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Remediation Action Plan

Proposed Multi Purpose Centre
All Saints College Maitland, Crn Hunter and Odd Streets, Horseshoe Bend

Prepared for
SHAC

Project 81916.07
November 2022

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	81916.07	Document No.	R.001.Rev1
Document title	Remediation Action Plan Proposed Multi Purpose Centre		
Site address	All Saints College Maitland, Crn Hunter and Odd Streets, Horseshoe Bend		
Report prepared for	Schreiber Hamilton Architecture Pty Ltd (SHAC)		
File name	81916.07.R.001.Rev1. RAP.docx		

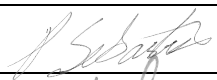
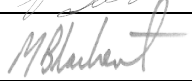
Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Paulo Sebastian	Matthew Blackert	27 October 2022
Revision 1	Paulo Sebastian	Matthew Blackert	21 November 2022

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Chris Vlatko, Schreiber Hamilton Architecture Pty Ltd (SHAC)
Revision 1	1	0	Chris Vlatko, Schreiber Hamilton Architecture Pty Ltd (SHAC)

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		21 November 2022
Reviewer		21 November 2022

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Remediation Action Plan
Proposed Multi Purpose Centre
All Saints College Maitland, Crn Hunter and Odd Streets, Horseshoe Bend

1. Introduction

Douglas Partners Pty Ltd (DP) has prepared this remediation action plan (RAP) for a proposed multi purpose centre at the All Saints College Maitland, Crn Hunter and Odd Streets, Horseshoe Bend. The investigation was commissioned by Chris Vlatko of Schreiber Hamilton Architecture Pty Ltd (SHAC) and was undertaken in accordance with DP's proposal 81916.07.P.001.Rev0 dated 12 May 2022.

It is understood that the RAP is required for the submission of a proposed rezoning application for the proposed development area, which is required prior to development approval. It is also noted that the remediation area subject to this RAP has been restricted to the proposed development footprint as instructed by SHAC.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013);
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020); and
- CRC CARE *Remediation Action Plan: Development - Guideline on Establishing Remediation Objectives* (CRC CARE, 2019a).

The remediation objectives, devised in accordance with CRC (2019a), are to:

- Address potentially unacceptable risks to relevant environmental values from contamination; and
- Render the site suitable, from a contamination perspective, for the proposed development.

This RAP provides details of the work that will be required at the site to meet the remediation objectives.

The proposed development involves the construction of a new multi purpose centre, demolition and refurbishment works to the existing St Pauls Parish Hall, landscaping and a forecourt area. A copy of the development application plans (drafted and provided by SHAC) for the proposed development are included in Appendix A.

Based on our understanding of the site location and proposed development, the site remediation works are considered to be Category 1 Remediation in accordance with NSW DUAP/EPA *Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land* (NSW DUAP/EPA, 1998). due to the site being within a heritage conservation area. Category 1 remediation requires development consent through the regulatory authority (Council). Council requirements should be confirmed prior to development application submission.

It should be noted that this RAP does not form a detailed specification for the proposed site remediation works, but rather represents a planning document which outlines the means by which site remediation can be achieved.

The site layout is shown on Drawing 1, Appendix A. This report must be read in conjunction with all appendices including the notes provided in Appendix A.

2. Proposed Development

The proposed development involves the construction and refurbishment of the following:

- Construction of a multipurpose centre in the eastern portion of the site which will comprise an enclosed basketball court, ground floor classrooms, storerooms and amenities and lower ground storerooms and amenities;
- The demolition of a lean to extension to St Pauls Parish Hall on the northern side of the original footprint, and associated upgrade works. A new forecourt to the north of St Pauls Parish Hall;
- Removal of the existing gravel driveway, decommissioned former memorial garden and several trees;
- A new forecourt area in the south western portion of the development area; and
- Surrounding landscaping.

It is noted that the remediation area has been restricted to the proposed development footprint as instructed by SHAC.

It is understood that only minor earthworks will be required for the construction of foundations and concrete slab, however bulk excavations earthworks are not proposed. A copy of the development application plans (drafted and provided by SHAC) for the proposed development are included in Appendix A.

It is understood that the proposed development will tie into the existing asphalt basket ball area to the south however the existing basket ball court and adjacent grassed areas to the east and south east are not within the development footprint and as instructed are not encompassed in this RAP. The approximate area proposed for development and the area subject to this RAP is shown below in Figure 1, Section 4.

3. Scope of Work

The scope of works to achieve the objective is as follows:

- Summarise the findings of previous investigations used to inform the status of contamination and contamination risk at the site;
- Present a conceptual site model (CSM) to list potential and likely contamination source, pathway and receptor linkages to address potentially unacceptable risks to relevant human health and ecological values from contamination;

- Undertake additional investigation across the site to determine the extent of remediation required;
- Define the anticipated extent of remediation which may be reduced pending the outcome of the additional investigation;
- Assess, select and justify a preferred approach to management and/or remediation to render the site suitable for its proposed use, and which will minimise potentially unacceptable risk to human health and/or ecological receptors;
- Select an appropriate remediation strategy to render the site suitable, from a contamination perspective, for the proposed development;
- Establish the remediation acceptance criteria (RAC) to be adopted for validation of remediation;
- Identify how successful implementation of the RAP will be demonstrated / validated;
- Outline waste classification, handling and tracking requirements;
- Outline environmental safeguards required to complete the remediation works;
- Include contingency plans and an unexpected finds protocol; and
- Identify the need for, and nature of, any long-term management and/or monitoring following the completion of on site management (if undertaken).

4. Site Description

Table 1: Site Identification

Item	Details
Allotment Identification	Part Lot 1 DP1261532, Part Lot 2 DP91268, Lot 1 DP669283 and Lot 1 DP69160
Street Address	Odd Street and Hunter Street
Locality	Horseshoe Bend, NSW
Site Area	3900 m^2 approx.
Zoning	General Residential (R1), Private Recreation (RE2) and Mixed Use (B4) (Maitland LEP 2011)
Local Government Area	Maitland City Council
Current Land Use	Secondary School playground
Current Owner	Catholic Diocese of Maitland Newcastle

Figure 1: Current site layout and approximate site boundary in red (MetroMap 9/10/2021).

The site is currently occupied by a gravel hardstand driveway and carpark, along with a building structure (St Paul's hall) in the north western portion and surrounding grassed areas and gardens along the southern and eastern boundaries and a grassed area in the far north western corner. The site layout is shown on Drawing 1, Appendix A and Figure 1 above.

5. Environmental Setting

5.1 Geology

Reference to the 1:100,000 Newcastle Coalfields Geology geodatabase indicates that the site is underlain by Quaternary alluvium which generally comprises gravel, sand, silt and clay.

5.2 Hydrogeology

The regional groundwater flow regime is believed to be towards the Hunter River which is located approximately 230 m north of the site.

An on-line records search of groundwater wells registered with the Water NSW indicated the following:

- The nearest registered groundwater well (GW200466) is located approximately 175 m south-south-west of the site (upgradient). GW200466 is a 16 m deep bore with a standing water level recorded at 6.9 m depth and a water bearing zone of 6.9 m to 16 m depth. Subsurface conditions comprised silt to 6.8 m underlain by sand to 11 m underlain by coarse gravel to termination;
- Groundwater well (GW201105) is located approximately 280 m east-south-east of the site at the Maitland Sportsground (likely cross-gradient). The bore is authorised for recreational purposes and was drilled in 1979 to a depth of 7 m. No further information was available for the bore;
- Groundwater bores GW064462 and GW064463 are the closest downgradient/cross-gradient bores, located approximately 465 m east-north-east of the site and authorised as a test bore and intended as a monitoring bore. Subsurface conditions in the well were summarised in GW064463 as 'topsoil' to 4.5 m underlain by sand to 8.5 m and gravel to 11.2 m. No water bearing information was noted.

5.3 Acid Sulfate Soils

Reference to the Acid Sulfate Soil Risk Map for Maitland, prepared by the Department of Land and Water Conservation (DLWC) indicates the site is mapped as having a high probability of acid sulfate soils (ASS) at depths greater than 3 m below the ground surface. The south-western corner of the site (corner of Hunter Street and Odd Street) is mapped as having no known occurrence of acid sulfate soils.

6. Previous Reports and Site History

6.1 Preliminary Site Investigation

DP conducted a Preliminary Site Investigation (PSI) for contamination (DP, 2016) in May 2016 on the footprint of the former proposed development area which included the basketball courts to the south and playing fields to the east and north east of the current site area (ie. area of previous investigation included areas outside the current proposed development footprint and site boundary for this RAP).

The results of the site history review and site observations conducted as part of the previous assessment indicated the following potential contaminant sources:

- Presence of fill materials (source unknown) within the site. The fill materials may contain petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), pesticides (OCP/OPP) heavy metals and asbestos subject to the source;
- Demolition of structures on the site. Demolished structures may be a source of hazardous building materials including lead paint and asbestos;
- Possible vehicle storage and service / maintenance on the site, which could be a source of hydrocarbon and heavy metal contamination;
- Possible hardware / homewares business on or adjacent to the site, which may be a source of hydrocarbon, heavy metal and pesticide contamination;

- Presence of a bowling green north west of the site. Chemical use and storage may have been associated with the maintenance of the bowling green, including pesticide, herbicide and hydrocarbon use and storage.

The results of the previous investigation also indicated the absence of acid sulphate soil conditions to the depths investigated (i.e. maximum depth of 2.5 m), which is consistent with the ASS risk map for the site.

Preliminary subsurface investigation and chemical laboratory testing conducted to target the above potential contaminant sources indicated the presence of some contamination in fill at selected borehole locations and at various depths, noted to be in exceedance of the adopted health-based and ecological investigation levels for the proposed school land uses. The source of contamination was generally associated with imported fill at the site.

Specific comments regarding the then proposed development and options for remediation were presented in the previous DP report (DP, 2016) for the site. In summary, it was reported that the site could be made suitable for the proposed high school playground land use, subject to remediation and/or management of the identified contamination. Options for the remediation/management of the identified contamination included off-site disposal of impacted soils, or on-site management of impacted soils given the minor propensity of the soils to leach and the absence of shallow groundwater within the depth of the investigation. On-site management would be via capping beneath building slabs and pavements and an appropriate soil cap in landscape areas.

