for both design events showing the flood level, depth, velocity, and flood hazard for the base case existing scenario and the proposed scenario are presented in Appendix B and Appendix C, respectively. The 100-Year Water Level Difference for sensitivity test is shown in Appendix D.

7.1.1 Flow Path

For the 100-year event, the main overland flow path differs. Currently, flow is conveyed from Flanders Avenue/Ashford Avenue through the southwest corner of the site to a swale near the M5 motorway, primarily affecting the southern part of the site due to the natural terrain grade. In the proposed scenario, the flow is conveyed from Flanders Avenue/Ashford Avenue through the bottom portion of Ashford Avenue which is unformed road reserve consisting of grass and trees before entering into the southern swale.

7.1.2 Flood Depth

Regarding flood depth, the existing scenario shows that Ashford Avenue and Flanders Avenue adjoining the site are mainly limited to a flood depth of less than 0.25m. The proposed scenario shows a similar pattern except for the intersection of Flanders and Ashford Avenues which slightly exceeds 0.25m to just above 0.30m. For the PMF event, the existing condition has a maximum depth of 2.2m in the south-western corner, with the intersection and areas along the M5 motorway heavily inundated by over 1.0m of water. The proposed scenario improves depths within the site to mainly under 0.25m, but the intersection and M5 areas remain heavily inundated.

7.1.3 Flood Velocities

Flood velocities in the existing 100-year event exceed 1m/s on Ashford and Flanders Avenues and locally in the south-western corner. The proposed scenario reduces velocities generally to under 1m/s along Ashford and Flanders Avenues. For the PMF, existing velocities exceed 1.5m/s on roadways and reach 2m/s in the south-western corner, while the proposed scenario sees velocities reduced to under 1.5m/s for most of along Ashford and Flanders Avenues.

7.1.4 Hazard Category

The hazard category for the existing 100-year event is mostly category 1, in the majority of Ashford and Flanders Avenues including the intersection of Ashford and Flanders falls into category 1. The exception to this is further west along Flanders which has a category 3 at the low point in the intersection with Dernancourt Parade. Along the southern site boundary, the swale in the M5 Motorway falls into categories 4 and 5 and areas across the M5 culverts are category 3 and above. In the proposed scenario, the 100-year event shows the majority of Ashford and Flanders Avenues remains as category 1 except that a small section in the intersection of Ashford and Flanders increases to Category 2. In the swale within the M5 Motorway, the Hazard Category changes as a result of the OSD Basin discharging water at a different location. A portion of the swale reduces categories while another section immediately downstream increases categories, but the swale never exceeds the maximum categories 4 and 5 shown in the existing condition.

For the PMF, the existing scenario the existing residential lots along the bottom portion of Ashford Avenue and along Flanders Avenue are impacted by varying hazard categories ranging from 1 to 4. The swale in the M5 Motorway boundary is primarily category 5 with some minor areas of category 6. For the PMF in the proposed scenario, the hazard category reduces along Ashford Avenue in particular at the intersection with Flanders Avenue where a portion is reduced from category 5 back to category 4. The other high-hazard areas remaining unchanged from the existing condition.

7.1.5 M5 Culverts

For drainage, the current M5 motorway culverts provide sufficient conveyance for all AEP design events under unblocked conditions in both existing and proposed scenarios.

7.2 Model Limitation

In TUFLOW modelling, “model noise” refers to small, localised variations in flood results that do not represent real impacts but are artefacts of the numerical solution. This arises because the shallow water equations used in flood modelling are nonlinear, meaning that even very minor changes in geometry, boundary conditions, or time stepping can produce localised differences in results. Such noise is most commonly observed at the flood extent margins, where cells may be intermittently wetting and drying. This can manifest as apparent changes, such as purple or yellow pixels on afflux maps, which indicate cells switching between wet and dry states across model runs. These edge effects are not hydraulically connected to the development and should not be interpreted as genuine flood impacts. Instead, they are recognised as numerical artefacts, distinguishable from true impacts, which propagate logically from modifications such as terrain changes, hydraulic controls, or boundary condition adjustments.

As shown in Figures C4 and C8 in Appendix C, several isolated purple cells are present in the western existing residential area. Because these cells are scattered and lack any continuous spatial pattern, they are interpreted as edge effects of the modelling process rather than true impacts generated by the proposed development.

8 FLOOD RISK ASSESSMENT AND MANAGEMENT

In this assessment, BW has interrogated the results noted above from the existing and proposed development scenarios simulated using the TUFLOW hydraulic model provided by Council with small refinements. The model was run under an unblocked drainage condition, which is considered as the worst case, to represent a conservative assessment of flooding behaviour.

8.1 Flood Impact Assessment and Management

8.1.1 Existing Western Residential Area

The modelling results indicate that the proposed site filling introduces a minor disturbance to the existing overland flow path along Flanders Avenue towards the M5 swale. This results in localised water level increase at the intersection of Flanders Avenue and Ashford Avenue. As shown in Figure C4 in Appendix C, during the 100-year event, the increase in flood level is less than 70mm, and this rise remains confined within the road carriageway. No afflux into adjoining residential properties is observed.

A review of the hazard mapping (Figures B3 in Appendix B and Figure C3 in Appendix C) demonstrates that, in 100-year event, under existing conditions, Ashford Avenue is predominantly classified as Hazard Category 1. Under the proposed development scenario, the road continues to fall within hazard category 1, with only a small number of cells transitioning to hazard category 2. Accordingly, the trafficability of Ashford Avenue and the intersection with Flanders Avenue remains unchanged.

The PMF map (Figure C8 in Appendix C), shows the swale in the M5 corridor to have an afflux range from 50mm to 100mm. Since it remains confined within the swale area and the hazard category for the swale remains in category 5 under proposed conditions it is considered a negligible impact. In the same map there is small patch of increase just above 50mm in Ashford Avenue north to the intersection of Flanders Avenue and Ashford Avenue. The maximum hazard category remains unchanged as category 3 in the lots and 5 in the road, but improvement is seen especially in Ashford Avenue and at the intersection, as shown in Figures B6 in Appendix B and Figure C7 in Appendix C.

A sensitivity analysis adopting an elevated tailwater of 5.55 m AHD (consistent with JWP, 2023) confirms the results are robust: impacts remain localised and negligible, with no off-site afflux, no change to road trafficability, and no material change to flood hazard. As shown in Figures D1 in Appendix D, for 100-Year, the predicted afflux remains within the site boundary, with only scattered increases in the swale; elsewhere in the model domain, flood-level differences are within ± 50 mm, which is considered negligible.

On this basis, it is concluded that flood impact risk caused from the proposed development is negligible on flood behaviour under 100-Year and PMF. Road trafficability is unchanged, no afflux within existing residential allotments for 100-year, and no increased implications for structural, vehicle, or community safety in the PMF.

The current design is considered sufficient to manage and mitigate the potential flood-related impacts identified in this assessment. Accordingly, no additional mitigation or management measures are required.

8.1.2 To M5 Crossings

For Culverts Cul_001b, the flow and velocity are essentially the same for existing and proposed scenario, as shown in Figure 7 and Figure 8, which proves that the proposed development with OSD does not imply extra flow through the culvert and the proposed basin on site will retain the flow as per existing condition.

For Culverts C16134A, the flows in proposed scenario and existing scenario are $1.97\text{m}^3/\text{s}$ and $2.02\text{m}^3/\text{s}$, respectively, in 100-Year event. The increase of the flow is only $0.05\text{m}^3/\text{s}$ and this will only be caused by minor water level increase in at the pit inlets. The velocity increased from 1.74 m/s to 1.79 m/s , when comparing the existing and proposed scenarios. The velocity still remains under 2m/s , and it is believed this is unlikely to create any structural damage to the drainage network.

The location of these two culverts is shown in Figure 6.

The current design is considered sufficient to manage and mitigate the potential flood-related impacts identified in this assessment. Accordingly, no additional mitigation or management measures are required.

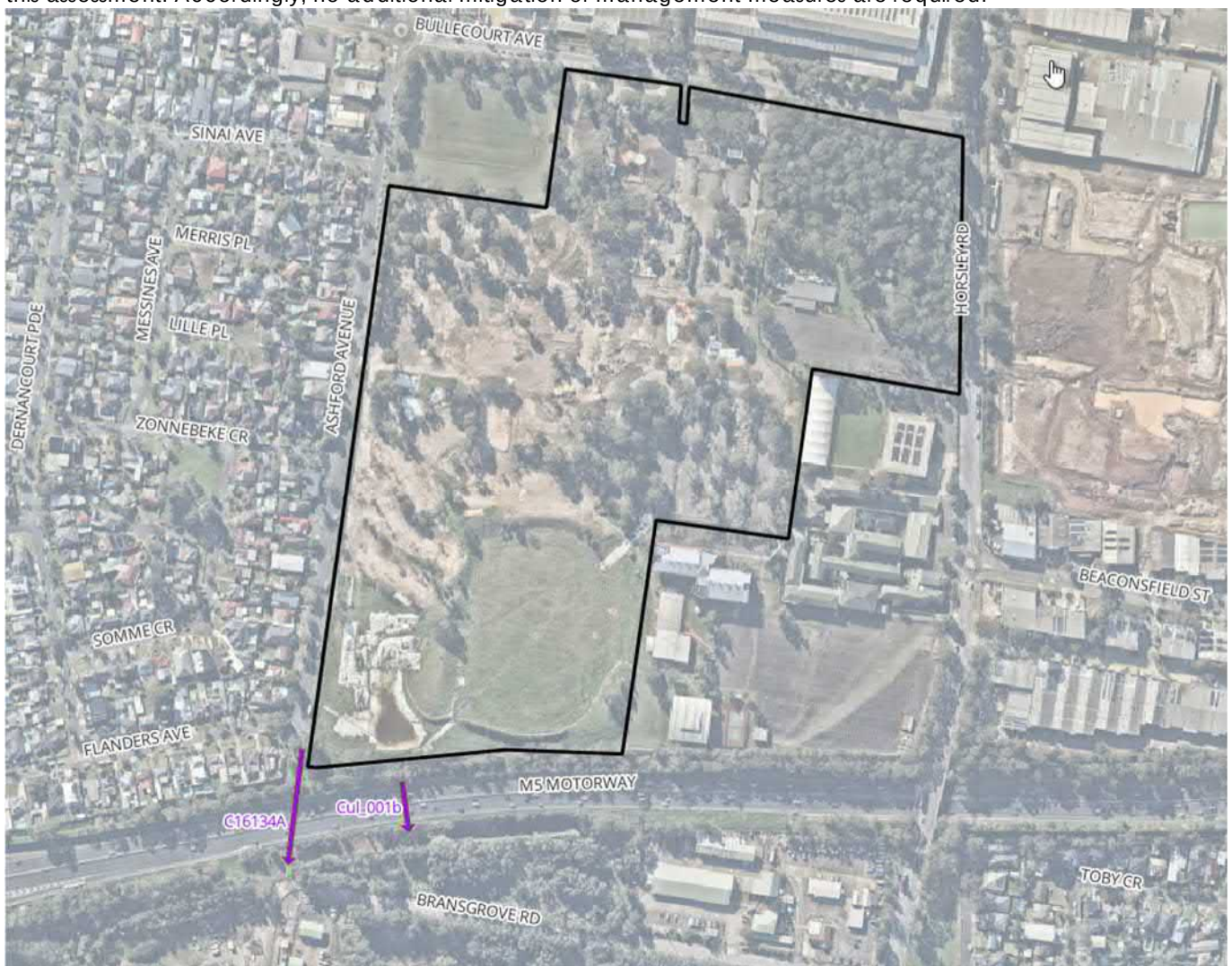


Figure 6 M5 Motorway Culverts Location

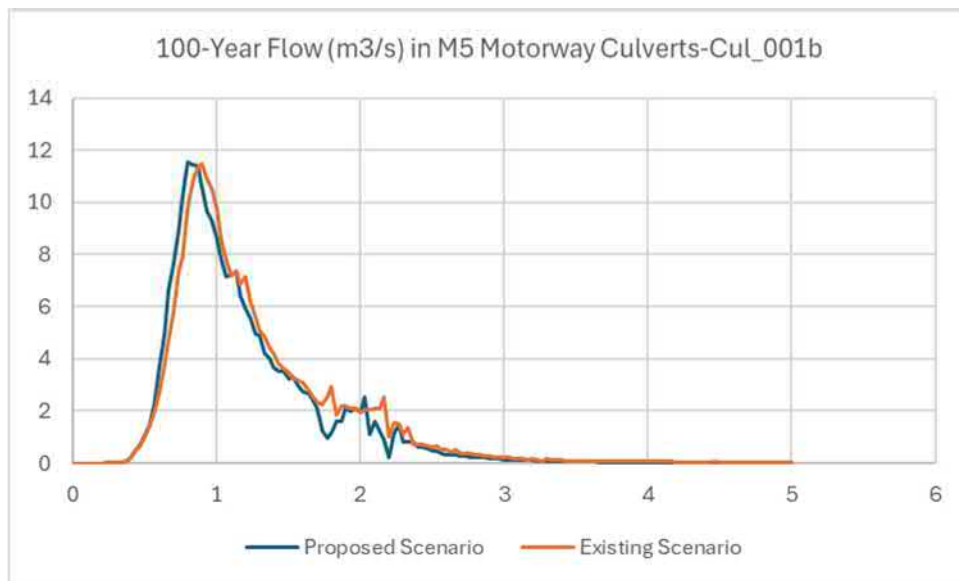


Figure 7 100-Year flow in M5 Motorway Culverts-Cul_001b between Existing scenario and Proposed Scenario

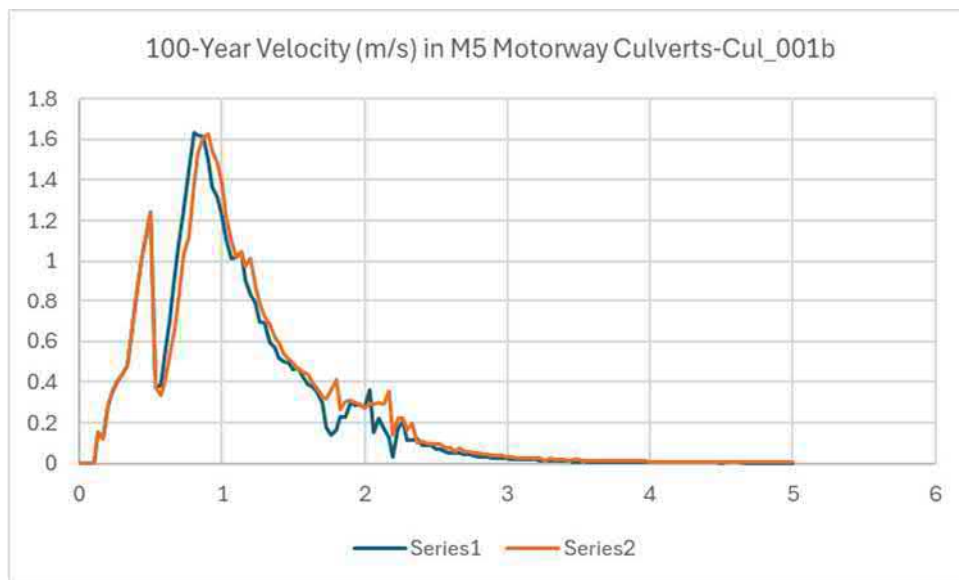


Figure 8 100-Year flood velocity in M5 Motorway Culverts-Cul_001b between Existing scenario and Proposed Scenario

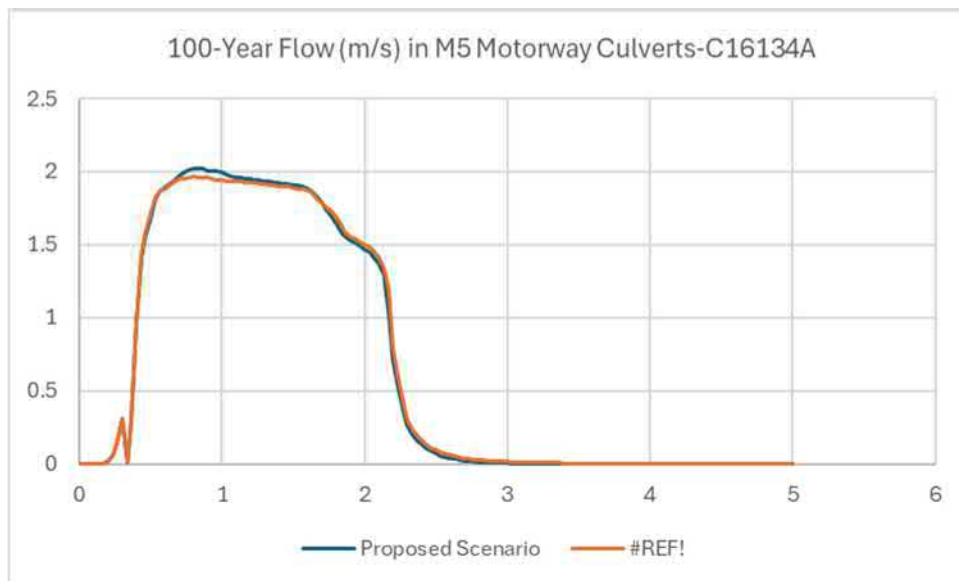


Figure 9 100-Year flood Flow in M5 Motorway Culverts-C1613A between Existing scenario and Proposed Scenario

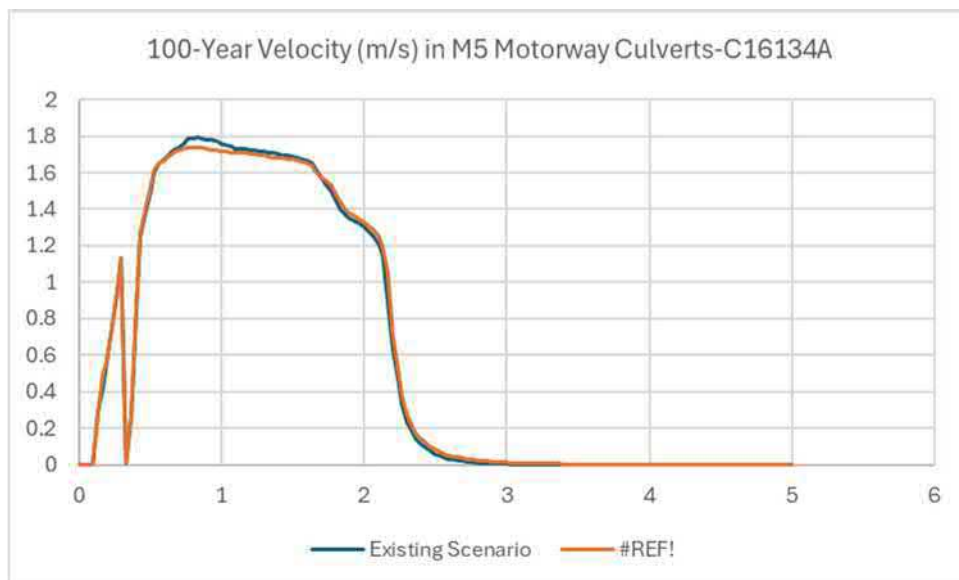


Figure 10 100-Year flood velocity in M5 Motorway Culverts- C16134A between Existing scenario and Proposed Scenario

8.1.3 Flood Impacts on the Downstream Floodplain i.e. Kelso Park / Swamp

While the flow and velocity have increased across the Culverts C16134A, the increases in flood level downstream of the culverts are less than 10mm for both 100-Year event and PMF event, which is considered as negligible. Also, the downstream area of the culverts falls in category 3 and above in the existing scenario of the 100-Year event, this remains unchanged in the proposed scenario for the 100-Year event. For the PMF event, in the existing scenario, this area is mainly subject to category 5 and above. In the proposed scenario, it still falls into category 5 and above. Therefore, it is concluded that the development does not imply any detrimental harm on the Kelso Park/Swamp area downstream of it.

