

Memorandum

To:	Western Sydney University	Date:	31/10/2025
Attention:	Stuart Pullens	Project No.:	227190.00
Email:	S.Pullens@westernsydney.edu.au	Reference:	R.004.Rev0
Subject:	Groundwater impact assessment - response to submissions		

The Environmental Impact Statement (EIS) for Western Sydney University's (WSU) Indigenous Centre of Excellence (ICoE) was originally submitted in August 2024, followed by an Amendment and Submission Report lodged on 11 August 2025.

Following public exhibition, feedback was received from various agencies. The Department of Climate Change, Energy, Environment and Water (DCCEEW) provided comments seeking clarification on groundwater-related matters (Table 1). This memorandum addresses those recommendations and provides the requested responses.

Table 1: Groundwater comments (from DCCEEW water group)

Theme	Agency requirement	Issue / Advice
Groundwater take quantification	Quantify maximum annual groundwater take from aquifer interference and demonstrate ability to acquire sufficient entitlement unless an exemption applies (EIS/RTS insufficient; excavations likely intercept groundwater).	Insufficient information on groundwater inflow; deepest excavation and piling likely to intercept water table; unsupported 0.1 ML take estimate.
Licensing / Exemptions	Obtain WAL(s) to account for maximum predicted groundwater take unless an exemption under Water Management (General) Regulation 2025 applies; keep and submit records per Schedule 4 requirements.	Obtain WAL for maximum predicted take unless exemption applies (e.g., coastal construction or ≤ 3 ML/y); keep records and report.
Aquifer interference impacts	If groundwater take >3 ML/year, assess aquifer interference impacts per NSW Aquifer Interference Policy and Assessment Framework and provide mitigation.	If groundwater take >3 ML/y, assess impacts per NSW Aquifer Interference Policy and Assessment Framework.

1. Proposed development

Based on the architectural plans (attached in Appendix A) the proposed development is understood to comprise the following two elements (Stage 1 and Stage 2).

1.1 Stage 1 - P1 Carpark Relocation

The P1 carpark relocation works are understood to be scheduled to be conducted prior to development of the ICoE building to replace the carpark currently occupying the proposed ICoE building area. The new carpark is to be divided into a western and eastern section (separated by Fifth Street) as shown on Drawing 1 (Appendix A) with the existing open space, grassed areas to be redeveloped into on-grade carparks.

Cut and fill is understood to be required as follows (refer civil drawing CI-02011, Appendix A):

- Western carpark, excavation will be required in the north-eastern part of this section to depths of up to ~1.2 m which comprises the mounded fill towards Bridge Street; generally minimal fill in other areas to maintain the approximate current levels (estimated net 120 m³ cut); and
- Eastern carpark – generally minor cut, up to ~0.5 m deep (estimated net 830 m³ cut).

An on-site detention (OSD) tank is proposed as part of the carpark relocation works. The tank is likely to require excavation to a depth of ~2 m.

1.2 Stage 2 - ICoE Building

The ICoE building development is understood to broadly entail:

- Site preparation including demolition of the existing carpark, tree removal and installation of inground utilities;
- Construction of a new four-storey structure (no basement levels); and
- External landscaping works.

Based on cut and fill plans the levels for the proposed ICoE building generally require raising of the landform by up to 1 m, with limited cut at the existing landscaping peripheries.

The ICoE development details are provided for information, noting this area does not form part of the required remediation extent (the site).

2. Hydrogeological context

2.1 Geology

Review of the Geological Survey of NSW Seamless Geology Web Map (Figure 1) and geotechnical investigation results (Douglas, 2024) indicates that the site is underlain by:

- Fill: variably compacted and of varying composition, including sandy gravel, gravelly sand, sand, and clay, sand and gravel mixtures;
- Alluvial sediments of the Quaternary and Tertiary Period: medium to high plasticity clay, silty clay and sandy clay; with some discontinuous clayey sand and sand layers;
- Residual soil: sand, clayey sand and sandy clay; and
- Hawkesbury Sandstone bedrock: medium to coarse-grained quartz sandstone with minor shale and laminite lenses. The sandstone is slightly fractured in the northern part of the site, unbroken elsewhere.

Borelogs from the previous investigation are attached in Appendix B.



Figure 1: NSW Seamless Geology map with approximate site location: NSW Seamless Geology map with approximate site location

2.2 Hydrogeological units

Two groundwater systems have been identified during the site investigation:

- A shallow groundwater system within the alluvial clay and residual soil. Groundwater flow direction within this system appears to be to the south, following surface topography; and
- A deeper groundwater system within the underlying sandstone.

2.3 Groundwater monitoring

Three groundwater monitoring wells (BH2, BH5 and BH6) were installed as part of geotechnical investigation (Douglas, 2024). The locations of the monitoring wells are shown on the attached Drawing 1 (Appendix A). An overview of the monitoring wells is provided in Table 2.

Table 2: Monitoring wells overview

Well	Surface RL (m AHD)	Screen depth (m bgl)	Screened lithology
BH2	7.9	2.0 – 8.0	Tertiary alluvial clay
BH5	7.9	2.5 – 4.5	Residual soil: sandy clay
BH6	7.3	5.0 – 9.9	Sandstone, slightly fractured

Notes: bgl: below ground level

Dataloggers were installed in groundwater monitoring wells BH2 and BH5 to record measurements of the groundwater levels at hourly intervals between 24 March and 10 July 2024. Hydrographs, including rainfall records from Parramatta North - Bureau of Meteorology Station 066124, are attached in Appendix C.

Manual measurements of the water level were taken on 24 March, 7 May and 10 July 2024 to calibrate the datalogger data (Table 3). Groundwater quality sampling was also undertaken at BH2 on 26 March 2024. Laboratory reports are attached in Appendix D.

Table 3: Manual groundwater measurements

Date	Measured depth to groundwater (m) [Groundwater level (m, AHD)]		
	BH2	BH5	BH6
24/03/2024	2.2 [5.7]	1.9 [6.0]	5.2 ⁽¹⁾ [2.1]
07/05/2024	2.0 [5.9]	1.9 [6.0]	1.8 [5.5]
10/07/2024	1.5 [6.4]	1.8 [6.1]	1.6 [5.7]

Notes: 1. Groundwater level was likely still recovering from bore development and sampling undertaken on 24 March 2024.

The maximum, minimum and average groundwater levels for each of the monitoring wells (using the data loggers) are provided in Table 4.

Table 4: Summary of groundwater monitoring results (logger data)

Borehole (Well)	Monitoring period	Depth to groundwater during monitoring (m) [Groundwater level (m, AHD)]		
		Minimum	Maximum	Average
BH2	24/03/2024 – 10/07/2024	2.4 [5.5]	1.4 [6.5]	1.9 [6.0]
BH5	24/03/2024 – 10/07/2024	2.0 [5.9]	1.7 [6.0]	1.8 [6.1]

The highest daily rainfall during the monitoring period was 103 mm on 6 April 2024, corresponding to a rise in groundwater level of about 0.3 m in BH2 and 0.2 m in BH5. The groundwater levels in the monitoring wells were observed to all similarly respond to rainfall events.

2.4 Groundwater receptors

No registered groundwater abstraction bores are present within or near the site.

A review of the groundwater dependent ecosystems (GDE) Atlas showed the closest mapped potential GDE is located approximated 450 m east of the site, being the Lower Blue Mountains Wet Forest within the Sydney Coast – Georges River area mapped as having low potential for groundwater dependence.

3. Potential groundwater impacts

No basement levels are proposed as part of the development. Proposed cuts are shallow (up to approximately 1.2 m below ground level) and are therefore not expected to intersect the water table, which was encountered at around 2.0 m depth on average, rising to approximately 1.4 m following heavy rainfall events. Long-term interception of groundwater is therefore not anticipated.

During construction, excavations will be limited to utility trenches, building foundations, and the OSD tank. Minor, temporary groundwater seepage may occur during these works; however, such inflows are expected to be minimal. Given the cohesive and low-permeability characteristics of the alluvial soils, seepage volumes are likely to be minimal (if any) and readily managed using conventional sump-and-pump methods.

No registered groundwater bores or GDEs occur in the vicinity of the site (Section 2.4). Therefore, no impacts on groundwater receptors are anticipated.

Any groundwater seepage collected during construction will be managed in accordance with the Protection of the Environment Operations Act 1997 (POEO Act). Any discharge to the environment will comply with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018).

4. Groundwater take quantification

Simple analytical calculation using Marinelli and Niccoli (2000) solution was undertaken to quantify the potential groundwater take for the OSD tank excavation. The following assumptions were made:

- The dimensions of the OSD tank are 19.2 m x 6.4 m (as per architectural drawings).
- The OSD tank requires excavation to 2.5 m depth (conservative).
- The water table is at 1.5 m depth (conservative).
- The hydraulic conductivity of the soil is 1×10^{-6} m/s (high-end of literature value for a sandy clay).
- The soil is homogeneous.
- Construction of the OSD tank will take 12 weeks.

Based on these assumptions, the predicted groundwater take is about 2 m³/day, i.e. a total of approximately 0.2 ML over a 12-week period.

5. Licensing requirements

Groundwater take associated with the proposed development will be limited to short-term, temporary dewatering and seepage management during the construction phase. No ongoing or operational groundwater extraction is proposed.

In June 2025, an amendment to the Water Management (General) Regulation 2018 introduced a temporary groundwater licensing exemption to support coastal housing and infrastructure development. This provision applies to the temporary take of groundwater for construction, excavation or remediation purposes. The exemption extends to water sources regulated under the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023.

Under this exemption, temporary, small-volume groundwater inflows encountered during construction activities (such as utility trenching, foundation piling or OSD tank excavation) are considered incidental to the works and do not require a Water Access Licence (WAL) under the *Water Management Act 2000*.

Please do not hesitate in contacting the undersigned should you have any queries in relation to this memorandum.

Douglas Partners Pty Ltd



Claire Corthier

Associate Hydrogeologist

Reviewed by



Scott Easton

Principal

Attachments:

Appendix A – Drawings

Appendix B – Borelogs

Appendix C – Hydrographs

Appendix D – Water quality laboratory reports

References:

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

Douglas. (2024). *Report on geotechnical investigation. 171 Victoria Road, Parramatta NSW*. Reference 227190.00.R.001.Rev2 dated June 2024.

Limitations:

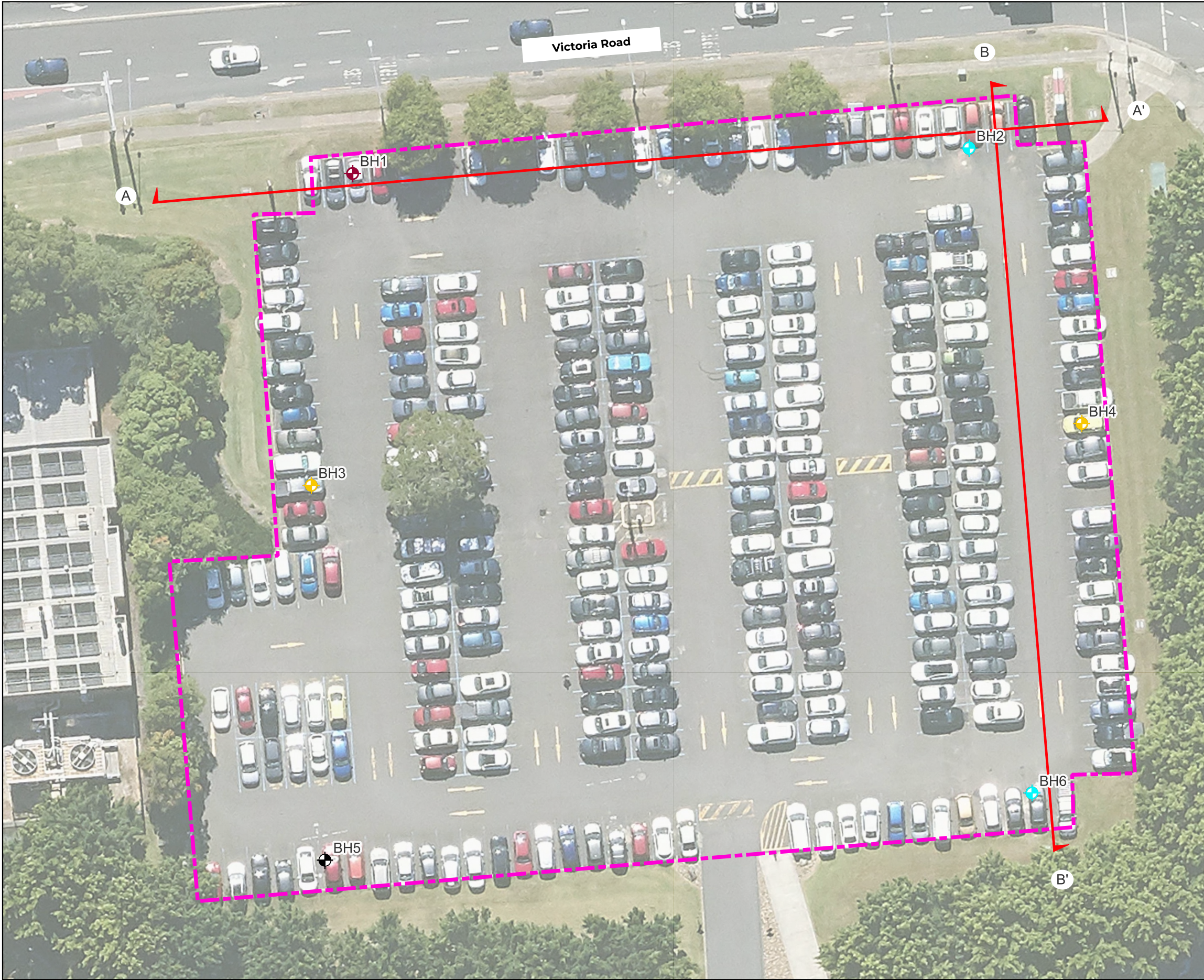
Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at 171 Victoria Road, Rydalmere NSW in accordance with Douglas' proposal dated 24 January 2024 and instructions received from Western Sydney University (WSU) dated 14 February 2024. The work was carried out under a Minor Consultancy Agreement (Non-Design Services) between WSU and Douglas. This report is provided for the exclusive use of WSU for this project only and for the purposes as described in the report. It should not be used by or be relied upon for other projects or purposes on the same or another sites, or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and / or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

Appendix A

Drawings



LEGEND

Test Locations

- Cored Borehole
- Cored borehole and well
- Non-cored borehole
- Non-cored borehole and well
- Cross-Section
- Project Site Boundary

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	Locations & Sections	15.04.2024	XX
SCALE: 0 5 10 15 m 1:400 @ A3			

Douglas
PARTNERS
OFFICE: SYDNEY
96-98 Hermitage Rd, West Ryde NSW 2114
(02)9809 0666

CLIENT:
Western Sydney University

NOTE:
1: Basemap from Metromaps

COORDINATE REFERENCE SYSTEM: GDA2020, MGA ZONE56

PROJECT NAME: **Indigenous Centre of Excellence**

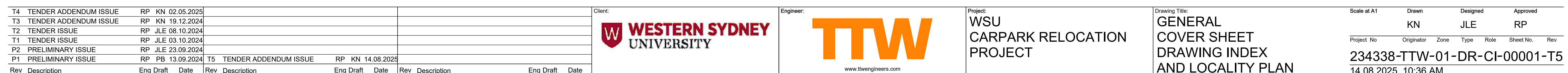
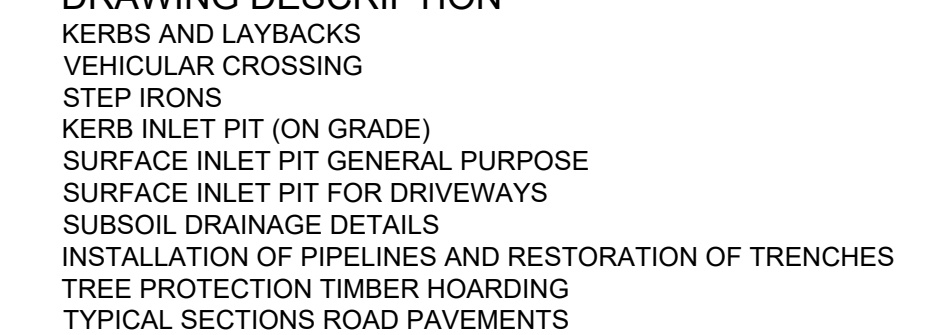
PROJECT ADDRESS: **171 Victoria Road, Rydalmere**

DRAWING TITLE: **TEST LOCATION PLAN**

PROJECT NO: **227190.00**

DRAWING NO: **1**

REVISION: **0**



AREA	COMPACTION RATIO % OF MAXIMUM DRY DENSITY OR DENSITY INDEX (DI)	MOISTURE % FROM OPTIMUM*
LANDSCAPE AREA		
BEDDING AND OVERLAY	70 (DI)	±2
TRENCH BACKFILL	70 (DI) OR 95% STANDARD	±2
UNDER OR WITHIN LINE OF INFLUENCE OF PAVEMENTS, STRUCTURES OR BUILDING SLABS		
BEDDING AND OVERLAY	80 (DI)	±2
TRENCH BACKFILL	80 (DI) OR 98% STANDARD	±2
PAVEMENT ZONE	98% MODIFIED	±2

SIGNS AND LINE MARKING

1. PAVEMENT MARKING AND SIGN POSTING ON PUBLIC ROADS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT ROAD AUTHORITY. THE CONTRACTOR SHALL OBTAIN THESE REQUIREMENTS FROM THE ROAD AUTHORITY.
2. PAVEMENT MARKING AND SIGN POSTING TO BE IN ACCORDANCE WITH R.T.A. 'INTERIM GUIDE TO SIGNS AND MARKINGS'.
3. CONTRACTOR IS TO PROVIDE GUIDE POSTS, SPACED IN ACCORDANCE WITH AS1742.2. THEY ARE TO BE LOCATED NEAR ALL HEAD WALLS AND PIPE OUTLETS.
4. RAISED PAVEMENT MARKERS TO BE IN ACCORDANCE WITH AS1742.2
5. WHERE EXISTING PAVEMENT MARKING CONFLICTS WITH PROPOSED, IT IS TO BE REMOVED.
6. LANE WIDTHS DO NOT INCLUDE WIDTH OF GUTTER.
7. LINE MARKING PLAN DOES NOT DEFINE BOUNDARIES.
8. ERECT TEMPORARY SIGN 'CHANGED TRAFFIC CONDITIONS AHEAD' 120M AHEAD OF NEW WORK IN BOTH DIRECTIONS.
9. ESTABLISH THE LOCATION OF EXISTING UTILITY SERVICES AND LOCATE NEW SIGNS CLEAR OF THESE INSTALLATIONS.
10. THE SLOPED FACE OF THE SF MEDIAN KERBS WHICH ADJOIN THROUGH LANES, ARE TO BE PAINTED WHITE IN LIEU OF AN E3 EDGE LINE. THE REFLECTIVE PAVEMENT MARKERS NORMALLY ASSOCIATED WITH AN E3 EDGE LINE ARE TO BE LOCATED ON THE PAVEMENT ADJACENT TO THE SF KERB.
11. BICYCLE PAVEMENT MARKINGS AND SIGN POSTING TO BE IN ACCORDANCE WITH AUSTROADS STANDARDS.
12. THE DESIGN OF MAJOR DIRECTIONAL SIGN POSTING TO BE PREPARED AND ASSESSED BY THE RELAVENT ROAD AUTHORITY

SAFETY IN DESIGN

EXISTING SERVICES
BEFORE EXCAVATING TRENCHES THROUGH EXISTING PAVEMENT, SAW-CUT EXISTING CONCRETE AND BITUMINOUS SURFACES ON EACH SIDE OF THE TRENCH TO PROVIDE A STRAIGHT EVEN JOINT. LIFT AND STORE UNIT PAVING FOR LATER REINSTATEMENT.