6.2 Detailed Site Investigation

DP conducted a detailed site investigation (DSI) for contamination on the footprint of the former proposed development area which included the basketball courts to the south and playing fields to the east and north east of the current site area (DP, 2018) (ie. area of previous investigations included areas outside the current proposed development footprint and site boundary for this RAP). The assessment comprised the drilling of additional boreholes, collection of soil samples for testing and identification purposes, analysis of selected soil samples for total and leachable concentrations of contaminants.

The results of subsurface investigation and chemical analysis indicated the presence of PAH contamination in fill within the site ((Bore 10) current proposed development area) exceeding the adopted site assessment criteria (SAC) for recreational land use (including secondary schools).

A fill platform is located adjacent to the southern boundary of the current site (i.e. current basketball court area). Elevated PAH concentrations were encountered at several locations within this fill platform exceeding the adopted health investigation levels for recreational sites, including high schools. Similar materials and criteria exceedances were encountered in fill materials within the south-eastern and eastern portion of the site (i.e. proposed playing field area). Elevated metals (lead and zinc) were also observed above ecological criteria within the grass field to the east and the basketball court to the south.

6.3 Asbestos Testing

In June 2020 asbestos testing was also conducted on placed fill directly to the north east of the site. The fill originated from stormwater infrastructure excavations conducted on the subject site. The assessment was targeted to the area of obvious fill in the southern extent of the fill embankment (Figure 2). The results indicated that the four fragments analysed contained asbestos (email dated 17 June 2020).

Figure 2: Outlined area of initial previous ACM testing (yellow).

6.4 Additional Contamination Testing

Additional contamination testing was undertaken by DP in 2020 (DP, 2020). The results of the investigation indicated exceedances of recreational land use (including high schools – HIL C. A summary of the testing from the previous investigations which exceeded the HIL C criteria are listed below:

- Within site area:
  - o B(a)P TEQ – Sample 10/0.2 and Sample 516/0.5.

- Adjacent to site area:
    - B(a)P TEQ – Samples 1/0.5, 3/1.0, 4/2.5, 13/0.5, 109/0.65, 111/0-0.1;
    - Lead - Sample 505/0.5;
    - B(a)P TEQ – Samples 505/1.5, 508/0.4, 509/0.5, 515/1.5.

Potential contaminant concentrations in all soil samples tested contained hydrocarbon concentrations within the health screening levels recreational land use (HSL-C), TRH management limits, direct contact HSLs and intrusive maintenance worker guidelines.

The previous investigations noted EIL and ESL exceedances for the following:

- Within site area:
    - TRH – Samples 10/0.2,
    - B(a)P – Samples 10/0.2, 501/0.3, 502/0.5, 503/0.1, , 506/0.5, 516/0.5.
- Adjacent to site area:
    - Copper and Zinc – Sample 1/0.5;
    - TRH – Samples 1/0.5, 3/1, 109/0.65, 111/0-0.1, 505/0.5, 505/1.5;
    - B(a)P – Samples 1/0.5, 3/1.0, 4/2.5, 13/0.5, 108/1/1, 09/0.65, 111/0-0.1, 114/0.2, 501/0.3, 505/1.5, 508/0.4, 509/0.5, 510/0.1, 513/0.5, 515/1.5; and
    - Zinc - Sample 513/0.5.

Based on the results of total concentrations and TCLP leachability testing results from the previous testing, all samples tested were classified as 'General Solid Waste' for disposal to an appropriately licensed landfill with the exception of Bore 505 at 1.5 m due to elevated total PAHs.

The GSW exceedances in Bore 505 at 1.5 m (outside the site area) is likely to be attributed to ash and coal observed in the fill. A final classification of 'General Solid Waste (non-putrescible)' has been provided, considering the classification of ash and coal materials based on leachable (TCLP) concentrations alone as per the NSW EPA "General Approval for the Immobilisation of Contaminants in Waste 1999/05 – Ash, ash contaminated natural excavated materials or coal contaminated natural excavated materials (NSW EPA, 1999).

Water leach testing was conducted on selected samples with elevated PAH and heavy metal results. The water leach test involves tumbling the soil sample in distilled water for 18 hours and testing the resulting leachate. The results of the water leach test are used to assess the potential for contaminants to leach from soils if retained on site. The results of water leach testing were compared to the ANZECC 2000 trigger values for slightly to moderately disturbed systems (ANZECC, 2000)). This is considered to be a conservative assessment of leachability given that the adopted criteria are for protection of aquatic ecosystems.

The results of the PAH and heavy metal water leach testing (within the current site and adjacent area (ie. basketball and playing field)) indicated the following:

- Exceedance of lead criteria for samples from Bore 505/0.5;
- Results for PAH and benzo(a)pyrene below detection limits for Bores 109/0.65, 505/0.5, 505/1.5, 508/0.4, 509/0.5, 515/1.5, 516/0.5.

The above results of water leach testing generally indicate a minor propensity for lead to leach at Bore 505/0.5. As discussed above, the ASLP test is likely to overestimate the leachability characteristics of the sample tested. The results of leachability testing and proposed land use are discussed further below. It is also noted that the depth of groundwater in the vicinity of Bore 505/0.5 was encountered at 7.7 m during geotechnical testing DP, 2020) which is well below the depth of the identified lead impact.

The results of the site history review and site observations conducted as part of the previous assessments indicated potential contaminant sources including fill materials of unknown origin within the site and directly adjacent areas to comprise demolition of former structures, possible vehicle storage and service/maintenance, hardware business and possible chemical use/storage associated with the bowling club and green.

Subsurface investigation and chemical laboratory testing conducted to target the above potential contaminant sources identified the presence of some contamination in fill at selected borehole locations and depths.

Due to the extensive fill across the site and elevated contamination concentration, remediation across the site area will be required.

The conclusion of the previous investigations indicated the results of site history assessment, site observations, subsurface investigation and laboratory testing, the site could be made suitable for the proposed development within the high school playground area, subject to remediation and/or management of the identified contamination.

Off-site disposal or on-site management of impacted fil (or a combination of both) could be considered. Options for the remediation/management of the identified contamination include the following:

Off-site Disposal of Impacted Soils

Off-site disposal of impacted soils could be considered for remediation of the identified contamination. Variable fill and contamination is present across the site and the presence of further contamination between sampling and testing points cannot be discounted. On this basis, excavation and off-site disposal of contamination may not be practical or feasible due to the potential presence and extent of contamination within the site.

On-site Management of Impacted Soils

On-site management of the identified contamination could be considered for the site, based on the following:

- The minor propensity for leaching of the identified PAH and lead contamination;
- The presence of underlying low permeability clayey soils; and
- The absence of shallow free groundwater within majority of the depths investigated (groundwater greater than 2.9 m) and free ground water greater than 6 m within the existing basketball courts.

On-site management of identified contaminated soil would require capping in situ, or within a purpose-built containment cell on site. Site capping options include capping beneath building slabs or pavements, and/or beneath a 'clean' soil cap (generally at least 0.3 m thick within landscaped areas). On-site management of contaminated soils would also require the implementation of a legally enforceable long-term Environmental Management Plan (EMP) and would also attract a notification on the property title. On-site management of contamination would also require regulatory approval.

A combination of localised off-site disposal and on-site management could also be considered for the site.

It is noted that although asbestos containing materials were not observed at the current test locations investigated for the assessment within the site, previous asbestos testing indicated the presence of asbestos containing material (ACM) fragments within the recently placed fill pad to the north east of the subject site, which was sourced from stormwater excavations conducted directly adjacent to the subject site. There is also a risk that further ACM are present due to the former site activities (i.e. demolition of former site structures), historical filling and possible association with anthropogenic materials within fill. The presence of ACM within filling at the subject site therefore cannot be precluded.

A plan showing the previous test locations, previous borehole logs and lab tables summarising the results of previous testing have been provided in Appendices B to D.

In summary the following exceedances from the previous investigations within the footprint of the proposed development are as follows:

- Two BaP TEQ exceedances above HSL (Bore 10 and Bore 516), one associated with ash in the fill materials;
- Six BaP ESL exceedances across the site, with a maximum concentration of 7.3 mg/kg;
- One exceedance of TRH in Bore 10 adjacent to the southern boundary.

In regard to the above exceedances the following is also noted:

- The NEPM ESL of 0.7 mg/kg is understood to be based on a single invertebrate species referenced in the 1999 Canadian Soil Quality Guidelines (since updated) and is considered conservative in the Australian context. These guidelines were updated in 2010 and now suggest a B(a)P concentration of 20 mg/kg for the protection of environmental health based on the soil contact exposure pathway. It is also noted that the benzo(a)pyrene ESL is a low reliability value. Higher reliability screening levels have been published in CRC CARE (2017), Risk-based Management and Remediation Guidance for Benzo(a)pyrene, CRCCARE Technical Report no. 39. The high reliability value of 33 mg/kg for aged contamination recommended in CRC CARE (2017) could be adopted and would therefore omit the previous ESL benzo(a) pyrene;
- Additional testing on the fill materials within the site could be undertaken to obtain a larger sample size in order to use statistics and possibly eliminate the BaP TEQ HSL exceedance observed in Bore 516, it is noted that the BaP in Bore 10 is considered a hotspot and will require remediation;
- Additional PAH source analysis may indicate the nature of the PAH exceedances. If the PAH source indicated asphalt materials the relative human health risk is low and could be discounted;
- The PAHs that have been observed along the southern boundary and most likely associated with the fill asphalt sealed basketball court may require some localised remediation.

With the above considered, the area of remediation may be considerably reduced pending favourable results from the additional testing. Recommendations for additional testing are outline in Section 8 below.

7. Conceptual Site Model

The data collected during previous investigations generally confirmed that for certain potential contaminant sources outlined in the preliminary CSM in (DP, 2020) potentially complete pathways to the identified receptors exist, whereas for others, they do not. No other sources of contamination have been identified as a result of the testing results to date. The source (and associated contaminants of potential concern (CoPC)), pathway and receptor linkages are summarised in Table 2.

Potential Sources

Based on the previous investigations, the following potential sources of contamination and associated CoPC have been identified.