The current design is considered sufficient to manage and mitigate the potential flood-related impacts identified in this assessment. Accordingly, no additional mitigation or management measures are required.

Refer to Figures C4 and Figure C8 in Appendix C.

8.2 Flood Evacuation Route

The safe evacuation of residents during a Probable Maximum Flood (PMF) event is a critical design consideration for the proposed development. The development layout must facilitate effective evacuation to flood-free areas during an extreme event, ensuring that all dwellings have access to a continuous, rising evacuation route leading to land situated above the PMF flood level. The evacuation pathway should maintain positive grade without localised depressions or flood hazards, thereby providing a reliable and hydraulically safe means of egress for all occupants under PMF conditions

Self-evacuation is considered achievable, and the proposed development is not likely to impose any additional burden on the State Emergency Service (SES). In a Probable Maximum Flood (PMF) event, lots affected by inundation will adopt a shelter-in-place strategy to ensure resident safety, while lots remaining above the PMF level will evacuate via the designated evacuation route. The proposed internal road network provides a continuous rising egress towards higher ground, facilitating safe evacuation for the unaffected lots during extreme events.

The details can be found in Figure 12.

8.3 Climate Change Scenario

A climate change assessment was undertaken to address the requirements outlined in the Secretary's Environmental Assessment Requirements (SEARs) table. The TUFLOW model was originally developed using ARR1987 design rainfall data with a rainfall-on-grid approach. To incorporate the latest climate change consideration, the centroid of the two-dimensional model domain was extracted, and the corresponding ARR2019 rainfall intensities were obtained. The climate change scenario is selected as SSP5-8.5, 2090, which is considered as the worst-case climate change scenario. The climate change multipliers are summarised in the table below and were applied to provide a conservative assessment. Rainfall and loss parameters were adjusted in accordance with this multiplier, while the tailwater boundary conditions were maintained consistent with the base model setup.

Table 2 Climate Change Multiplier

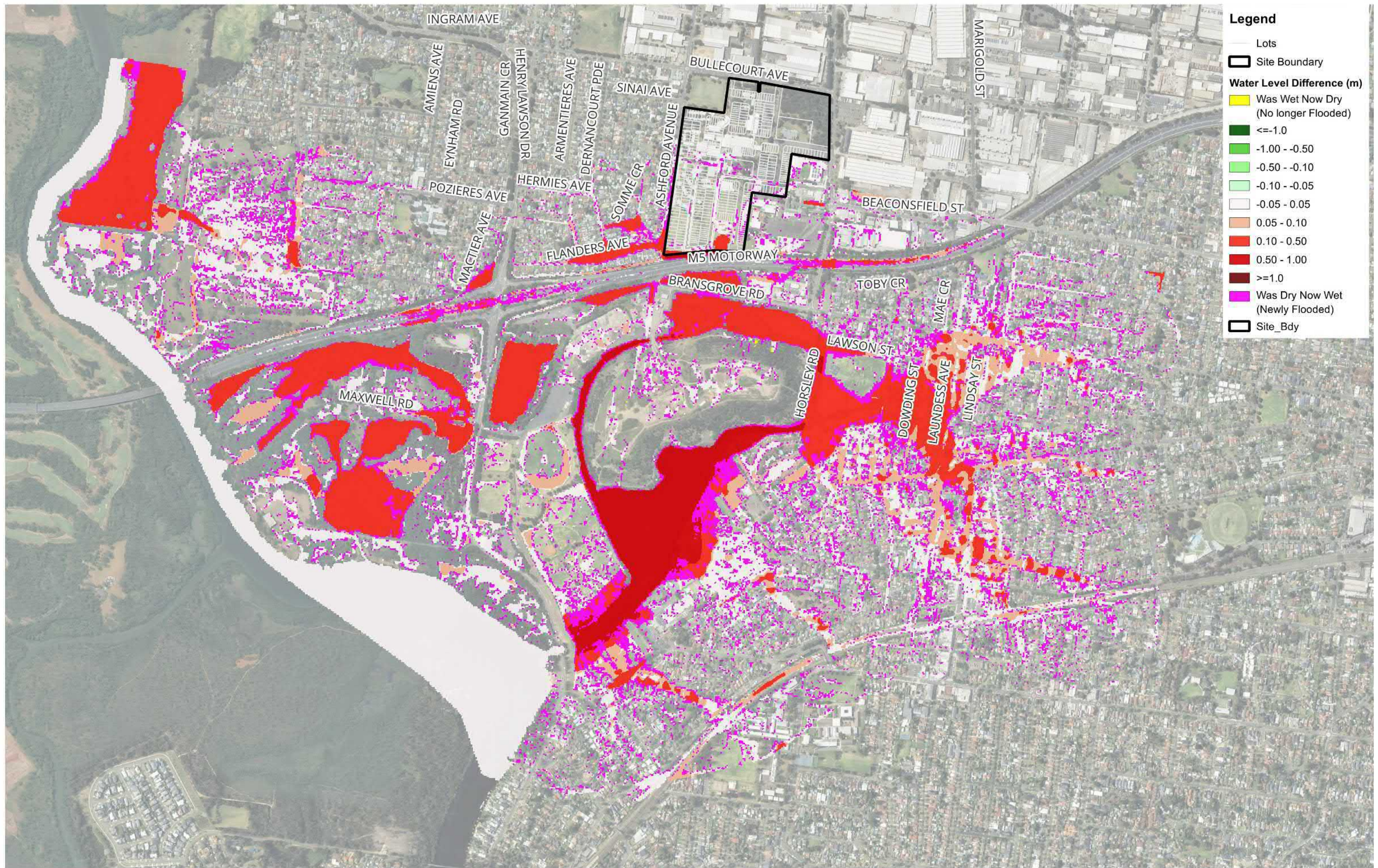
Selected SSP	Target/Design Year	Initial Loss Multiplier	Continuing Loss Multiplier	Burst Duration Multiplier for 2 Hour
SSP5-8.5	2090	1.08	1.16	1.64

The water level difference between proposed climate change case and proposed base case is presented in Figure 11, indicates that when compared to the proposed base case, the climate change scenario generally results in water level increases of less than 0.5 m, which is typically considered within the acceptable threshold for climate change impact. The water level increase in the proposed basin is less than 0.3m and it is showed that the freeboard is sufficient to cover the uncertainties imposed by the worst-case climate change scenario. Localised increases exceeding 0.5 m are observed within the swale adjacent to the M5 Motorway and downstream of the M5 culverts; however, these changes are confined to limited areas and do not result in significant changes to overall flood behaviour.

8.4 Other Flood Risk

The proposed multi-purpose hardstand sports court within Basin 1 is located in an area subject to flooding and rapidly rising floodwater. The surrounding parkland has been designed so that the moat encircling the court is inundated first, acting as an early-warning indicator of rising water. Upon moat inundation, users of the court are to evacuate promptly via the designated footpath egress to exit the basin. Based on the hydraulic assessment, there is approximately 16.9 minutes from when water first reaches the moat invert (RL 3.40 m AHD) to the 1% AEP peak flood level (RL 4.62 m AHD). Users should exit the court immediately once the moat is fully inundated ($\approx$ RL 3.50 m AHD), following the signed egress route.

To support safe operation, install clear and durable flood warning signage (e.g., "Area subject to rapid flooding—leave immediately if water enters moat") and egress wayfinding (pavement arrows and signs marking the evacuation route). Signage should discourage use of the court during storms and be positioned at court entries and along the egress path where practicable.



Legend

Lots

Site Boundary

Evacuation Route

Flood Depth (m)

0.00 - 0.25

0.25 - 0.50

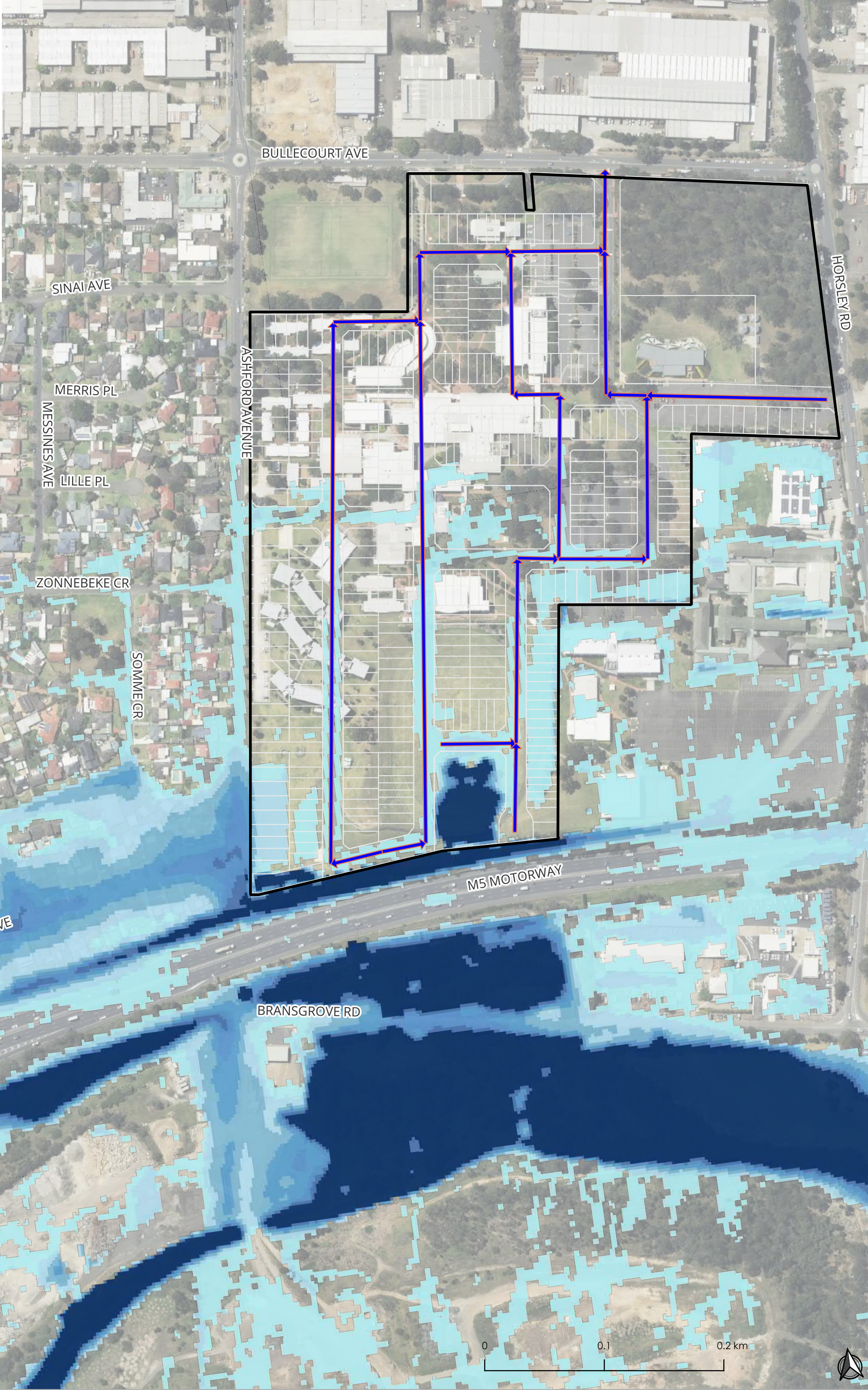
0.50 - 0.75

0.75 - 1.00

1.00 - 1.25

1.25 - 1.50

> 1.50



9 CONCLUSIONS

In support of the proposed Development Application (DA) for 2&2A Bullecourt Avenue Milperra (Lot 2 in DP1291984) to create, residential lots and dwellings, superlots for future residential lots and dwellings, roads, public recreation areas, drainage reserves this flood impact and Risk assessment has been prepared.

As requested by Council, this flood impact and Risk assessment has been undertaken by using the existing hydraulic model for the Kelso Park/Swamp provided by Council with minor updates as described in Section 2.

Previously Council has accepted that all internal overland flows and pit/pipe systems and flood compensatory storage can be addressed through the design process, most of which is documented in the Water Cycle Management Report prepared by BW which is to be read in conjunction with this report.

The aim of this Flood Impact and Risk Assessment is to investigate:

- the flood behaviour in the southern portion of Ashford Avenue and how any change to the overland flow from Ashford Avenue and Flanders Avenue into the site under may impact adjacent residential properties.
- any increase in flows into the M5 culverts, and.
- any adverse flood impacts on downstream floodplain i.e. Kelso Park / Swamp.

The modelling has been completed and is documented in Appendices B, C and D. The key findings are summarised as follows:

- Due to the natural site gradients, overland flow is concentrated in the southern portion of the site. Filling this area to support the future residential development results in the flow path from Ashford Avenue into the site diverting south along the unconstructed portion of Ashford Avenue to the swale adjacent to the M5 Motorway for all design events. More of this unconstructed portion of Ashford Avenue now gets wet but it generally does not impact the adjoining property.
- The hazard category in Ashford Avenue generally remains the same H1 category in the 100-year event except for a small section in the intersection that increases to a H2 category. The hazard category for the PMF event actually reduces from H5 to H4 for a large area in Ashford Avenue.
- The height of the water level increases slightly in Ashford Avenue at the intersection with Flanders Avenue and minor increases in the M5 swale in the 100 year event.
- The M5 Motorway culverts provide sufficient conveyance capacity under unblocked conditions for both existing and proposed scenarios across all design events.
- The proposed development has generally no impact on the Kelso Park/Swamp on the other side of the M5 Motorway as can be seen in Appendix C.
- The sensitivity test was conducted which uses a higher 100 year tailwater (RL 5.5m) in accordance with the JWP Report for both scenarios. The sensitivity test found there tailwater to have negligible impacts to the safety of structures, vehicles, or the community.

Overall, flood impacts associated with all design events are negligible, with no loss of trafficability along Ashford Avenue and no afflux affecting existing residential allotments, no detrimental impact on the existing M5 motorway and flood level increases to the downstream Kelso Park/Swamp area of less than 10mm in 100-Year event and PMF event.

The current design is considered sufficient to manage and mitigate the potential flood-related impacts identified in this assessment. Accordingly, no additional mitigation or management measures are required.

This report is to be read in conjunction with the Water Cycle Management Plan which addresses Water Quantity/OSD modelling, Water Quality/WSUD modelling, Compensatory Storage, and the assessment of increased rainfall data as a result of climate change to the year 2090 in accordance with the recent AR&R changes.

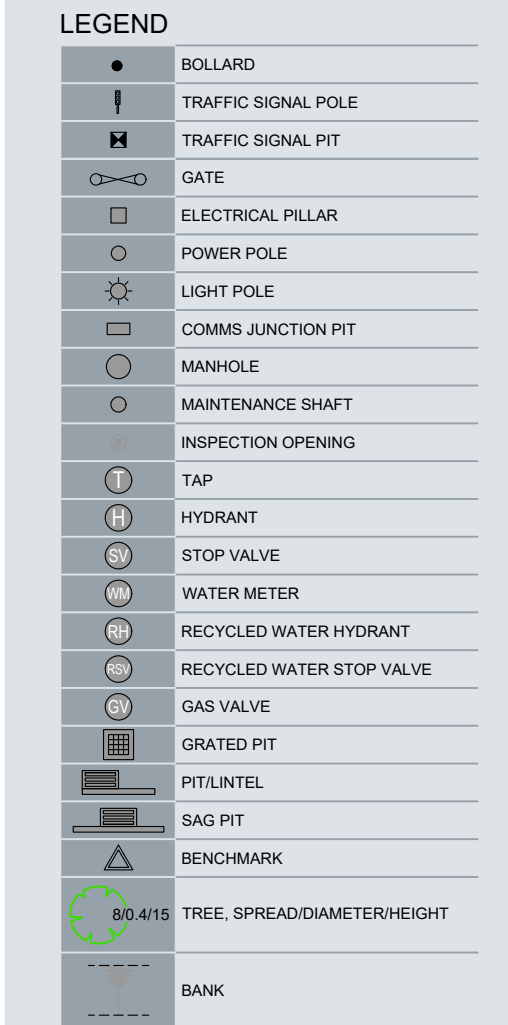
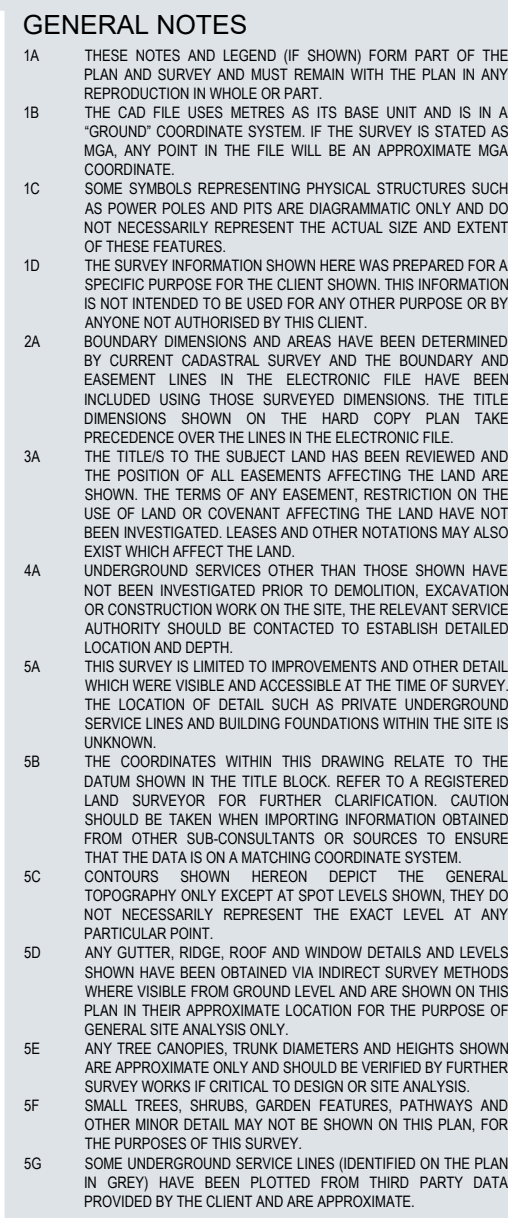