EXISTING STRUCTURES
CONTRACTOR TO BE AWARE EXISTING STRUCTURES MAY EXIST WITHIN THE SITE. TO PREVENT DAMAGE TO EXISTING STRUCTURE(S) AND/OR PERSONNEL, SITE WORKS TO BE CARRIED OUT AS FAR AS PRACTICABLY POSSIBLE FROM EXISTING STRUCTURE(S).

EXISTING TREES
CONTRACTOR TO BE AWARE EXISTING TREES EXIST WITHIN THE SITE WHICH NEED TO BE PROTECTED. TO PREVENT DAMAGE TO TREES AND/OR PERSONNEL, SITE WORKS TO BE CARRIED OUT AS FAR AS PRACTICABLY POSSIBLE FROM EXISTING TREES. ADVICE NEEDS TO BE SOUGHT FROM ARBORIST AND/OR LANDSCAPE ARCHITECT ON MEASURES REQUIRED TO PROTECT TREES.

GROUNDWATER
CONTRACTOR TO BE AWARE OF GROUNDWATER LEVELS CLOSE TO EXISTING SURFACE LEVEL. TEMPORARY DE-WATERING MAY BE REQUIRED DURING CONSTRUCTION WORKS.

EXCAVATIONS
DEEP EXCAVATIONS DUE TO STORMWATER DRAINAGE WORKS IS REQUIRED. CONTRACTOR TO ENSURE SAFE WORKING PROCEDURES ARE IN PLACE FOR WORKS. ALL EXCAVATIONS TO BE FENCED OFF AND BATTERS ADEQUATELY SUPPORTED TO APPROVAL OF GEOTECHNICAL ENGINEER.

GROUND CONDITIONS
CONTRACTOR TO BE AWARE OF THE SITE GEOTECHNICAL CONDITIONS. REFER TO THE GEOTECHNICAL REPORT BY DOUGLAS PARTNERS 227191.00.R.001.REVO DATED 15 NOVEMBER 2024 FOR FURTHER INFORMATION.

HAZARDOUS MATERIALS
EXISTING ASBESTOS PRODUCTS & CONTAMINATED MATERIAL ARE PRESENT ON SITE. CONTRACTOR TO ENSURE ALL HAZARDOUS MATERIALS ARE IDENTIFIED PRIOR TO COMMENCING WORKS. SAFE WORKING PRACTISES AS PER RELEVANT AUTHORITY TO BE ADOPTED AND APPROPRIATE PPE TO BE USED WHEN HANDLING ALL HAZARDOUS MATERIALS. REFER TO REMEDIATION ACTION PLAN BY DOUGLAS PARTNERS 227190.04.R.001.REVO DATED 14 AUGUST 2025 FOR FURTHER INFORMATION.

CONFINED SPACES
CONTRACTOR TO BE AWARE OF POTENTIAL HAZARDS DUE TO WORKING IN CONFINED SPACES SUCH AS STORMWATER PITS, TRENCHES AND/OR TANKS. CONTRACTOR TO PROVIDE SAFE WORKING METHODS AND USE APPROPRIATE PPE WHEN ENTERING CONFINED SPACES.

MANUAL HANDLING
CONTRACTOR TO BE AWARE MANUAL HANDLING MAY BE REQUIRED DURING CONSTRUCTION. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ENSURE MANUAL HANDLING PROCEDURES AND ASSESSMENTS ARE IN PLACE PRIOR TO COMMENCING WORKS.

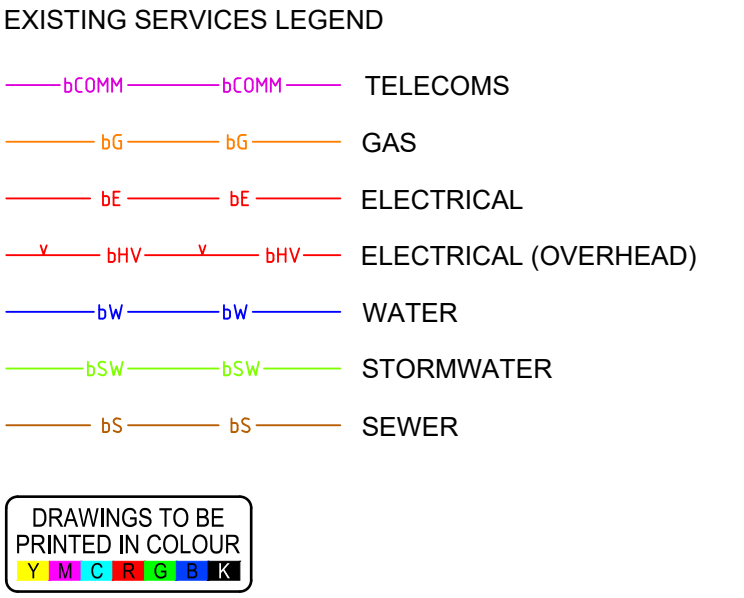
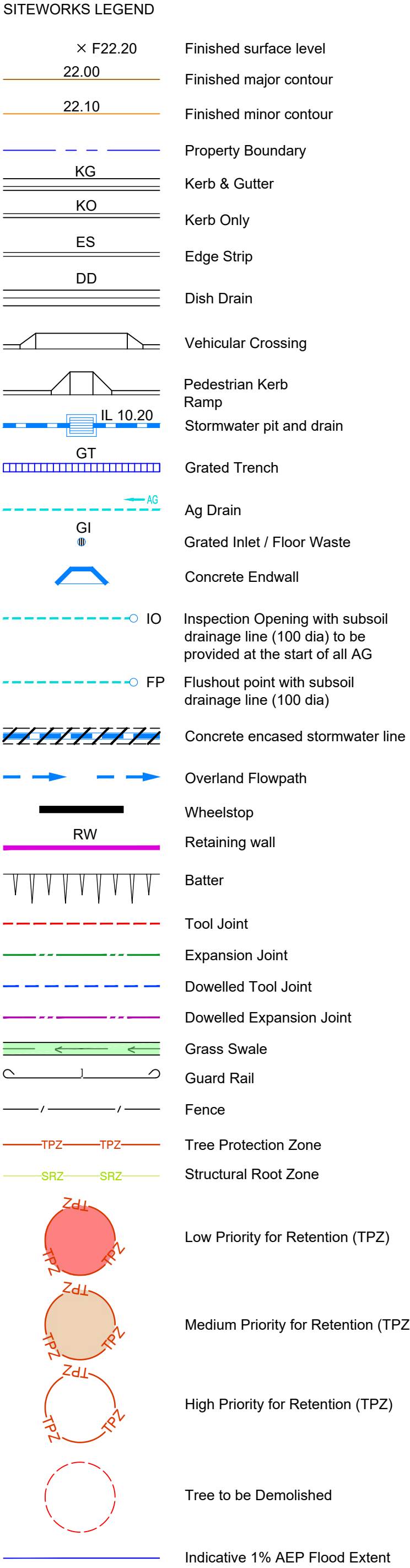
WATER POLLUTION
CONTRACTOR TO ENSURE APPROPRIATE MEASURES ARE TAKEN TO PREVENT POLLUTANTS FROM CONSTRUCTION WORKS CONTAMINATING THE SURROUNDING ENVIRONMENT, INCLUDING COUNCIL STORMWATER DRAINAGE SYSTEM.

SITE ACCESS/EGRESS
CONTRACTOR TO BE AWARE SITE WORKS OCCUR IN CLOSE PROXIMITY TO FOOTPATHS AND ROADWAYS. CONTRACTOR TO ERECT APPROPRIATE BARRIERS AND SIGNAGE TO PROTECT SITE PERSONNEL AND PUBLIC.

VEHICLE MOVEMENT
CONTRACTOR TO SUPPLY AND COMPLY WITH TRAFFIC MANAGEMENT PLAN AND PROVIDE ADEQUATE SITE TRAFFIC CONTROL INCLUDING A CERTIFIED TRAFFIC MARSHALL TO SUPERVISE VEHICLE MOVEMENTS WHERE NECESSARY.

ABBREVIATIONS

TOK	TOP OF KERB	EX	EXISTING LEVEL
IOK	INVERT OF KERB	FL	FINISHED LEVEL
BOK	BACK OF KERB	F*	FUTURE LEVEL
RCL	ROAD CENTRE LINE		
BDY	BOUNDARY	FFL	FINISHED FLOOR LEVEL
		SSL	STRUCTURAL SLAB LEVEL
TOW	TOP OF WALL		
BOW	BOTTOM OF WALL		
CL	COVER LEVEL		
IL	INVERT LEVEL		



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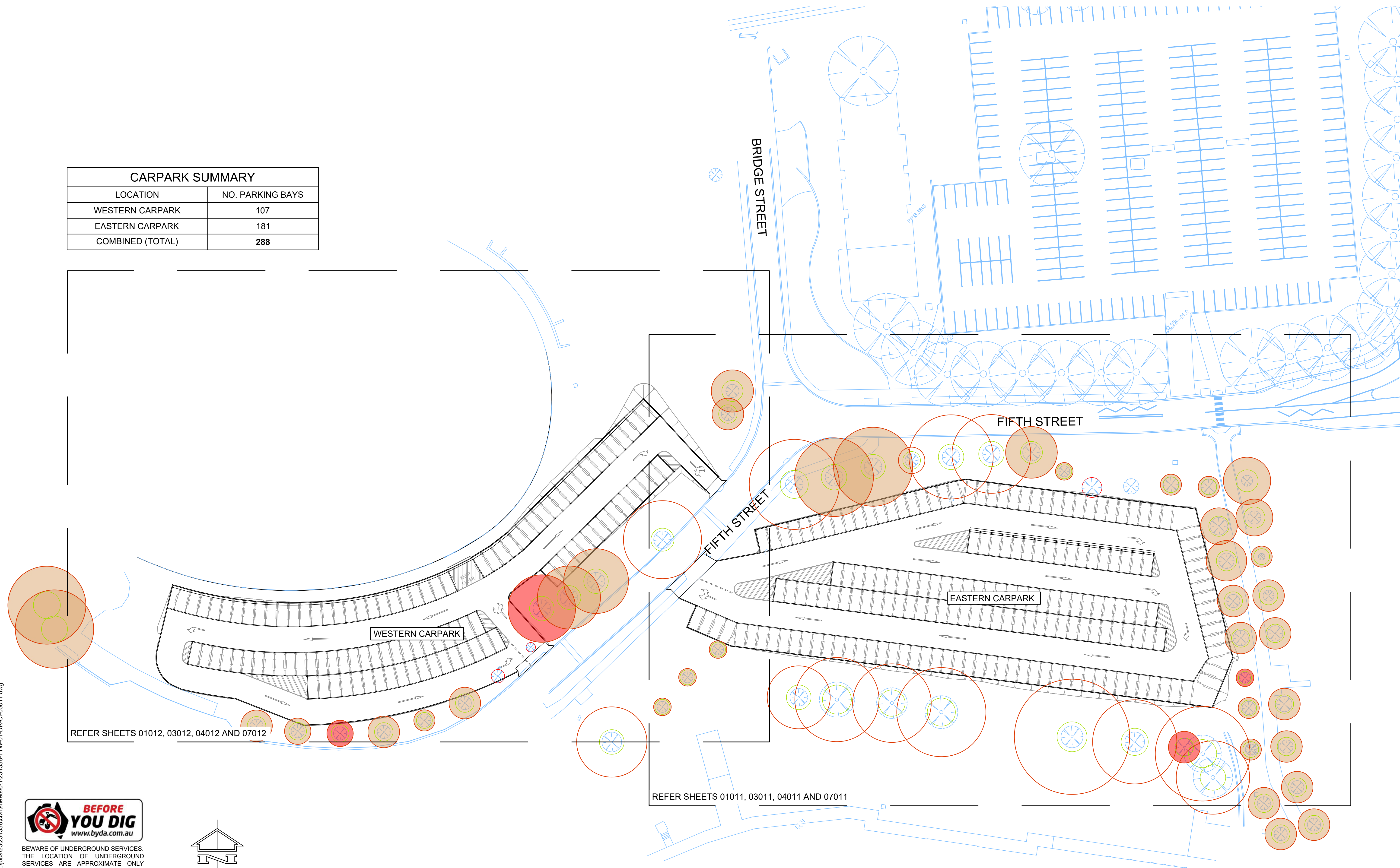
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T2	TENDER ISSUE	RP	JLE	08.10.2024															
T1	TENDER ISSUE	RP	JLE	03.10.2024															
P2	PRELIMINARY ISSUE	RP	JLE	23.09.2024															
P1	PRELIMINARY ISSUE	RP	PB	13.09.2024	T5	TENDER ADDENDUM ISSUE	RP	KN	14.08.2025										
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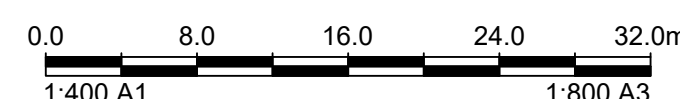
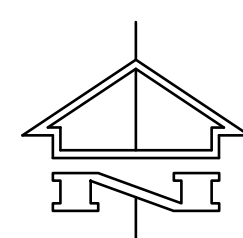
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CARPARK SUMMARY	
LOCATION	NO. PARKING BAYS
WESTERN CARPARK	107
EASTERN CARPARK	181
COMBINED (TOTAL)	288



BEWARE OF UNDERGROUND SERVICES.
THE LOCATION OF UNDERGROUND
SERVICES ARE APPROXIMATE ONLY
AND THEIR EXACT POSITION SHOULD
BE PROVEN ON SITE. NO GUARANTEE IS
GIVEN THAT ALL EXISTING SERVICES
ARE SHOWN



T4	TENDER ADDENDUM ISSUE	RP	KN	02.05.2025			
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P1	PRELIMINARY ISSUE	RP	PB	13.09.2024			
Rev	Description	Eng	Draft	Date	Rev	Description	Eng

Client	
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	Engineer
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	Project:
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WSU
CARPARK RELOCATION
PROJECT

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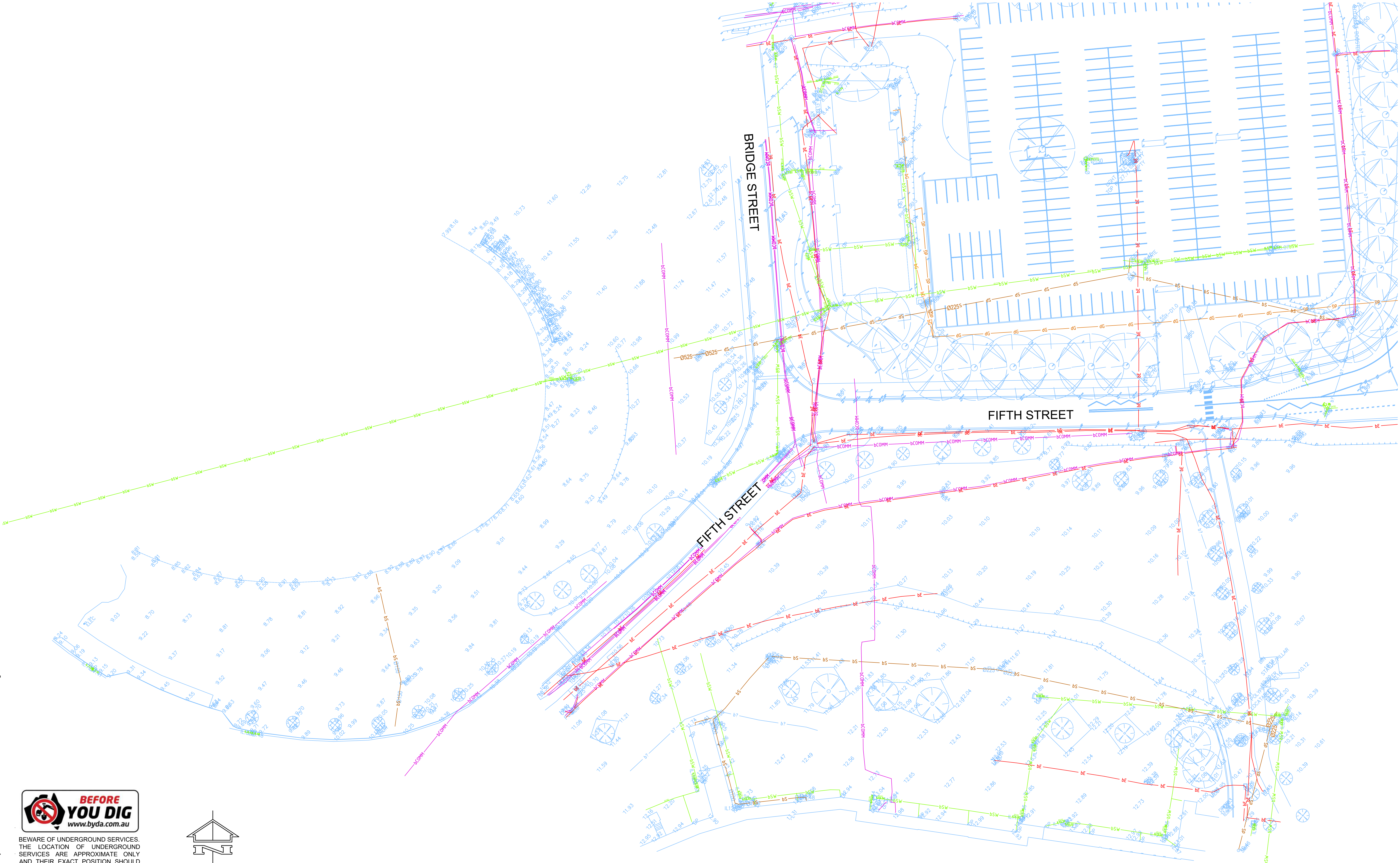
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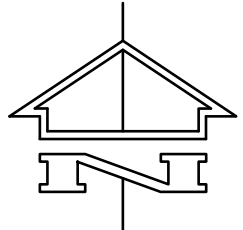
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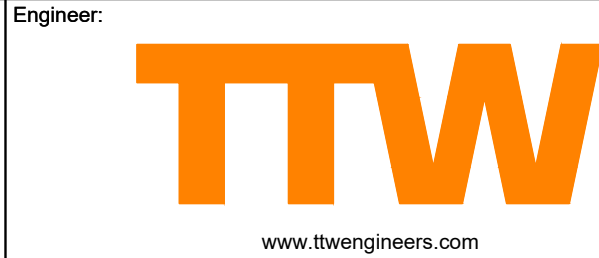
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Rev	Description	Eng Draft	Date	Rev	Description	Eng Draft	Date	Rev	Description	Eng Draft	Date
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T2	TENDER ADDENDUM ISSUE	RP	KN	19.12.2024							
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Project:
WSU
CARPARK RELOCATION
PROJECT

Drawing Title:
GENERAL
SURVEY AND SERVICES
PLAN

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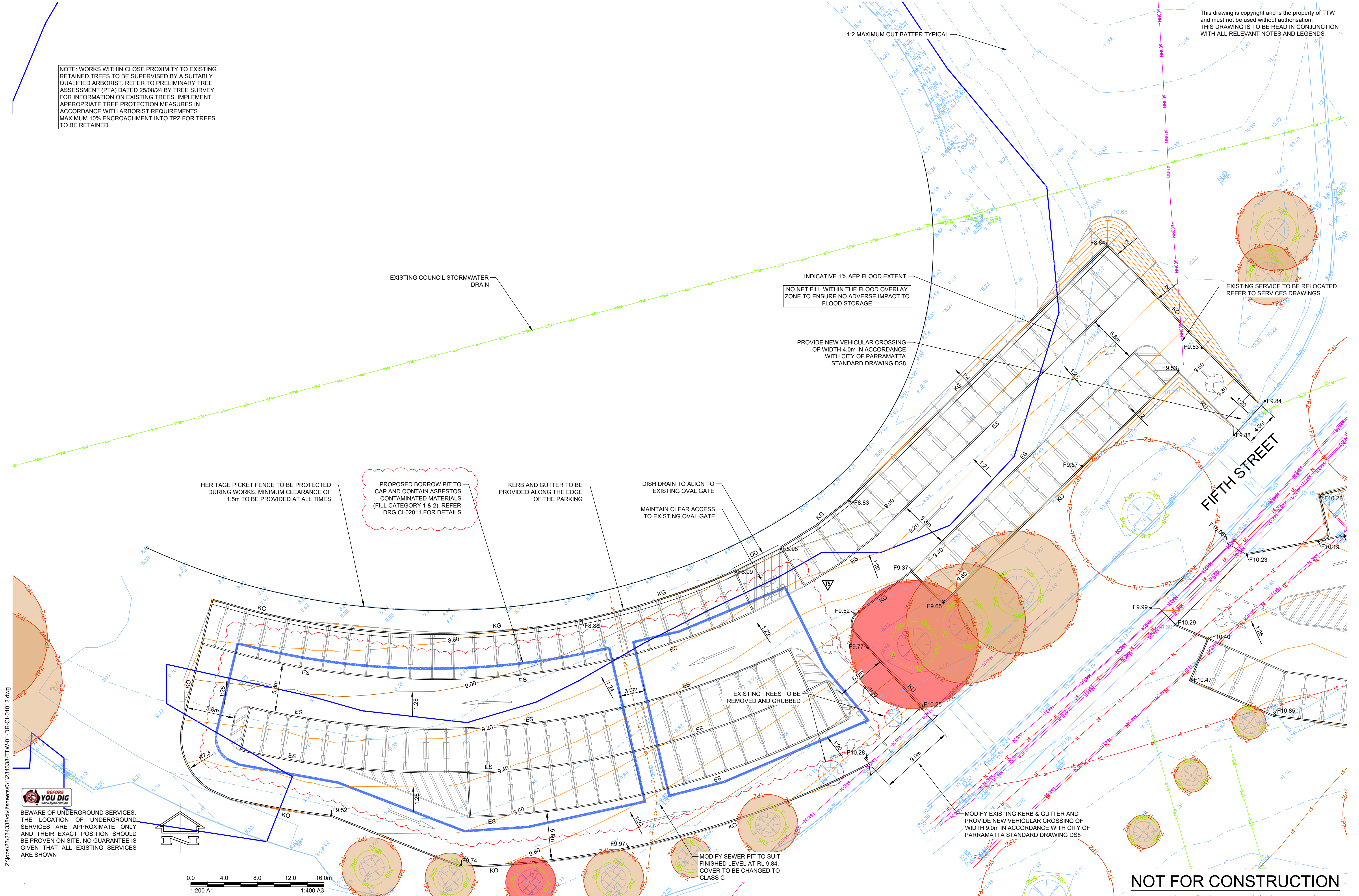
WORKS WITHIN CLOSE PROXIMITY TO EXISTING
NED TREES TO BE SUPERVISED BY A SUITABLY
FIED ARBORIST. REFER TO PRELIMINARY TREE
SSMENT (PTA) DATED 25/08/24 BY TREE SURVEY
FORMATION ON EXISTING TREES. IMPLEMENT
OPRIATE TREE PROTECTION MEASURES IN
RDANCE WITH ARBORIST REQUIREMENTS.
UM 10% ENCROACHMENT INTO TPZ FOR TREES
RETAINED.