- S1: Imported fill - Remediation/management required in areas where site users and ecological receptors are potentially exposed to fill;
  - CoPC: PAH, heavy metals, TRH, BTEX, asbestos (i.e. as bonded asbestos containing material (ACM), pesticides, PCB.
- S2: Demolition of former structures - Controls should be in place in the event that ACM are disturbed during construction.
  - CoPC: heavy metals, possible asbestos (i.e. as bonded asbestos containing material (ACM)).
- S3: Storage of vehicles and vehicle servicing - Testing of soil within the site indicates that contaminants associated with this former land use does not appear to have significantly impacted the site.
  - CoPC: PAH, TRH, BTEX, heavy metals.
- S4: Chemical and fuel storage - Testing of soil within the site indicates that contaminants associated with this former land use does not appear to have significantly impacted the site.
  - CoPC: PAH, TRH, BTEX, heavy metals, pesticides and herbicides.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users [high school].
- R2: Construction and maintenance workers.
- R3: End users [high school].
- R4: Adjacent site users [early learning/ high school site users].

The following potential environmental receptors have been identified:

- R5: Surface water [Hunter River].

- R6: Groundwater.
- R7: Terrestrial ecosystems.

Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact.
- P2: Inhalation of dust and/or vapours.
- P3: Surface water run-off.
- P4: Leaching of contaminants and vertical migration into groundwater.
- P5: Lateral migration of groundwater providing base flow to water bodies.
- P6: Inhalation, ingestion and absorption.

A summary of the potentially complete exposure pathways for the proposed land use based on the results of previous investigations is shown in the table below.

Table 2: Summary of Potentially Complete Exposure Pathways (Proposed Land Use)

Source and CoPC	Transport Pathway	Receptor	Action
Remediation Area • Imported fill; o CoC: PAH, TRH and heavy metals, o COPC asbestos (i.e. as bonded asbestos containing material (ACM)).	P1: Ingestion and dermal contact. P2: Inhalation of dust and/or vapours.	R1: Current site users. R2: Construction and maintenance workers. R3: End users.	Remediation/management required in areas where site users are potentially exposed to contaminated fill
	P3: Surface water run-off. P5: Lateral migration of groundwater providing base flow to water bodies.	R5: Surface water.	
	P4: Leaching of contaminants and vertical migration into groundwater.	R6: Groundwater.	
	P6: Inhalation, ingestion and absorption.	R7: Terrestrial ecosystems.	

It is noted that asbestos was not encountered within the tests undertaken within the proposed development area, however due to the nature of the impacted fill comprising building materials and the vicinity of the site to the surrounding areas where ACM has been observed, there is a risk of ACM impact within the fill on the subject site which if encountered during remediation / construction of the development would require further investigation and management under an unexpected finds protocol.

8. Additional Investigation

Additional investigation is recommended to further assess the development footprint in order to assess data gaps in the previous investigation, potentially reduce the area requiring remediation and confirm the most appropriate remediation option/s. The additional investigation should include:

- Inspection of surface materials following removal of a portion of the existing hall/temporary removal of floorboards within the hall to remain and pavements proposed for demolition to assess soil conditions any additional contamination impacts which require remediation;
- Test locations to delineate the hotspot areas along the southern boundary of the proposed development area;
- Test locations within the north eastern portion of the site to enable screening of possible asbestos impacted soils;
- Test locations within the driveway to confirm PAH source, extent of PAH impact and requirements for remediation;
- Laboratory testing of hydrocarbons, metals and asbestos from selected soil samples to assess the suitability of the materials to remain on site and to confirm waste classification (if off-site disposal is required); and
- The sampling density within the areas of additional investigation is to be confirmed by the environmental consultant.

9. Remediation Extent

The extent of remediation currently comprises the proposed development footprint shown in Figure 1 and Drawing 1, Appendix A. This however may be reduced pending the outcome of additional investigation across the development footprint as indicated above. The additional investigation may reduce the remediation extent to the known hotspot areas adjacent to the southern boundary and the building footprint pending the outcome of the additional investigation

10. Remediation Options Assessment

The objective of the remediation options assessment and evaluation is to establish a preferred remediation strategy. The process involves canvassing various remedial options which may be viable and then ranking each option based on a number of evaluation criteria. The remediation options assessment was undertaken with reference to CRC CARE *Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment* (CRC CARE, 2019b).

The remediation options assessment is included in Appendix E.

11. Preferred Remediation Strategy

11.1 Rationale

The rationale for the selection of the preferred remediation strategy is outlined in Appendix E. The preferred remediation strategy is for capping and containing the PAH and minor long-chain TRH (F3) impacted soils beneath the proposed building slabs and appropriate soil capping or pavement within landscaped areas.

It is noted that the landscaped areas requiring remediation could be capped and managed on site via stripping/excavation of impacted fill and placement and compaction within the proposed building footprint to reduce the total capped area and therefore the area of the site subject to ongoing management requirements in accordance with a site management plan (SMP) and Section 10.7 planning certificate notification. Where this option is considered the impacted fill materials requiring capping should be maintained above the groundwater table as a precaution.

Where remediation via stripping/excavation of impacted fill is undertaken validation of the stripped surface will be required to confirm appropriate remediation has been achieved.

11.2 Sequence of Remediation

The following staged remediation methodology is recommended to achieve the remediation goals:

Stage 1: Additional Investigation / Data Gap Analysis

- Further subsurface investigation and testing of fill materials within the site as described in Section 8;
- Analysis of the results to determine and define the extent of remediation required and the most practical remediation approach.

Stage 2: Initial Preparation and Site Meeting

- Client/Contractor to obtain all necessary approvals and notifications to allow commencement of the works, including Council approvals. The contractor should hold the relevant licences/approvals;
- Site inception meeting between environmental consultant, the remediation contractor, and the site owner to discuss remediation methodologies and responsibilities, prior to commencement activities.

Stage 3: Stripping of Landscaped Areas / Validation – (where or if required)

- Excavation and ‘chasing out’ of the fill materials within the proposed landscaped areas requiring remediation by the contractor based on visual observations by the environmental consultant (periodic inspection);
- Validation of excavated areas (environmental consultant);
- Stockpiling of excavated fill for off-site disposal or placement within the proposed building footprint for capping.

Stage 4: Validation – Imported Fill Materials (if required)

- Inspection and analysis by the environmental consultant of fill materials proposed to be imported to site to re-instate or raise site levels in order to confirm concentration are within RAC and are classified as VENM/ENM or an appropriate resource recover order as required (i.e. where a certificate from the supplier is not available).

Stage 4: On-site Management of Impacted Fill

- Contractor to conduct ground works (i.e. installation of service, footings etc.) and construct concrete slab/pavements (i.e. capping layer for PAH impacted soil).

11.3 On-site Management of Impacted Fill

11.3.1 Methodology

The following general procedures are recommended for the on-site management of minor TRH and PAH impacted fill across the site based on the existing test results:

- Trim/excavate the surface and/or place excavated fill materials within the proposed capping footprint of the proposed building footprint in order to be able to achieve the final design surface level and maximise use of excess site soils (i.e. contaminated soils) beneath concrete slabs/pavements. Due regard should be made to the geotechnical properties of the soils for placement within load bearing areas;
- If stripping/excavation of contaminated fill materials within landscaped areas is conducted to reduce the onsite management footprint, validation of the stripped surface will be required as follows:
  - As a minimum, validation samples will be collected at a frequency of generally 10 m by 10 m (i.e. systematic grid based sampling) on trimmed / excavated areas;
  - Analysis will be conducted by a NATA registered laboratory on samples collected to validate the removal of materials containing TRH and PAH, and possible ACM and heavy metal contamination (refer to Section 12.4).
- Coordinate excavations for service trenches (or other underground installations) so that excess trench spoil (potentially contaminated soils) can be utilised beneath capping if suitable;
- Prior to capping, the site surface should be surveyed by a registered surveyor to confirm that appropriate levels have been achieved (i.e. to allow design finished levels for concrete slabs and pavements). Construction of building pad and pavements should only commence once appropriate levels have been achieved;
- Following survey confirmation of site levels, place a geofabric marker/separation layer (Bidim A34 or similar) over the placed materials across the site. Plastic sheeting could be utilised immediately beneath concrete floor slabs or concrete pavements in lieu of the geofabric;
- The footprint of the contaminated soils / capping area should also be surveyed;
- Where required, import and place approved fill material (VENM/ENM or suitable RRE materials) to achieve the final design finish levels prior to construction of concrete slabs/pavements. All imported fill materials utilised during construction should be confirmed by a suitably qualified environmental consultant prior to importation and use on site;

- Excess contaminated soils excavated from within the site that cannot be accommodated beneath capping should be disposed to a licensed landfill facility following waste classification;
- Upon the completion of capping, a suitably qualified environmental consultant should prepare a Remediation and Validation report that will be finalised following the completion of pavement (capping) construction. At the completion of construction a long term Environmental Management Plan (EMP) will be prepared by the qualified environmental consultant for Council review and approval, in order for Council to update the Section 10.7 certificate for the site. An important part of the ongoing management of the site will be the inspection and maintenance of landscape areas (where capping of these areas is undertaken) and capping pavements.

Due regard should be given to the geotechnical requirements for site development so that site works are compatible with remediation requirements.

It is noted that the above procedure is not prescriptive and the contractor should confirm the construction process that will achieve the objectives of remediation in a practical and economical manner, with due regard to WHS. This procedure should be presented in the contractors CEMP for the work.

11.3.2 Contingency Plan

If contaminated soil quantities are such that they cannot be accommodated beneath the proposed concrete pavement, the excess materials will require off-site disposal to a licensed landfill (refer to Section 13).

If indications of further soil contamination are observed on-site during remediation works (i.e. staining / odour, evidence of potential ACM), the materials should be appropriately investigated by a suitably qualified environmental consultant and either managed on site (if appropriate) or disposed off-site to a licenced landfill following classification.

The CEMP should provide further details regarding contingency procedures, including incident management and unexpected finds protocol.

The general sequence of remediation shall be determined by the Contractor and should consider the following recommended sequence:

12. Assessment Criteria

12.1 Remediation Acceptance Criteria

In the absence of derivation of Tier 2 site specific target levels (SSTL), the remediation acceptance criteria (RAC) for contaminants in soil are the same as the Tier 1 site assessment criteria (SAC) in Appendix F for protective of human health and ecology. The following table provides a summary of the qualitative and concentration-based RAC.