Yanzhe Li
Water Resources Engineer
liy@bevwill.com.au



Frank Guo
Senior Water Resources Engineer
guof@bevwill.com.au

APPENDIX A: SITE SURVEY

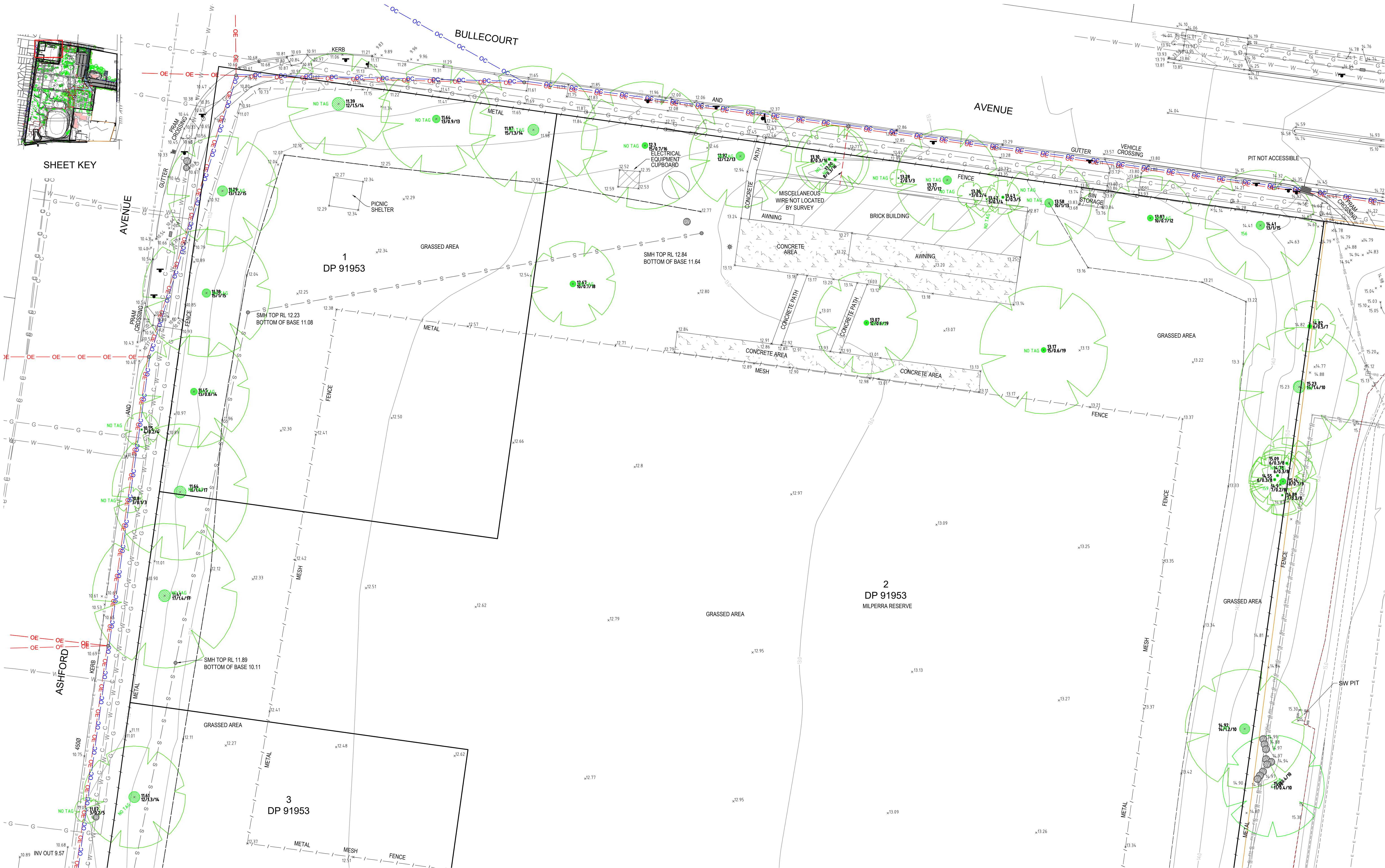


UNDERGROUND POWER	E	E	E	E
OVERHEAD POWER	OE	OE	OE	OE
COMMUNICATIONS	C	C	C	C
OVERHEAD COMMUNICATIONS	OC	OC	OC	OC
SEWER	S	S	S	S
WATER	W	W	W	W
RECYCLED WATER	RW	RW	RW	RW
GAS	G	G	G	G
SERVICE HYDRANT	FH	FH	FH	FH
DRAINAGE				
CONTOUR	95.3			
UNDERGROUND POWER	E	E	E	E
COMMUNICATIONS	C	C	C	C
SEWER	S	S	S	S
WATER	W	W	W	W
SEWER	S	S	S	S
STORM WATER	SW	SW	SW	SW
FIRE HYDRANT	FH	FH	FH	FH
THIRD PARTY DATA				
BOUNDARIES				

 BUILDING/STRUCTURES
 HARD SURFACES

THIRD PARTY DATA FROM DWG FILE - 2301879-010-LAY

- 0 30 60 90
SCALE ON ORIGINAL DRAWING AT 1:1500



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

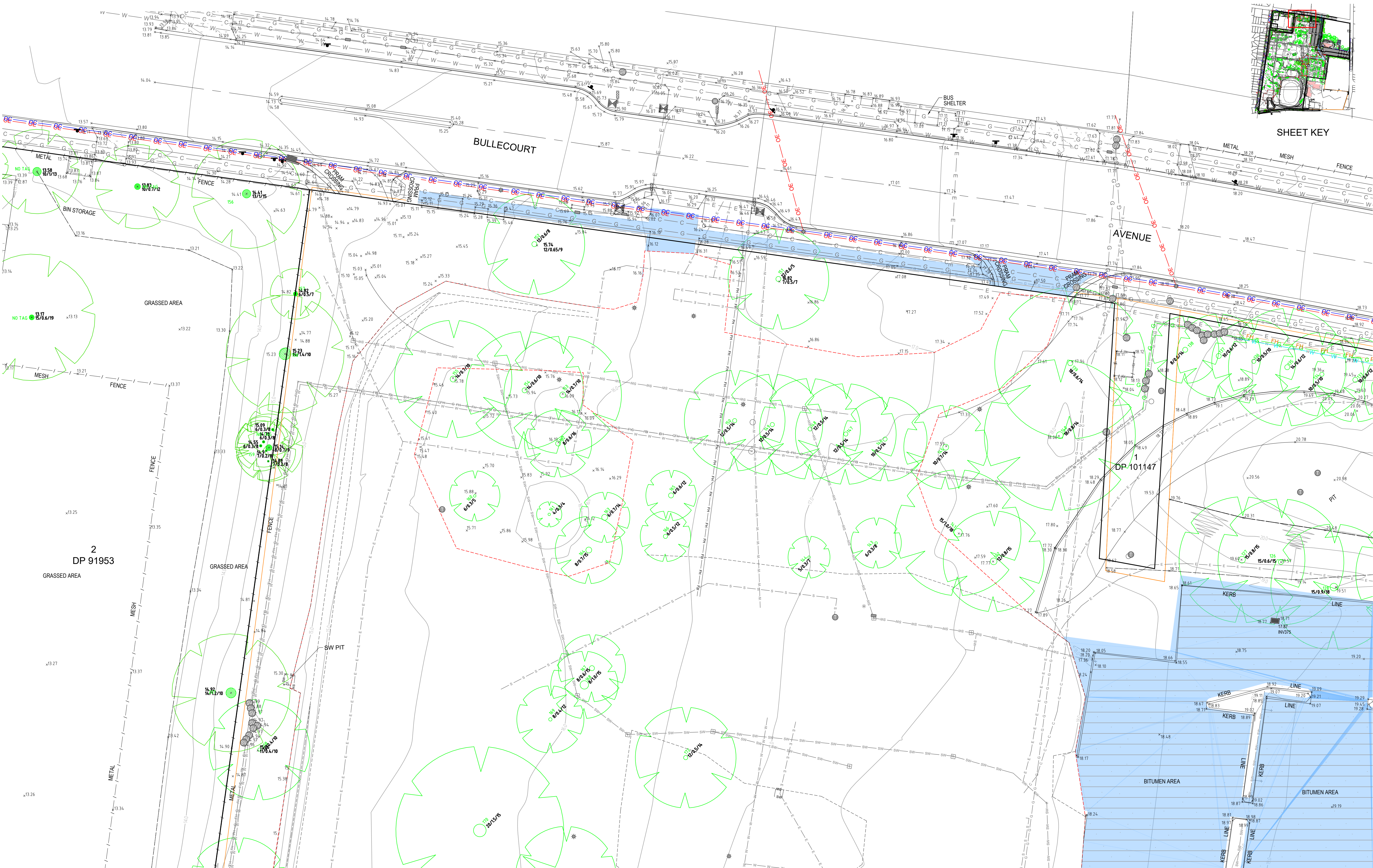
Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
BY	Ver	Date	Amendments

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels	SSM:
	25363
RL:	4.927
Scale (A3)	1:200
Scale (A1)	1:200
Sheet 2 of 22	



This work is licensed under a Creative Commons Attribution 4.0 International License.
S:\JOBS\2301879 - 2 Bullecourt Avenue Milperra_SurEMW2301879-DET3 Drafting\Current CAD file\2301879-DET.dwg



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECCOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

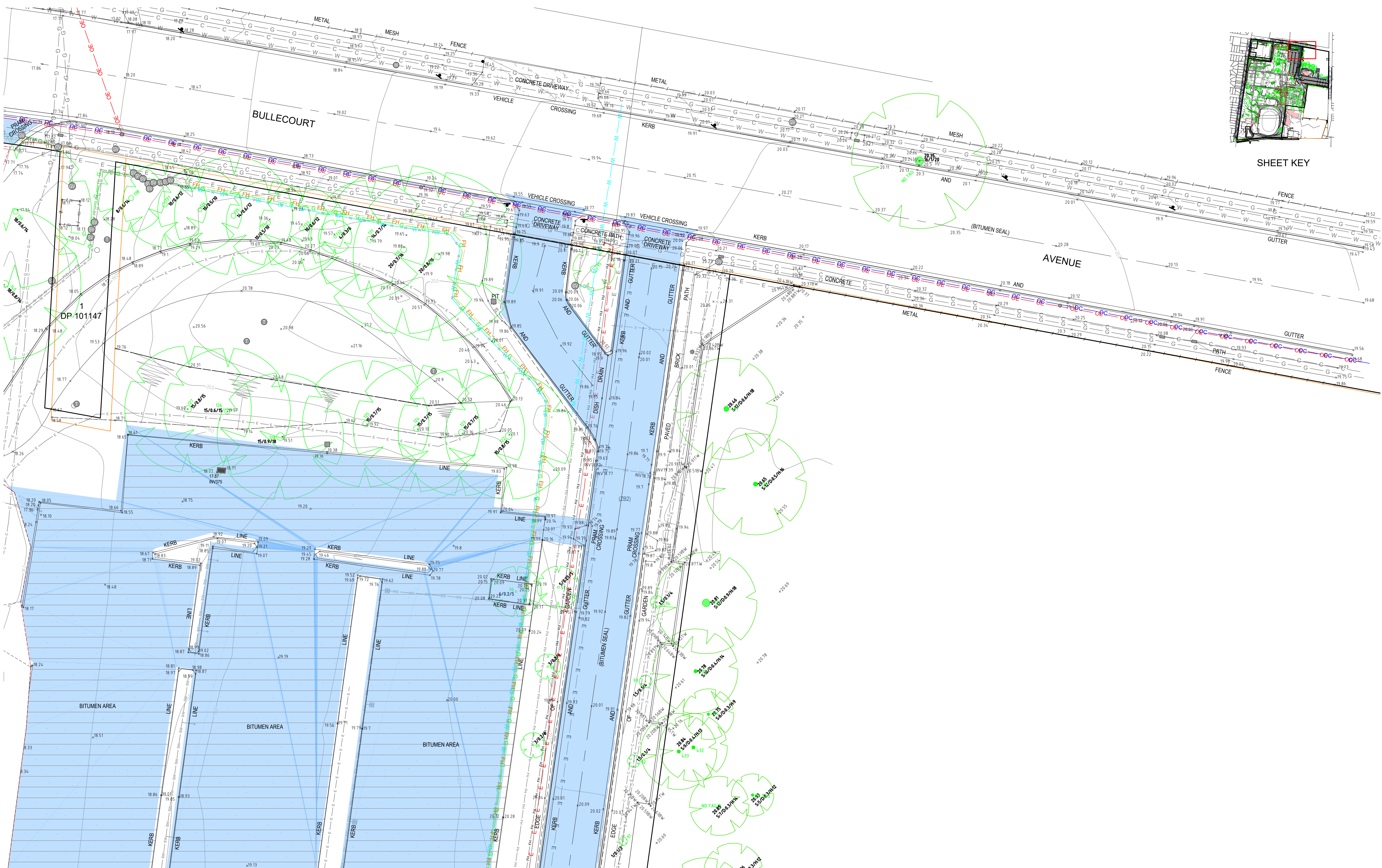
BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
By	Ver	Date	Amendments

Scale (A3)	1:200
Scale (A1)	1:200

SEE SHEET 1 FOR LEGEND AND PLAN NOTES
0 4 8 12
SCALE ON ORIGINAL DRAWING AT 1:200

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels:	SSM:
	25363
RL:	4.927





PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

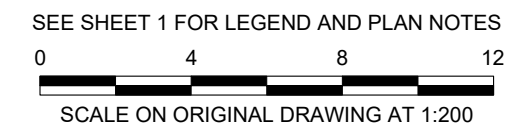
BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
By	Ver	Date	Amendments

Survey Date: 25-09-2023
Vertical Datum: AHD
Horizontal Datum: GDA 2020
Origin of Levels
SSM: 25363
RL: 4.927

Scale (A3)
(A1) 1:200



Sheet 4 of 22

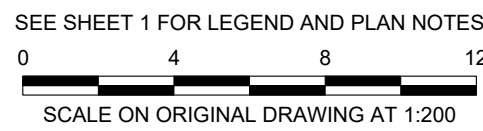




SHEET KEY

HORSLEY

ROAD



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	~	Original Issue

By	Ver	Date	Amendments
----	-----	------	------------

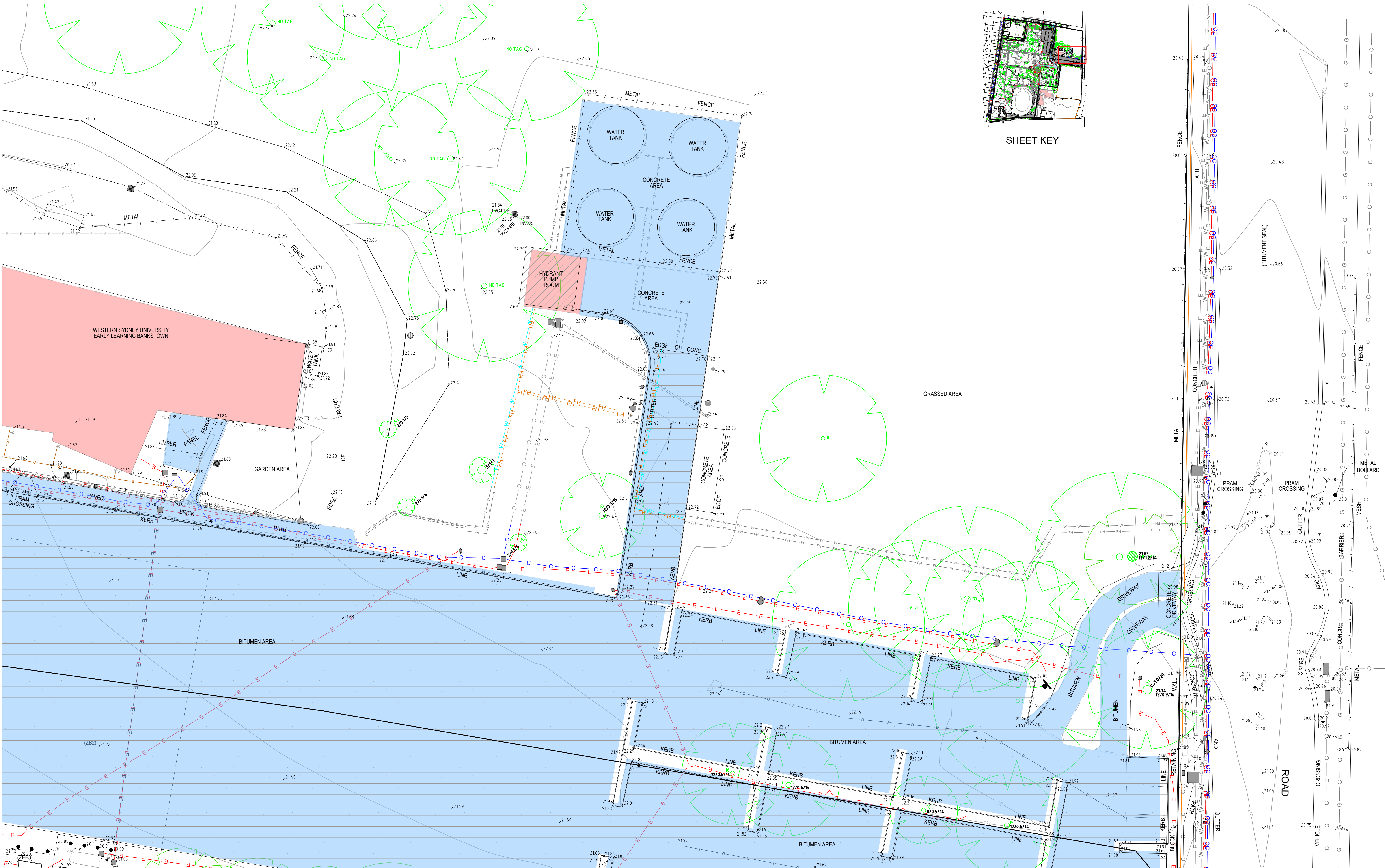
This work is licensed under a Creative Commons Attribution 4.0 International License.

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels	SSM:
SSM:	25363
RL:	4.927

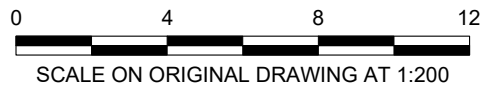
Scale (A3)	Sheet 5 of 22
(A1) 1:200	



S:\OBS\2301879 - 2 Bullecourt Avenue Milperra_SurEMW\2301879-DET\3 Drafting\current CAD file\2301879-DET.dwg



SEE SHEET 1 FOR LEGEND AND PLAN NOTES



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECCOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
By	Ver	Date	Amendments
This work is licensed under a Creative Commons Attribution 4.0 International License.			