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NOTE: WORKS WITHIN CLOSE PROXIMITY TO EXISTING RETAINED TREES TO BE SUPERVISED BY A SUITABLY QUALIFIED ARBORIST. REFER TO PRELIMINARY TREE ASSESSMENT (PTA) DATED 25/09/24 BY TREE SURVEY FOR INFORMATION ON EXISTING TREES. IMPLEMENT APPROPRIATE TREE PROTECTION MEASURES IN ACCORDANCE WITH ARBORIST REQUIREMENTS. MAXIMUM 10% ENCROACHMENT INTO TPZ FOR TREES TO BE RETAINED.

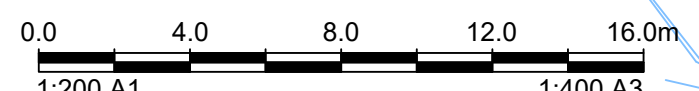
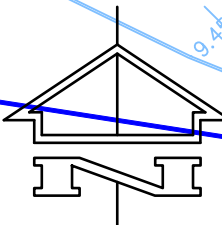
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BEWARE OF UNDERGROUND SERVICES. THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN



T4	TENDER ADDENDUM ISSUE	RP	KN	02.05.2025					
T3	TENDER ADDENDUM ISSUE	RP	KN	19.12.2024					
T2	TENDER ISSUE	RP	JLE	08.10.2024					
T1	TENDER ISSUE	RP	JLE	03.10.2024					
P2	PRELIMINARY ISSUE	RP	JLE	23.09.2024					
P1	PRELIMINARY ISSUE	RP	PB	13.09.2024					
Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date



Project:
WSU
CARPARK RELOCATION
PROJECT

Drawing Title:
GEOMETRY
SITE PLAN
SHEET 2

Scale at A1
1:200
Project No
234338-TTW-01-DR-CI-01012-T5
14.08.2025 2:27 PM

Drawn	KN	Designed	JLE	Approved	RP
Originator	Zone	Type	Role	Sheet No.	Rev

EASTERN CARPARK	
CUT	940 m ³
FILL	110 m ³

WESTERN CARPARK	
CUT	310 m ³
FILL	190 m ³

FX.XX DENOTES CUT AND FILL DEPTH FROM THE NATURAL SURFACE TO THE DESIGN FINISHED SURFACE

 DENOTES PROPOSED ACM BORROW PIT EXTENT AS PER RAP REQUIREMENTS - SEE NOTE 4 & ASBESTOS CONTAMINATED MATERIALS VOLUMES AND BORROW PIT NOTES

NOTES:

1. NO BULKING FACTOR APPLIED.
2. CUT AND FILL VOLUME ESTIMATES CALCULATED FROM THE NATURAL SURFACE TO THE DESIGNED FINISHED SURFACE.
3. NO VOLUME ALLOWANCE HAS BEEN MADE FOR EXCAVATIONS REQUIRED FOR SERVICE TRENCHINGS, THICKENINGS, BORROW PITS TO CAP AND CONTAIN ASBESTOS CONTAMINATED MATERIALS AS DESCRIBED IN THE REMEDIATION ACTION PLAN (RAP) BY DOUGLAS PARTNERS ETC. THE CONTRACTOR SHALL MAKE THEIR OWN ALLOWANCE AS REQUIRED TO COMPLETE BULK EARTHWORKS.
4. CONTRACTOR TO BE AWARE OF ASBESTOS CONTAMINATED MATERIALS (ACM) PRESENT ON SITE. REMEDIATION OF ACM EXPOSED ON SITE SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE REQUIREMENTS NOTED IN THE REMEDIATION ACTION PLAN BY DOUGLAS PARTNERS. ACM VOLUMES ARE INDICATIVE ONLY AND ARE BASED ON REPORT BY DOUGLAS PARTNERS. ACTUAL VOLUME OF ACM MAY VARY. REFER ASBESTOS CONTAMINATED MATERIALS VOLUME AND BORROW PIT NOTES FOR ADDITIONAL REQUIREMENTS.
5. CONTRACTOR TO MAKE ALLOWANCE FOR DISPOSAL OF SITE WON MATERIAL. FOR RE-USE OF SITE WON MATERIAL, REFERENCE SHOULD BE MADE TO THE GEOTECHNICAL REPORT. THE CONTRACTOR IS TO MAKE ALLOWANCE FOR SORTING/TESTING AND HANDLING OF ANY FILL MATERIAL PROPOSED FOR RE-USE.
6. REFER TO GEOTECHNICAL REPORT PREPARED BY DOUGLAS PARTNERS 227191.00.R.001.REV0 DATED 15 NOVEMBER 2024 FOR SUBGRADE PREPARATION.
7. WORKS WITHIN CLOSE PROXIMITY TO EXISTING RETAINED TREES TO BE SUPERVISED BY A SUITABLY QUALIFIED ARBORIST
8. THE CONTRACTOR SHALL UNDERTAKE A DILAPIDATION SURVEY OF EXISTING PAVEMENTS AROUND THE EXTENT OF WORKS PRIOR TO COMMENCING WORKS. DAMAGE TO EXISTING PAVEMENTS OUTSIDE THE LIMIT OF WORKS SHALL BE REMEDIATED AND MADE GOOD AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO OBTAIN ALL NECESSARY AUTHORITY PERMITS & APPROVALS.

LEVELS TABLE

No.	FROM LEVEL (m)	TO LEVEL (m)	COLOUR
1	-2.00	-1.50	
2	-1.50	-1.00	
3	-1.00	-0.50	
4	-0.50	0.00	
5	0.00	0.50	
6	0.50	1.00	

ASBESTOS CONTAMINATED MATERIALS VOLUMES AND BORROW PIT NOTES

ASBESTOS CONTAMINATED MATERIALS (ACM) VOLUMES SHOWN ARE PRELIMINARY ESTIMATES ONLY, DERIVED FROM AVAILABLE ENVIRONMENTAL INVESTIGATIONS AND GEOTECHNICAL TEST PIT DATA PROVIDED BY DOUGLAS PARTNERS.

ESTIMATES ARE BASED ON ASSUMED CONTAMINATION EXTENTS FROM THE REMEDIATION ACTION PLAN (RAP) AND MAY NOT REFLECT ACTUAL SITE CONDITIONS. ACTUAL VOLUME OF ACM MAY VARY.

TTW DRAWINGS SHOW DESIGN INTENT ONLY. BORROW PIT LOCATIONS, EXTENTS, LEVELS AND VOLUMES ARE INDICATIVE ONLY.

THE CONTRACTOR SHALL UNDERTAKE THEIR OWN SITE INVESTIGATIONS AND DETAILED DESIGN TO FINALISE THE BORROW PIT VOLUME AND ARRANGEMENT IN ACCORDANCE WITH:

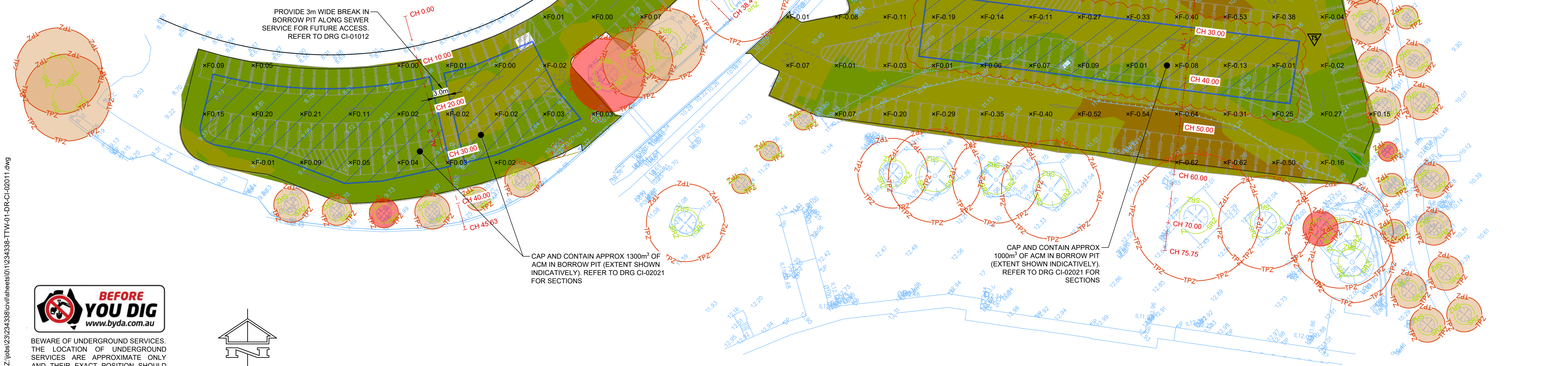
- GEOTECHNICAL REPORT BY DOUGLAS PARTNERS 227191.00.R.001Rev0 DATED 15 NOVEMBER 2024
- REMEDIATION ACTION PLAN BY DOUGLAS PARTNERS 227190.04.R.001Rev0 DATED 14 AUGUST 2025
- TTW DRAWINGS (DESIGN INTENT ONLY)

THE DETAILED DESIGN SHALL BE CERTIFIED BY A SUITABLY QUALIFIED CIVIL AND/OR GEOTECHNICAL ENGINEER ENGAGED BY THE CONTRACTOR AND SUBMITTED TO THE SUPERINTENDENT PRIOR TO COMMENCEMENT OF WORKS.

CONTRACTOR TO ALLOW FOR ALL NECESSARY ELEMENTS TO CONSTRUCT BORROW PITS INCLUDING BUT NOT LIMITED TO; TEMPORARY DEWATERING, MARKER LAYERS, GEOTEXTILES, GEOGRIDS, CAPPING LAYERS ETC. AS DESCRIBED IN THE GEOTECHNICAL REPORT AND RAP.

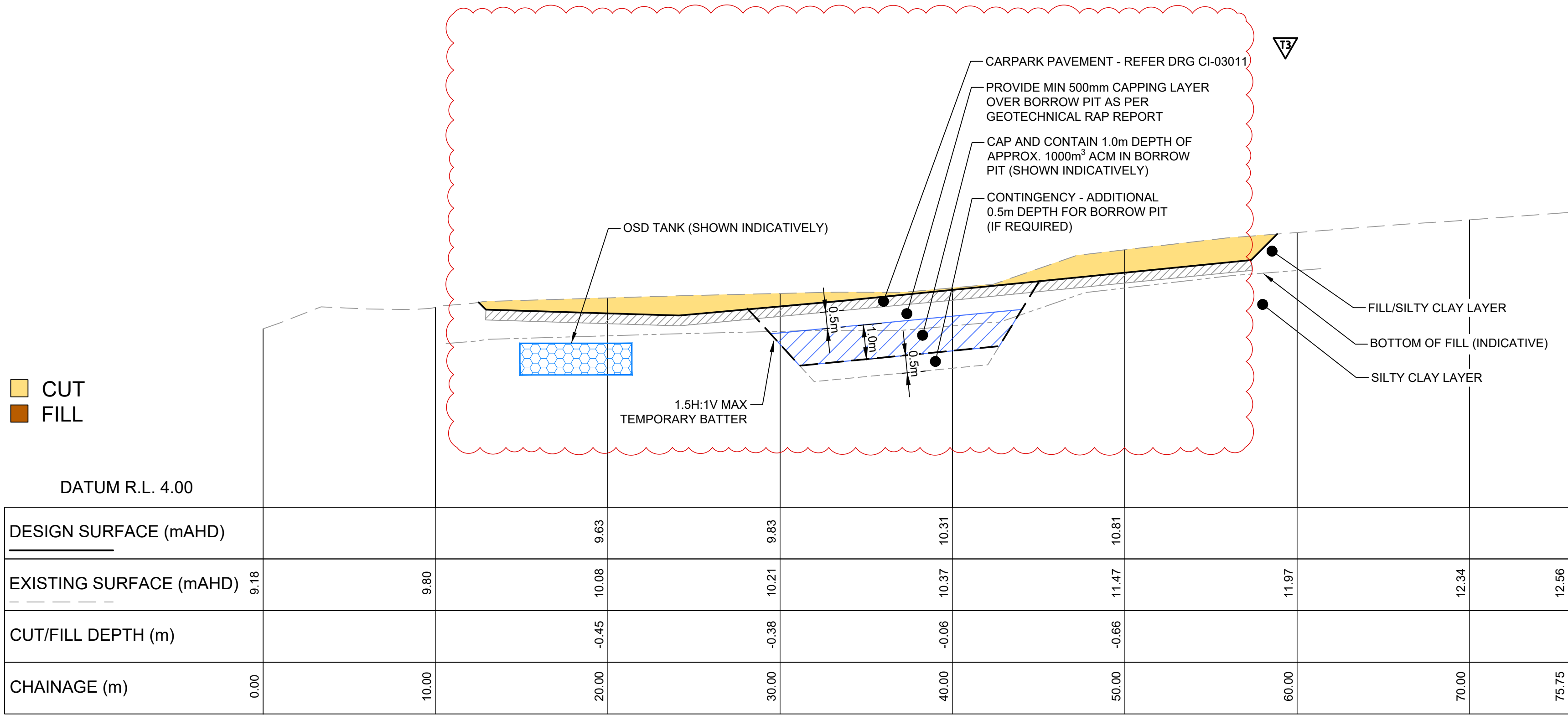
NOTE: WORKS WITHIN CLOSE PROXIMITY TO EXISTING RETAINED TREES TO BE SUPERVISED BY A SUITABLY QUALIFIED ARBORIST. REFER TO PRELIMINARY TREE ASSESSMENT (PTA) DATED 25/08/24 BY TREE SURVEY FOR INFORMATION ON EXISTING TREES. IMPLEMENT APPROPRIATE TREE PROTECTION MEASURES IN ACCORDANCE WITH ARBORIST REQUIREMENTS. MAXIMUM 10% ENCROACHMENT INTO TPZ FOR TREES TO BE RETAINED.

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[illegible]



LONGITUDINAL SECTION AL - 1
SCALES: HORIZONTAL 1:200 VERTICAL 1:100

ASBESTOS CONTAMINATED MATERIALS VOLUMES AND BORROW PIT NOTES

ASBESTOS CONTAMINATED MATERIALS (ACM) VOLUMES SHOWN ARE PRELIMINARY ESTIMATES ONLY, DERIVED FROM AVAILABLE ENVIRONMENTAL INVESTIGATIONS AND GEOTECHNICAL TEST PIT DATA PROVIDED BY DOUGLAS PARTNERS.

ESTIMATES ARE BASED ON ASSUMED CONTAMINATION EXTENTS FROM THE REMEDIATION ACTION PLAN (RAP) AND MAY NOT REFLECT ACTUAL SITE CONDITIONS. ACTUAL VOLUME OF ACM MAY VARY.

TTW DRAWINGS SHOW DESIGN INTENT ONLY. BORROW PIT LOCATIONS, EXTENTS, LEVELS AND VOLUMES ARE INDICATIVE ONLY.