Table 3: Remediation Acceptance Criteria

Item	Remediation Acceptance Criteria
Remediation Area Cap and Contain (building footprint) And Strip / dispose and validate (landscaped areas)	The RAC is for the impacted fill to be capped with a concrete slab/pavement over the high visibility (orange) geotextile marker layer. If areas of the proposed development are proposed to be stripped and validated (ie. landscaped areas), the criteria for validation is the generic NEPC (2013) open space and recreational land use criteria which is appropriate for secondary (high) schools. As outlined in the SAC / RAC, Appendix F. Where validation of soils beneath buildings (ie Parish Hall or new Multi-Purpose Centre) is required the health screening level for petroleum hydrocarbons for residential land use (HSLA/B for soil vapours) is applicable for secondary schools as per NEPC (2013).

12.2 Site Assessment Criteria

Additional area(s) of contamination encountered beyond those outlined in Section 9 or identified during additional investigation, during the course of the remediation and site redevelopment will be subject to the contingency plan or unexpected find protocol (Appendix I) and assessed using the SAC in Appendix F. The broader list of contaminants and their SAC are included in Appendix F.

The SAC / RAC should also be used as part of the assessment framework for imported soils (i.e. contaminant concentrations in imported soils must, as a minimum, comply with the SAC / RAC).

The adopted investigation and screening levels comprise levels for a generic open space and recreational land use scenario which is commensurate with secondary (high) schools, except where buildings are proposed and the health screening level for petroleum hydrocarbons for residential land use (HSLA/B for soil vapours) is applicable. The derivation of the SAC is included in Appendix F and the adopted SAC are listed on the summary analytical results tables in Appendix C.

13. Validation Plan

13.1 Data Quality Objectives

The data quality objectives (DQO) for the validation plan are included in Appendix G.

13.2 Validation Assessment Requirements

The following site validation work will be required:

- Field assessment by the Environmental Consultant comprising:
  - Visual inspection, including taking photographs for record purposes;

  - Collecting validation samples from excavations resulting from the removal of contaminated soils;
  - Collecting validation / characterisation samples for materials to be re-used on site.
- Surveying by the Surveyor comprising:
  - Survey of the extent and levels of the base of the excavations;
  - Survey of the extent and levels of the top of the marker layer; and
  - Survey of the extent and levels of the top of the capping layer / concrete slab.
- Laboratory analysis of validation samples at a NATA accredited laboratory for:
  - The CoPC relevant to the remediation area; and
  - Quality control (QC) samples in accordance with Section 16;
- Comparison by the Environmental Consultant of the laboratory results with the SAC and/or RAC as appropriate (refer to Section 12); and
- Preparation by the Environmental Consultant of a validation report detailing the methods and results of the remediation works and validation assessment.

13.3 Visual Inspections

All areas to be assessed and validated will first be subject to a visual inspection by the Environmental Consultant. Any areas of fill or staining (as appropriate for the remediation) must be removed prior to validation sampling.

13.4 Validation Sampling

The sampling frequency will depend on the volume or area to be assessed and the previous results. The following approximate sampling frequencies will be adopted but may be modified by the Environmental Consultant to take into account previous results, where applicable.

Small to medium excavations (base <500 m^2):

- Base of excavation: one sample per 25 m^2 to 50 m^2 or part thereof, with a minimum of three samples collected; and
- Sides of excavation: one sample per 10 m to 20 m length or part thereof with a minimum of one sample per wall. Additional samples will be collected at depths of concern where there is more than one depth of concern, with a minimum of one sample per 1.5 m depth in fill.

Large excavations (base ≥500 m^2):

- Base of excavation: sampling on a grid at a density in accordance with Table A in NSW EPA (1995) or a minimum of 10 samples. In sub-areas with any specific signs of concern, a higher sampling density may be required; and

- Sides of excavation: one sample per 20 m length or part thereof with a minimum of one sample per wall. Additional samples will be collected at depths of concern where there is more than one depth of concern, with a minimum of one sample per 1.5 m depth in filling.

Where contaminated soils are stored or treated on bare soils, the footprint of the stockpile will require validation following removal of the contaminated soils.

Validation samples will be analysed by a NATA accredited laboratory for the relevant CoPC relevant to the remediation area.

Validation sample test results will be compared to the RAC, as per the DQO (Appendix G). Where the RAC are considered to have not been met, the remediation excavation(s) will be expanded to 'chase-out' impacted material, as instructed by the Environmental Consultant, with the validation sampling then continuing into the extended excavation. This process will continue until the impacted material has been fully chased out.

14. Waste Disposal

Any waste disposed off-site must be initially classified by the Environmental Consultant in accordance with:

- NSW EPA *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA, 2014a);
- NSW EPA *Waste Classification Guidelines, Part 2: Immobilisation of Waste* (NSW EPA, 2014b);
- NSW EPA *Waste Classification Guidelines, Part 4: Acid Sulfate Soils* (NSW EPA, 2014c); and
- NSW EPA *Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste* (NSW EPA, 2016) [addendum for per- and poly-fluoroalkyl substances (PFAS)].

Disposal of waste must be to an appropriately licensed waste facility, as per *Protection of the Environment Operations Act 1997* NSW (POEO Act) and the *Protection of the Environment (Waste) Regulation 2014* NSW.

Samples will be collected from stockpiles / in situ fill at various depths to characterise the full depth of the material. The frequency is to be determined by the Environmental Consultant based on the risk of contamination and heterogeneity of the material.

The suggested sampling frequency for the initial assessment of stockpiles comprising similar materials shall be one sample per 25 m^3 for stockpiles up to 200 m^3, with a minimum of three per stockpile.

It may be possible to classify excavated soil / fill for reuse on another site under a relevant NSW EPA resource recovery order (RRO) so that it can be used on other sites under the requirements of the corresponding NSW EPA resource recovery exemption (RRE). For this option, the frequency of sampling should be in accordance with the relevant RRO and the contaminants to be analysed will be determined by the Environmental Consultant. The Environmental Consultant will provide a report confirming the suitability of the spoil for reuse under a RRO, or otherwise.

All waste must be tracked by the Remediation Contractor from 'cradle to grave'. Copies of all consignment notes / disposal dockets (or similar) and Environment Protection Licences for receipt and disposal of the materials must be maintained by the Remediation Contractor as part of the site log and must be provided to the Environmental Consultant for inclusion in the validation report.

15. Imported Material

Any soil, aggregate etc imported for the remediation works must have contaminant concentrations that meet the relevant criteria outlined in Section 11 and have no aesthetic issues of concern. Imported materials will only be accepted for use at the site if:

- It can legally be accepted onto the site (e.g. classified as virgin excavated natural material (VENM), accompanied by an appropriate report / certificate prepared by a qualified environmental consultant);
- Visual inspection of the imported soil confirms that the soil has no signs of concern and is consistent with those described in the supporting classification documentation; and
- The materials are validated (by inspection / sampling) by the Environmental Consultant as being suitable for use at the site.

The classification report / certificate for all material proposed for import must be reviewed and approved in writing by the Environmental Consultant prior to import. Materials to be imported may need to meet geotechnical requirements which are to be assessed by others, as required.

If permitted by the development consent and approved by the site owner, Remediation Contractor and Environmental Consultant, material classified under a NSW EPA RRO may also be accepted, provided the material can be used on site in accordance with the corresponding RRE. This could include excavated natural material (ENM), classified under NSW EPA *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014* (NSW EPA, 2014d).

The need for check-sampling of RRO material is to be determined by the Environmental Consultant depending on the source of the material, adequacy of the supporting documentation provided and inspection(s) of material. Quarried material / VENM may need little or no check sampling.

Any imported recycled aggregates must be sampled at a frequency of sampling of one sample per 25 m^3, with a minimum of three samples per load. The recycled aggregate will not be permitted to be used on site until the results of the inspection and laboratory analysis have been approved in writing by the Environmental Consultant.

16. Quality Assurance and Quality Control

Field quality assurance and quality control (QA/QC) testing will include the following:

- 10% sample intra-laboratory analysis, analysed for the same suite as primary sample; or
- 5% sample inter-laboratory analysis, analysed for the same suite as primary sample; and

- 5% sample intra-laboratory analysis, analysed for the same suite as primary sample.

The laboratory will undertake analysis in accordance with its NATA accreditation, including in-house QA/QC procedures.

The QC analytical results will be assessed using the following criteria:

- Sampling location rationale met the sampling objective;
- Standard operating procedures (SOP) are followed;
- Appropriate QA/QC samples are collected/prepared and analysed;
- Samples are stored under secure, temperature-controlled conditions;
- Chain of custody documentation is employed for the handling, transport and delivery of samples to the selected laboratory;
- Conformance with specified holding times;
- Accuracy of spiked samples within the laboratory's acceptable range (typically 70-130% for inorganic contaminants and greater for some organic contaminants);
- Field and laboratory duplicate and replicate samples will have a precision average of +/- 30% relative percentage difference (RPD); and
- Rinsate samples will show that the sampling equipment (if used) is free of introduced contaminants, i.e. the analytes show that the rinsate sample is within the normal range for deionised water.

17. Management and Responsibilities

17.1 Site Management Plan

A general site management plan for the operational phase of site remediation is included in Appendix H. The management plan includes soil, noise, dust, work health safety (WHS), remediation schedule, hours of operation and incident response. The Remediation Contractor is to implement the general site management plan for the duration of remedial works by incorporating the plan into their over-arching construction environmental management plan (CEMP).

17.2 Site Responsibilities

The site management plan (Appendix H) provides a summary of the general program management and associated responsibilities. Contact details for key utilities are also included in the event of needing to respond to any incidents.

17.3 Contingency Plan and Unexpected Finds Protocol

Plans for contingency situations (e.g. encountering asbestos in fill), along with an unexpected finds protocol for dealing with unexpected finds during remediation work / earthworks, are included in Appendix I.