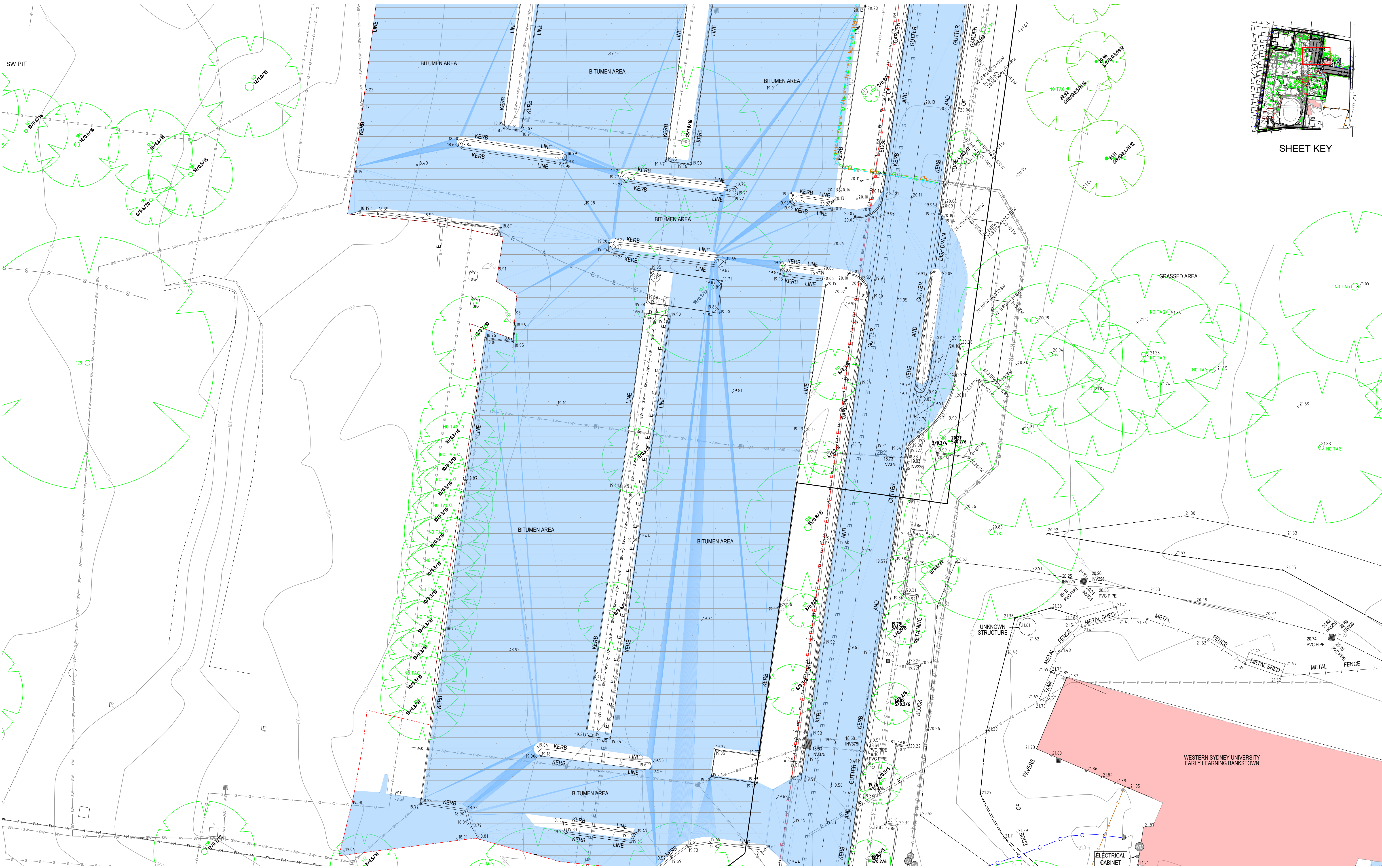
Survey Date: 25-09-2023
Vertical Datum: AHD
Horizontal Datum: GDA 2020
Origin of Levels
SSM: 25363
RL: 4.927

Scale (A3)
(A1) 1:200



Sheet 6 of 22

S:\005232301879 - 2 Bullecourt Avenue Milperra_SurEMW2301879-DET3 Drafting\current CAD file\2301879-DET.dwg



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC

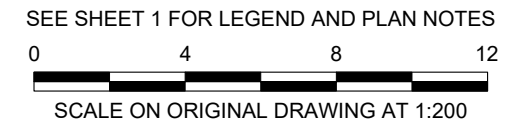


Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
BY	Ver	Date	Amendments
This work is licensed under a Creative Commons Attribution 4.0 International License.			

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels	SSM:
SSM:	25363
RL:	4.927
Scale (A3)	1:200
(A1)	1:200
Sheet 7 of 22	





SHEET KEY

PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue

By	Ver	Date	Amendments
This work is licensed under a Creative Commons Attribution 4.0 International License.			

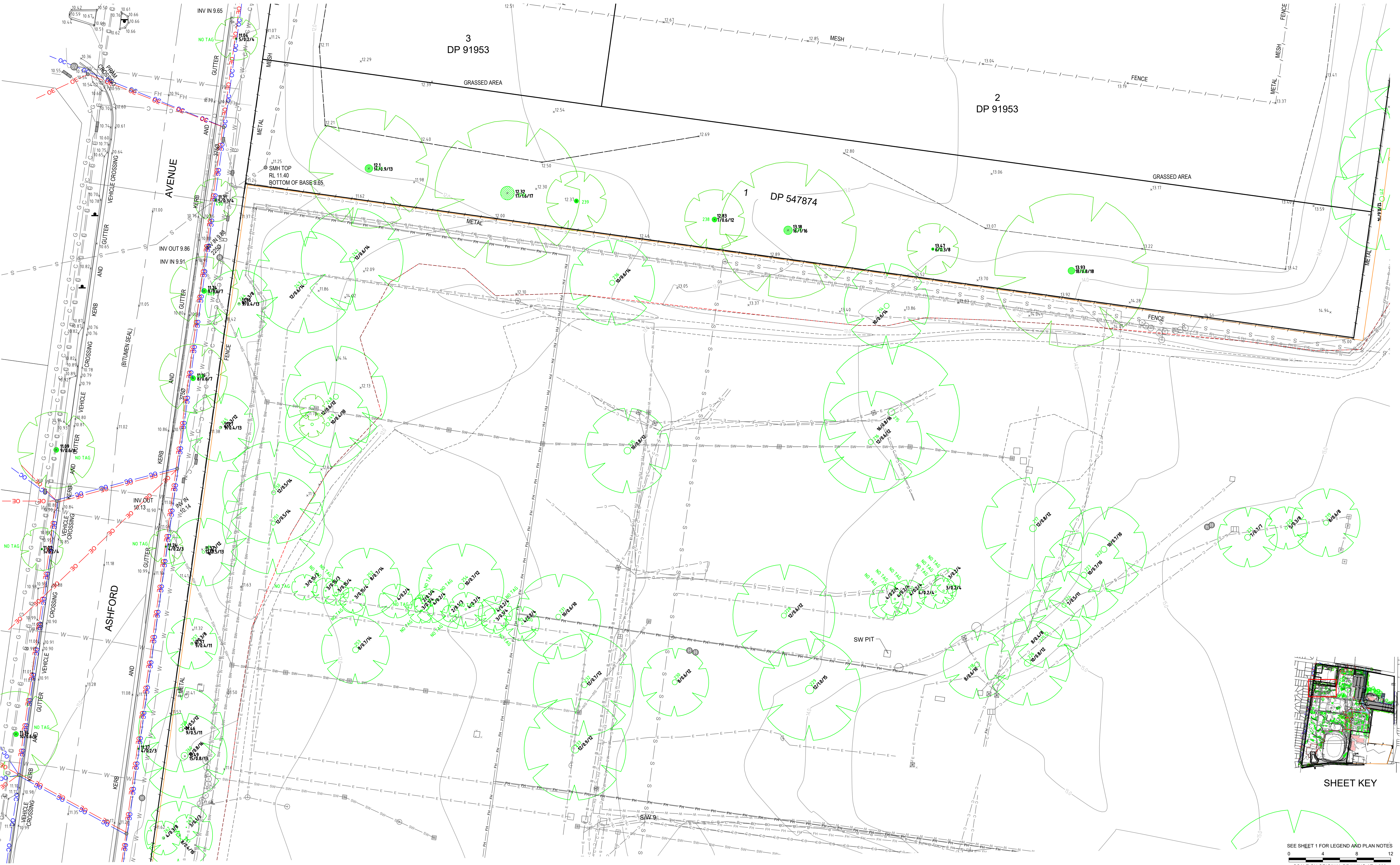
Survey Date:	25-09-2023
Vertical Datum:	AHD 2020
Origin of Levels	SSM:
SSM:	25363
RL:	4.927

Scale (A3):	1:200
(A1):	1:200



Sheet 8 of 22

S:\JOBS\23\2301879 - 2 Bullecourt Avenue Milperra_SurEMW\2301879-DET\3 Drafting\Current CAD file\2301879-DET.dwg



SHEET KEY

SEE SHEET 1 FOR LEGEND AND PLAN NOTES
0 4 8 12
SCALE ON ORIGINAL DRAWING AT 1:200

PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5056
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	~	Original Issue
By	Ver	Date	Amendments

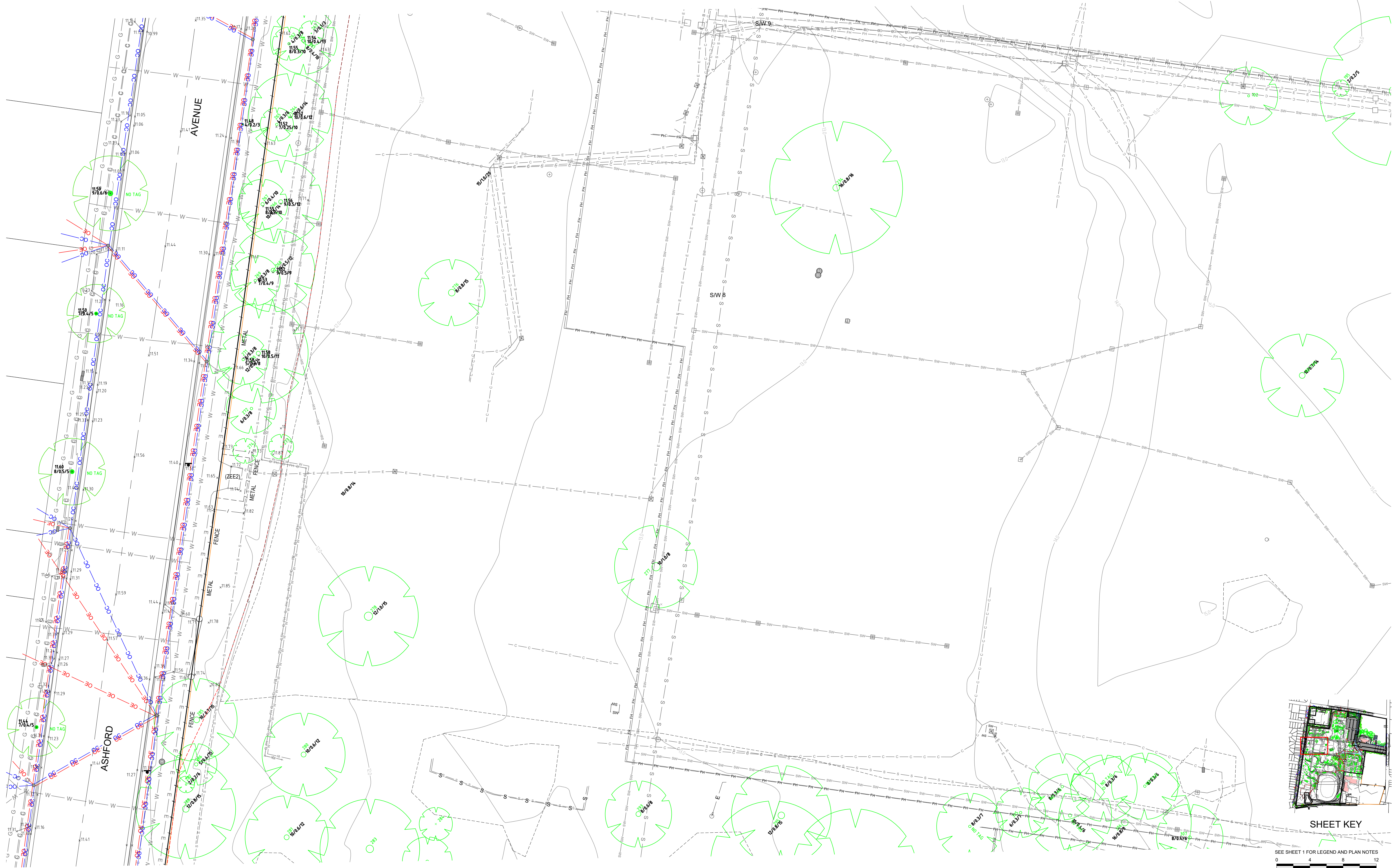
Survey Date: 25-09-2023
Vertical Datum: AHD
Horizontal Datum: GDA 2020
Origin of Levels
SSM: 25363
RL: 4.927

Scale (A3)
(A1) 1:200



Sheet 9 of 22

This work is licensed under a Creative Commons Attribution 4.0 International License
S:\J089\232301879 - 2 Bullecourt Avenue Milperra_Sur\EMW\2301879-DET\3 Drafting\out CAD file\2301879-DET.dwg



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP19513
2 BULLECCOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	~	Original Issue

By	Ver	Date	Amendments

This work is licensed under a Creative Commons Attribution 4.0 International License.

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels:	
SSM:	25363
RL:	4.927

Scale (A3):	1:200
(A1):	1:200



Sheet 10 of 22

S:\UOBS\2301879 - 2 Bullecourt Avenue Milperra_Sur\EMW\2301879-DET\3 Drafting\current CAD Ref\2301879-DET.dwg



SEE SHEET 1 FOR LEGEND AND PLAN NOTES

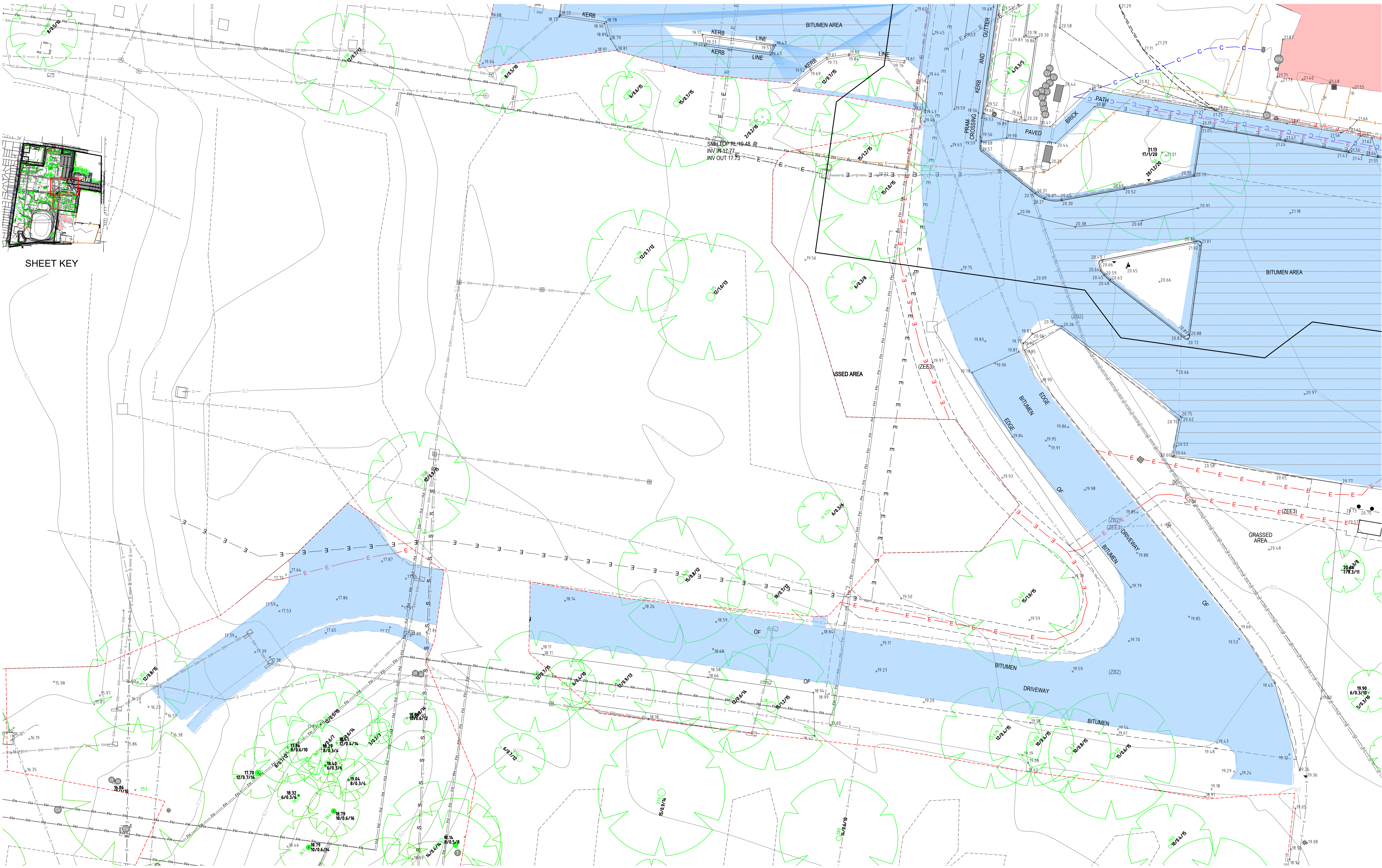


Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	~	Original Issue
By	Ver	Date	Amendments

Survey Date: 25-09-2023
Vertical Datum: AHD
Horizontal Datum: GDA 2020
Origin of Levels
BSM: 25363
I.L.: 4.927





PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
By	Ver	Date	Amendments

Survey Date:	25-09-2023
Horizontal Datum:	AHD
Origin of Levels:	GDA 2020
SSM:	25363
RL:	4.927
Scale (A3):	(A1) 1:200



Sheet 12 of 22



102
DP 874035



SHEET KEY

PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue

By	Ver	Date	Amendments

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels	
SSM:	25363
RL:	4.927

Scale (A3):	1:200
(A1):	1:200



Sheet 13 of 22

S:\JOBS\23\2301879 - 2 Bullecourt Avenue Milperra_SurEMW\2301879-DET\3 Drafting\Current CAD file\2301879-DET.dwg



102
DP 874035



Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

SCALE ON ORIGINAL DRAWING AT 1:200





SHEET KEY

PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



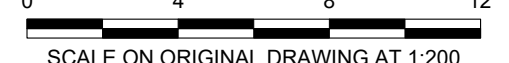
Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional information
BC	A	-	Original Issue

By Ver Date Amendments
This work is licensed under a Creative Commons Attribution 4.0 International License.