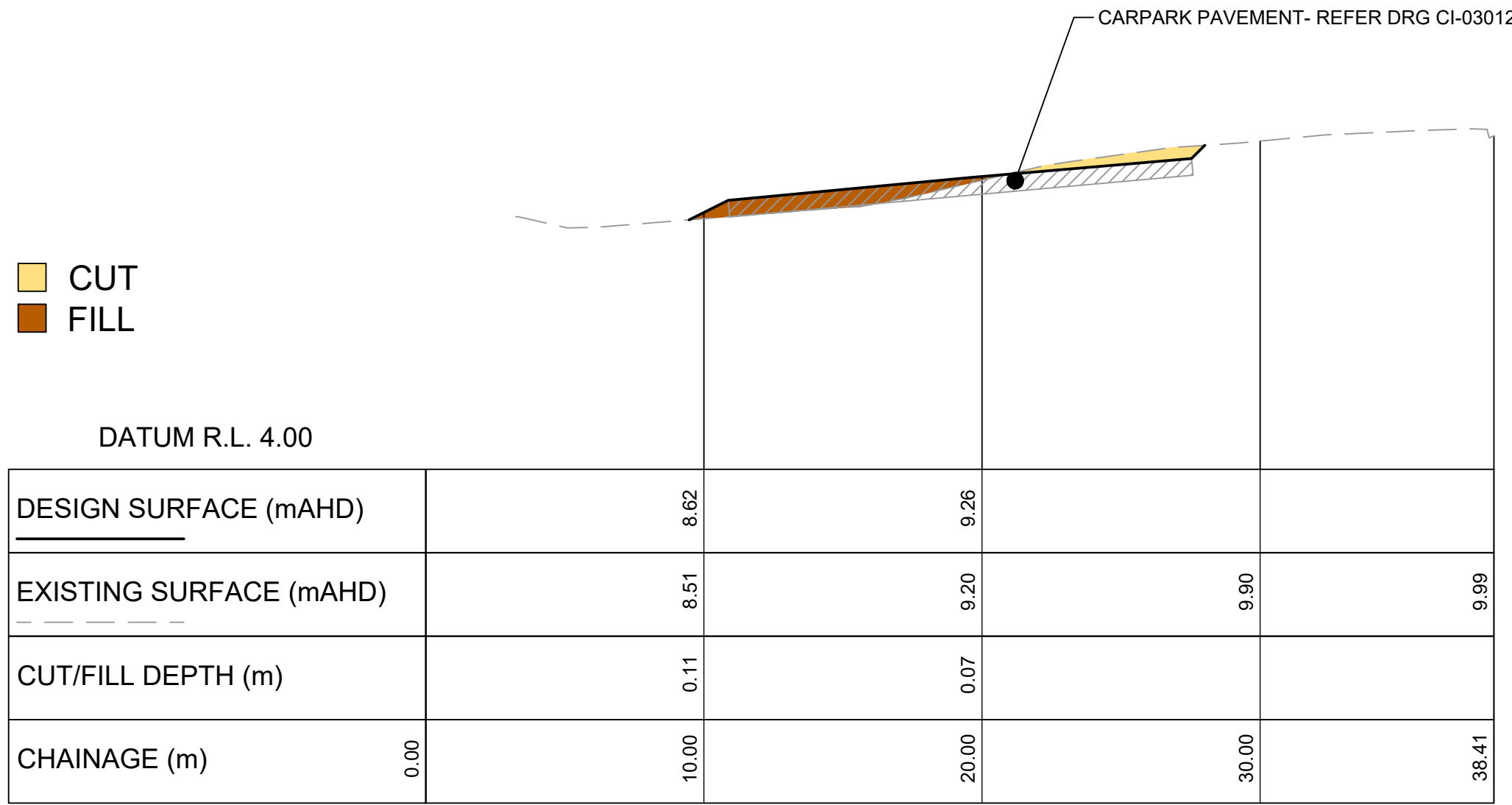
THE CONTRACTOR SHALL UNDERTAKE THEIR OWN SITE INVESTIGATIONS AND DETAILED DESIGN TO FINALISE THE BORROW PIT VOLUME AND ARRANGEMENT IN ACCORDANCE WITH:

- GEOTECHNICAL REPORT BY DOUGLAS PARTNERS 227191.00.R.001Rev0 DATED 15 NOVEMBER 2024
- REMEDIATION ACTION PLAN BY DOUGLAS PARTNERS 227190.04.R.001Rev0 DATED 14 AUGUST 2025
- TTW DRAWINGS (DESIGN INTENT ONLY)

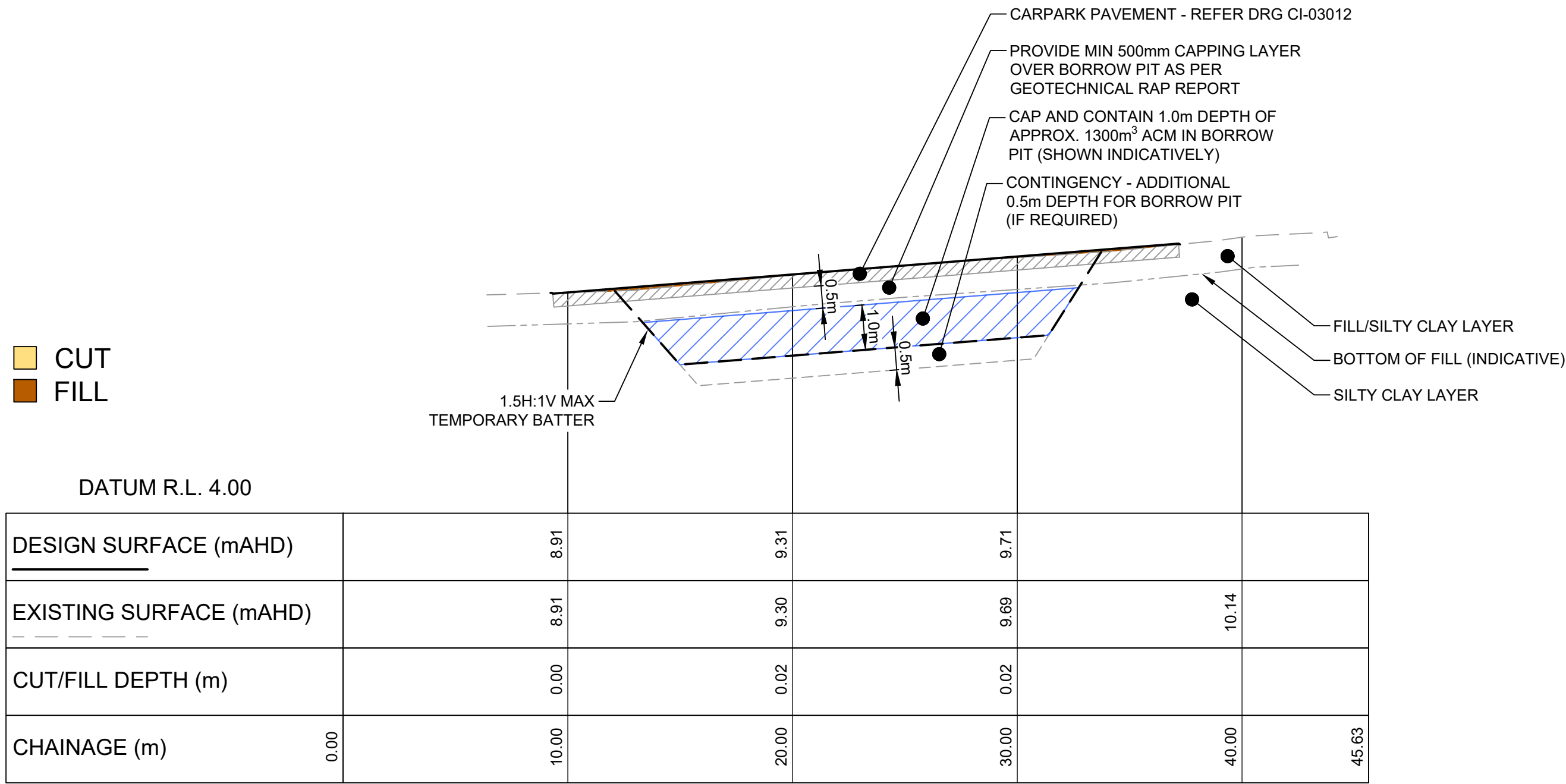
THE DETAILED DESIGN SHALL BE CERTIFIED BY A SUITABLY QUALIFIED CIVIL AND/OR GEOTECHNICAL ENGINEER ENGAGED BY THE CONTRACTOR AND SUBMITTED TO THE SUPERINTENDENT PRIOR TO COMMENCEMENT OF WORKS.

CONTRACTOR TO ALLOW FOR ALL NECESSARY ELEMENTS TO CONSTRUCT BORROW PITS INCLUDING BUT NOT LIMITED TO; TEMPORARY DEWATERING, MARKER LAYERS, GEOTEXTILES, GEOGRIDS, CAPPING LAYERS ETC. AS DESCRIBED IN THE GEOTECHNICAL REPORT AND RAP.

THE NATURAL SILTY CLAY/BOTTOM OF FILL LEVEL SHOWN IN THE LONGITUDINAL SECTIONS ARE INDICATIVE ONLY BASED ON GEOTECHNICAL BOREHOLE INFORMATION AND IS NOT GUARANTEED TO BE CORRECT OR COMPLETE. CONTRACTOR SHALL CONFIRM EXACT DEPTH TO THE NATURAL SILTY CLAY ON SITE. DEPTH MAY VARY ACROSS SITE.

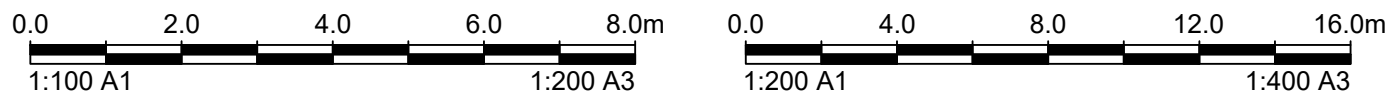


LONGITUDINAL SECTION AL - 2
SCALES: HORIZONTAL 1:200 VERTICAL 1:100



LONGITUDINAL SECTION AL - 3
SCALES: HORIZONTAL 1:200 VERTICAL 1:100

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T2	TENDER ADDENDUM ISSUE	RP	KN	14.08.2025	
T1	TENDER ADDENDUM ISSUE	RP	KN	02.05.2025	
Rev	Description	Eng	Draft	Date	

Client:	

Engineer:	

Project:	
	WSU CARPARK RELOCATION PROJECT

Drawing Title:	
	EARTHWORKS SITE SECTIONS

Scale at A1	Drawn	Designed	Approved
AS SHOWN	KN	JLE	RP
Project No	Originator	Zone	Type
234338-TTW-01-DR-CI-02021-T3			
27.10.2025	1:03 PM		

PAVEMENT LEGEND

- P1

VEHICULAR ASPHALT PAVEMENT
REFER TO CITY OF PARRAMATTA COUNCIL STANDARD
DRAWING DS47 PAVEMENT FOR OFF-STREET CAR PARK.
PROVIDE BIDIM A29 GEOTEXTILE.
- P2

VEHICULAR CONCRETE PAVEMENT
REFER TO CITY OF PARRAMATTA COUNCIL STANDARD
DRAWING DS8
- P3

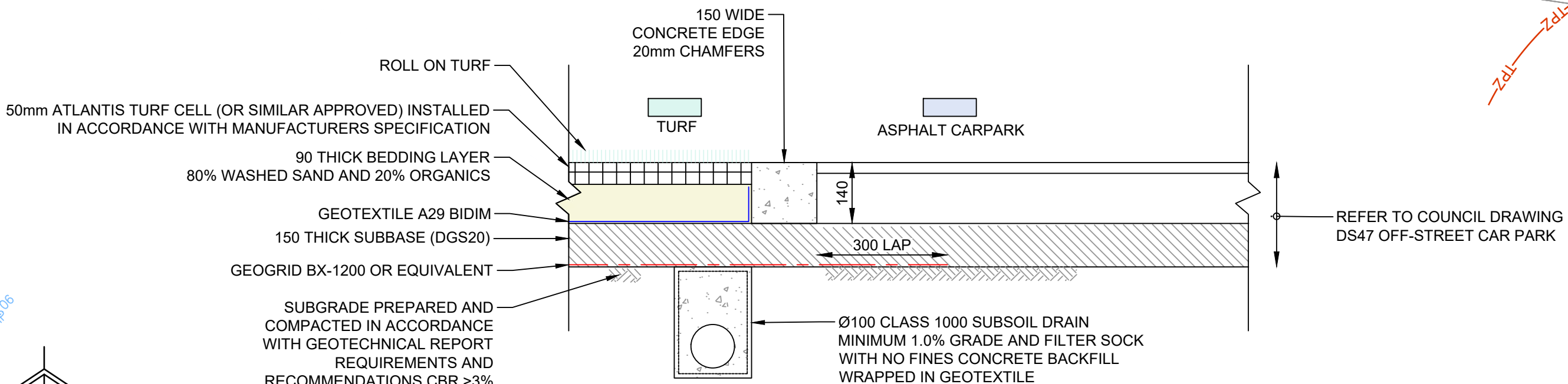
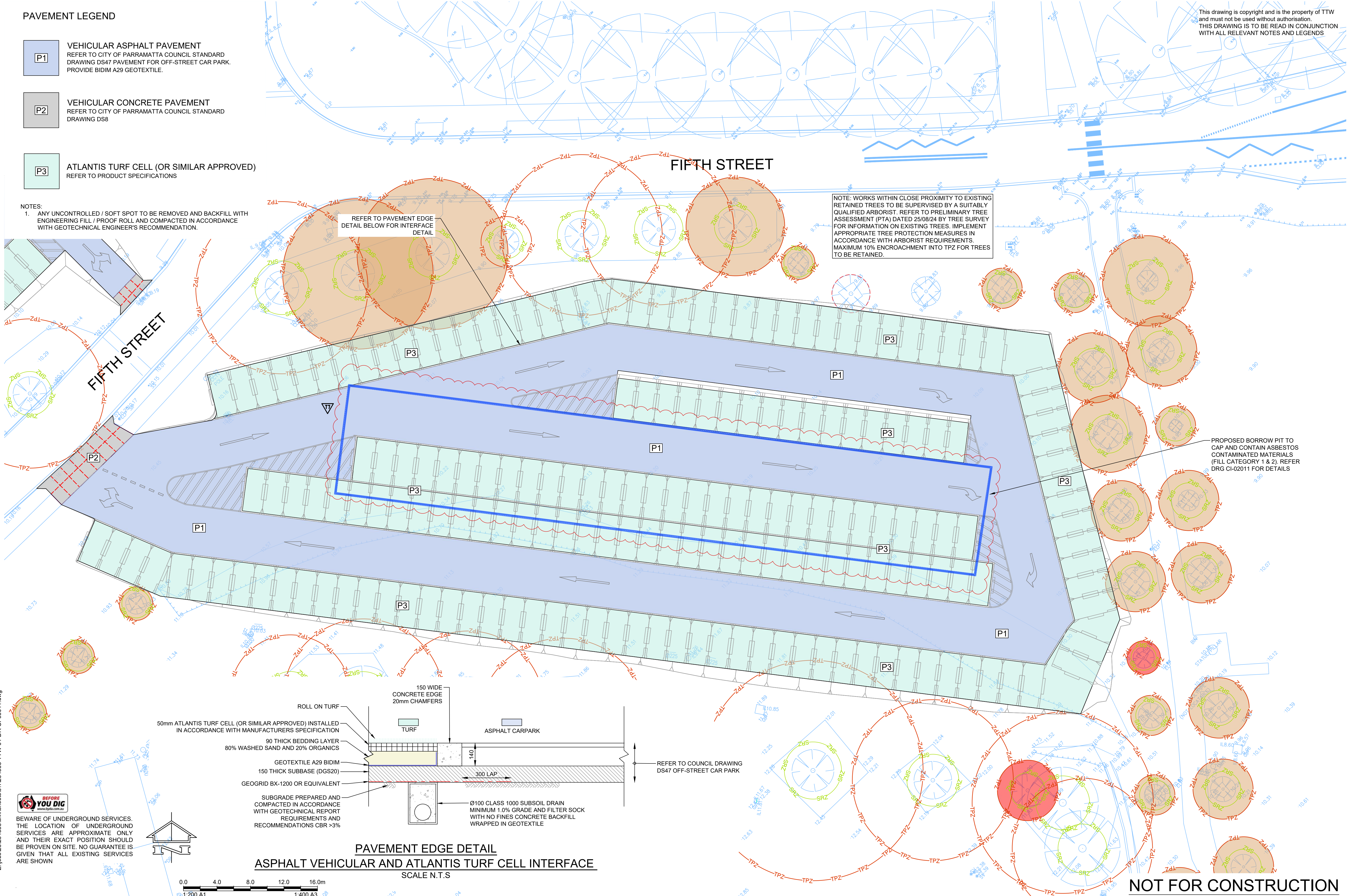
ATLANTIS TURF CELL (OR SIMILAR APPROVED)
REFER TO PRODUCT SPECIFICATIONS

NOTES:
1. ANY UNCONTROLLED / SOFT SPOT TO BE REMOVED AND BACKFILL WITH
ENGINEERING FILL / PROOF ROLL AND COMPACTED IN ACCORDANCE
WITH GEOTECHNICAL ENGINEER'S RECOMMENDATION.

REFER TO PAVEMENT EDGE
DETAIL BELOW FOR INTERFACE
DETAIL

NOTE: WORKS WITHIN CLOSE PROXIMITY TO EXISTING
RETAINED TREES TO BE SUPERVISED BY A SUITABLY
QUALIFIED ARBORIST. REFER TO PRELIMINARY TREE
ASSESSMENT (PTA) DATED 25/08/24 BY TREE SURVEY
FOR INFORMATION ON EXISTING TREES. IMPLEMENT
APPROPRIATE TREE PROTECTION MEASURES IN
ACCORDANCE WITH ARBORIST REQUIREMENTS.
MAXIMUM 10% ENCROACHMENT INTO TPZ FOR TREES
TO BE RETAINED.

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BE PROVEN ON SITE. NO GUARANTEE IS
GIVEN THAT ALL EXISTING SERVICES
ARE SHOWN

NOT FOR CONSTRUCTION

T4	TENDER ADDENDUM ISSUE	RP	KN	02.05.2025					
T3	TENDER ADDENDUM ISSUE	RP	KN	19.12.2024					
T2	TENDER ISSUE	RP	JLE	08.10.2024					
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P1	PRELIMINARY ISSUE	RP	PB	13.09.2024	T5	TENDER ADDENDUM ISSUE	RP	SFU	06.05.2025
Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date



Project:
**WSU
CARPARK RELOCATION
PROJECT**

Drawing Title:
**PAVEMENT
AND JOINTING PLAN
SHEET 1**

Scale at A1	Drawn	Designed	Approved			
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Project No	Originator	Zone	Type	Role	Sheet No.	Rev
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27.10.2025 2:58 PM						

PAVEMENT LEGEND

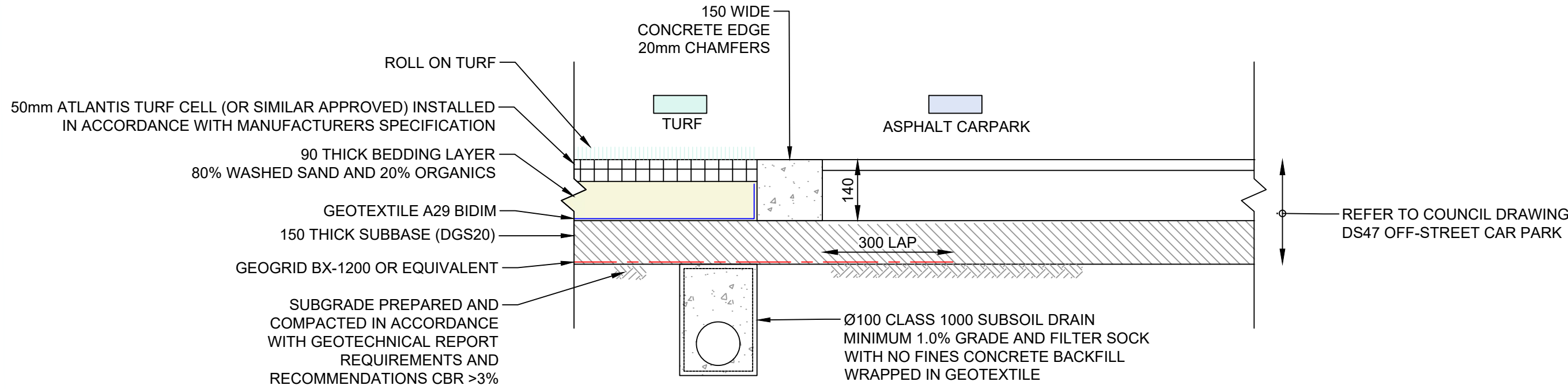
- P1

VEHICULAR ASPHALT PAVEMENT
REFER TO CITY OF PARRAMATTA COUNCIL STANDARD
DRAWING DS47 PAVEMENT FOR OFF-STREET CAR PARK.
PROVIDE BIDIM A29 GEOTEXTILE.
- P2