18. Validation Reporting

18.1 Documentation

The following documents will need to be collated and reviewed by the Environmental Consultant as part of the validation assessment (including those items that are prepared by the Environmental Consultant):

- Any licences and approvals required for the remediation works;
- Waste classification report(s);
- Transportation Record: comprising a record of all truck-loads of soil (including aggregate) entering the site, including truck identification (e.g. registration number), date, time, source site, load characteristics (e.g. type of material, i.e. quarried aggregate, etc.), approximate volume, use (e.g., general site raising, service trenches, etc.);
- Disposal dockets: for any soil disposed off-site. The Remediation Contractor will supply records of: transportation records, spoil source, spoil disposal location, receipt provided by the receiving waste facility / site. Note: A record of the building materials disposed off-site is also be kept and provided to the Principal, on request;
- Imported materials records: records for any soil imported onto the site, including source site, classification reports, inspection records of soil upon receipt at site and transportation records;
- Records relating to any unexpected finds and contingency plans implemented;
- Laboratory certificates and chain-of-custody documentation;
- Inspections records from the Environmental Consultant;
- Photographic records by all contractors and consultants of the works undertaken within their purview of responsibilities;
- Surveys pre- and post-installation of geotextile marker layer and clean fill cap; and
- Interim / final visual and sampling clearances for any asbestos related works (in the event that asbestos works are undertaken).

18.2 Reporting

A validation assessment report will be prepared by the Environmental Consultant in accordance with NSW EPA (2020).

The validation report shall describe the remediation approach adopted, methodology, results and conclusion of the assessment and make a statement regarding the suitability of the site for the proposed development (high school).

An additional investigation report may also be required along with an update / revision of this RAP based on the findings of the additional investigation.

If capping of impacted materials is undertaken, upon the completion of remediation and validation works and construction, a SMP will be drafted for long-term management of capped materials on-site (ie measures to reduce the likelihood of future disturbance, and procedures for handling/disposal in the event that identified contaminated materials are disturbed). Again, due to the staged construction program proposed, interim SMP reports may be required for each stage.

The SMP will promote awareness of the contamination management and the requirement of avoiding disturbance to the capping.

19. Conclusions

It is considered that the site can be made suitable for the proposed development subject to implementation of this RAP.

20. References

ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.* Australia New Zealand Environment Conservation Council.

CRC CARE. (2019a). *Remediation Action Plan: Development - Guideline on Establishing Remediation Objectives.* National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2019b). *Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment.* National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

DP. (2016). *Preliminary Site Investigation (Contamination) and Preliminary Geotechnical Investigation, Proposed Early Learning Centre, Carrington Street, Horese Bend.* Doulglas Partners Pty Ltd: 81916.00.R001.Rev0.

DP. (2018). *Detailed Site Investigation, Proposed Early Learning Centre, Carrington Street, Horseshoe Bend.* Douglas Partners Pty Ltd: 81916.02.R001.Rev0.

DP. (2020). *Report on Additional Contamination Testing and Geotechnical Investigation, Propsoed Multipurpose Building, Odd Street,.* Horeshoe Bend: Douglas Partners Pty Ltd.

EPA Victoria. (2009). *Soil Sampling.* Publication IWRG702, June 2009: Environment Protection Authority Victoria, Melbourne, Australia.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW DUAP/EPA. (1998). *Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land .* NSW Department of Urban Affairs and Planning / Environment Protection Authority.

NSW EPA. (2014a). *Waste Classification Guidelines, Part 1: Classifying Waste.* NSW Environment Protection Authority.

NSW EPA. (2014b). *Waste Classification Guidelines, Part 2: Immobilisation of Waste.* NSW Environment Protection Authority.

NSW EPA. (2014c). *Waste Classification Guidelines, Part 4: Acid Sulfate Soils.* NSW Environment Protection Authority.

NSW EPA. (2014d). *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014.* NSW Environment Protection Authority.

NSW EPA. (2016). *Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste.* NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

21. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at in accordance with DP's proposal dated 12 May 2022 and acceptance received from SHAC dated 16 May 2022. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site 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 DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP 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 sampling and/or 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 DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the (geotechnical / environmental / groundwater) components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

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. DP 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.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Asbestos has not been detected by observation or by laboratory analysis, either on the surface of the site, or in fill materials at the test locations sampled and analysed. Building demolition materials, such as concrete, brick, tile [list as appropriate to the field work findings], were, however, located in previous below-ground fill and/or above-ground stockpiles [as appropriate], and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to parts of the site being inaccessible and not available for inspection/sampling [where appropriate], or to vegetation preventing visual inspection and reasonable access [where appropriate]. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

Douglas Partners Pty Ltd

Appendix A

About This Report
Drawings

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

DEVELOPMENT APPLICATION

All Saints College Multi-Purpose Centre

New Multi-Purpose Centre and St Paul's Parish Hall Restoration

REVISION I

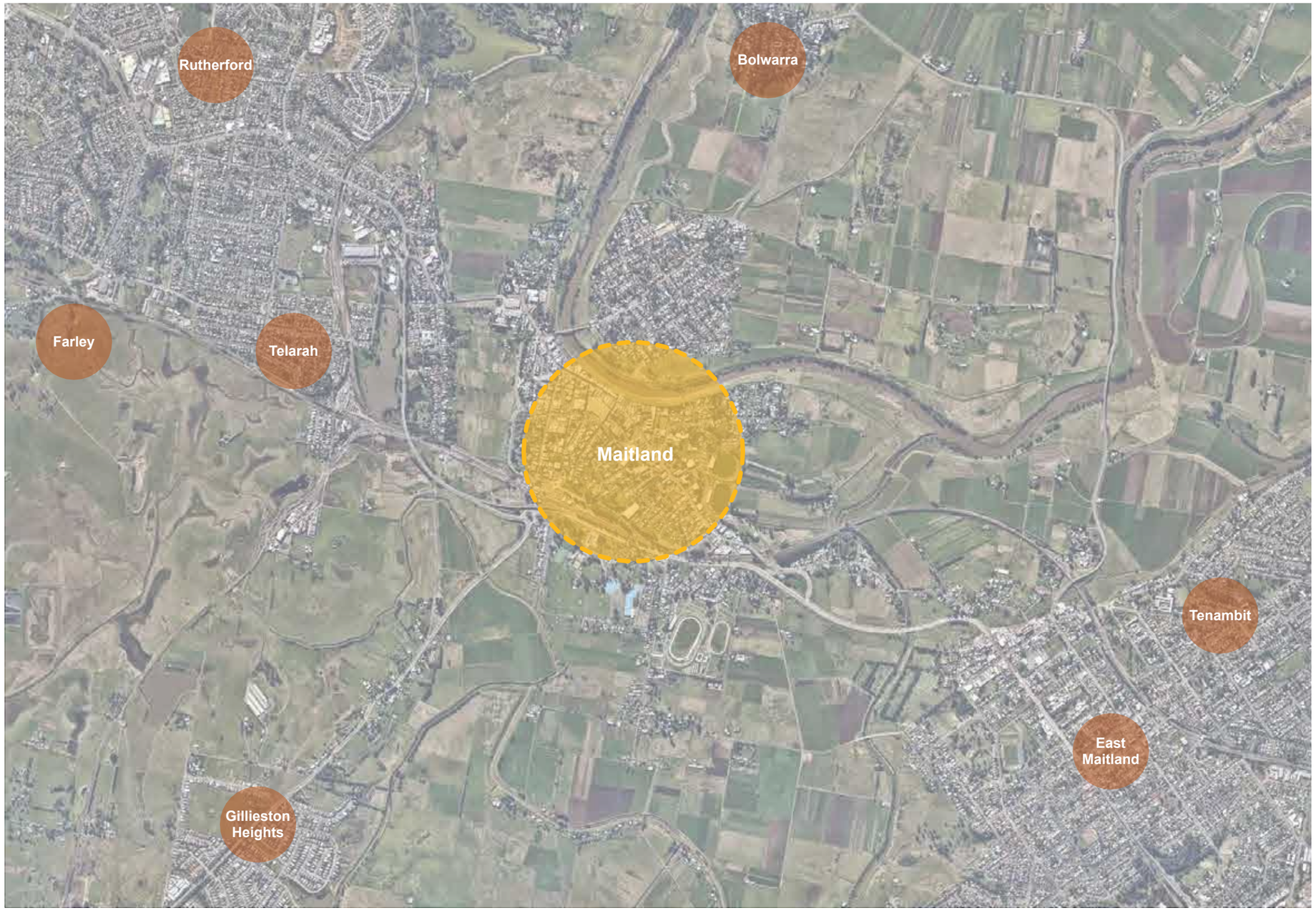
SITE
24 Hunter Street, Horseshoe Bend Maitland NSW 2320

CLIENT
Catholic Diocese Maitland Newcastle

DATE
31.08.22

PROJECT NO.
4367

SHAC



DEVELOPMENT APPLICATION

1. Dimensions are in millimetres unless otherwise shown.
2. Work to given dimensions. Do not scale from drawing.
3. Check all dimensions on site prior to construction and fabrication.
4. Bring any discrepancies to the attention of the proprietor & architect.

KEY POINTS

LOCALITY

The European settlement of Maitland began with farmers in the early 1800s. The majority of Maitland, including its main avenue, High Street, grew without apparent planning giving the city its great charm. The original bullock track became fixed as the line of High Street with its meandering curves which are still evident today. Maitland grew rapidly and became prosperous, which resulted in the many substantial and ornate Victorian facades and buildings that adorn the street today. Landmark buildings erected over 170 years ago stand alongside fine modern buildings, a harmonious mix of new and old. The area has long been an industrious area and since the 1820s Central Maitland has been home to industry, trade and commerce.

Maitland lies at the centre of the major growth corridor of the Hunter Valley. The city is sited at a junction in the rail network, close to several highways, 170 kilometres north of Sydney and 41 kilometres from Newcastle. Maitland's proximity to the Hunter River has resulted in a succession of floods since European settlement. The most major flood being in 1955, which was the first Australian natural disaster to be broadcast by the media on an international scale and where waters reached 12.5m and caused catastrophic damage. The Maitland Levee flood embankment was completed in 1980.

Central Maitland is now the focus of an intense program of urban revitalisation. It focuses on creating a thematic and interpretive framework for Central Maitland that will revitalise the town and increase visitation through communicating the town's heritage in exciting, dramatic and unusual ways. A new Riverwalk located on the levee and a River Link public building were also designed to reconnect the precinct to the adjacent Hunter River.

Horseshoe Bend is an inner city suburb of Maitland, named for the shape made by the Hunter River flowing through the area as it was observed by early European settlers. It is one of the earliest settled areas in Maitland, characterised by narrow streets and laneways, as well as a mixture of architectural styles spanning the 19th and 20th centuries. Maitland City Council planning strategies have identified Horseshoe Bend as a future growth area.