SEE SHEET 1 FOR LEGEND AND PLAN NOTES

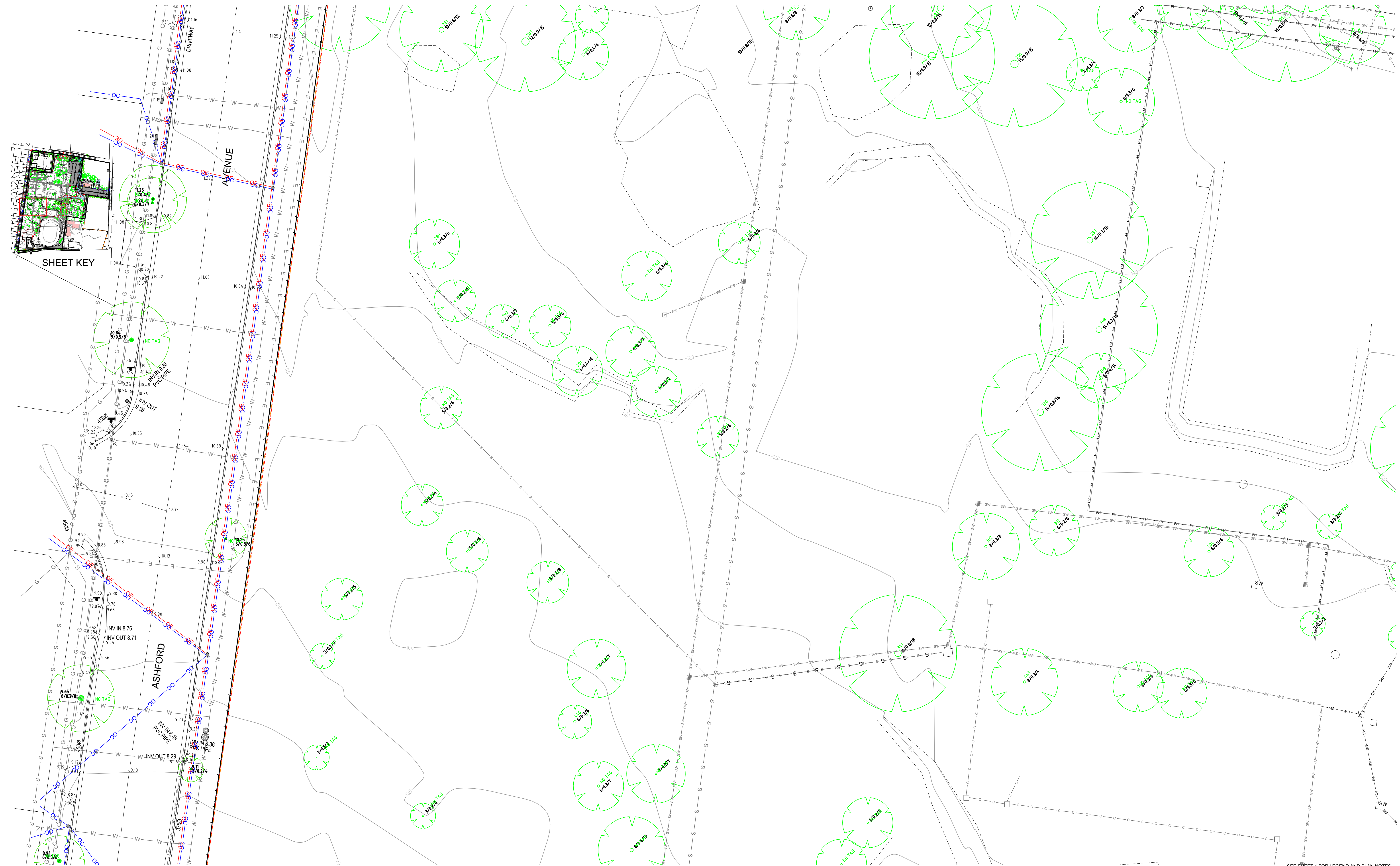


SCALE ON ORIGINAL DRAWING AT 1:200

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels:	SSM
SSM:	25363
RL:	4.927

Scale (A3) 1:200
Sheet 15 of 22





PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP195163
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



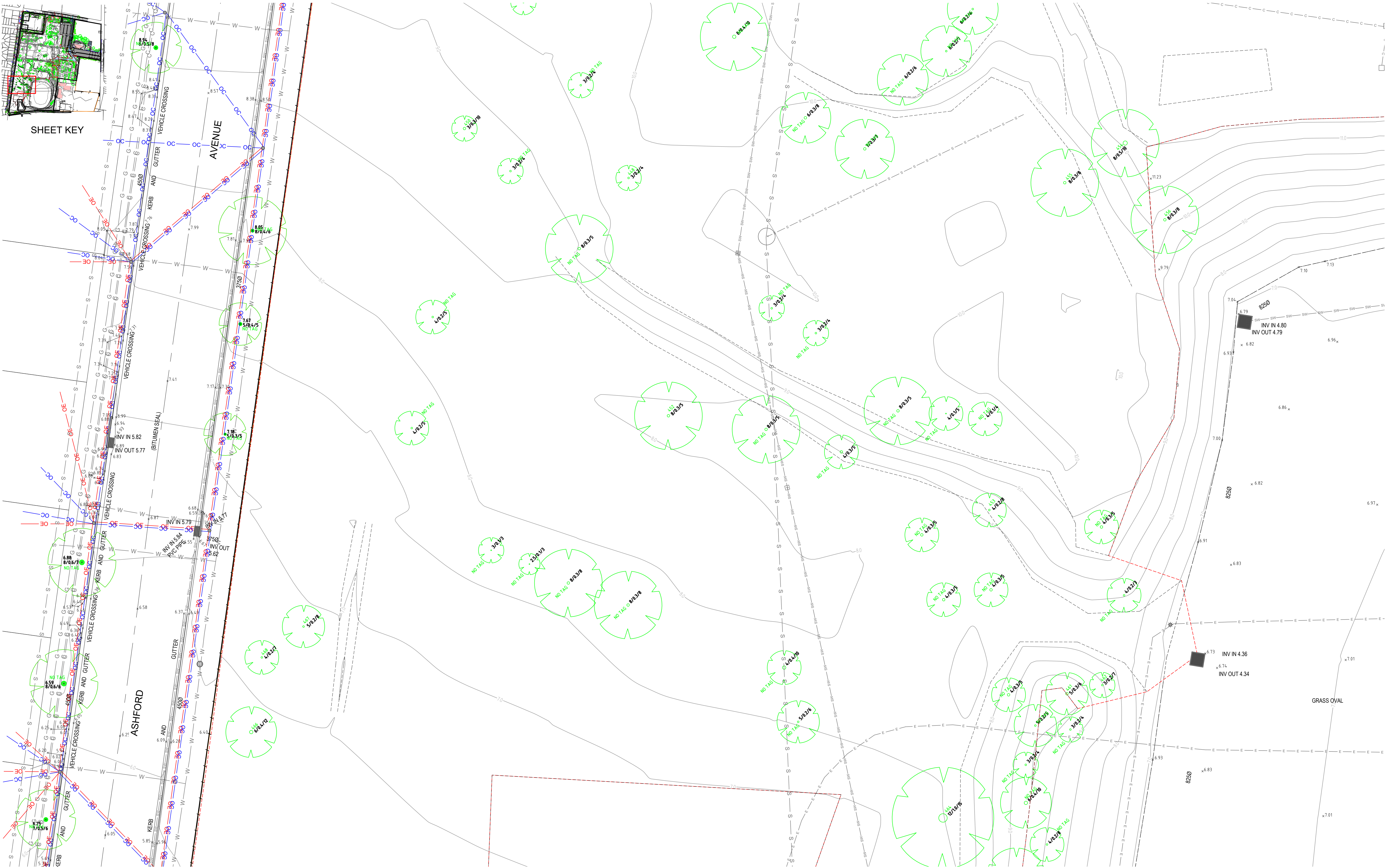
Beveridge Williams
Development and Infrastructure Consultants

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	~	Original Issue
By	Ver	Date	Amendments

Survey Date: 25-09-2023
Vertical Datum: AHD
Horizontal Datum: GDA 2020
Origin of Levels: SSM:
RL: 25363
4.927



SEE SHEET 1 FOR LEGEND AND PLAN NOTES
0 4 8 12
SCALE ON ORIGINAL DRAWING AT 1:200



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
By	Ver	Date	Amendments

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels	SSM:
SSM:	25363
RL:	4.927
Scale (A3):	(A1) 1:200
Scale (A1):	1:200
Sheet	17 of 22

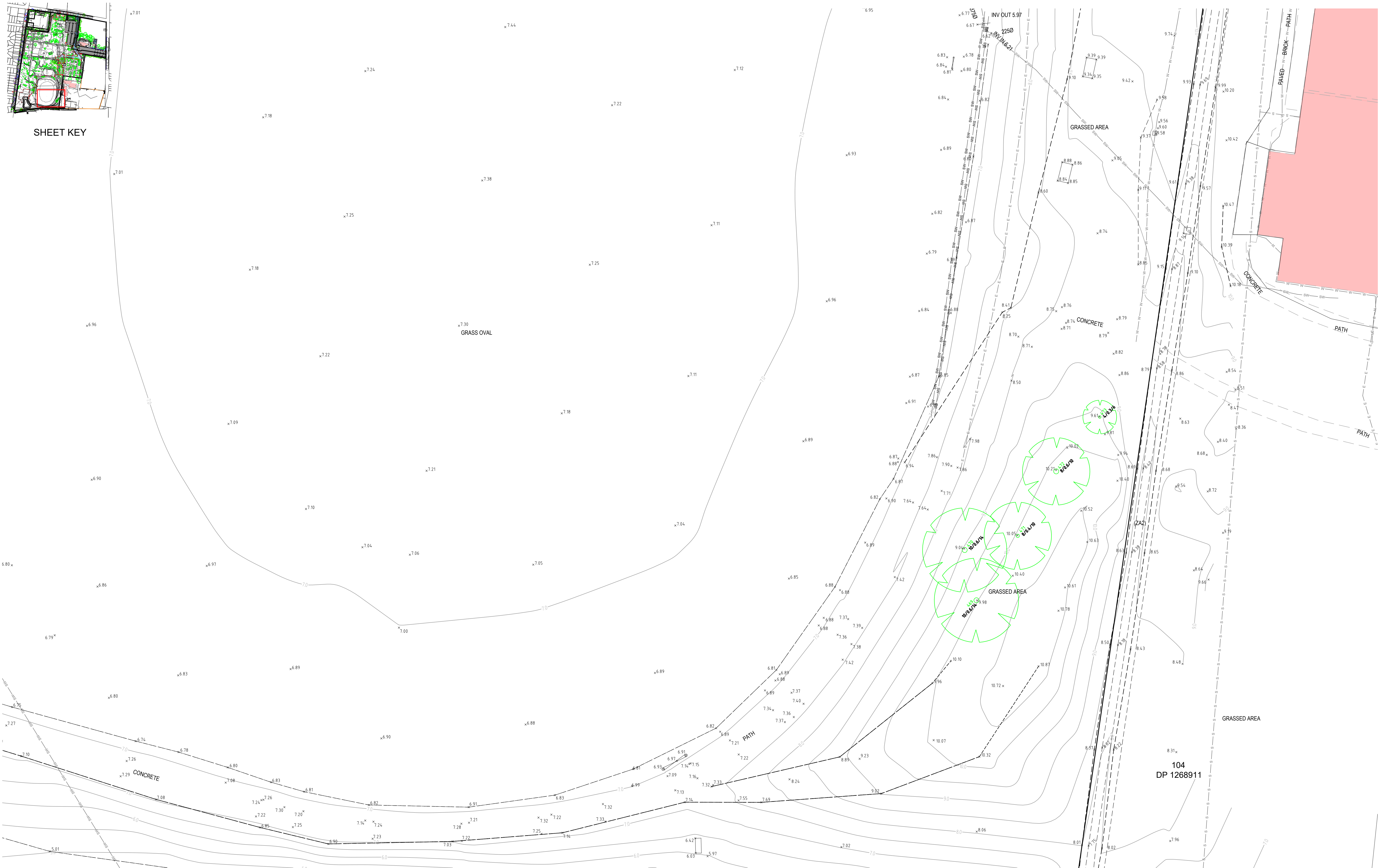


SEE SHEET 1 FOR LEGEND AND PLAN NOTES
0 4 8 12
SCALE ON ORIGINAL DRAWING AT 1:200

S:\JOBS\23\2301879 - 2 Bullecourt Avenue Milperra_SurEMW\2301879-DET\3 Drafting\Current CAD file\2301879-DET.dwg



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

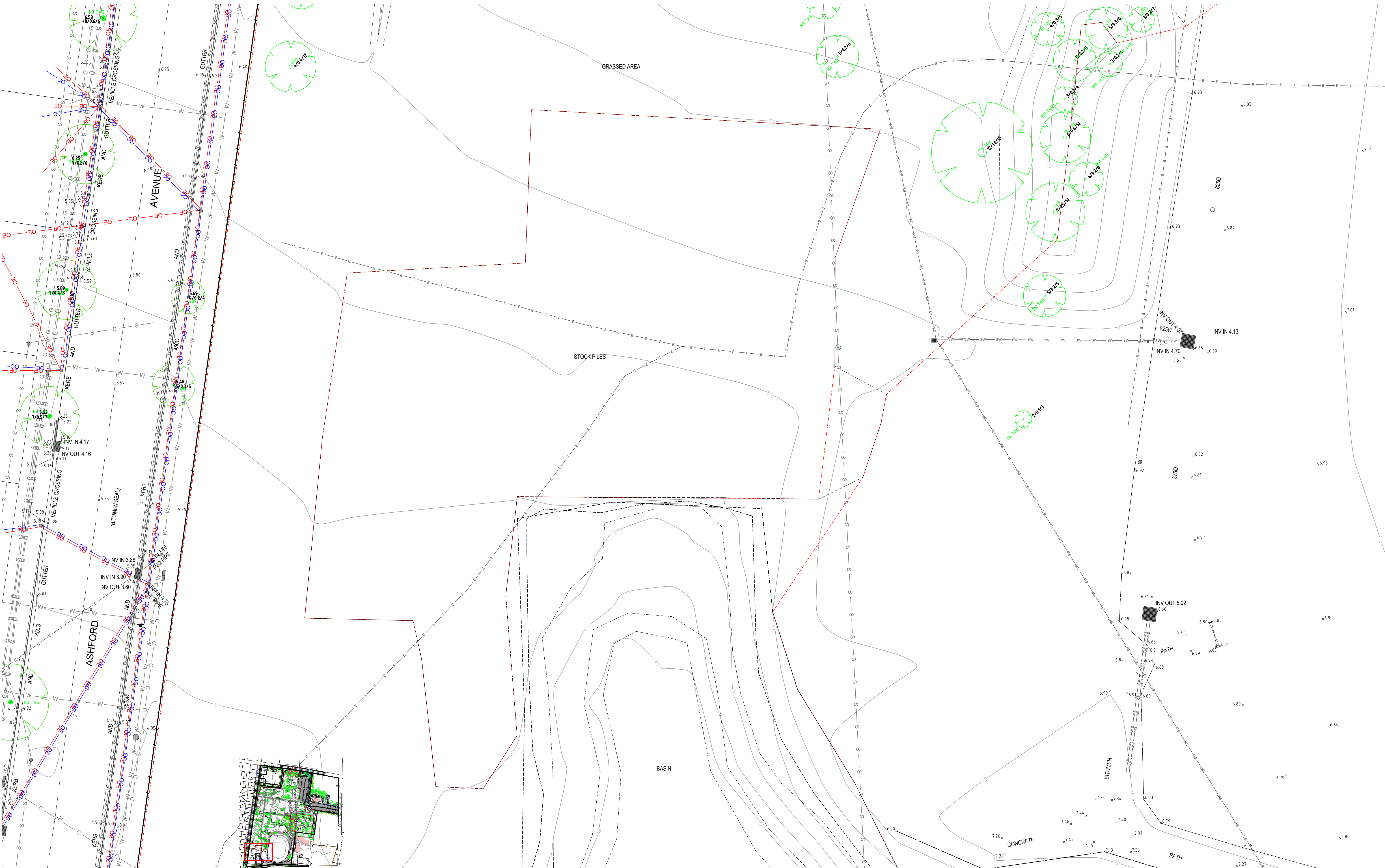
Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
By	Ver	Date	Amendments

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels	SSM:
SSM:	25363
RL:	4.927
Scale (A3)	(A1) 1:200
Scale (A1)	1:200
Sheet	19 of 22



SEE SHEET 1 FOR LEGEND AND PLAN NOTES
0 4 8 12
SCALE ON ORIGINAL DRAWING AT 1:200



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
By	Ver	Date	Amendments

This work is licensed under a Creative Commons Attribution 4.0 International License.

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels	SSM:
SSM:	25363
RL:	4.927

Scale (A3)
(A1) 1:200



Sheet 20 of 22

SEE SHEET 1 FOR LEGEND AND PLAN NOTES
0 4 8 12
SCALE ON ORIGINAL DRAWING AT 1:200



PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue

By	Ver	Date	Amendments

This work is licensed under a Creative Commons Attribution 4.0 International License.

SEE SHEET 1 FOR LEGEND AND PLAN NOTES

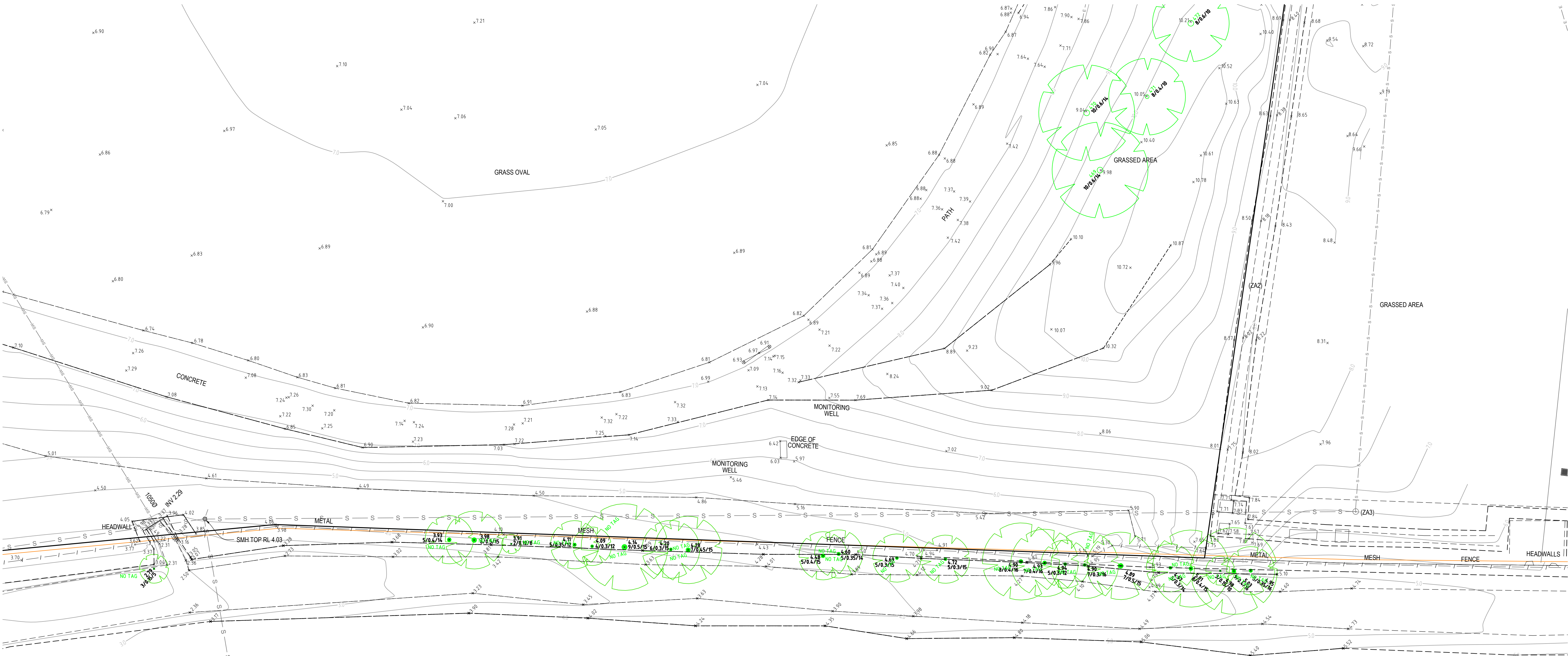


Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels	SSM:
	25363
RL:	4.927

Scale (A3)	1:200
Scale (A1)	1:200

Sheet 21 of 22

S:\JOBS\23\2301879 - 2 Bullecourt Avenue Milperra_SurEMW\2301879-DET\3 Drafting\Current CAD file\2301879-DET.dwg