VEHICULAR CONCRETE PAVEMENT
REFER TO CITY OF PARRAMATTA COUNCIL STANDARD
DRAWING DS8
- P3

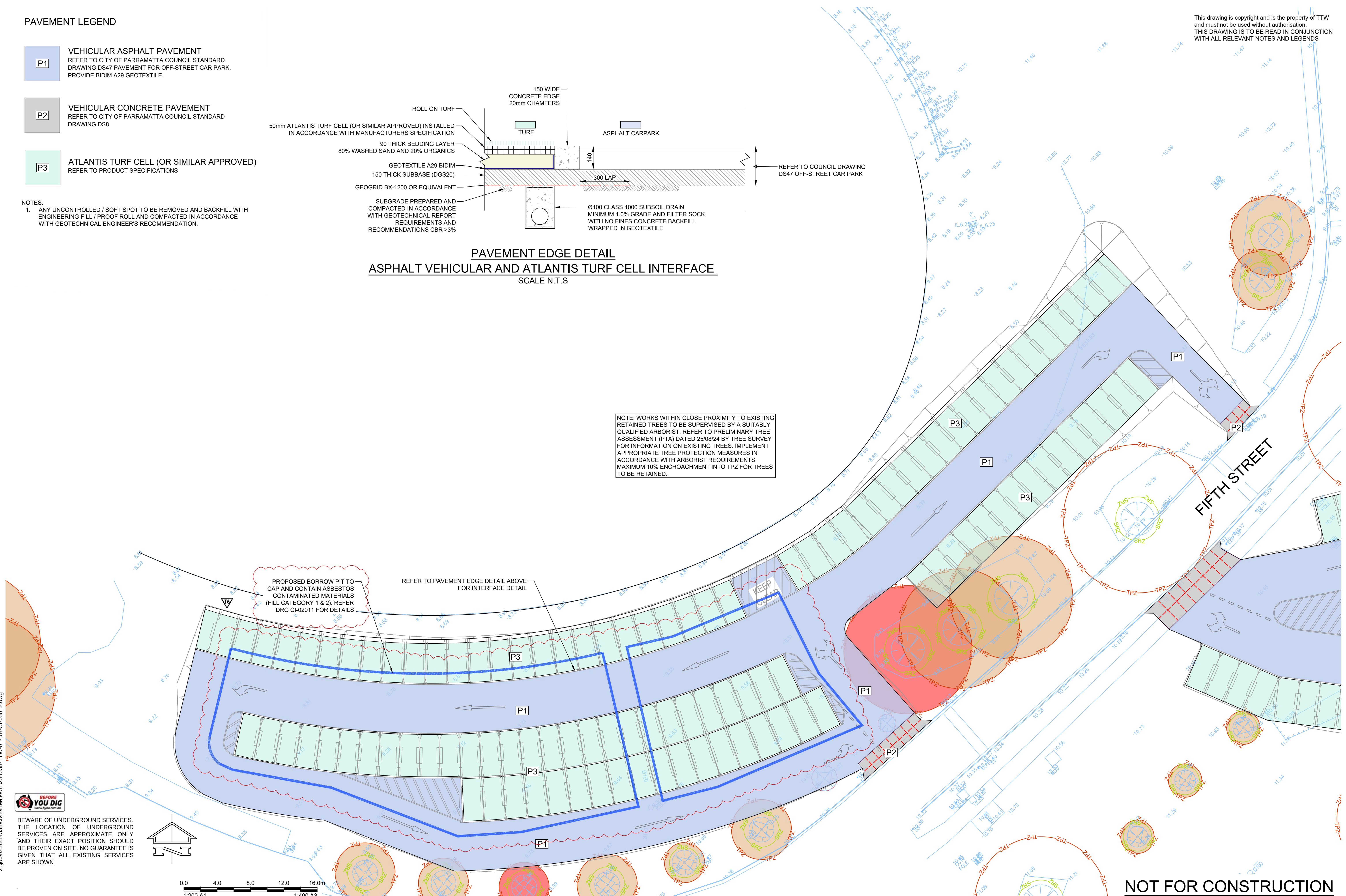
ATLANTIS TURF CELL (OR SIMILAR APPROVED)
REFER TO PRODUCT SPECIFICATIONS

NOTES:
1. ANY UNCONTROLLED / SOFT SPOT TO BE REMOVED AND BACKFILL WITH
ENGINEERING FILL / PROOF ROLL AND COMPACTED IN ACCORDANCE
WITH GEOTECHNICAL ENGINEER'S RECOMMENDATION.



PAVEMENT EDGE DETAIL
ASPHALT VEHICULAR AND ATLANTIS TURF CELL INTERFACE
SCALE N.T.S

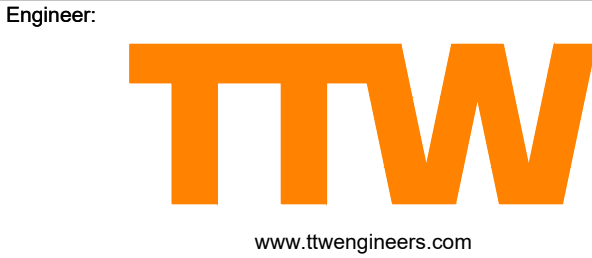
NOTE: WORKS WITHIN CLOSE PROXIMITY TO EXISTING
RETAINED TREES TO BE SUPERVISED BY A SUITABLY
QUALIFIED ARBORIST. REFER TO PRELIMINARY TREE
ASSESSMENT (PTA) DATED 25/08/24 BY TREE SURVEY
FOR INFORMATION ON EXISTING TREES. IMPLEMENT
APPROPRIATE TREE PROTECTION MEASURES IN
ACCORDANCE WITH ARBORIST REQUIREMENTS.
MAXIMUM 10% ENCROACHMENT INTO TPZ FOR TREES
TO BE RETAINED.



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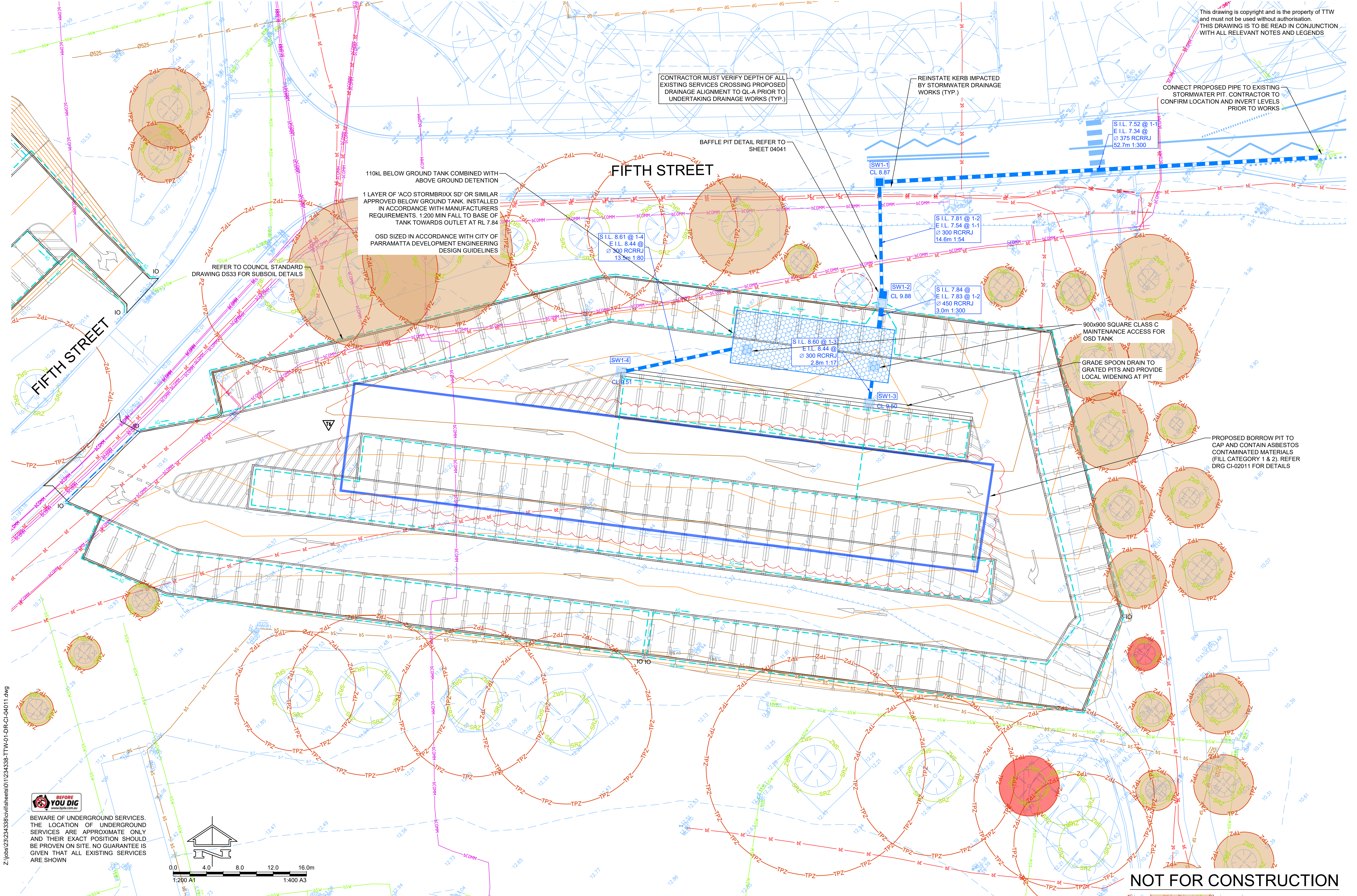
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Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date



Project:
WSU
CARPARK RELOCATION
PROJECT

Drawing Title:
PAVEMENT
AND JOINTING PLAN
SHEET 2

Scale at A1	Drawn	Designed		Approved		
1:200	KN	JLE		RP		
Project No	Originator	Zone	Type	Role	Sheet No.	Rev
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14.08.2025 4:24 PM						



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CONTRACTOR MUST VERIFY DEPTH OF ALL EXISTING SERVICES CROSSING PROPOSED DRAINAGE ALIGNMENT TO QL-A PRIOR TO UNDERTAKING DRAINAGE WORKS (TYP.)

REINSTATE KERB IMPACTED BY STORMWATER DRAINAGE WORKS (TYP.)

CONNECT PROPOSED PIPE TO EXISTING STORMWATER PIT. CONTRACTOR TO CONFIRM LOCATION AND INVERT LEVELS PRIOR TO WORKS

BAFFLE PIT DETAIL REFER TO SHEET 04041

110KL BELOW GROUND TANK COMBINED WITH ABOVE GROUND DETENTION

1 LAYER OF 'ACO STORMBRIXX SD' OR SIMILAR APPROVED BELOW GROUND TANK. INSTALLED IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS. 1:200 MIN FALL TO BASE OF TANK TOWARDS OUTLET AT RL 7.84

OSD SIZED IN ACCORDANCE WITH CITY OF PARRAMATTA DEVELOPMENT ENGINEERING DESIGN GUIDELINES

REFER TO COUNCIL STANDARD DRAWING DS33 FOR SUBSOIL DETAILS

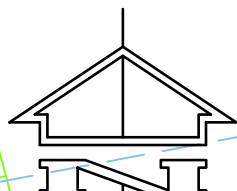
900x900 SQUARE CLASS C MAINTENANCE ACCESS FOR OSD TANK

GRADE SPOON DRAIN TO GRATED PITS AND PROVIDE LOCAL WIDENING AT PIT

PROPOSED BORROW PIT TO CAP AND CONTAIN ASBESTOS CONTAMINATED MATERIALS (FILL CATEGORY 1 & 2). REFER DRG CI-02011 FOR DETAILS



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0.0 4.0 8.0 12.0 16.0m
1:200 A1 1:400 A3

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T3	TENDER ADDENDUM ISSUE	RP	KN	19.12.2024					
T2	TENDER ISSUE	RP	JLE	08.10.2024					
T1	TENDER ISSUE	RP	JLE	03.10.2024					
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P1	PRELIMINARY ISSUE	RP	PB	13.09.2024	T5	TENDER ADDENDUM ISSUE	RP	KN	14.08.2025
Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date

Client:
WESTERN SYDNEY UNIVERSITY

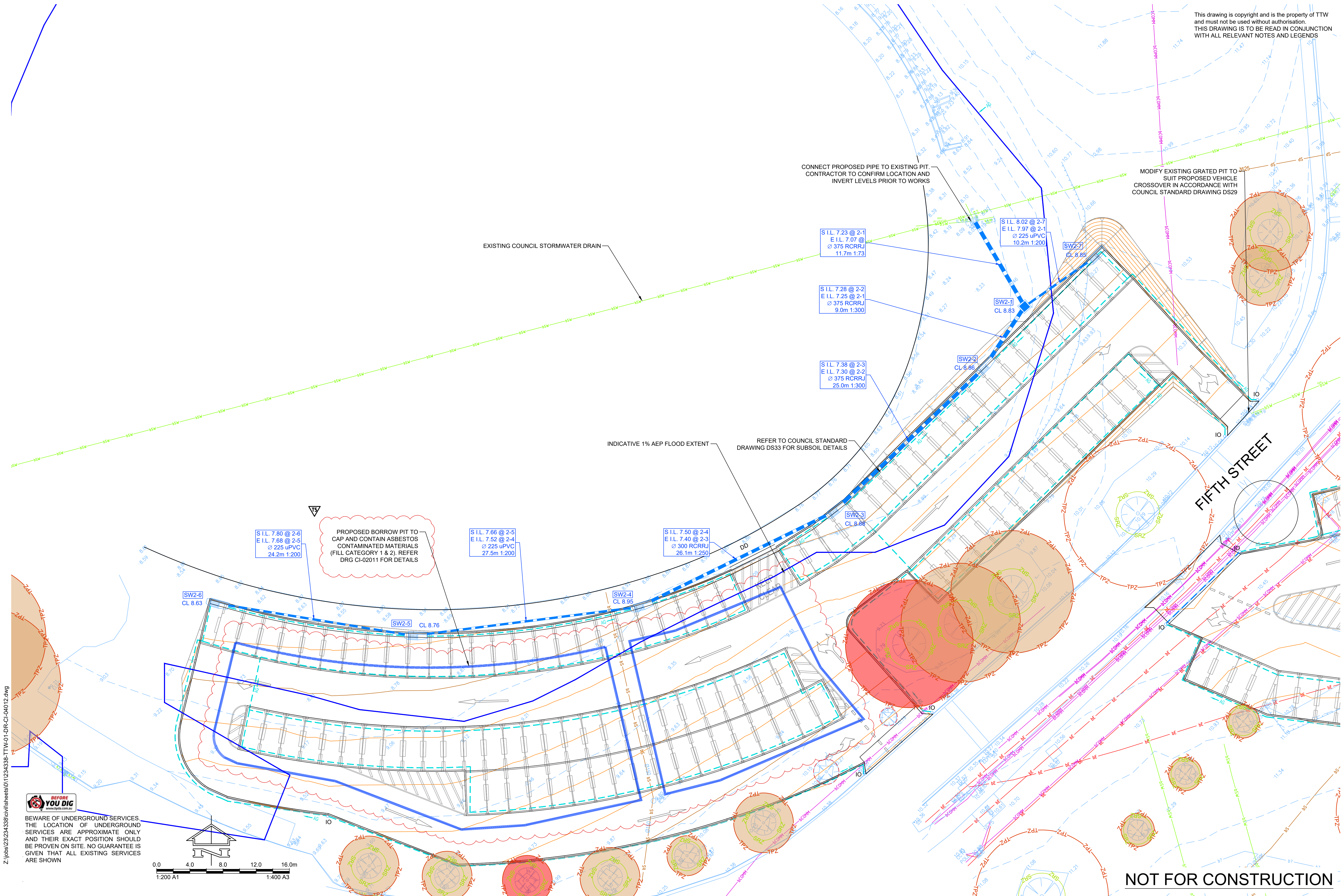
Engineer:
TTW
www.ttweengineers.com

Project:
WSU CARPARK RELOCATION PROJECT

Drawing Title:
STORMWATER DRAINAGE PLAN SHEET 1

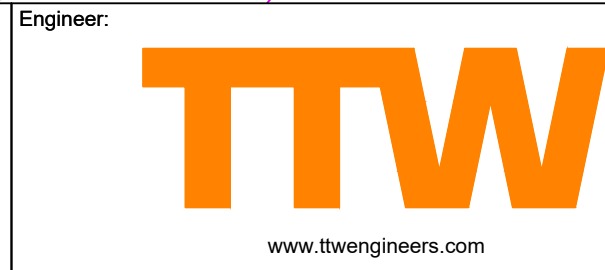
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Project No
234338-TTW-01-DR-CI-04011-T6
27.10.2025 3:00 PM
Drawn
KN
Designed
JLE
Approved
RP
Type
Role
Sheet No.
Rev

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T3	TENDER ADDENDUM ISSUE	RP	KN	19.12.2024
T2	TENDER ISSUE	RP	JLE	08.10.2024
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Rev	Description	Eng	Draft	Date
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Rev	Description	Eng	Draft	Date
Rev	Description	Eng	Draft	Date



Project:
WSU
CARPARK RELOCATION
PROJECT

Drawing Title:
STORMWATER
DRAINAGE PLAN
SHEET 2

Scale at A1	Drawn	Designed	Approved
1:200	KN	JLE	RP
Project No	Originator	Zone	Type
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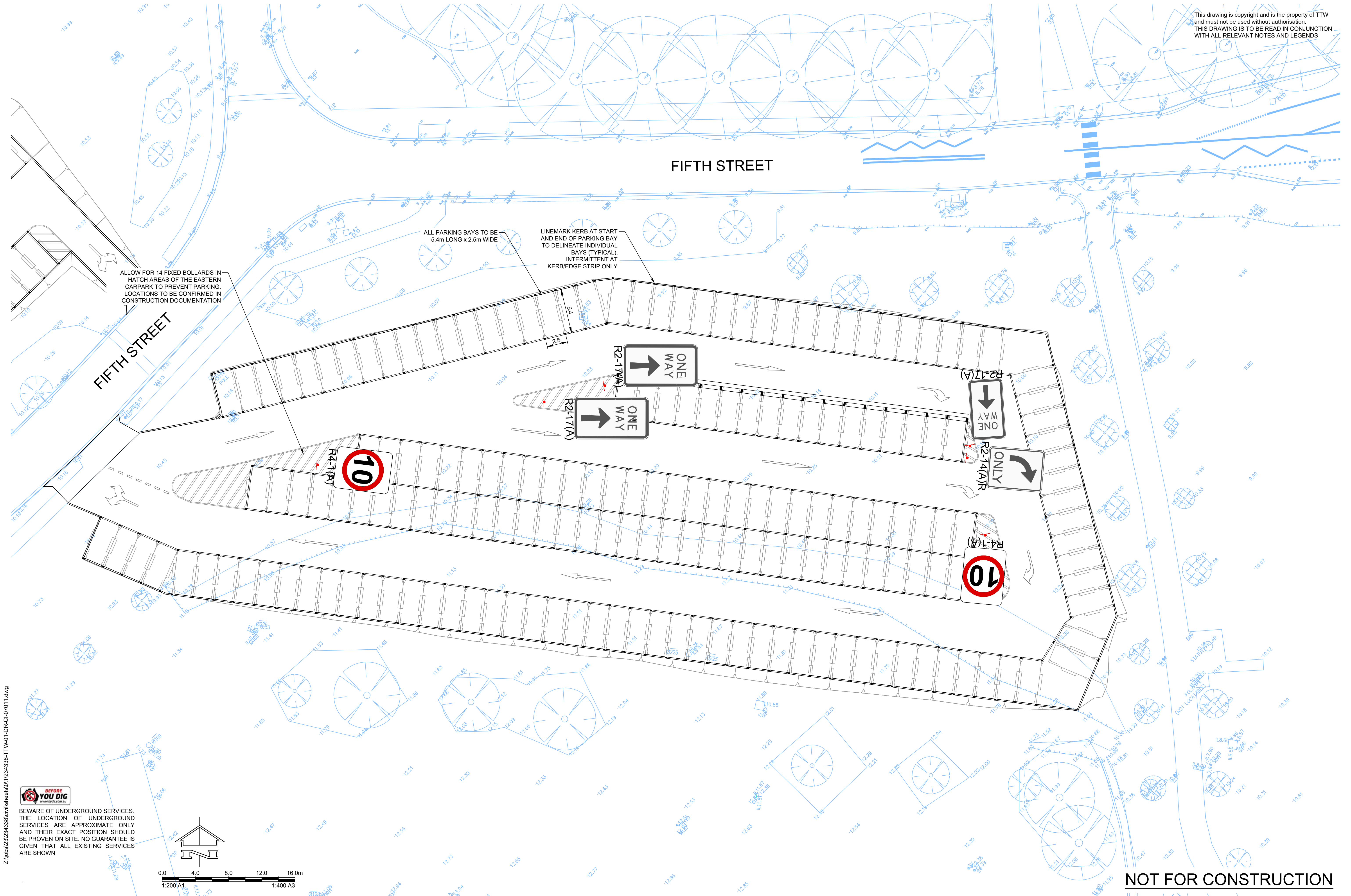
NOT FOR CONSTRUCTION