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Revl 31.08.22

Locality
All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

NTS
@A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Aborigines Kangaroo Hunting - Joseph Lycett

Australian Bittern Botaurus Australis - Elizabeth Gould
Boun - Aboriginal name for Wallis Plains; 'place of the Bittern

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Pre-European History

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

NTS
@A3

Catholic Diocese of Maitland-Newcastle

DEVELOPMENT APPLICATION

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2. Work to given dimensions. Do not scale from drawing.
3. Check all dimensions on site prior to construction and fabrication.
4. Bring any discrepancies to the attention of the proprietor & architect.

HISTORY

LOCALITY

The Wonnarua people are the traditional land owners of the Maitland area, with lands extending throughout the Hunter Valley. A dreamtime story from the Wonnarua explains how the hills and rivers in the Hunter Valley were created by a spirit called Baiame. Neighbouring nations to Wonnarua include Geawegal, Worimi, Awabakal, Gamilaroi, Wiradjuri, Darkinjung and Birpai. These nations would travel through the area and were often invited to participate in local ceremonies.

The ethnographic literature from the 1800s, describes the vegetation of the Maitland area (Wallis Plains) as ‘luxuriant’ rainforest and thick scrub flanking the Hunter River; tracts of dense brush and forest with overlapping canopies and vine thickets (Backhouse, 1843:388, 397; Breton, 1833:122). References were also made to aquatic habitats; open swamps and wetlands, oxbows, natural levees, silted flood channels, and a network of lagoons that fed into the Hunter (Brayshaw, 1987:12). Many references were also made to the rich fertility of the alluvial soils of floodplain (Cunningham 1827:150-151; Dawson, 1830:379). In the hinterland and further up the Valley the landscape was more open, characterised by extensive, park-like grasslands, luxuriant plains and open woodland (Howe, 1819; Cunningham 1827:150-151, 156). Coupled with its warm-temperate climate, mild winters and reliable rainfall , the landscape of the Maitland region would have been highly conducive to the hunter-gatherer lifestyle of the Wonnarua prior to colonisation.

Encounters between the Aborigines of the Hunter Valley and the Europeans were at first based on mutual curiosity, friendliness and relative peace (Threlkeld in Gunson, 1974:44; Moore, 1970: 28). However, the rapid and ever-increasing influx of settlers to the region from 1822 onwards, disrupted the traditional lifestyle and economy of the Aboriginal people and impeded their movement across the land (Australian Museum, 2010). European occupation led to widespread disturbance of the landscape: natural grasslands were ploughed up or grazed down by stock; swamps and lagoons were drained; vegetation cleared; forests felled; exotic pastures introduced; the Hunter River re-aligned, and fences erected that kept the Wonnarua out. (Aboriginal Cultural Heritage Preliminary Due Diligence Assessment Report - Eureka Consultants Jan 2019)

The Indigenous name for the area is 'Boun' meaning 'place of the Bittern', and was once covered in forest, however, it was cleared to access to the fertile alluvial soil. A great number of cedar trees were cleared in this area, indicated by one specimen which was found on a tributary of the Hunter which “measured 27 feet in circumference near the base, and the main trunk was 50 feet in length before it threw out vast branches which overtopped the neighbouring trees” (in Wood 1972:2). Cunningham notes that; "Wallis Plains are of no great extent, and being originally densely wooded, required great labour in clearing; a disadvantage, however, amply compensated by the amazing fertility of the soil, which is all alluvial, and still subject to being covered with water during the high floods." (Cunningham 1827:150).

John and Elizabeth Gould stayed at Maitland in 1839 and described the prolific bird life that was present in the brushes and ‘wild scenery’. John Gould described one incident where he came across a forest full of eucalyptus covered in blossom which was being used by many different types of birds. He noted the Lorikeets (Trichoglossi) in particular. His journal records; "However graphically it might be described, I scarcely believe it possible to convey the idea of the appearance of a forest of flowering plants tenanted by Trichoglossi.. During one of my morning rambles in the brushes of the Hunter I came suddenly upon an immense Eucalyptus, which was at least two hundred feet high. The blossoms of this noble tree had attracted hundreds of birds, both Parrots and Honey-suckers. (Gould, in Albrecht and Albrecht 1992:12).

From - Rediscovering the Coquun: Towards an Environmental History of the Hunter River By Glen Albrecht PhD

KEY POINTS

- The Indigenous name for the area is 'Boun' meaning 'place of the Bittern.'
- The historic vegetation of the Maitland area was mostly rainforest and thick scrub flanking the Hunter River, with dense brush and forest with overlapping canopies and vine thickets
- A meaningful acknowledgement of Aboriginal history within the project, of the Wonnarua culture, without tokenistic appropriation

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Catholic Diocese of Maitland-Newcastle

DEVELOPMENT APPLICATION

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2. Work to given dimensions. Do not scale from drawing.
3. Check all dimensions on site prior to construction and fabrication.
4. Bring any discrepancies to the attention of the proprietor & architect.

LEGEND

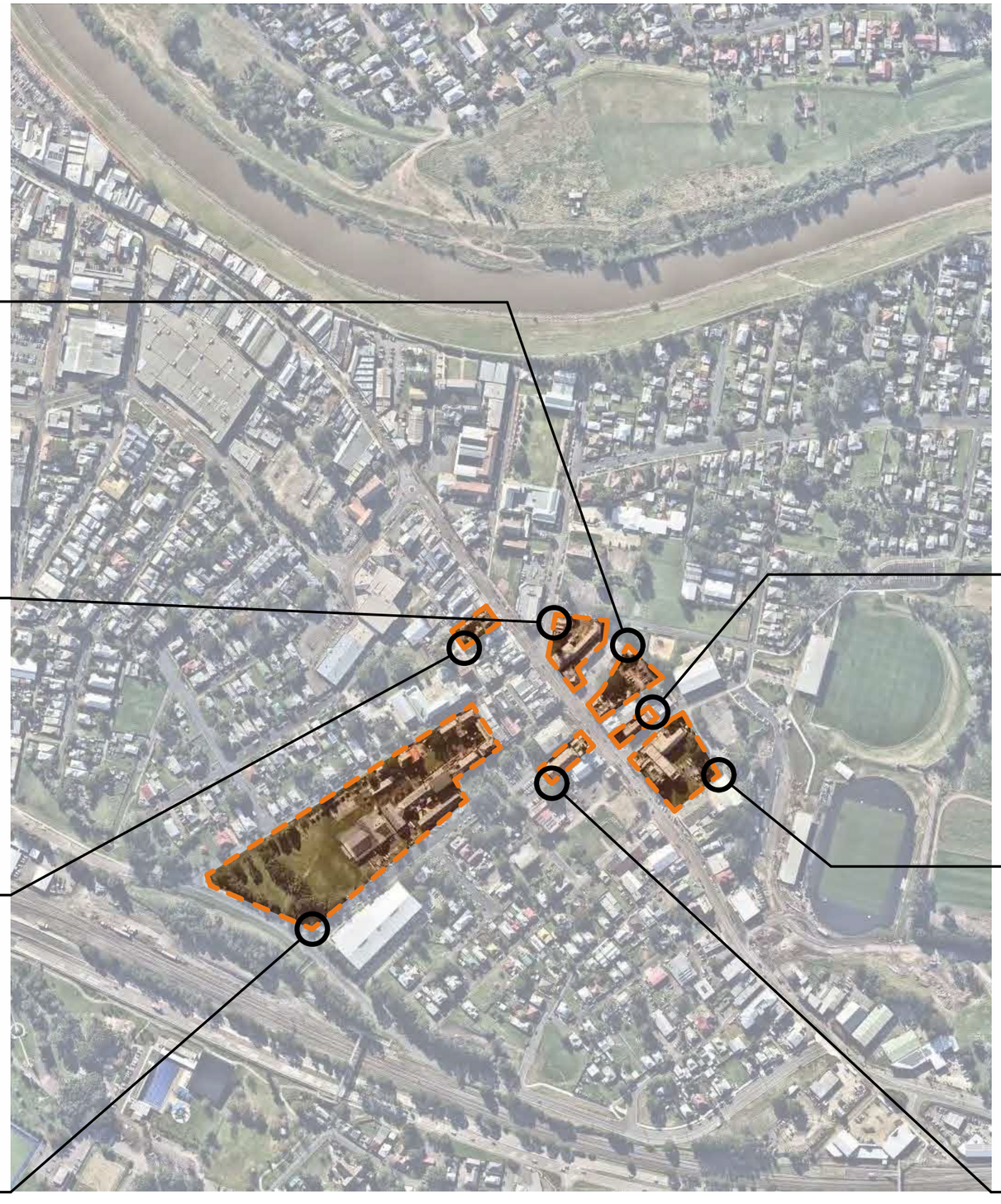
1. MAITLAND CULTURAL CENTRE, 1882
2. MAITLAND MERCURY NEWSPAPER & PRINTING CO, 1843
3. MANSFIELD HOUSE, 1887
4. ST MARYS CAMPUS, ESTABLISHED 1867
5. REPERATORY THEATRE, 1947
6. MAITLAND REGIONAL ART GALLERY, 1830
7. MAITLAND TOWN HALL, 1890

1

2

3

4



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7

4367
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Character & History of the Area

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

NTS
@A3

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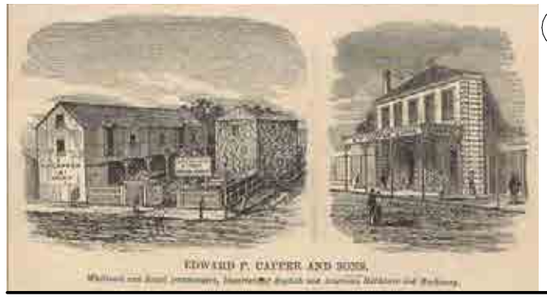

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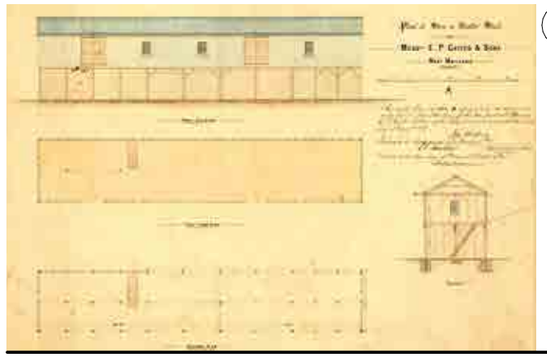