SHEET KEY

PLAN OF CONTOUR AND DETAIL OVER SITE
LOT 2 IN DP1291984, LOT 1 IN DP547874, AND LOTS 1, 2 AND 3 IN DP91953
2 BULLECOURT AVENUE, MILPERRA

Client: MIRVAC



Beveridge Williams
Development and Infrastructure Consultants

Western Sydney ph: (02) 4625 5055
www.beveridgewilliams.com.au

BC	E	22-08-2025	Detail survey after demolition
BC	D	08-05-2025	Addition of extra trees
BC	C	16-09-2024	Updated tree positions
BC	B	28-02-2024	Additional Information
BC	A	-	Original Issue
By	Ver	Date	Amendments

This work is licensed under a Creative Commons Attribution 4.0 International License.
S:\JOBS\23\2301879 - 2 Bullecourt Avenue Milperra_Sur\EMW\2301879-DET\3 Drafting\Current CAD file\2301879-DET.dwg

SEE SHEET 1 FOR LEGEND AND PLAN NOTES



SCALE ON ORIGINAL DRAWING AT 1:200

Survey Date:	25-09-2023
Vertical Datum:	AHD
Horizontal Datum:	GDA 2020
Origin of Levels	SSM:
SSM:	25363
RL:	4.927

Scale (A3): 1:200
Sheet 22 of 22

APPENDIX B: BASE CASE EXISTING FLOOD MAPS

Legend

Site Boundary

M5 Motorway Culverts

Flood Depth (m)

0.00 - 0.25

0.25 - 0.50

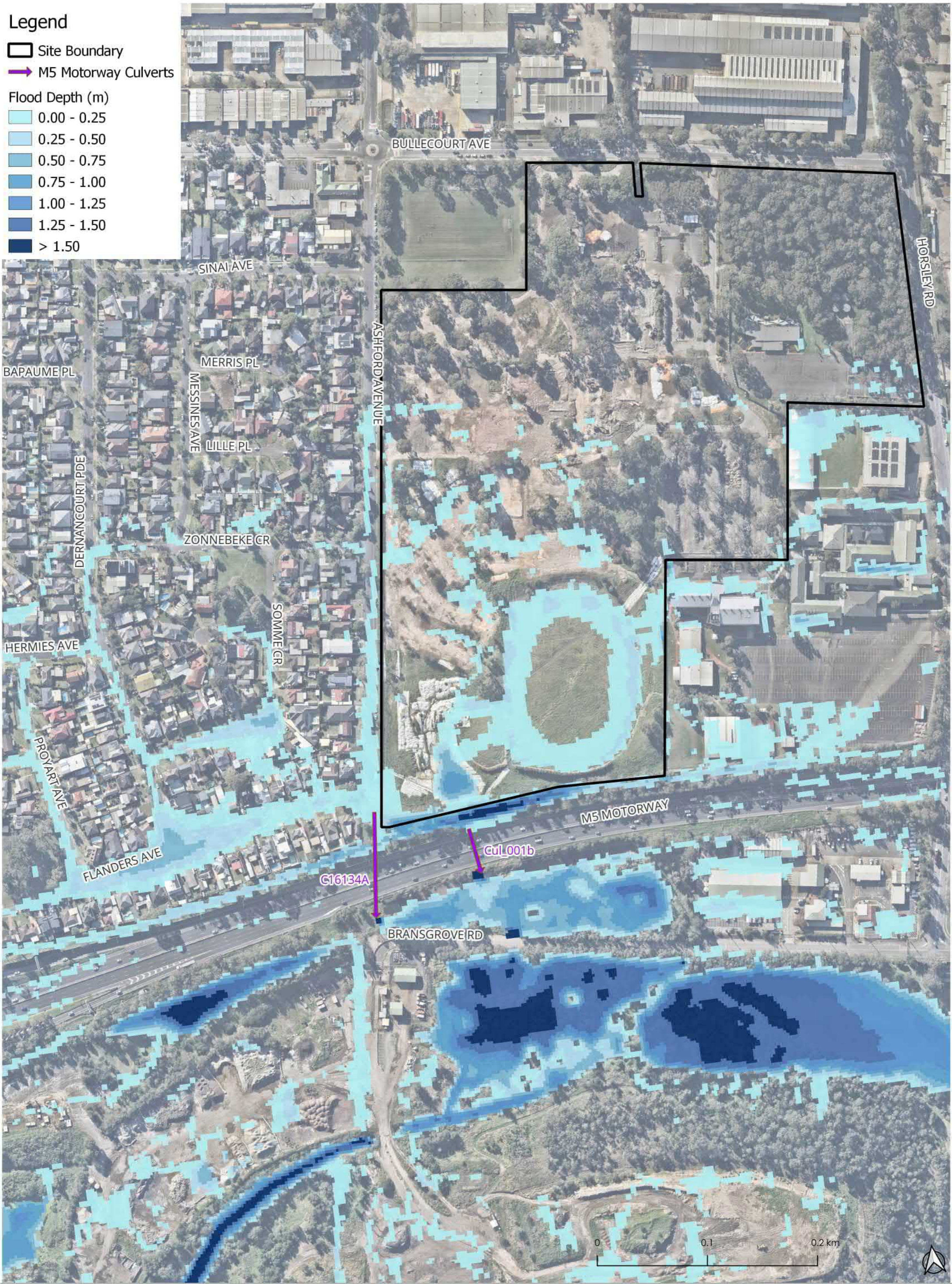
0.50 - 0.75

0.75 - 1.00

1.00 - 1.25

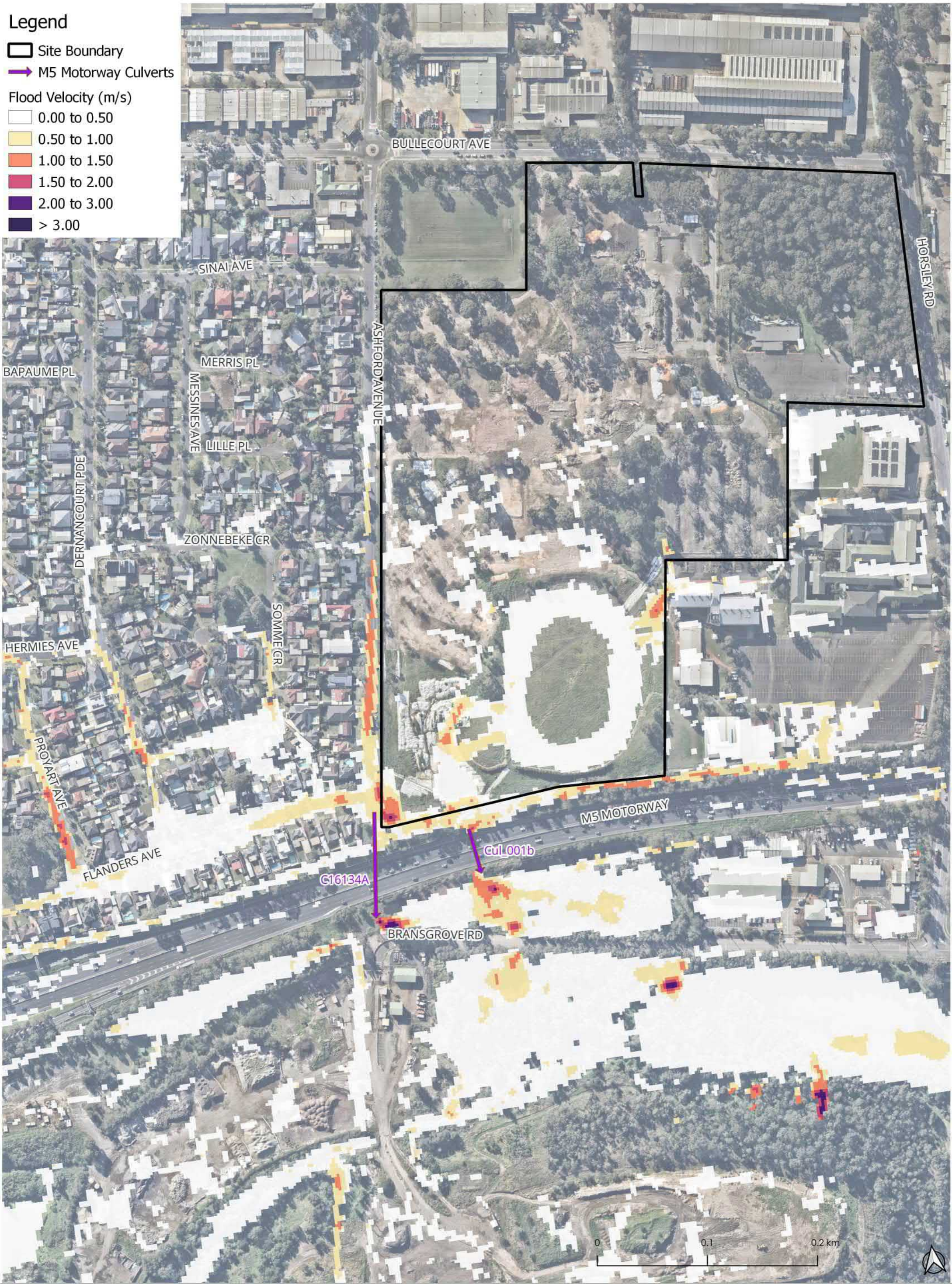
1.25 - 1.50

> 1.50



Legend

- Site Boundary
- M5 Motorway Culverts
- Flood Velocity (m/s)
 - 0.00 to 0.50
 - 0.50 to 1.00
 - 1.00 to 1.50
 - 1.50 to 2.00
 - 2.00 to 3.00
 - > 3.00



Legend

Site Boundary

M5 Motorway Culverts

Hazard Category

H1

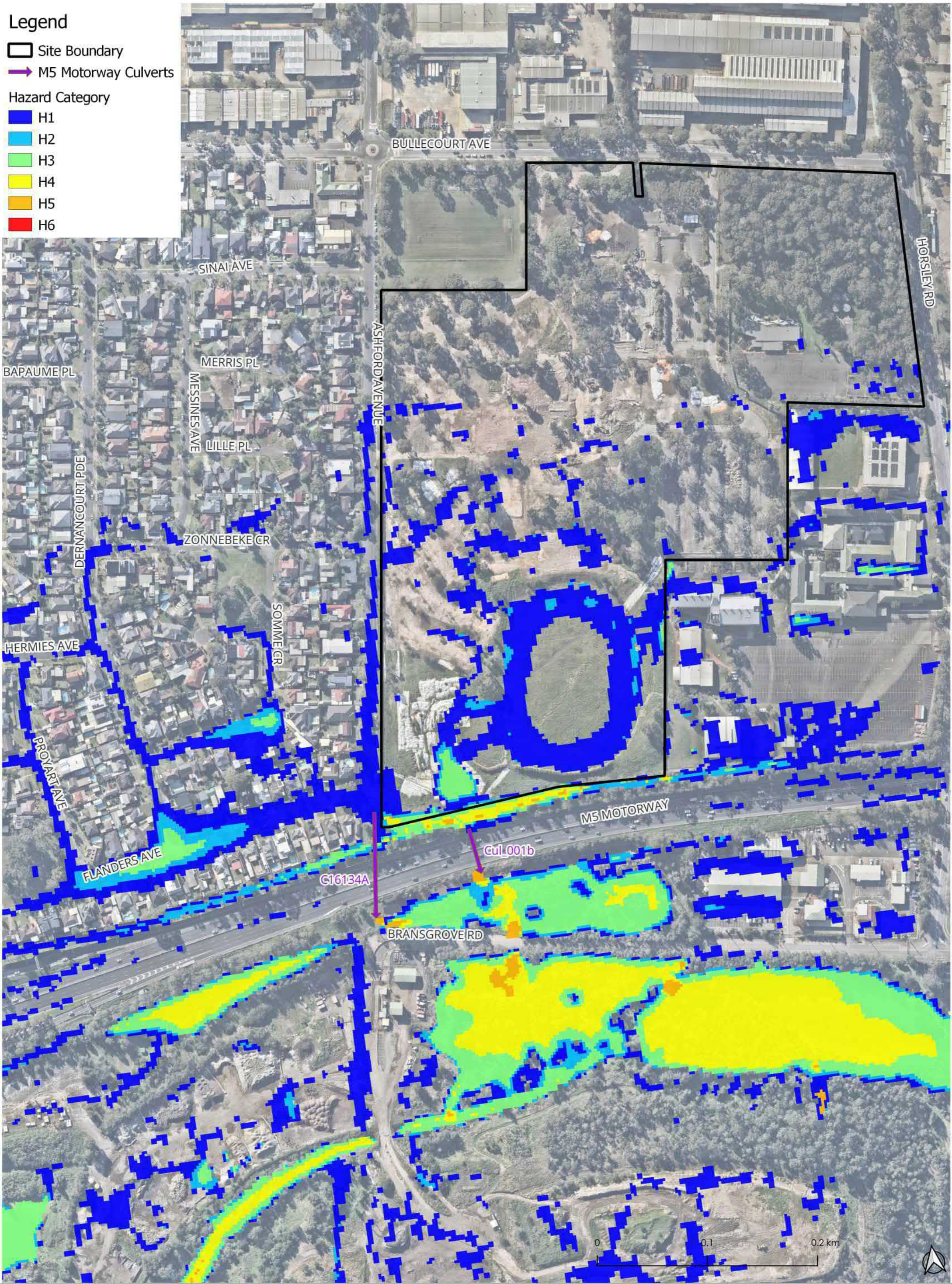
H2

H3

H4

H5

H6



Legend

Site Boundary

M5 Motorway Culverts

Flood Depth (m)