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02.05.2025 2:40 PM			

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Scale at A1	Drawn	Designed	Approved			
AS SHOWN	KN	JLE	RP			
Project No	Originator	Zone	Type	Role	Sheet No.	Rev
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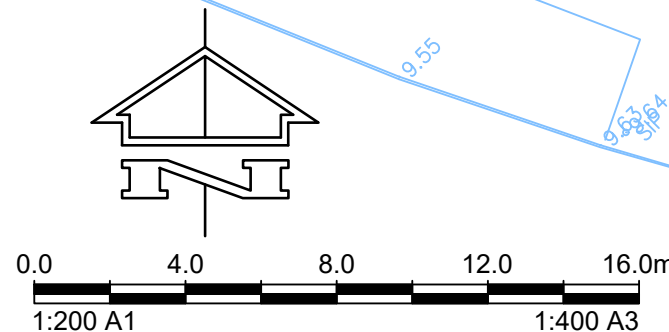
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Rev	Description	Eng Draft	Date	Rev	Description	Eng Draft	Date	Rev	Description	Eng Draft	Date
Client:			Engineer:			Project:			Drawing Title:		
WESTERN SYDNEY UNIVERSITY			TTW			WSU CARPARK RELOCATION PROJECT			TRAFFIC CONTROL SIGNAGE AND LINEMARKING SHEET 1		
Scale at A1			Drawn			Designed			Approved		
1:200			KN			JLE			RP		
Project No			Originator			Zone			Type		
234338-TTW-01-DR-CI-07011-T4			14.08.2025			2:42 PM					

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Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
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T3	TENDER ADDENDUM ISSUE	RP	KN	19.12.2024										
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T1	TENDER ISSUE	RP	AE	03.10.2024										

Client:

Engineer:

Project:

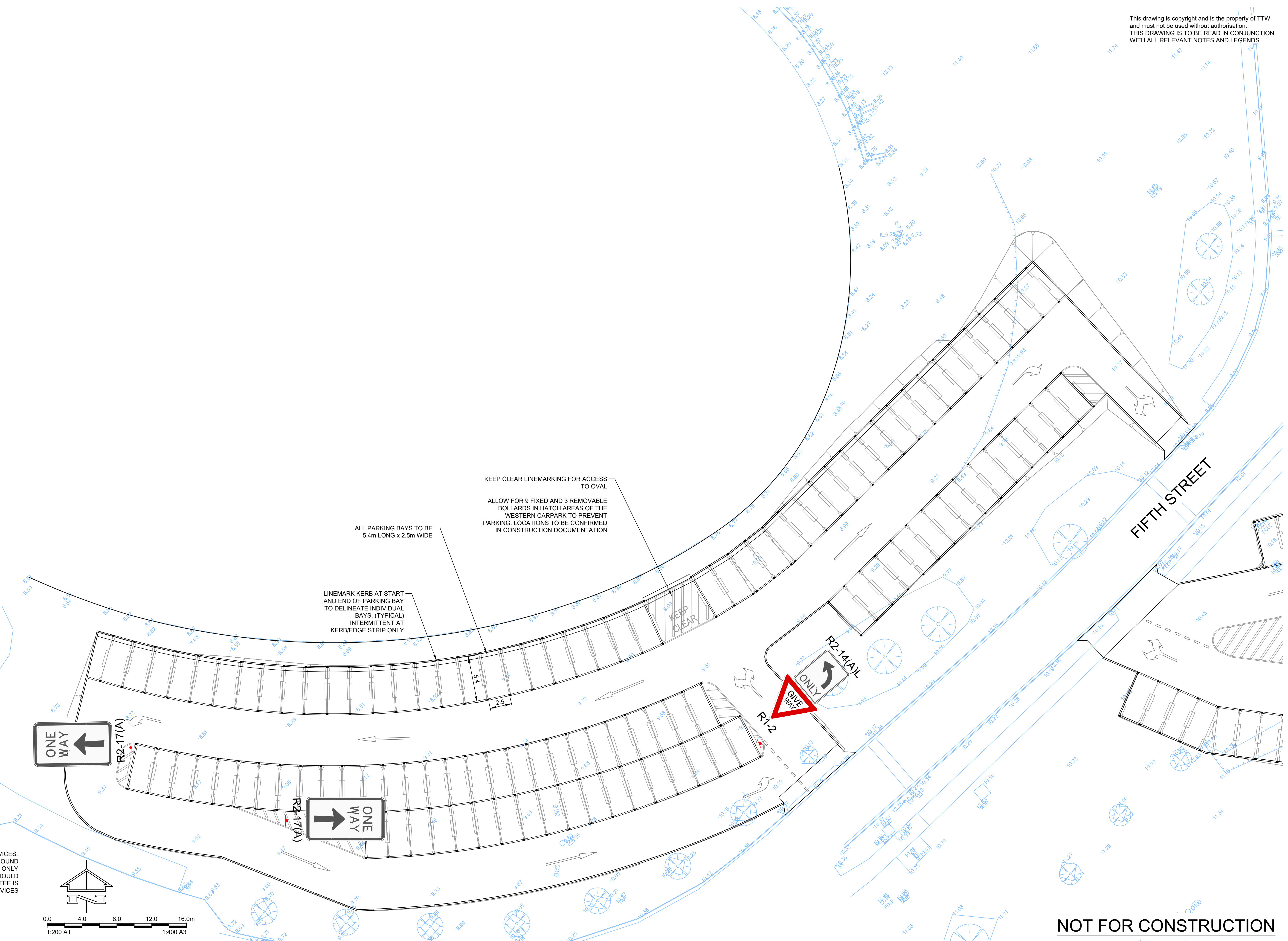
WSU
CARPARK RELOCATION
PROJECT

Drawing Title:

TRAFFIC CONTROL
SIGNAGE AND LINEMARKING
SHEET 2

Scale at A1: 1:200

Drawn	KN	Designed	JLE	Approved	RP	
Project No	Originator	Zone	Type	Role	Sheet No.	Rev
234338-TTW-01-DR-CI-07012-T4						
14.08.2025 2:44 PM						



NOT FOR CONSTRUCTION

Appendix B

Borelogs

BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 8.1 AHD
COORDINATE: E:317339.2, N:6257241.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH1
PROJECT No: 227190.00
DATE: 01/03/24 - 02/03/24
SHEET: 1 of 3

CONDITIONS ENCOUNTERED						SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (%)	DENSITY (g/cm³)	MOISTURE	REMARKS	TYPE	INTERVAL
	0.10	ASPHALTIC CONCRETE: wearing surface			NA	NA			A/ES	0.10
	0.60	FILL / Sandy GRAVEL: grey; fine to medium; fine to coarse sand; (probably roadbase).		FILL	(WC)		D to M		A/ES	0.50
	0.70	FILL / CLAY AND GRAVEL; mixture.		FILL						
	1	CLAY (CI-CH): grey mottled orange-brown; medium to high plasticity.		ALV	F		w>PL		A/ES	1.00
	2.00	CLAY (CI-CH): grey stained red-brown; medium to high plasticity.		ALV					A	2.00
	2.50								A	2.50
	3									
	3.55	CORE LOSS: 650mm								
	4.20	CLAY (CI-CH): grey stained red-brown; medium to high plasticity.		ALV						
	4.50	CORE LOSS: 900mm			St		w<PL			
	5.40	CLAY (CI-CH): grey stained red-brown; medium to high plasticity.		ALV						
	5.80	CORE LOSS: 1200mm								
	7.00	CLAY (CI-CH): grey stained red-brown; medium to high plasticity.		ALV						
	7.20	CORE LOSS: 200mm		ALV						
	7.40	Sandy CLAY (CI): grey and dark grey mottled red-brown; medium plasticity; fine to medium sand; with iron-cemented bands; possibly tertiary-aged alluvium.								
	7.74	CORE LOSS: 140mm								
	7.88	Sandy CLAY (CI): grey and dark grey; medium plasticity; fine sand.		ALV	F		w=PL			
	9									
	9.85	Continued as rock								
	10									

NOTES: #Soil origin is "probable" unless otherwise stated. %Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio 205
METHOD: AD/T to 2.5m; NMLC to 15.9m
REMARKS:

OPERATOR: Terratest

LOGGED: JBC/CC/AK
CASING: HW to 2.5m

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 8.1 AHD
COORDINATE: E:317339.2, N:6257241.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH1
PROJECT No: 227190.00
DATE: 01/03/24 - 02/03/24
SHEET: 2 of 3

[illegible]

NOTES: (#) Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 205
METHOD: AD/T to 2.5m; NMLC to 15.9m
REMARKS:

OPERATOR: Terratest

LOGGED: JBC/CC/AK
CASING: HW to 2.5m

BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 8.1 AHD
COORDINATE: E:317339.2, N:6257241.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH1
PROJECT No: 227190.00
DATE: 01/03/24 - 02/03/24
SHEET: 3 of 3

CONDITIONS ENCOUNTERED														SAMPLE			TESTING						
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.				DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE	
	11.96		SANDSTONE: pale grey-brown grading to orange-brown stained red-brown, fine to medium grained. Hawkesbury Sandstone		PS	SW	HW	DW															
	12.08				SEAM																		
	12.64				SEAM																		
	14.39				MW																		
	15.13		SANDSTONE: brown, fine to medium grained. Hawkesbury Sandstone		HW																		
	15.49				SW																		
	15.90		SANDSTONE: pale grey stained orange-brown, medium to coarse grained. Hawkesbury Sandstone		SW to MW																		
	16.00																						
	16.00		Borehole discontinued at 15.90m depth. Limit of investigation.																				
	17.00																						
	18.00																						
	19.00																						
	20.00																						
	21.00																						

NOTES: [#]Soil origin is "probable" unless otherwise stated.

NOTES: #Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio 205
METHOD: AD/T to 2.5m; NMLC to 15.9m
REMARKS:

OPERATOR: Terratest

LOGGED: JBC/CC/AK
CASING: HW to 2.5m



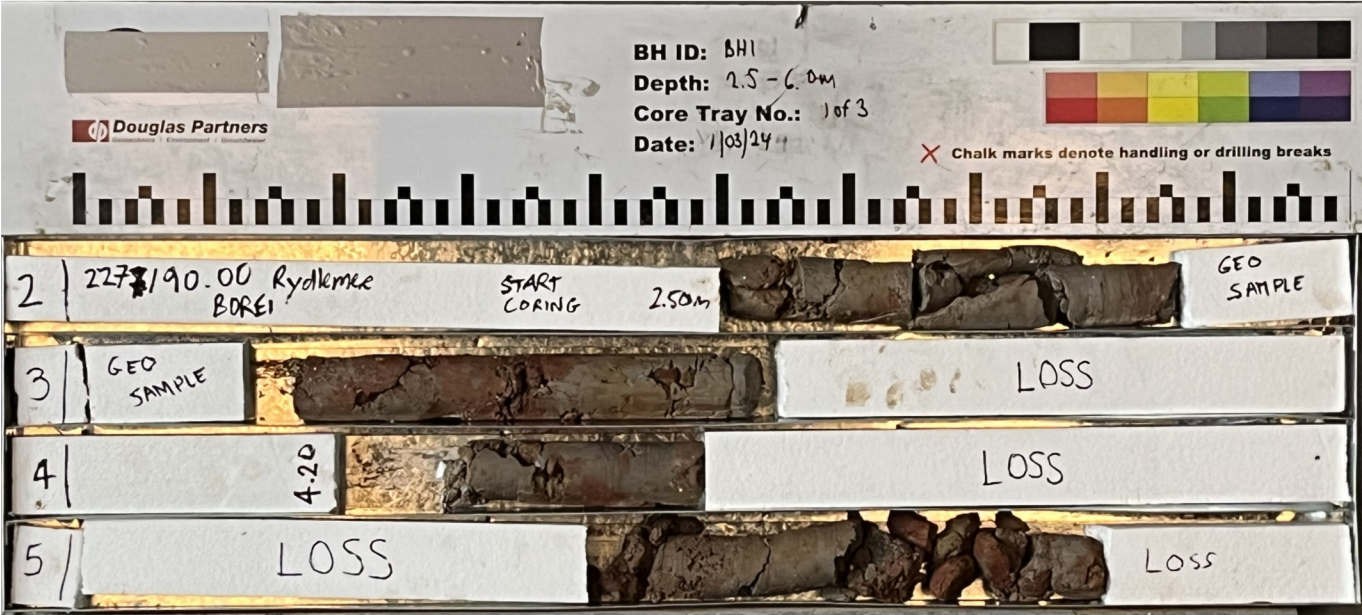
Refer to explanatory notes for symbol and abbreviation definitions

CORE PHOTO LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 8.1 AHD
COORDINATE: E:317339.2, N:6257241.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH1
PROJECT No: 227190.00
DATE: 01/03/24 - 02/03/24
SHEET: 1 of 2



Box 1 of 3: 2.50-6.00 m depth



Box 2 of 3: 6.00-11.00 m depth

CORE PHOTO LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 8.1 AHD
COORDINATE: E:317339.2, N:6257241.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH1
PROJECT No: 227190.00
DATE: 01/03/24 - 02/03/24
SHEET: 2 of 2



Box 3 of 3: 11.00-15.90 m depth

BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.9 AHD
COORDINATE: E:317401.5, N:6257243.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH2
PROJECT No: 227190.00
DATE: 09/03/24
SHEET: 1 of 3

CONDITIONS ENCOUNTERED							SAMPLE			TESTING AND REMARKS					
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. ⁽¹⁾ DENSITY. ⁽²⁾	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
		0.02	ASPHALTIC CONCRETE: 20mm thick wearing surface		FILL	(WC)	D		ES		0.10				
		0.30	FILL / SAND: dark grey and dark brown; with igneous gravel; trace silt and asphalt fragments; slight bituminous odour.			St			*	ES	0.50				
		1	CLAY (CI-CH): brown, red-brown and pale grey; medium to high plasticity; trace rootlets			VSt				ES	1.00	SPT	4,6,8 N=14		
										ES	1.50				
		2								ES	2.00				
									*	ES	2.50	SPT	3,7,10 N=17		
										ES	3.00				
			From 3.50m: trace silt			H				ES	3.50				
		4	From 4.00m: bands of iron cemented soil (ironstone)							ES	4.00				
					ALV					U50	4.45				
		5					w=PL					SPT	8,18,14 N=32		
										ES	5.00				
										ES	5.50				
		6								ES	6.00	SPT	5,8,14 N=22		
			From 6.50m: trace fine to medium sand			VSt				ES	6.50				
		7								ES	7.00				
		8										PP	235-205kPa		
		8.50	Silty CLAY (CI): grey mottled red-brown and orange-brown; medium plasticity.									PP	370-340kPa		
		9			ALV	VSt to H						PP	410kPa		

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio MC450 P1

OPERATOR: Terratest

LOGGED: JBC/AK

METHOD: AD/T to 7.5m; NMLC to 17.9m

CASING: HW to 7.5m

REMARKS: *Field Replicate BD1/20243009 taken from 0.5m, BD02/20240309 taken from 2.5m

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.9 AHD
COORDINATE: E:317401.5, N:6257243.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH2
PROJECT No: 227190.00
DATE: 09/03/24
SHEET: 2 of 3

CONDITIONS ENCOUNTERED															SAMPLE			TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. ⁽¹⁾	DENSITY. ⁽¹⁾	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE					
	10.2	10	[CONT] Silty CLAY (CI): grey mottled red-brown and orange-brown; medium plasticity.		ALV	VSt to H		w=PL				10	PP	455-375kPa							
	11.3	11	From 9.60m: dark-grey mottled red-brown and brown																		
	11.93	11.93	Clayey SAND (SC): grey; fine to medium; medium plasticity clay.																		
	12.90	12.90	Continued as rock		ALV	(D)		W				12									
	13.5	13										13									
	14.5	14										14									
	15.5	15										15									
	16.5	16										16									
	17.5	17										17									
	18.5	18										18									
	19.5	19										19									

NOTES: ⁽¹⁾Soil origin is "probable" unless otherwise stated. ⁽²⁾Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio MC450 P1
METHOD: AD/T to 7.5m; NMLC to 17.9m
REMARKS: *Field Replicate BD1/20243009 taken from 0.5m, BD02/20240309 taken from 2.5m

OPERATOR: Terratest

LOGGED: JBC/AK
CASING: HW to 7.5m

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.9 AHD
COORDINATE: E:317401.5, N:6257243.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---

LOCATION ID: BH2
PROJECT No: 227190.00
DATE: 09/03/24
SHEET: 3 of 3

CONDITIONS ENCOUNTERED														SAMPLE			TESTING						
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH.				DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE	
	10.2	10			PS	XW	HW	DW	MW	SW	FR							10					
	10.3	11																11					
	10.4	12										100	11					12					
	10.5	13	Continued from soil SANDSTONE: pale grey-brown, fine to medium grained. Hawkesbury Sandstone						SW						12.90				13	PLT	PL(A)=1.5MPa		
	10.6	14							MW						13.35								
	10.7	15	CORE LOSS: 300mm						SEAM						13.85				14	PLT	PL(A)=0.25MPa		
	10.8	16							SW						14.09								
	10.9	17							SEAM						14.45								
	11.0	18	SANDSTONE: pale grey-brown stained orange-brown and red-brown, fine to medium grained. Hawkesbury Sandstone						MW						15.00				15	PLT	PL(A)=0.35MPa		
	11.1	19							SEAM						15.30								
	11.2	20													15.43								
	11.3	21	CORE LOSS: 170mm						SW						15.61								
	11.4	22													15.96								
	11.5	23	SANDSTONE: pale grey-brown stained orange-brown, fine to medium grained. Hawkesbury Sandstone						SW						16.36				16	PLT	PL(A)=0.94MPa		
	11.6	24													16.70								
	11.7	25							SW to FR						17.03				17	PLT	PL(A)=0.46MPa		
	11.8	26	SANDSTONE: orange-brown stained red-brown, medium to coarse grained. Hawkesbury Sandstone						MW						17.33								
	11.9	27							SEAM						17.49								
	12.0	28							MW						17.60								
	12.1	29	Borehole discontinued at 17.90m depth. Limit of investigation.																				
	12.2	30																					
	12.3	31																					

NOTES: #Soil origin is "probable" unless otherwise stated.