2

3

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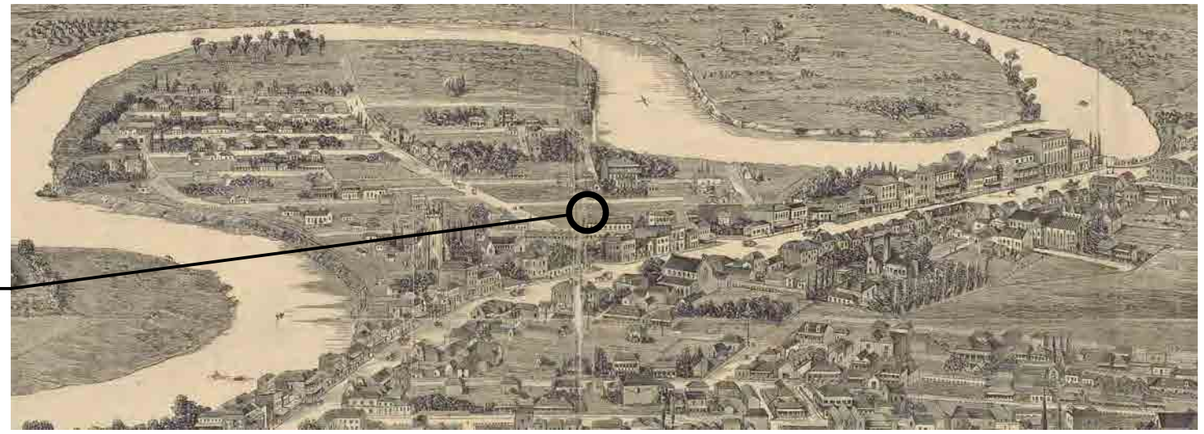

BIRDS EYE VIEW OF HORSESHOE BEND

MAP OF WEST MAITLAND, 1936

5

DEVELOPMENT APPLICATION

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LEGEND

1. CAPPER'S IRON YARD, 1878
2. PENDER'S PLAN OF CAPPER'S IRON YARD, 1877
3. VIEW FROM HUNTER STREET TO HIGH STREET AFTER THE 1955 FLOOD
4. ODD STREET AFTER THE 1955 FLOOD
5. ST PAULS PARISH HALL, 1921

HISTORY

St Pauls Parish Hall is believed to be designed by Architect Frederick George Castleden and erected in 1914. Castleden was born in England and arrived in Sydney at the age of 20, where he worked as an architect for many years, he took a post with the Government Architect of NSW as district architect in the early 1900's and later partnered with Menkens, another prolific local architect. Castelden worked on many prolific buildings across the region from the Newcastle Ocean Baths, works to Christ Church Cathedral Newcastle and St Peters Cathedral in Armidale.

Historically the site at Horseshoe Bend was used for industrial purposes by Edward Peter Capper. Capper was a hardware merchant from Birmingham, England and sailed to Australia in 1833, he chose Maitland as the headquaters for his iron and hardware business in 1888, which grew to a major emporium and the name "Cappers of Maitland" became a household name. Capper's Hardware became a prolific historical landmark on High Street, across from the site, the hardware stocked many items including tools, rocking chairs, beds, porcelain and gunpowder. The building was lost in a major fire in 1971. The site at the corner of Odd and Hunter Street was the iron works for the Capper business and supplied much of the regions farmers with machinery, wagons, sulkies and farming equipment. Capper is attributed to Maitland's economic growth and success during this time as a commercial centre.

The Capper buildings were designed by John Wiltshire Pender, a scottish born emigrant who became a prolific Maitland Architect. Pender established 'Pender Practice' in 1863, he was best known for the homesteads he designed in the 1880s throughout the Hunter, including the two storeyed Saumarez near Armidale (1890), owned by the National Trust (NSW) and the Presbyterian Schoolhouse at West Maitland. At the 1888 Melbourne Centennial International Exhibition Pender exhibited a drawing of the front elevation of E.P. Capper & Sons warehouse at West Maitland he had designed.

KEY POINTS

- Historically an industrial site with several large scale industrial buildings
- The site has a strong connection to prolific historical figures in Edward Peter Capper and Architects John Pender and FG Castleden

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History of the Site

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

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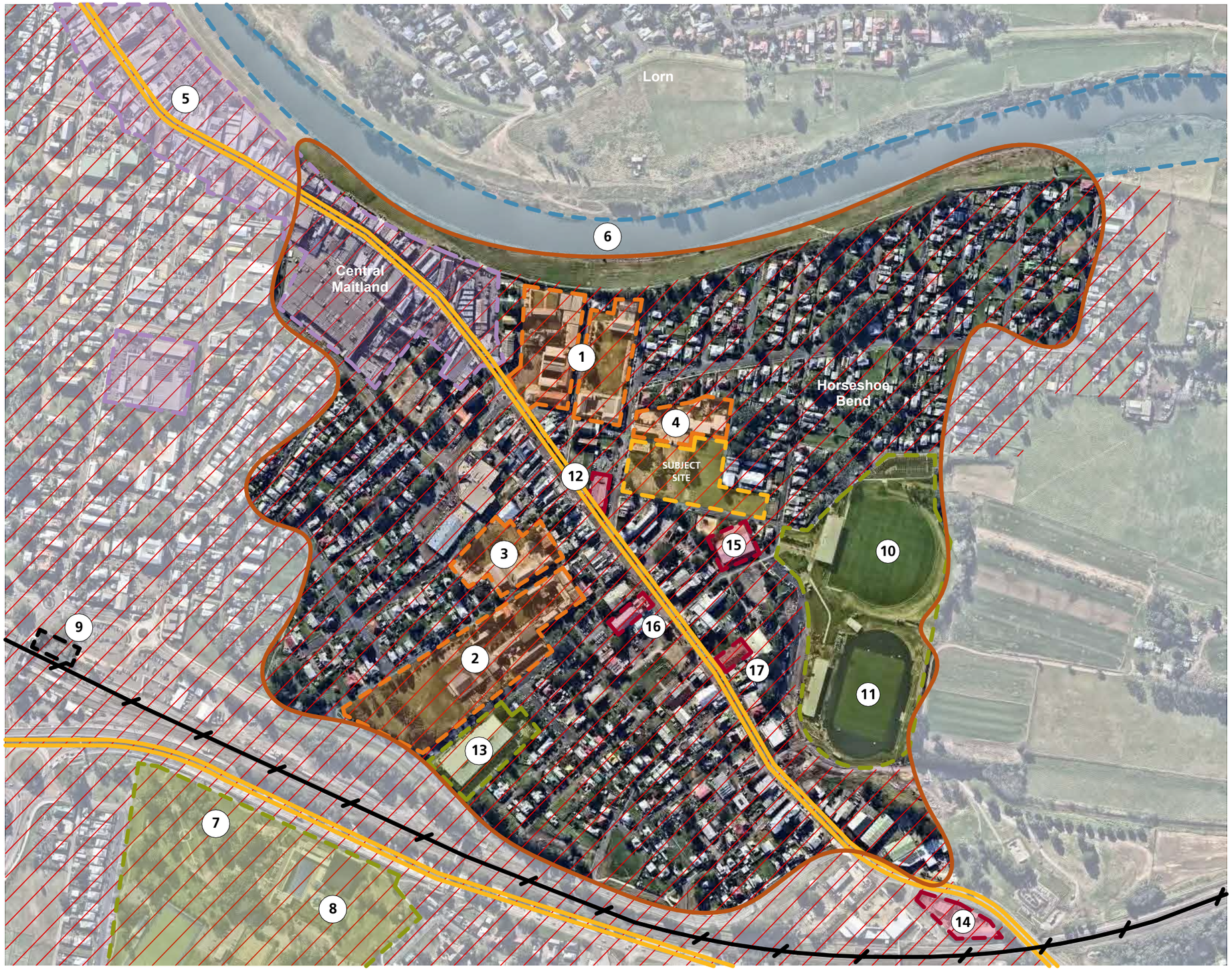

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POINTS OF INTEREST

1. ALL SAINTS COLLEGE ST PETER'S CAMPUS
2. ALL SAINTS COLLEGE ST MARY'S CAMPUS
3. ST JOHN THE BAPTIST PRIMARY SCHOOL
4. ST NICHOLAS EARLY EDUCATION CENTRE
5. MAITLAND MALL
6. HUNTER RIVER
7. MAITLAND PARK
8. MAITLAND AQUATIC CENTRE
9. MAITLAND TRAIN STATION
10. MAITLAND SPORTS GROUND
11. ATHLETICS CENTRE
12. LIFE WITHOUT BARRIERS
13. MAITLAND BASKETBALL ASSOCIATION
14. MAITLAND VISITOR INFORMATION CENTRE
15. PCYC MAITLAND
16. MAITLAND TOWN HALL
17. CENTRELINK

LEGEND

- Subject Site
- Educational Establishments
- Sporting Facilities
- Retail Links
- Transport Stations
- Community Infrastructure
- Retail Centres
- Approx. 10 min walk
- Main Roads
- Railway

KEY POINTS

- The site is within an established and growing sports precinct
- The site is close to key community infrastructure and the main retail street of Maitland

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Location Context

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

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SHAC

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DEVELOPMENT APPLICATION

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POINTS OF INTEREST

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2. ALL SAINTS COLLEGE ST MARY'S CAMPUS
3. ST JOHN THE BAPTIST PRIMARY SCHOOL
4. ST NICHOLAS EARLY EDUCATION CENTRE
5. PCYC MAITLAND

LEGEND

- Subject Site
- Educational Establishments
- Sporting Facilities
- Carpark
- Proposed Maitland Administration Centre
- Community Infrastructure
- Main Arterial Roads
- Primary Roads
- Secondary Residential Roads

KEY POINTS

The proposed site adjoins the existing Number 1 Sportsground and Athletics Centre. Athletics Centre Facilities include the following:

- 1x 8 Lane 400m track
- 4x Long Jump and Triple Jump pits
- 1x Pole Vault track with dual runway
- 1x Track Infield for informal soccer games
- 3x Shot Put throwing circles
- 2x Hammer and Discus throw cages
- 2x Javelin throw runways
- 1x Steeplechase Area
- 2x High Jump runways and land maps