0.00 - 0.25

0.25 - 0.50

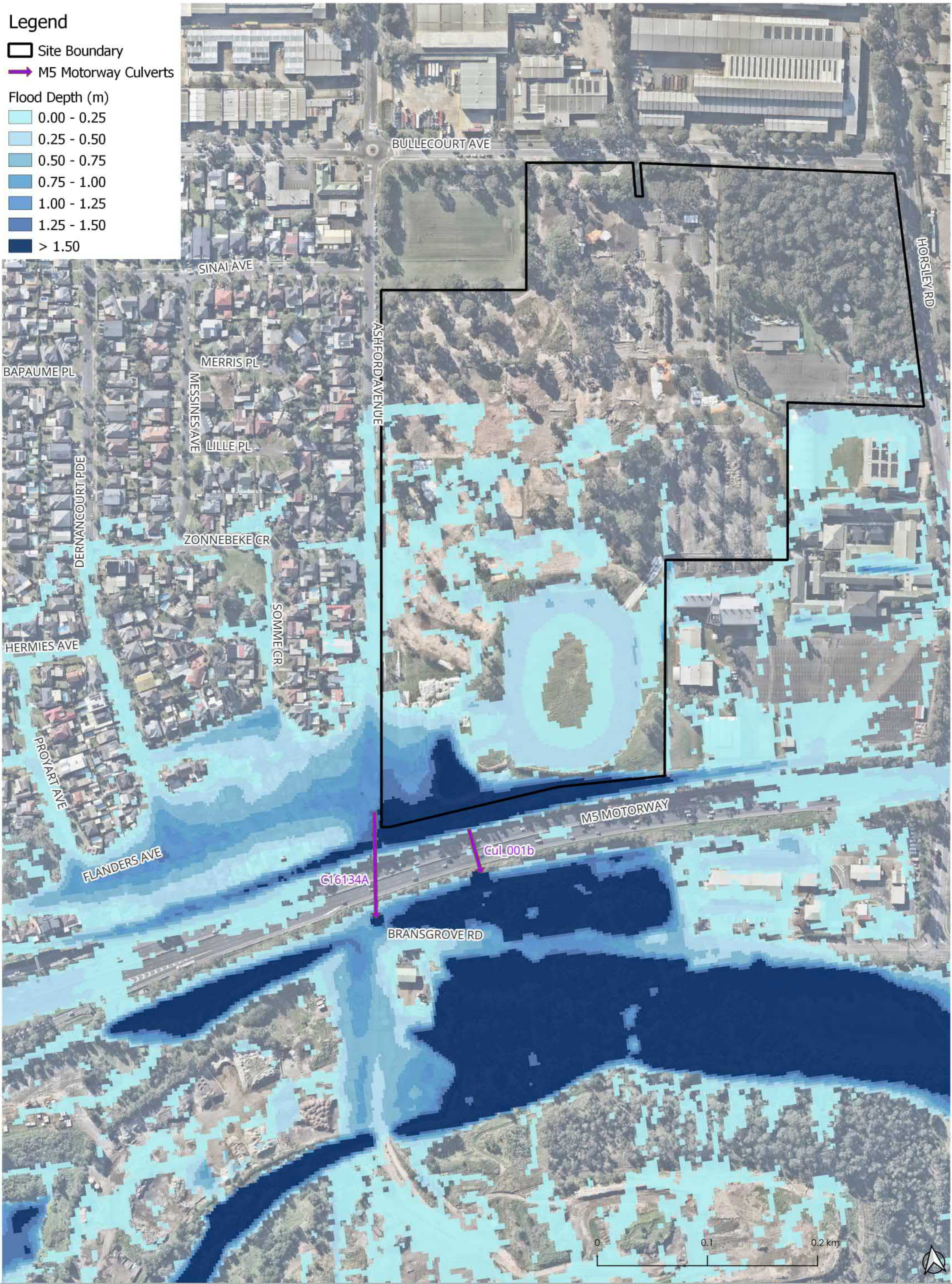
0.50 - 0.75

0.75 - 1.00

1.00 - 1.25

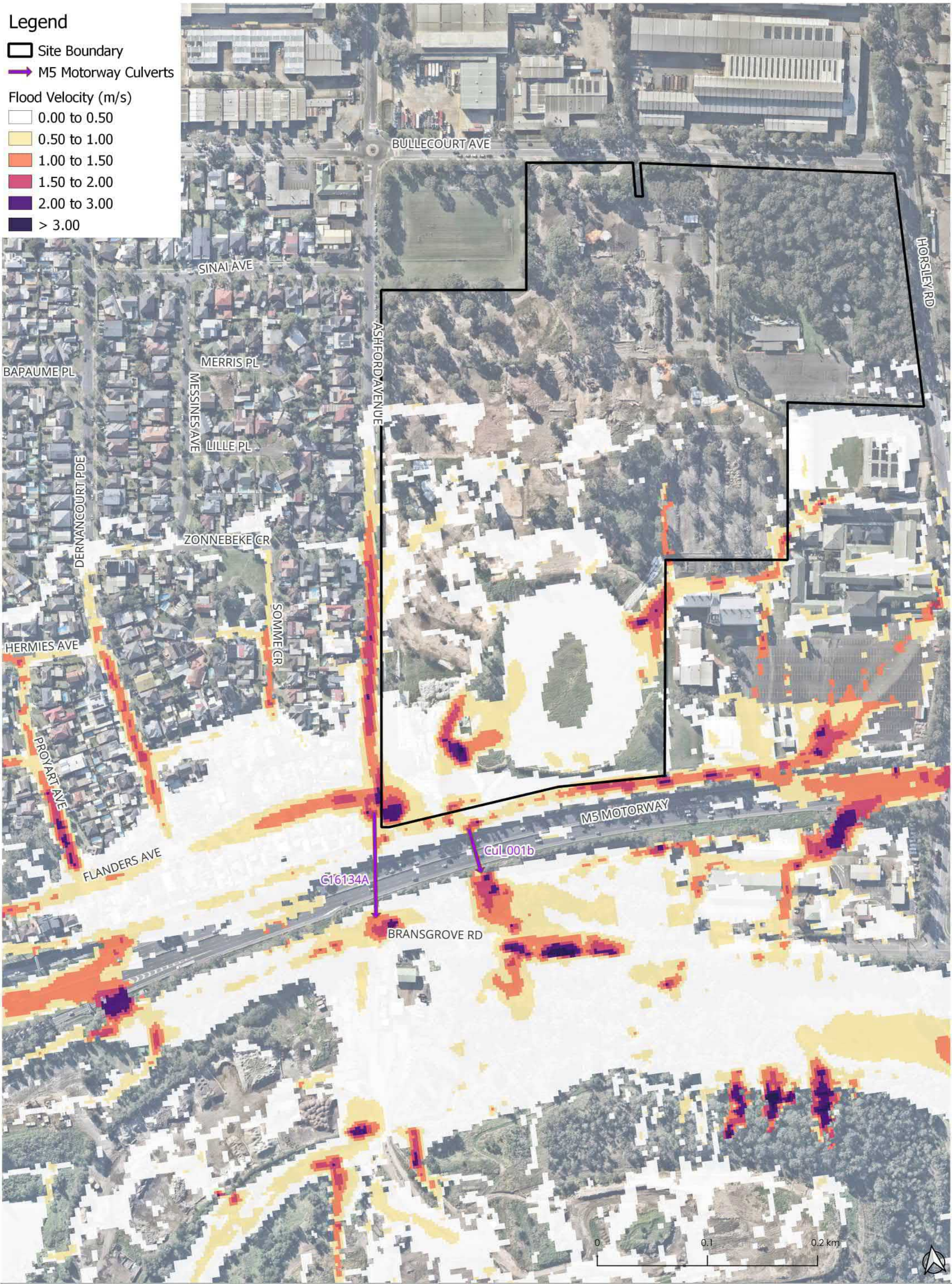
1.25 - 1.50

> 1.50



Legend

- Site Boundary
- M5 Motorway Culverts
- Flood Velocity (m/s)
 - 0.00 to 0.50
 - 0.50 to 1.00
 - 1.00 to 1.50
 - 1.50 to 2.00
 - 2.00 to 3.00
 - > 3.00



Legend

Site Boundary

M5 Motorway Culverts

Hazard Category

H1

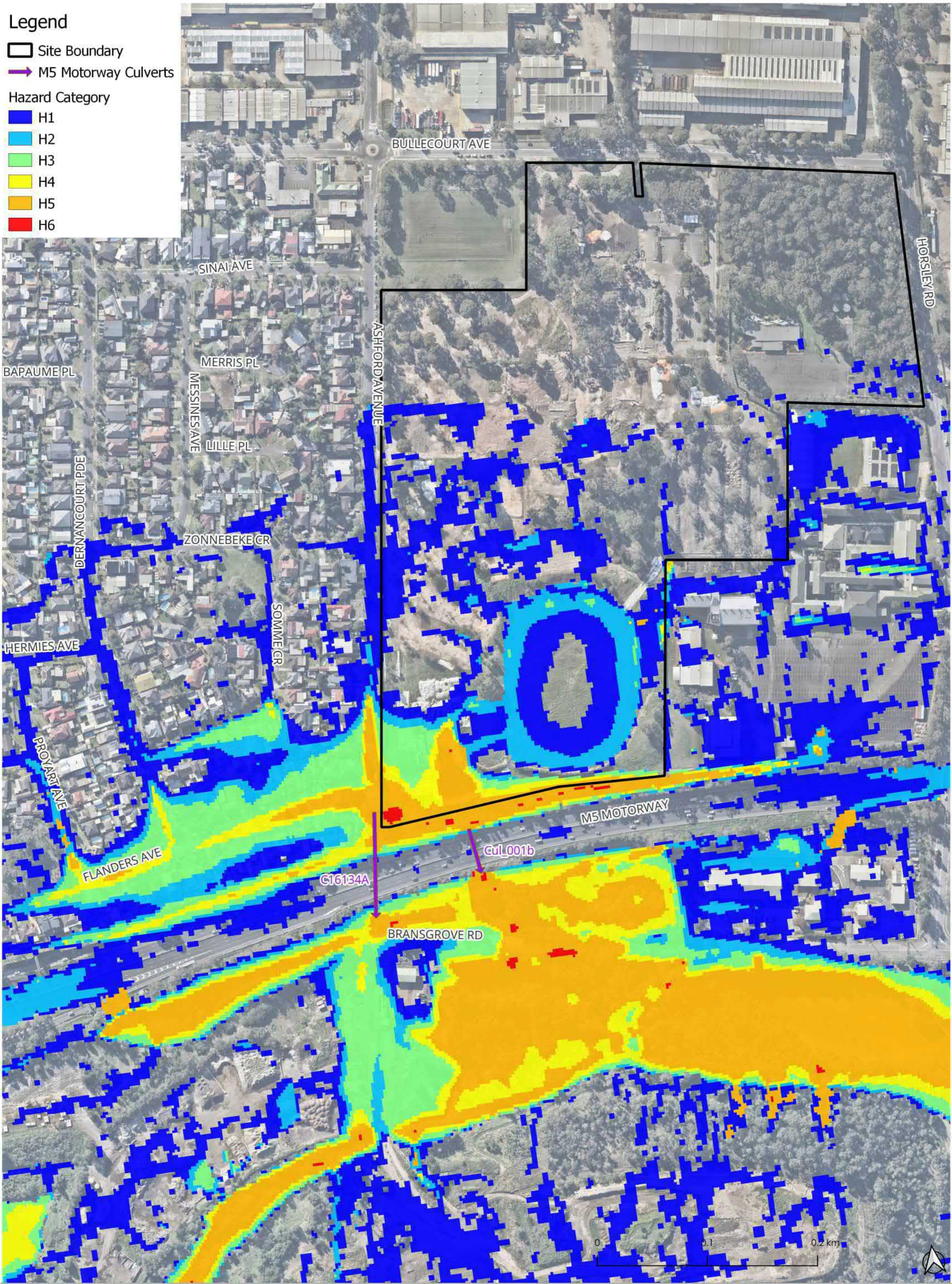
H2

H3

H4

H5

H6



APPENDIX C: BASE CASE PROPOSED FLOOD MAPS

Legend

Site Boundary

M5 Motorway Culverts

Flood Depth (m)

0.00 - 0.25

0.25 - 0.50

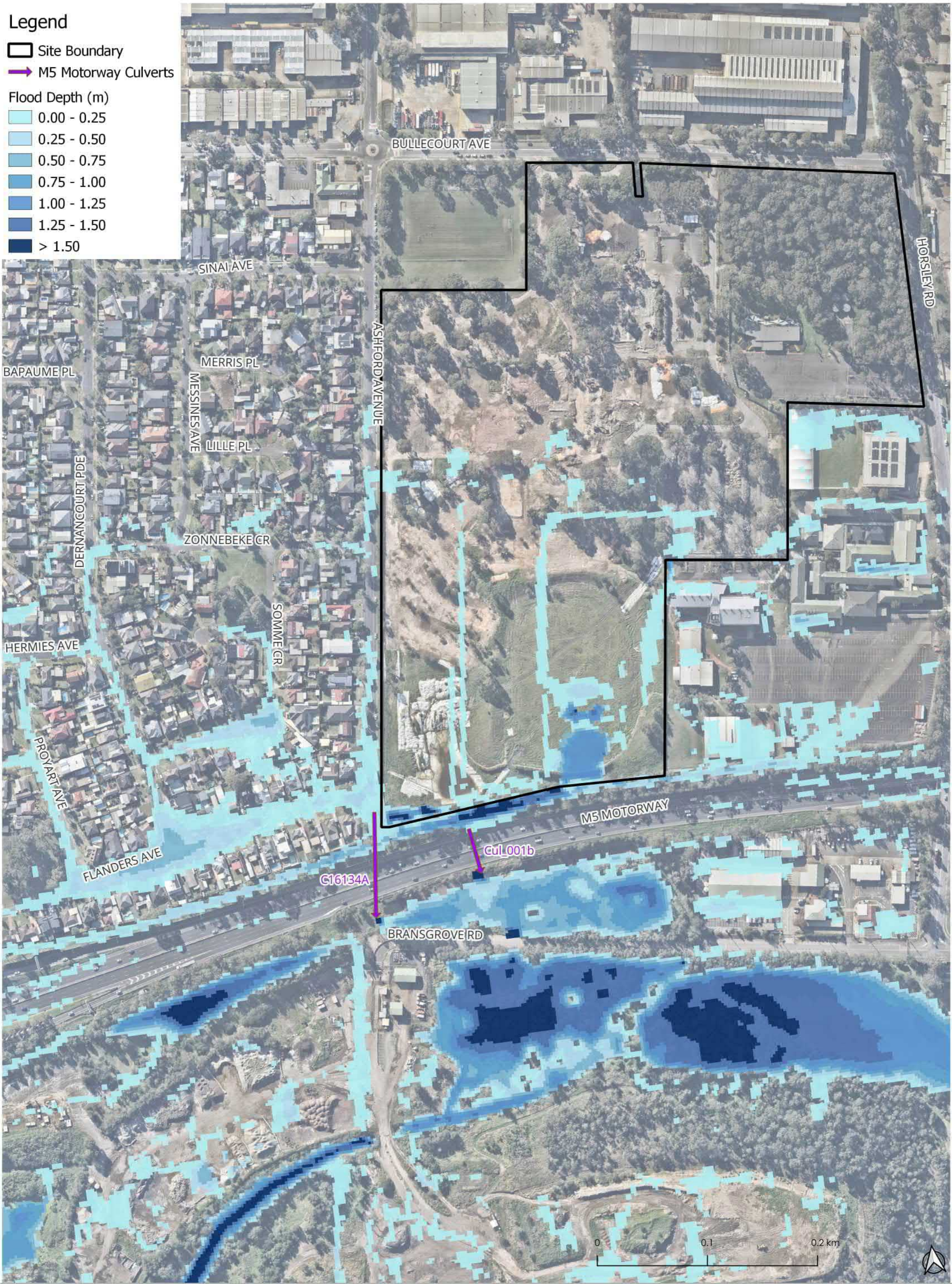
0.50 - 0.75

0.75 - 1.00

1.00 - 1.25

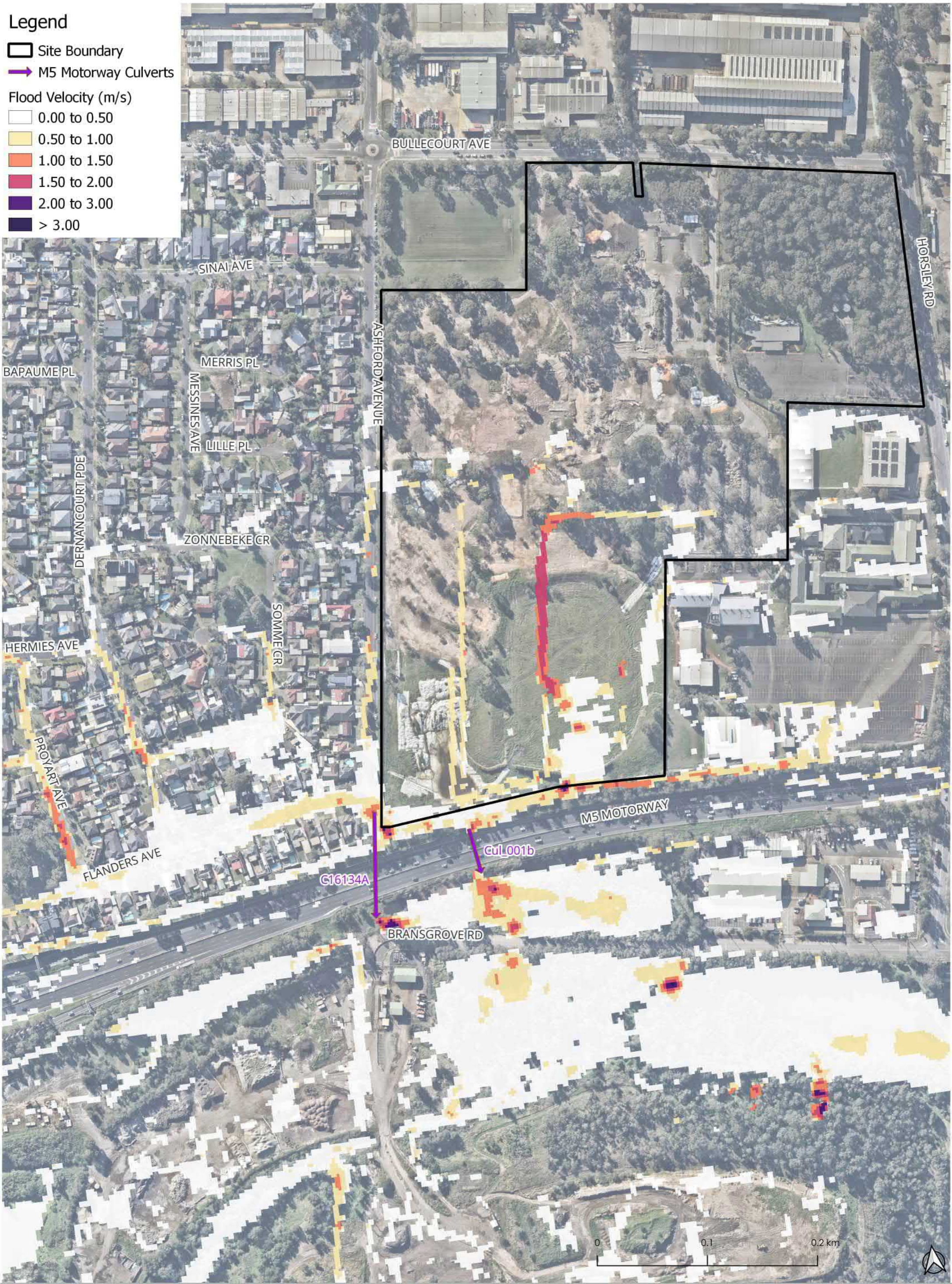
1.25 - 1.50

> 1.50



Legend

- Site Boundary
- M5 Motorway Culverts
- Flood Velocity (m/s)
 - 0.00 to 0.50
 - 0.50 to 1.00
 - 1.00 to 1.50
 - 1.50 to 2.00
 - 2.00 to 3.00
 - > 3.00



Western Sydney Office
Level 4, LPC House,
Suite 4.05, 3 Fordham Way
Oran Park, NSW 2570
Tel: (02) 4625 5055

Client:
Mirvac Residential
(NSW) Development
Pty Ltd

Flood Velocity
100 Year ARI
Base Case Proposed
Figure C2

Project Coordination: EPSG:7856
Drawn by: YL
Checked by: FG
Issued: Date: 2025-08-27

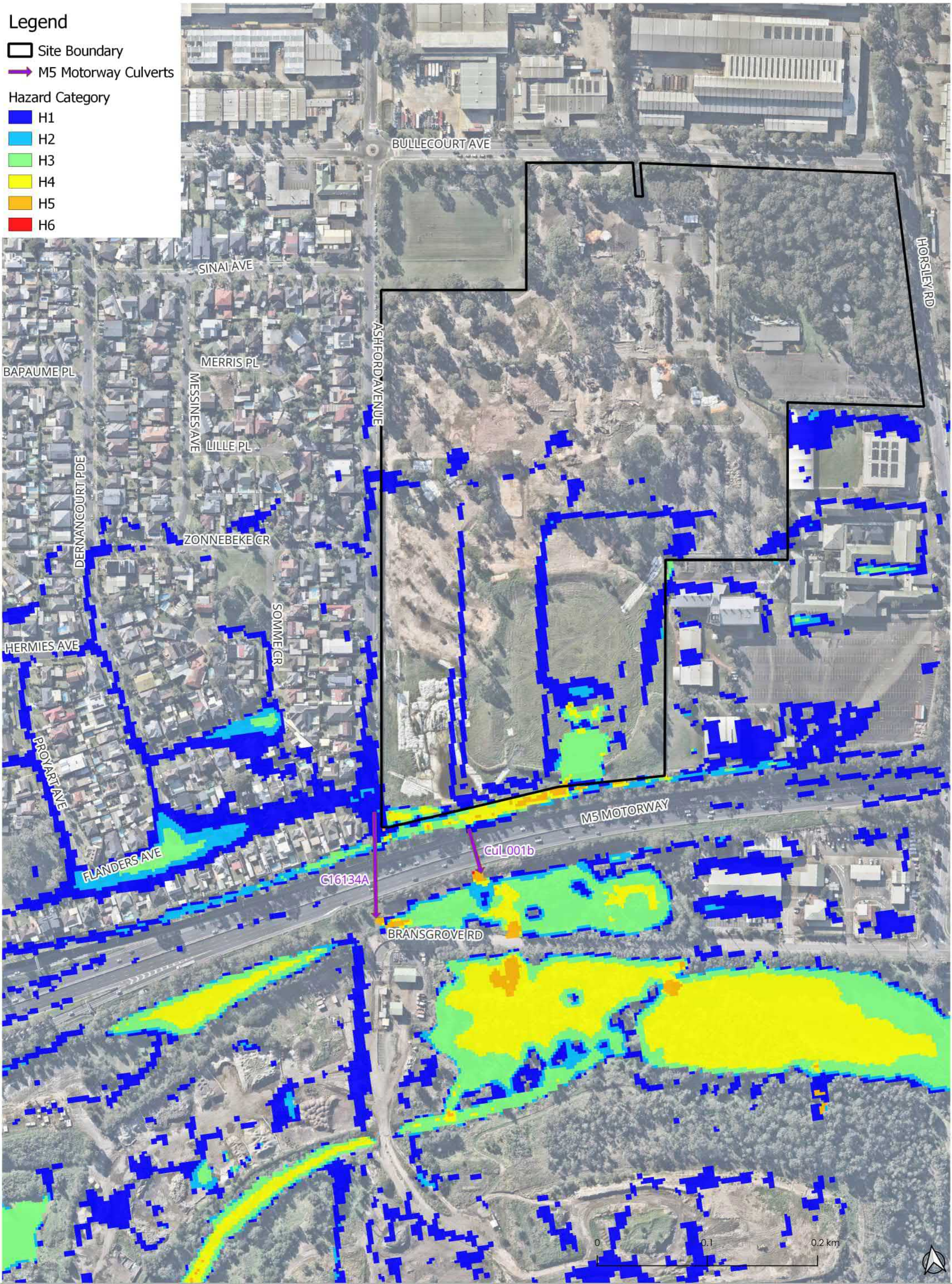
Legend

Site Boundary

M5 Motorway Culverts

Hazard Category

- H1
- H2
- H3
- H4
- H5
- H6



Western Sydney Office
Level 4, LPC House,
Suite 4.05, 3 Fordham Way
Oran Park, NSW 2570
Tel: (02) 4625 5055