PLANT: Comacchio MC450 P1
METHOD: AD/T to 7.5m; NMLC to 17.9m
REMARKS: *Field Replicate BD1/20243009 taken from 0.5m, BD02/20240309 taken from 2.5m

OPERATOR: Terratest

LOGGED: JBC/AK
CASING: HW to 7.5m

Refer to explanatory notes for symbol and abbreviation definitions



CORE PHOTO LOG

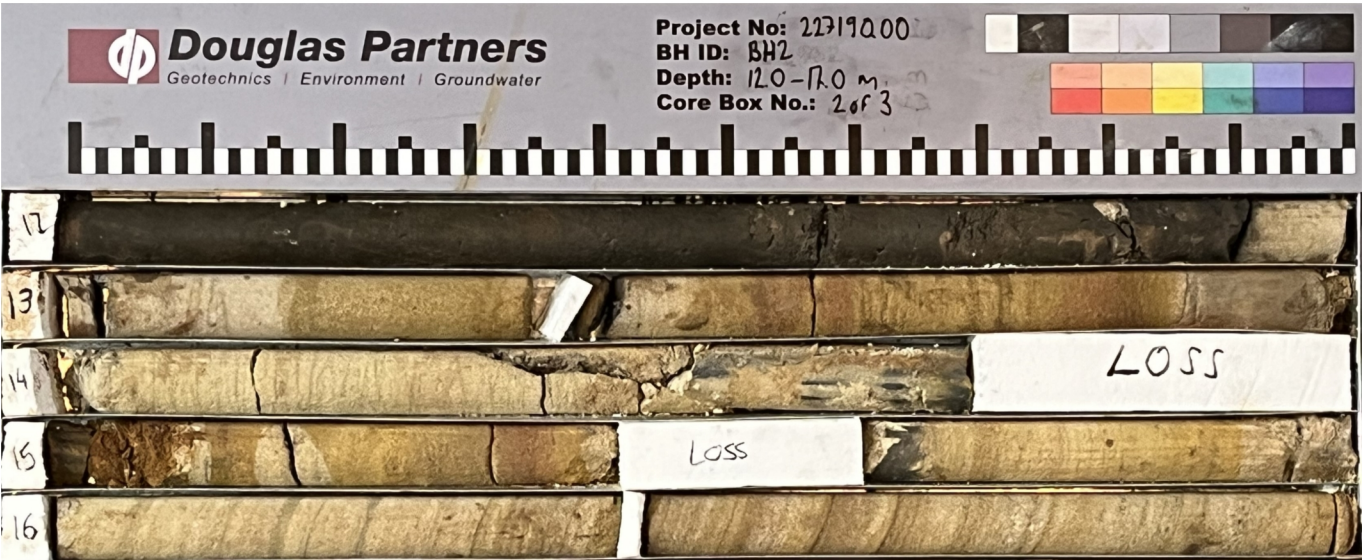
CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.9 AHD
COORDINATE: E:317401.5, N:6257243.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH2
PROJECT No: 227190.00
DATE: 09/03/24
SHEET: 1 of 2



Box 1 of 3: 7.50-12.00 m depth



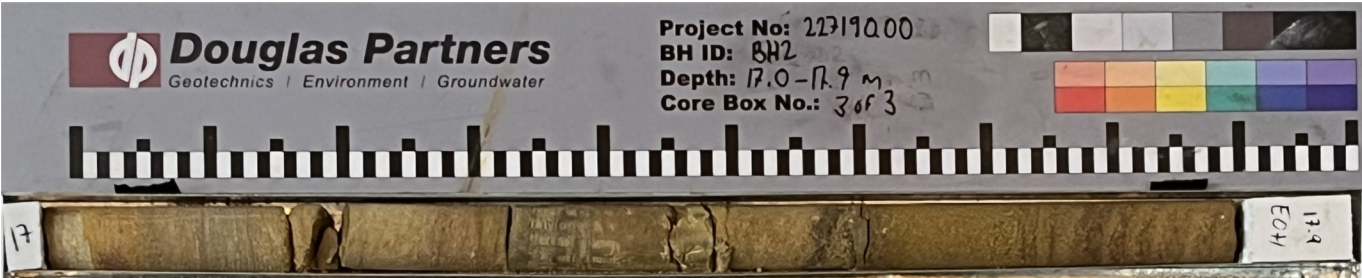
Box 2 of 3: 12.00-17.00 m depth

CORE PHOTO LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.9 AHD
COORDINATE: E:317401.5, N:6257243.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH2
PROJECT No: 227190.00
DATE: 09/03/24
SHEET: 2 of 2



Biox 3 of 3: 17.00-17.90 m depth

BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.9 AHD
COORDINATE: E:317335.0, N:6257209.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH3
PROJECT No: 227190.00
DATE: 10/03/24
SHEET: 1 of 1

GROUNDWATER		CONDITIONS ENCOUNTERED					SAMPLE			TESTING AND REMARKS				
RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. ⁽¹⁾	DENSITY. ⁽¹⁾	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	
10/03/24 Possible groundwater seepage at 1.0m whilst auger drilling	0.05	CONCRETE AND ROADBASE GRAVEL		FILL	(VC)		D / w<PL		ES		0.10			
		FILL / CLAY, SAND AND GRAVEL.							A/ES		0.50			
	1.10	FILL / GRAVELLY SANDSTONE, SAND AND GRAVEL.		FILL					A/ES		1.00	SPT	2,4,4 N=8	
	1.50	Sandy CLAY (CH): grey-brown; high plasticity; medium sand.							A/ES		1.50			
	2.80	CLAY (CI): dark grey mottled red and brown; medium plasticity; trace sand. Teritary alluvium.		ALV	St	w<PL			A		2.50	SPT	3,6,10 N=16	
	3.00								A		3.00			
	3.50								A		3.50			
	4.50	CLAY (CH): dark grey mottled red and brown; high plasticity. Tertiary alluvium.		ALV					A		4.00	SPT	9,10,13 N=23	
	4.50								A		4.50			
	5.00								A		5.00			
	6.00								A		6.00			
	7.00			ALV	VSt	w=PL			A		6.50	SPT	8,14,16 N=30	
	7.00								A		7.00			
	7.50								A		7.50			
	8.00								A		8.00			
	9.00			ALV					A		8.50	SPT	7,8,11 N=19	
	9.00								A		9.00			
	10.00	Borehole discontinued at 10.00m depth. Limit of investigation - hole caved in.												

NOTES: ⁽¹⁾Soil origin is "probable" unless otherwise stated. ⁽²⁾Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

NOTES: ⁽¹⁾Soil origin is "probable" unless otherwise stated. ⁽²⁾Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio 405
METHOD: AD/T to 10.0m
REMARKS:

OPERATOR: Terratest

LOGGED: CC
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.7 AHD
COORDINATE: E:317412.8, N:6257216.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH4
PROJECT No: 227190.00
DATE: 10/03/24
SHEET: 1 of 1

CONDITIONS ENCOUNTERED					SAMPLE			TESTING AND REMARKS	
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (°)	DENSITY (°)	MOISTURE	REMARKS	RESULTS AND REMARKS
	0.05	ASPHALTIC CONCRETE: wearing surface		FILL	(VC)		D / w<PL		
	0.50	FILL / CLAY AND GRAVEL; mixture.							
	1	CLAY (CI): orange-brown; medium plasticity; trace sand		ALV			w<PL		
	2								
	2.50	CLAY (CI-CH): red and grey grading to grey mottled brown and red; medium to high plasticity; trace fine sand.		ALV	VSt				
	3								
	4	From 4.00m-5.00m: pale grey-brown		ALV			w=PL		
	5.00	CLAY (CH): dark red; high plasticity.		ALV					
	6								
	6.50	CLAY (CH): dark grey; high plasticity; with sand		ALV	H				
	7								
	7.20	SAND (SP): grey; fine to medium; with low plasticity fines.		RS	D		M to W		
	8								
	8.50	Borehole discontinued at 8.50m depth. Limit of investigation - due to sidewall collapse below 7.2m.							
	9								
	10								

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio 405
METHOD: AD/T to 8.50m
REMARKS:

OPERATOR: Terratest

LOGGED: CC
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.9 AHD
COORDINATE: E:317336.6, N:6257172.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH5
PROJECT No: 227190.00
DATE: 10/03/24
SHEET: 1 of 1

CONDITIONS ENCOUNTERED						SAMPLE			TESTING AND REMARKS												
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. ⁽¹⁾ ■ DENSITY. ⁽²⁾ ■	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE						
24.03/24.6 ▼ 7 6 5 4 3 2 1 0 -1 -2		0.05	ASPHALTIC CONCRETE: wearing surface		FILL	(WC)	D / w<PL		ES		0.10		4,5,6 N=11								
			FILL / CLAY AND GRAVEL; mixture.													A/ES		0.50			
		0.70	CLAY (Cl): grey mottled brown; medium plasticity; with sand.		ALV	St	w<PL		A/ES		1.00										
		1.00	CLAY (Cl); medium plasticity; with sand; medium quartz; well sorted. Alluvium.		ALV				A/B/ES		1.20										
		2.00	Sandy CLAY (CL): grey; low plasticity; fine sand.		RS	F	w=PL		A/ES		2										
																		2.50			
		3	From 3.00m: brown mottled red-brown															3			
																		4			
		4.45	SANDSTONE: orange-grey mottled red-brown, fine to medium grained; distinctly weathered. Hawkesbury Sandstone			VSt												SPT	6,9,18 N=27		
		5	Borehole discontinued at 4.50m depth. Limit of investigation.																		

NOTES: #Soil origin is "probable" unless otherwise stated. %Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio 405
METHOD: AD/T to 4.5m
REMARKS:

OPERATOR: Terratest

LOGGED: CC
CASING: Uncased

Refer to explanatory notes for symbol and abbreviation definitions

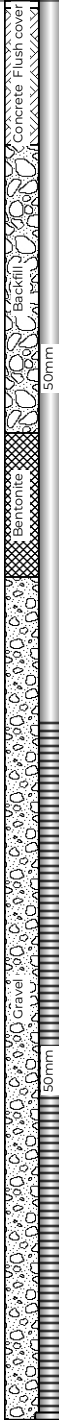


BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.3 AHD
COORDINATE: E:317407.8, N:6257178.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH6
PROJECT No: 227190.00
DATE: 09/03/24
SHEET: 1 of 2

CONDITIONS ENCOUNTERED						SAMPLE			TESTING AND REMARKS						
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. ⁽¹⁾ DENSITY. ⁽¹⁾	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
24.0374 ▼	7	0.05	ASPHALTIC CONCRETE: wearing surface		FILL	(WC)	D				1	SPT	4,8,18 N=26		
	0.50	FILL / Gravelly SAND: grey; fine to coarse; fine to medium gravel.		FILL	(VC)	M / w<PL									
	1.00	FILL / CLAY AND GRAVEL; mixture.		FILL	(WC)	w<PL									
	1.50	FILL / CLAY: pale brown-orange; medium plasticity; with fine to medium sand.		FILL	(WC)	w<PL									
	2.00	Sandy CLAY (CI): orange-brown; medium plasticity; fine to medium sand.		ALV	(VSt)	D									
	2.50	Clayey SAND (SC): orange-brown mottled red-brown; fine to medium; low plasticity clay.		ALV possibly RS	(MD)	D to M									
	3.00	Clayey SAND (SC): red-brown; medium to coarse; low plasticity clay.		RS	MD										
	3.10	Clayey SAND (SC): pale grey-brown; medium to coarse; low plasticity clay; extremely weathered sandstone.		XWM	(VD)	D									
	4.10	Continued as rock													
	5														
6															
7															
8															
9															
10															

NOTES: ^(#)Soil origin is "probable" unless otherwise stated. ⁽¹⁾Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

NOTES: ^(#)Soil origin is "probable" unless otherwise stated. ⁽¹⁾Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Comacchio 405
METHOD: AD/T to 4.1m; NMLC to 9.85m
REMARKS:

OPERATOR: Terratest

LOGGED: CC/AK
CASING: HW to 4.1m

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.3 AHD
COORDINATE: E:317407.8, N:6257178.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH6
PROJECT No: 227190.00
DATE: 09/03/24
SHEET: 2 of 2

CONDITIONS ENCOUNTERED										SAMPLE				TESTING					
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	WEATH. PS XW HW MW SW FR DW	DEPTH (m)	STRENGTH VL L M W VH EH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
	24.03/24.4	0																	
		1																	
		2																	
		3																	
		4																	
		5	Continued from soil SANDSTONE: pale grey, fine to medium grained. Hawkesbury Sandstone From 4.45m: orange-brown stained red-brown																
		6																	
		7																	
		8																	
		9																	
		10	Borehole discontinued at 9.85m depth. Limit of investigation.																

NOTES: #Soil origin is 'probable' unless otherwise stated.

PLANT: Comacchio 405

METHOD: AD/T to 4.1m; NMLC to 9.85m

REMARKS:

OPERATOR: Terratest

LOGGED: CC/AK

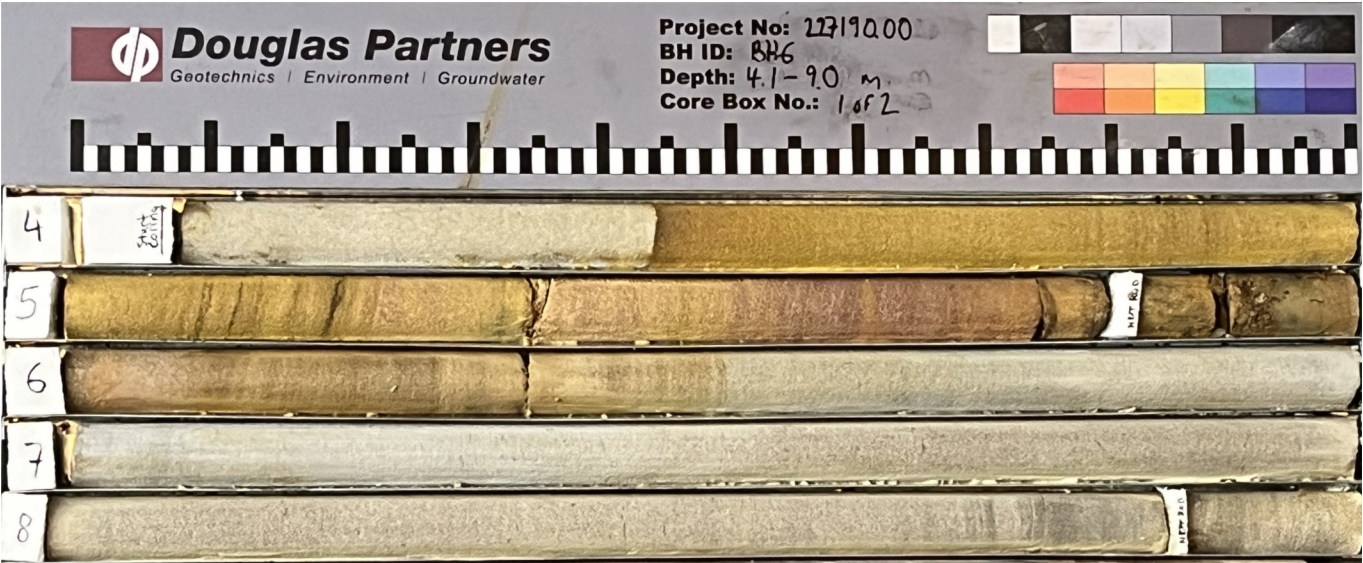
CASING: HW to 4.1m

CORE PHOTO LOG

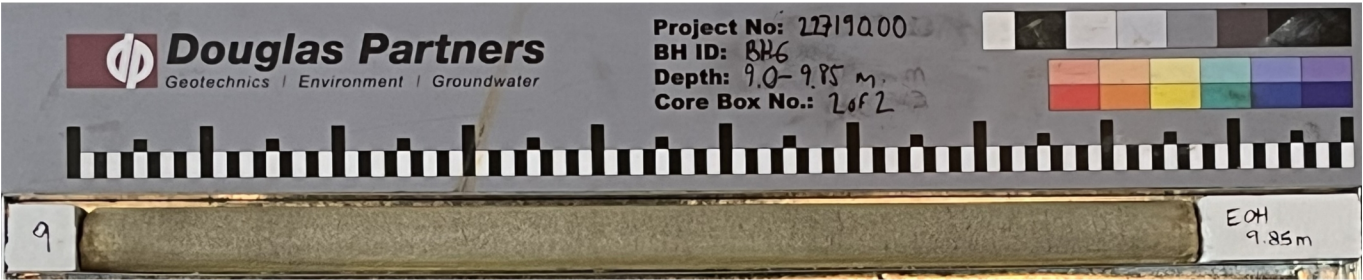
CLIENT: Western Sydney University
PROJECT: Indigenous Centre of Excellence
LOCATION: 171 Victoria Road, Parramatta, NSW

SURFACE LEVEL: 7.3 AHD
COORDINATE: E:317407.8, N:6257178.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH6
PROJECT No: 227190.00
DATE: 09/03/24
SHEET: 1 of 1