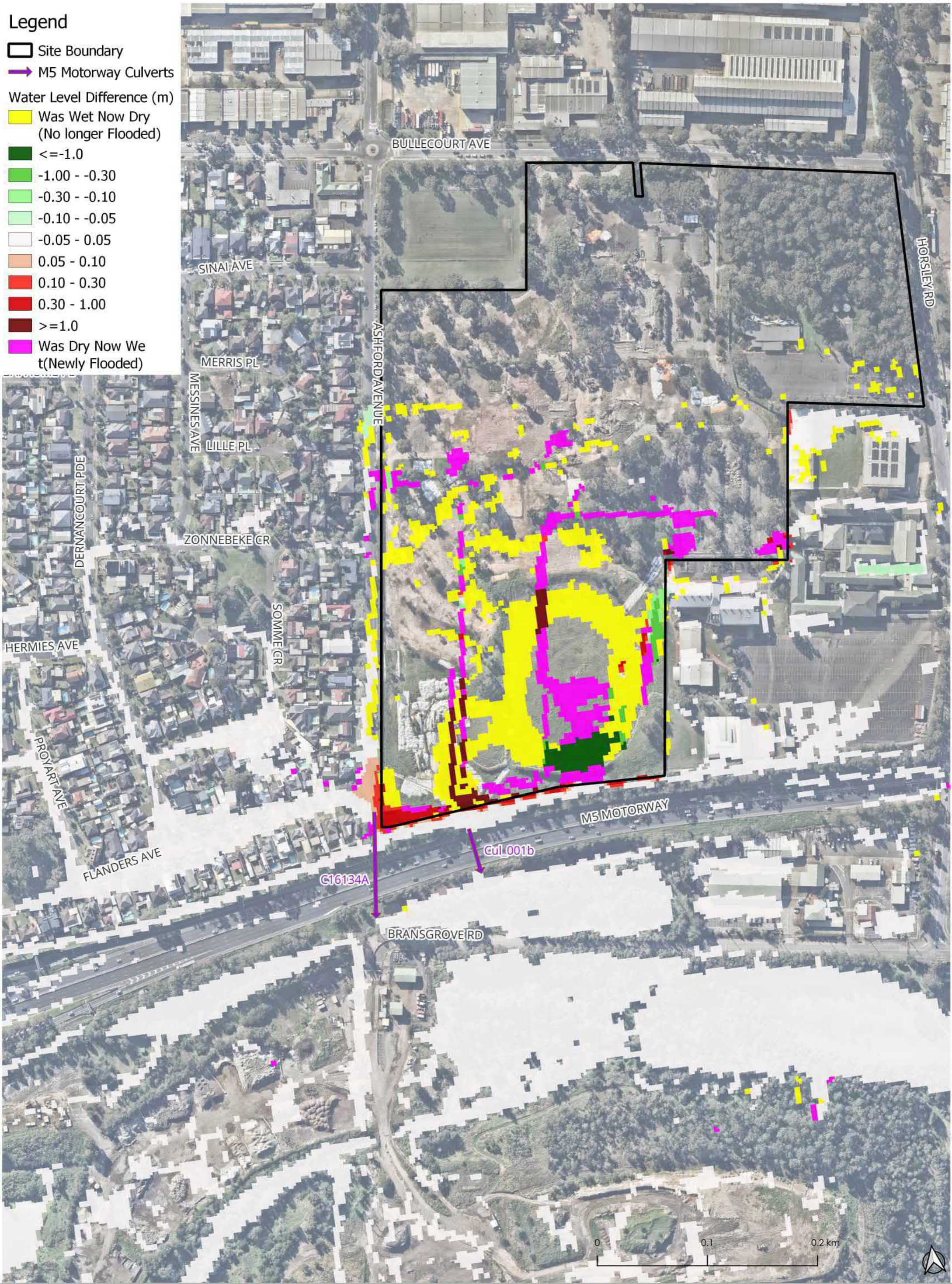
Client:
Mirvac Residential
(NSW) Development
Pty Ltd

Hazard Category
100 Year ARI
Base Case Proposed
Figure C3

Project Coordination: EPSG:7856
Drawn by: YL
Checked by: FG
Issued: Date: 2025-08-27

Legend

- Site Boundary
- M5 Motorway Culverts
- Water Level Difference (m)
 - Was Wet Now Dry (No longer Flooded)
 - ≤ -1.0
 - 1.00 - -0.30
 - 0.30 - -0.10
 - 0.10 - -0.05
 - 0.05 - 0.05
 - 0.05 - 0.10
 - 0.10 - 0.30
 - 0.30 - 1.00
 - ≥ 1.0
 - Was Dry Now Wet (Newly Flooded)



Legend

Site Boundary

M5 Motorway Culverts

Flood Depth (m)

0.00 - 0.25

0.25 - 0.50

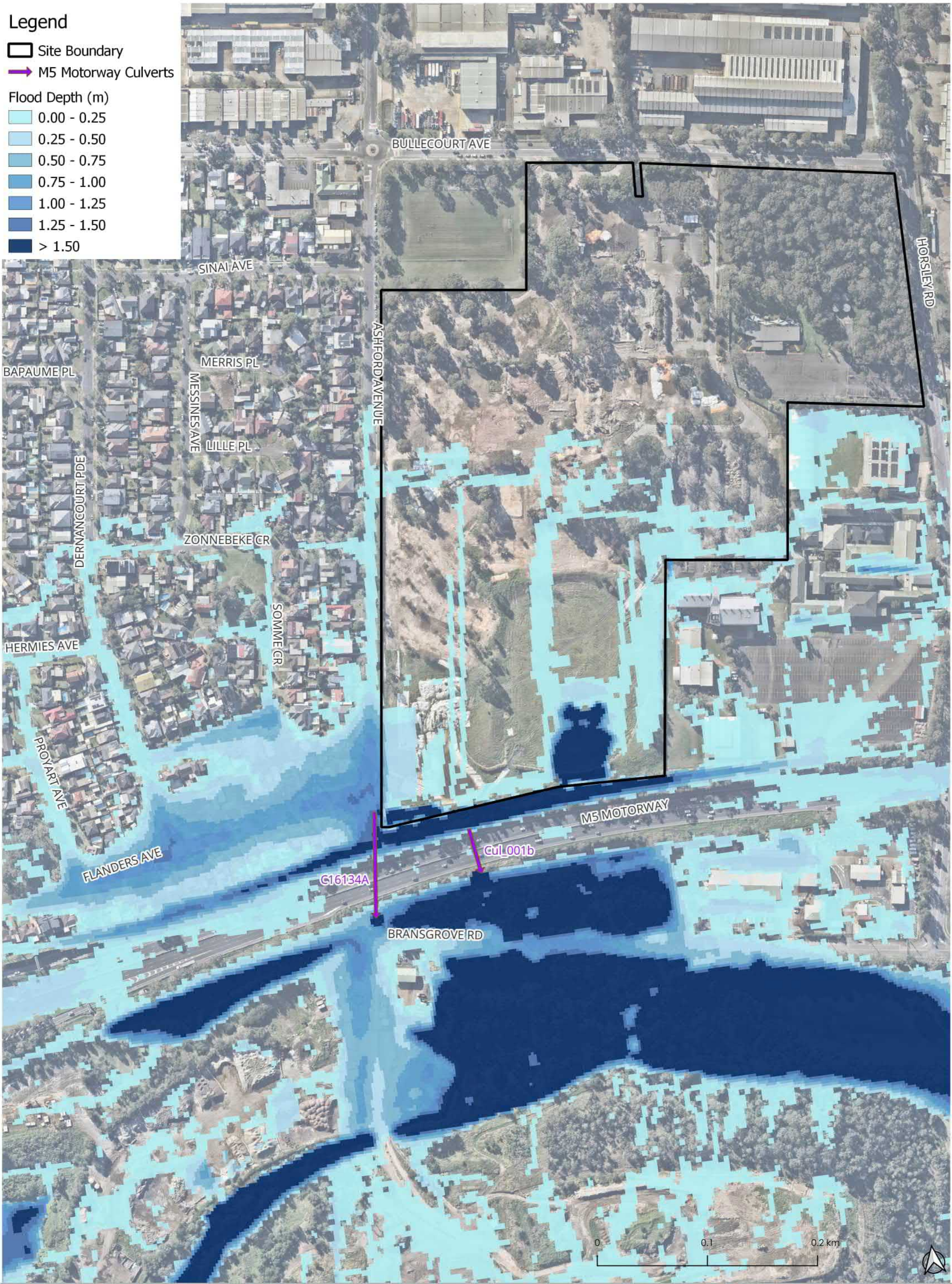
0.50 - 0.75

0.75 - 1.00

1.00 - 1.25

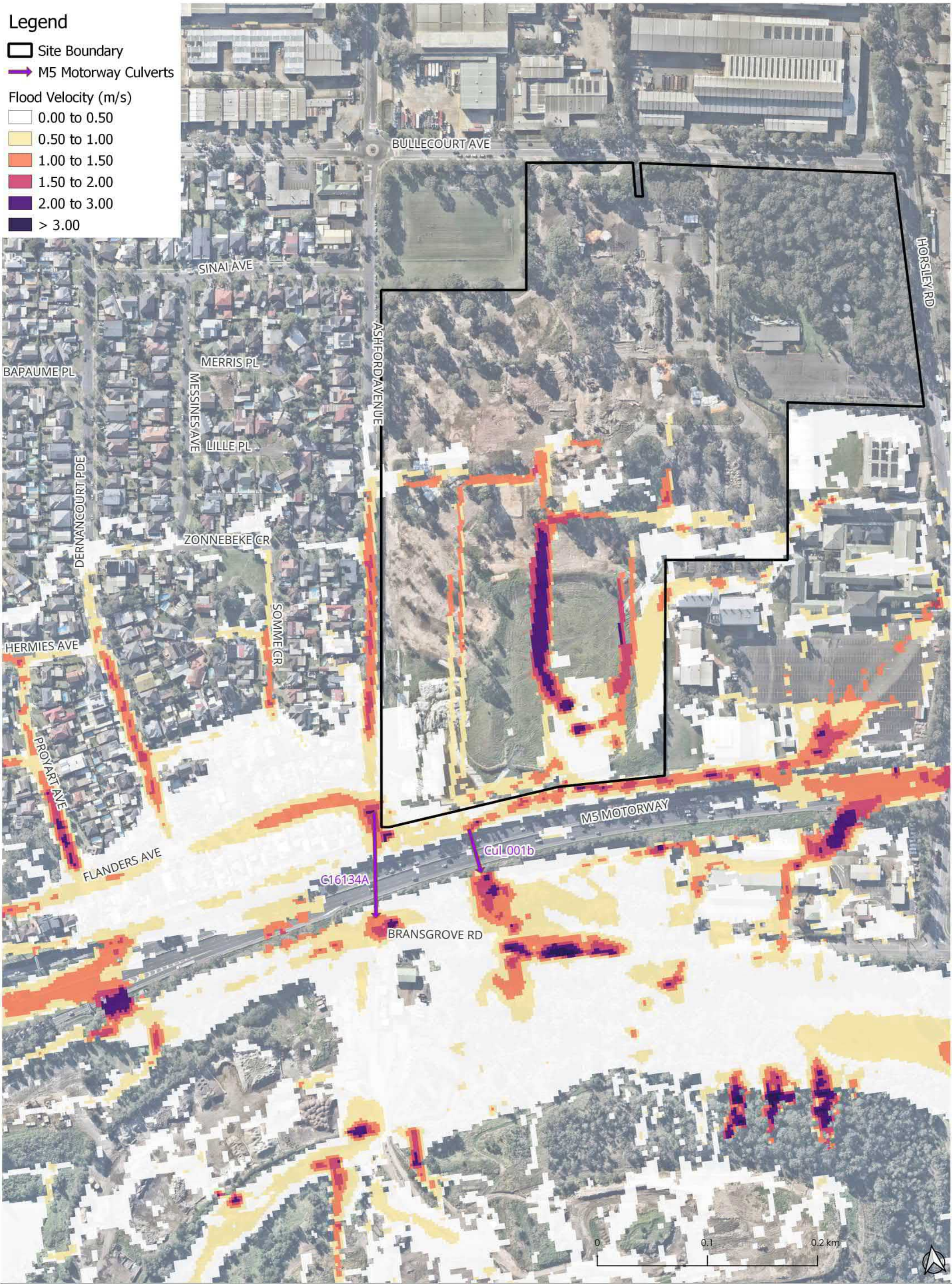
1.25 - 1.50

> 1.50



Legend

- Site Boundary
- M5 Motorway Culverts
- Flood Velocity (m/s)
 - 0.00 to 0.50
 - 0.50 to 1.00
 - 1.00 to 1.50
 - 1.50 to 2.00
 - 2.00 to 3.00
 - > 3.00



Western Sydney Office
Level 4, LPC House,
Suite 4.05, 3 Fordham Way
Oran Park, NSW 2570
Tel: (02) 4625 5055

Client:
Mirvac Residential
(NSW) Development
Pty Ltd

Flood Velocity
PMF
Base Case Proposed
Figure C6

Project Coordination: EPSG:7856
Drawn by: YL
Checked by: FG
Issued: Date: 2025-08-27

Legend

Site Boundary

M5 Motorway Culverts

Hazard Category

H1

H2

H3

H4

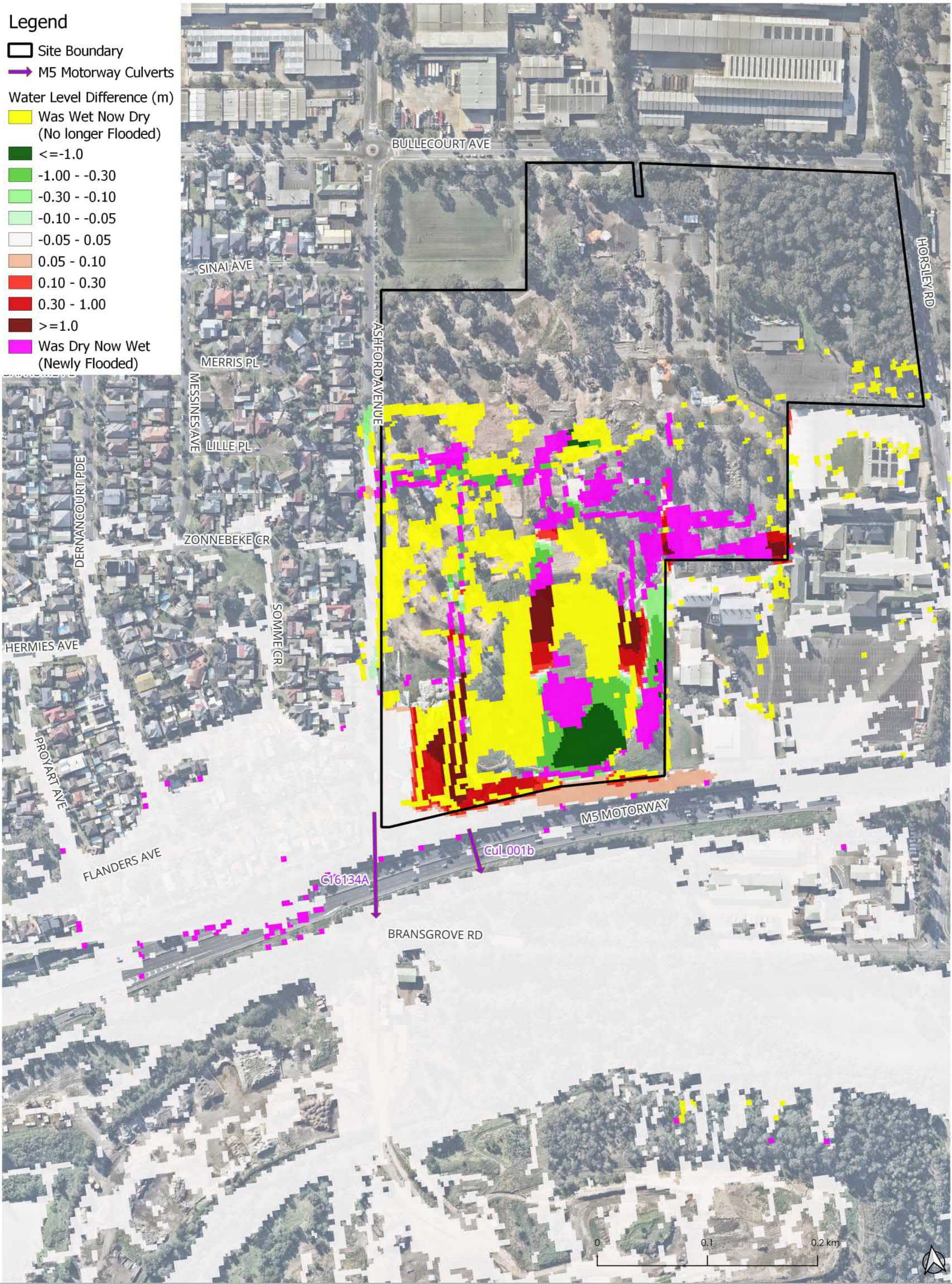
H5

H6

	Western Sydney Office	Client:	Hazard Category	Project Coordination: EPSG:7856
	Level 4, LPC House,	Mirvac Residential	PMF	Drawn by: YL
	Suite 4.05, 3 Fordham Way	(NSW) Development	Base Case Proposed	Checked by: FG
	Oran Park, NSW 2570	Pty Ltd	Figure C7	Issued: Date: 2025-08-27
	Tel: (02) 4625 5055			

Legend

- Site Boundary
- M5 Motorway Culverts
- Water Level Difference (m)
 - Was Wet Now Dry (No longer Flooded)
 - ≤ -1.0
 - 1.00 - -0.30
 - 0.30 - -0.10
 - 0.10 - -0.05
 - 0.05 - 0.05
 - 0.05 - 0.10
 - 0.10 - 0.30
 - 0.30 - 1.00
 - ≥ 1.0
 - Was Dry Now Wet (Newly Flooded)



Western Sydney Office
Level 4, LPC House,
Suite 4.05, 3 Fordham Way
Oran Park, NSW 2570
Tel: (02) 4625 5055

Client:
Mirvac Residential
(NSW) Development
Pty Ltd

Water Level Difference
PMF
Base Case Proposed Less Base Case Existing
Figure C8

Project Coordination: EPSG:7856
Drawn by: YL
Checked by: FG
Issued: Date: 2025-08-27

APPENDIX D: SENSITIVITY TEST 100-YEAR WATER LEVEL DIFFERENCE

- Legend
- Site Boundary
 - M5 Motorway Culverts