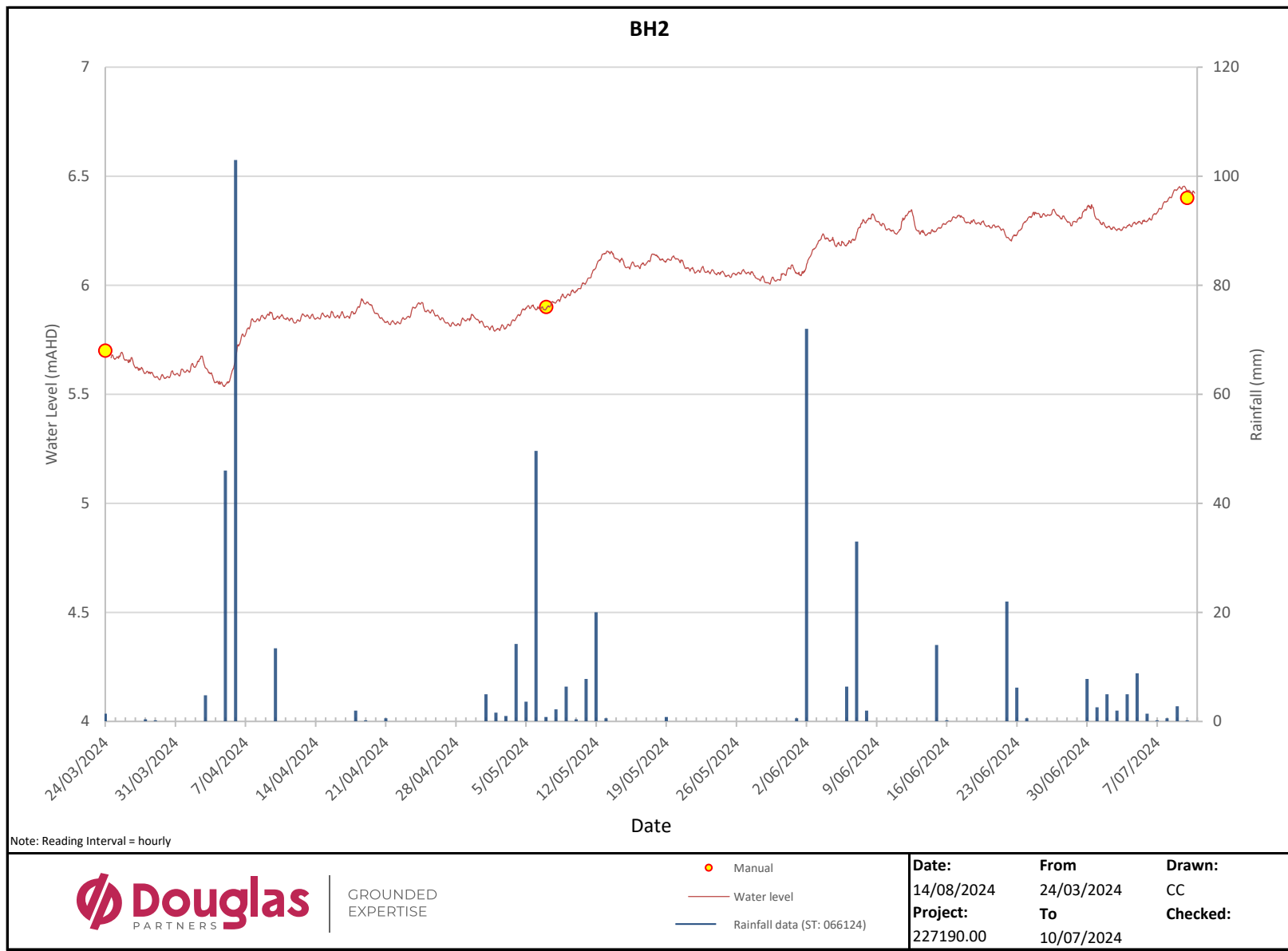
Box 1 of 2: 4.10-9.00 m depth

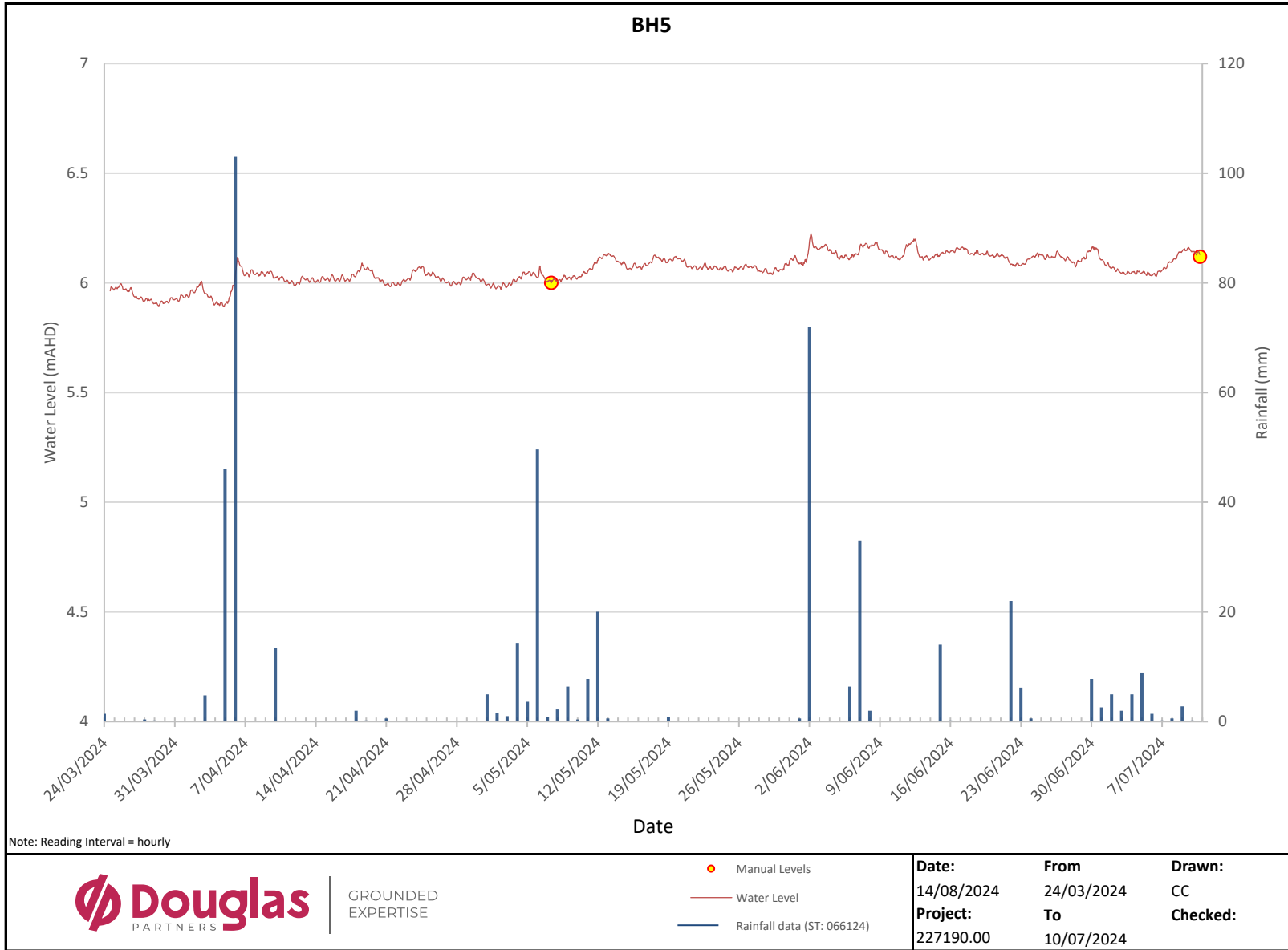


Box 2 of 2: 9.00-9.85 m depth

Appendix C

Hydrographs





Appendix D

Water quality laboratory reports

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Pty Ltd
Attention	Atha Kapitanof

Sample Login Details

Your reference	227190.00 Rydalmere
Envirolab Reference	347582
Date Sample Received	26/03/2024
Date Instructions Received	26/03/2024
Date Results Expected to be Reported	04/04/2024

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	3 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	10
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolab.com.au	Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:



Sample ID	VOCs in water	VTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water	Organochlorine Pesticides in Water	OP Pesticides in Water	PCBs in Water	Total Phenolics in Water	HM in water - dissolved	pH	Electrical Conductivity	Chloride, Cl	Sulphate, SO4	Ferrous Iron	Ferric Iron (by calculation)	PFAS in Water TRACE Short	Cations in water Dissolved	On Hold
BH2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
BH5																		✓
BH6																		✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

CERTIFICATE OF ANALYSIS 347582

Client Details

Client	Douglas Partners Pty Ltd
Attention	Atha Kapitanof
Address	96 Hermitage Rd, West Ryde, NSW, 2114

Sample Details

Your Reference	<u>227190.00 Rydalmere</u>
Number of Samples	3 Water
Date samples received	26/03/2024
Date completed instructions received	26/03/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	04/04/2024
Date of Issue	04/04/2024
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Diego Bigolin, Inorganics Supervisor
 Dragana Tomas, Senior Chemist
 Loren Bardwell, Development Chemist
 Sean McAlary, Chemist (FAS)
 Timothy Toll, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

VOCs in water		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date Extracted	-	30/03/2024
Date Analysed	-	02/04/2024
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	<1
Bromochloromethane	µg/L	<1
Chloroform	µg/L	15
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Cyclohexane	µg/L	<1
Carbon tetrachloride	µg/L	<1
Benzene	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	<1
Bromodichloromethane	µg/L	2
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	1
Toluene	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	<1
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Ethylbenzene	µg/L	<1

VOCs in water		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Bromoform	µg/L	<1
m+p-xylene	µg/L	<2
Styrene	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	<1
o-xylene	µg/L	<1
1,2,3-trichloropropane	µg/L	<1
Isopropylbenzene	µg/L	<1
Bromobenzene	µg/L	<1
n-propyl benzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3,5-trimethyl benzene	µg/L	<1
Tert-butyl benzene	µg/L	<1
1,2,4-trimethyl benzene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
Sec-butyl benzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
4-isopropyl toluene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1
n-butyl benzene	µg/L	<1
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	99
Surrogate Toluene-d8	%	100
Surrogate 4-Bromofluorobenzene	%	100

vTRH(C6-C10)/BTEXN in Water		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date extracted	-	30/03/2024
Date analysed	-	02/04/2024
TRH C ₆ - C ₉	µg/L	37
TRH C ₆ - C ₁₀	µg/L	43
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	43
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	99
Surrogate Toluene-d8	%	100
Surrogate 4-Bromofluorobenzene	%	100

svTRH (C10-C40) in Water		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date extracted	-	28/03/2024
Date analysed	-	29/03/2024
TRH C ₁₀ - C ₁₄	µg/L	130
TRH C ₁₅ - C ₂₈	µg/L	<100
TRH C ₂₉ - C ₃₆	µg/L	<100
Total +ve TRH (C10-C36)	µg/L	130
TRH >C ₁₀ - C ₁₆	µg/L	130
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	130
TRH >C ₁₆ - C ₃₄	µg/L	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100
Total +ve TRH (>C10-C40)	µg/L	130
Surrogate o-Terphenyl	%	90

PAHs in Water		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date extracted	-	28/03/2024
Date analysed	-	02/04/2024
Naphthalene	µg/L	<0.1
Acenaphthylene	µg/L	<0.1
Acenaphthene	µg/L	<0.1
Fluorene	µg/L	<0.1
Phenanthrene	µg/L	<0.1
Anthracene	µg/L	<0.1
Fluoranthene	µg/L	<0.1
Pyrene	µg/L	<0.1
Benzo(a)anthracene	µg/L	<0.1
Chrysene	µg/L	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2
Benzo(a)pyrene	µg/L	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5
Total +ve PAH's	µg/L	<0.1
Surrogate <i>p</i> -Terphenyl-d14	%	106

Organochlorine Pesticides in Water		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date extracted	-	28/03/2024
Date analysed	-	02/04/2024
alpha-BHC	µg/L	<0.2
HCB	µg/L	<0.2
beta-BHC	µg/L	<0.2
gamma-BHC	µg/L	<0.2
Heptachlor	µg/L	<0.2
delta-BHC	µg/L	<0.2
Aldrin	µg/L	<0.2
Heptachlor Epoxide	µg/L	<0.2
gamma-Chlordane	µg/L	<0.2
alpha-Chlordane	µg/L	<0.2
Endosulfan I	µg/L	<0.2
pp-DDE	µg/L	<0.2
Dieldrin	µg/L	<0.2
Endrin	µg/L	<0.2
Endosulfan II	µg/L	<0.2
pp-DDD	µg/L	<0.2
Endrin Aldehyde	µg/L	<0.2
pp-DDT	µg/L	<0.2
Endosulfan Sulphate	µg/L	<0.2
Methoxychlor	µg/L	<0.2
Mirex	ug/L	<0.2
Surrogate 4-Chloro-3-NBTF	%	97

OP Pesticides in Water		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date extracted	-	28/03/2024
Date analysed	-	02/04/2024
Dichlorvos	µg/L	<0.2
Mevinphos	µg/L	<0.2
Phorate	µg/L	<0.2
Dimethoate	µg/L	<0.2
Diazinon	µg/L	<0.2
Disulfoton	µg/L	<0.2
Chlorpyrifos-methyl	µg/L	<0.2
Parathion-Methyl	µg/L	<0.2
Ronnel	µg/L	<0.2
Fenitrothion	µg/L	<0.2
Malathion	µg/L	<0.2
Chlorpyrifos	µg/L	<0.2
Fenthion	µg/L	<0.2
Parathion	µg/L	<0.2
Bromophos ethyl	µg/L	<0.2
Methidathion	µg/L	<0.2
Fenamiphos	µg/L	<0.2
Ethion	µg/L	<0.2
Phosalone	µg/L	<0.2
Azinphos-methyl (Guthion)	µg/L	<0.2
Coumaphos	µg/L	<0.2
Surrogate 4-Chloro-3-NBTF	%	97

PCBs in Water		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date extracted	-	28/03/2024
Date analysed	-	02/04/2024
Aroclor 1016	µg/L	<2
Aroclor 1221	µg/L	<2
Aroclor 1232	µg/L	<2
Aroclor 1242	µg/L	<2
Aroclor 1248	µg/L	<2
Aroclor 1254	µg/L	<2
Aroclor 1260	µg/L	<2
Surrogate 2-Fluorobiphenyl	%	100

Total Phenolics in Water		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date extracted	-	28/03/2024
Date analysed	-	28/03/2024
Total Phenolics (as Phenol)	mg/L	<0.05

HM in water - dissolved		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date prepared	-	28/03/2024
Date analysed	-	28/03/2024
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	<1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	2
Zinc-Dissolved	µg/L	21
Iron-Dissolved	µg/L	1,400

Miscellaneous Inorganics		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date prepared	-	27/03/2024
Date analysed	-	27/03/2024
pH	pH Units	6.0
Electrical Conductivity	µS/cm	490
Chloride, Cl	mg/L	72
Sulphate, SO ₄	mg/L	63
Ferrous Iron	mg/L	1.3
Ferric Iron (by calculation)	mg/L	0.11

PFAS in Water TRACE Short		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date prepared	-	02/04/2024
Date analysed	-	02/04/2024
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0033
Perfluorooctanesulfonic acid PFOS	µg/L	0.0040
Perfluorooctanoic acid PFOA	µg/L	0.001
6:2 FTS	µg/L	<0.0004
8:2 FTS	µg/L	<0.0004
Surrogate ¹³ C ₈ PFOS	%	98
Surrogate ¹³ C ₂ PFOA	%	95
Extracted ISTD ¹⁸ O ₂ PFHxS	%	81
Extracted ISTD ¹³ C ₄ PFOS	%	81
Extracted ISTD ¹³ C ₄ PFOA	%	103
Extracted ISTD ¹³ C ₂ 6:2FTS	%	#
Extracted ISTD ¹³ C ₂ 8:2FTS	%	187
Total Positive PFHxS & PFOS	µg/L	0.0073
Total Positive PFOS & PFOA	µg/L	0.0052
Total Positive PFAS	µg/L	0.0085

Cations in water Dissolved		
Our Reference		347582-1
Your Reference	UNITS	BH2
Date Sampled		24/03/2024
Type of sample		Water
Date digested	-	28/03/2024
Date analysed	-	28/03/2024
Calcium - Dissolved	mg/L	8.3
Magnesium - Dissolved	mg/L	3
Hardness	mgCaCO ₃ /L	33

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-076	Ferrous Iron is determined colourimetrically by discrete analyser. Waters samples are filtered on receipt prior to analysis.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Salt forms (e.g. FeO, PbO, ZnO) are determined stoichiometrically from the base metal concentration.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: VOCs in water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date Extracted	-			30/03/2024	[NT]	[NT]	[NT]	[NT]	30/03/2024	[NT]
Date Analysed	-			02/04/2024	[NT]	[NT]	[NT]	[NT]	02/04/2024	[NT]
Dichlorodifluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Vinyl Chloride	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromomethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichlorofluoromethane	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-Dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trans-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Cis-1,2-dichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chloroform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
2,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	106	[NT]
1,1,1-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
1,1-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Cyclohexane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Carbon tetrachloride	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Dibromomethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Trichloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Bromodichloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
trans-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
cis-1,3-dichloropropene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2-trichloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
1,3-dichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibromochloromethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
1,2-dibromoethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tetrachloroethene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
1,1,1,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	121	[NT]
Bromoform	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	122	[NT]
Styrene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,1,2,2-tetrachloroethane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: VOCs in water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	121	[NT]
1,2,3-trichloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Isopropylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Bromobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-propyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
2-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-chlorotoluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3,5-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Tert-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trimethyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,3-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Sec-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,4-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
4-isopropyl toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
n-butyl benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2-dibromo-3-chloropropane	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,4-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Hexachlorobutadiene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
1,2,3-trichlorobenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	93	[NT]	[NT]	[NT]	[NT]	102	[NT]
Surrogate Toluene-d8	%		Org-023	94	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	108	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date extracted	-			30/03/2024	[NT]	[NT]	[NT]	[NT]	30/03/2024	[NT]
Date analysed	-			02/04/2024	[NT]	[NT]	[NT]	[NT]	02/04/2024	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	116	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	116	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	119	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	119	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	93	[NT]	[NT]	[NT]	[NT]	83	[NT]
Surrogate Toluene-d8	%		Org-023	94	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	107	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			28/03/2024	1	28/03/2024	28/03/2024		28/03/2024	[NT]
Date analysed	-			29/03/2024	1	29/03/2024	29/03/2024		29/03/2024	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	1	130	140	7	108	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	1	<100	<100	0	113	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	1	<100	<100	0	114	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	1	130	140	7	108	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	1	<100	<100	0	113	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	1	<100	<100	0	114	[NT]
Surrogate o-Terphenyl	%		Org-020	85	1	90	96	6	88	[NT]

QUALITY CONTROL: PAHs in Water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			28/03/2024	1	28/03/2024	28/03/2024		28/03/2024	[NT]
Date analysed	-			02/04/2024	1	02/04/2024	02/04/2024		02/04/2024	[NT]
Naphthalene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	91	[NT]
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	85	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	82	[NT]
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	[NT]
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	[NT]
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	103	1	106	116	9	93	[NT]

QUALITY CONTROL: Organochlorine Pesticides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			28/03/2024	1	28/03/2024	28/03/2024		28/03/2024	[NT]
Date analysed	-			02/04/2024	1	02/04/2024	02/04/2024		02/04/2024	[NT]
alpha-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	86	[NT]
HCB	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
beta-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	87	[NT]
gamma-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Heptachlor	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	93	[NT]
delta-BHC	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Aldrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	93	[NT]
Heptachlor Epoxide	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	98	[NT]
gamma-Chlordane	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
alpha-Chlordane	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan I	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDE	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	98	[NT]
Dieldrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	115	[NT]
Endrin	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	89	[NT]
Endosulfan II	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDD	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	92	[NT]
Endrin Aldehyde	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
pp-DDT	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	87	[NT]
Methoxychlor	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Mirex	ug/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	94	1	97	107	10	76	[NT]

QUALITY CONTROL: OP Pesticides in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			28/03/2024	1	28/03/2024	28/03/2024		28/03/2024	[NT]
Date analysed	-			02/04/2024	1	02/04/2024	02/04/2024		02/04/2024	[NT]
Dichlorvos	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	119	[NT]
Mevinphos	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Phorate	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Dimethoate	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Diazinon	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Disulfoton	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Chlorpyrifos-methyl	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Parathion-Methyl	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Ronnel	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	93	[NT]
Fenitrothion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	112	[NT]
Malathion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	114	[NT]
Chlorpyrifos	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	100	[NT]
Fenthion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Parathion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	108	[NT]
Bromophos ethyl	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Methidathion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Fenamiphos	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Ethion	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	103	[NT]
Phosalone	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Azinphos-methyl (Guthion)	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Coumaphos	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Surrogate 4-Chloro-3-NBTF	%		Org-022/025	94	1	97	107	10	76	[NT]

QUALITY CONTROL: PCBs in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			28/03/2024	1	28/03/2024	28/03/2024		28/03/2024	[NT]
Date analysed	-			02/04/2024	1	02/04/2024	02/04/2024		02/04/2024	[NT]
Aroclor 1016	µg/L	2	Org-021/022/025	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1221	µg/L	2	Org-021/022/025	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1232	µg/L	2	Org-021/022/025	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1242	µg/L	2	Org-021/022/025	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1248	µg/L	2	Org-021/022/025	<2	1	<2	<2	0	[NT]	[NT]
Aroclor 1254	µg/L	2	Org-021/022/025	<2	1	<2	<2	0	102	[NT]
Aroclor 1260	µg/L	2	Org-021/022/025	<2	1	<2	<2	0	[NT]	[NT]
Surrogate 2-Fluorobiphenyl	%		Org-021/022/025	97	1	100	114	13	87	[NT]

QUALITY CONTROL: Total Phenolics in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			28/03/2024	[NT]	[NT]	[NT]	[NT]	28/03/2024	[NT]
Date analysed	-			28/03/2024	[NT]	[NT]	[NT]	[NT]	28/03/2024	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			28/03/2024	[NT]	[NT]	[NT]	[NT]	28/03/2024	[NT]
Date analysed	-			28/03/2024	[NT]	[NT]	[NT]	[NT]	28/03/2024	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	94	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			27/03/2024	[NT]	[NT]	[NT]	[NT]	27/03/2024	[NT]
Date analysed	-			27/03/2024	[NT]	[NT]	[NT]	[NT]	27/03/2024	[NT]
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Chloride, Cl	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Sulphate, SO4	mg/L	1	Inorg-081	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Ferrous Iron	mg/L	0.05	Inorg-076	<0.05	[NT]	[NT]	[NT]	[NT]	98	[NT]
Ferric Iron (by calculation)	mg/L	0.05		<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

QUALITY CONTROL: PFAS in Water TRACE Short						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			02/04/2024	[NT]	[NT]	[NT]	[NT]	02/04/2024	[NT]
Date analysed	-			02/04/2024	[NT]	[NT]	[NT]	[NT]	02/04/2024	[NT]
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	104	[NT]
Perfluorooctanesulfonic acid PFOS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	107	[NT]
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	108	[NT]
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	110	[NT]
Surrogate ¹³ C ₈ PFOS	%		Org-029	99	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate ¹³ C ₂ PFOA	%		Org-029	93	[NT]	[NT]	[NT]	[NT]	99	[NT]
Extracted ISTD ¹⁸ O ₂ PFHxS	%		Org-029	81	[NT]	[NT]	[NT]	[NT]	78	[NT]
Extracted ISTD ¹³ C ₄ PFOS	%		Org-029	73	[NT]	[NT]	[NT]	[NT]	66	[NT]
Extracted ISTD ¹³ C ₄ PFOA	%		Org-029	101	[NT]	[NT]	[NT]	[NT]	84	[NT]
Extracted ISTD ¹³ C ₂ 6:2FTS	%		Org-029	116	[NT]	[NT]	[NT]	[NT]	104	[NT]
Extracted ISTD ¹³ C ₂ 8:2FTS	%		Org-029	172	[NT]	[NT]	[NT]	[NT]	132	[NT]

QUALITY CONTROL: Cations in water Dissolved						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date digested	-			28/03/2024	[NT]	[NT]	[NT]	[NT]	28/03/2024	[NT]
Date analysed	-			28/03/2024	[NT]	[NT]	[NT]	[NT]	28/03/2024	[NT]
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	104	[NT]
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	[NT]	[NT]	107	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).