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Civic Precinct

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

NTS
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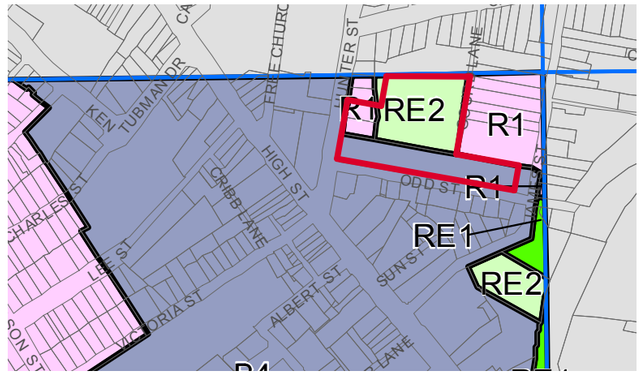
LAND ZONING

- B1 Neighbourhood Centre
- B2 Local Centre
- B3 Commercial Core
- B4 Mixed Use
- B5 Business Development
- B6 Enterprise Corridor
- E2 Environmental Conservation
- E3 Environmental Management
- E4 Environmental Living
- IN1 General Industrial
- R1 General Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation

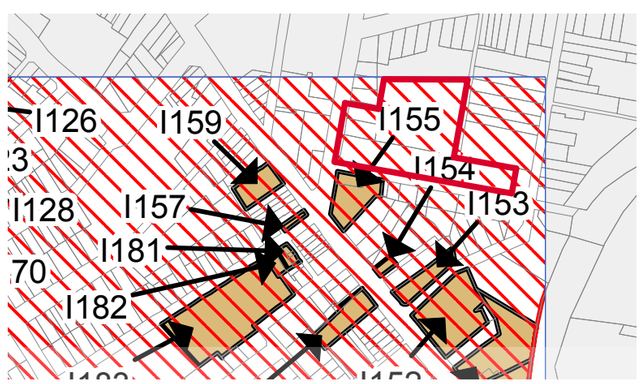


MINIMUM LOT SIZE

- G 450
- S 800
- U 1500
- V 2000
- W1 3000
- W2 4000
- X 5000
- Y 1 ha
- Z 2 ha
- AB1 20 ha
- AB2 40 ha

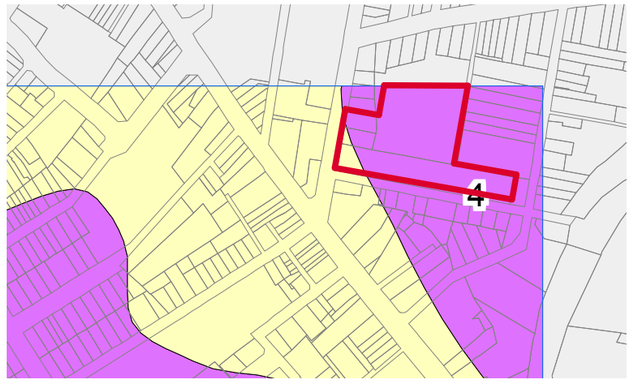
HERITAGE

- Item - General
- Conservation Area - General



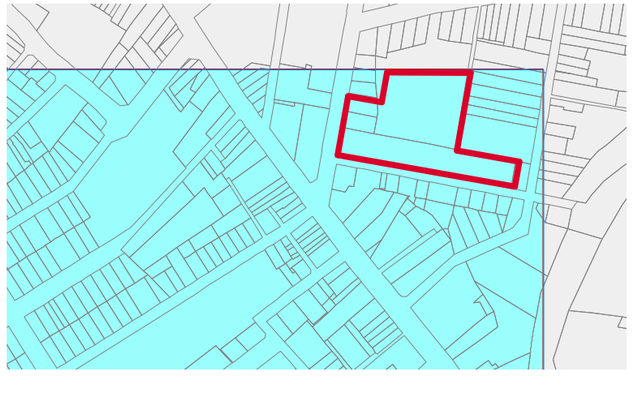
ACID SULFATE SOILS

- 1 Class 1
- 2 Class 2
- 3 Class 3
- 4 Class 4
- 5 Class 5



FLOODING

- Flood Planning Level



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KEY POINTS

LAND ZONING

According to the *Maitland Local Environmental Plan 2011*, the proposed allotments are subject to the zoning objectives of *B4 Mixed Use*, *R1 General Residential* and *RE2 Private Recreation*.

The objectives for *B4 Mixed Use* zoning sites is:
- To provide a mixture of compatible land uses.
- To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.

The objectives for *R1 General Residential* zoning sites is:
- To provide for the housing needs of the community.
- To provide for a variety of housing types and densities.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.

The objectives for *RE2 Private Recreation* zoning sites is:
- To enable land to be used for private open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.

MINIMUM LOT SIZE

The subject site comprises of four separate lots, the site area is partially zoned to have a minimum lot size of 450m2 whilst the area majority has no minimum lot size restrictions.

The objectives of this clause are as follows—
(a) to ensure that lot sizes are able to accommodate development that is suitable for its purpose and consistent with relevant development controls,
(b) to prevent the fragmentation of rural land.

HERITAGE

The subject site is located within a Heritage Conservation Area according to the Maitland Local Environmental Plan 2011 - Heritage Maps.

Objectives The objectives of this clause are as follows—
(a) to conserve the environmental heritage of Maitland,
(b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,
(c) to conserve archaeological sites,
(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.

ACID SULFATE SOILS

According to the *Maitland Local Environmental Plan 2011 - Acid Sulfate Soils Maps*, the site is subject to the conditions of Class 4 and Class 5.
The objective of this clause is to ensure that development does not disturb, expose or drain acid sulfate soils and cause environmental damage.

FLOOD PLANNING

According to the , the subject site is located within a flood planning area

The objectives of this clause are as follows—
(a) to minimise the flood risk to life and property associated with the use of land,
(b) to allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change,
(c) to avoid significant adverse impacts on flood behaviour and the environment.

Maitland Local Environmental Plan 2011

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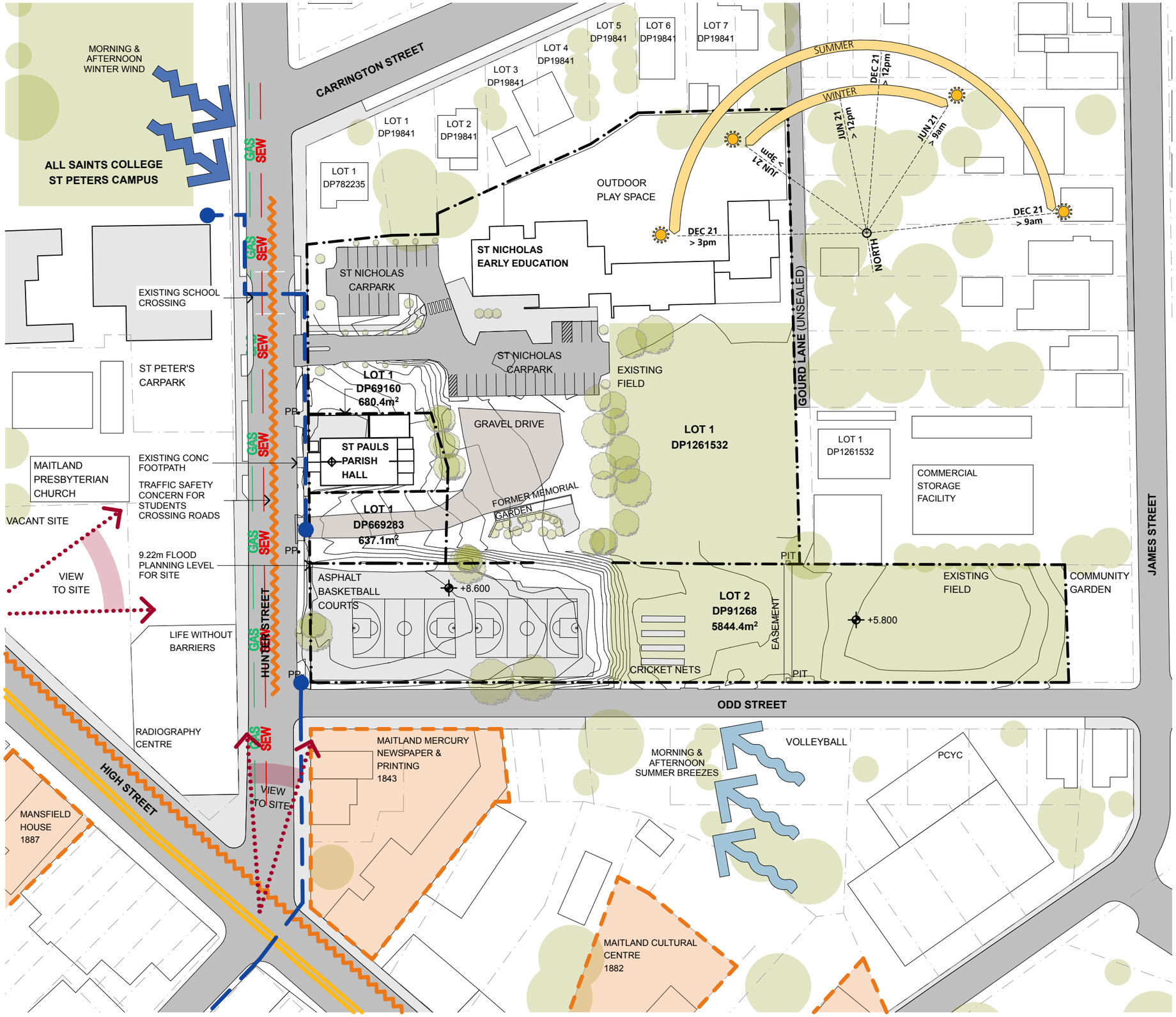
Authority Analysis

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

NTS
@A3

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846



DEVELOPMENT APPLICATION

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KEY POINTS

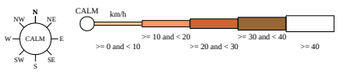
Site Address: Corner of Hunter & Odd Street
Lot 1 DP 69160
Lot 1 DP 669283
Lot 2 DP 91268

Site Area: Approximately 11,329 m2

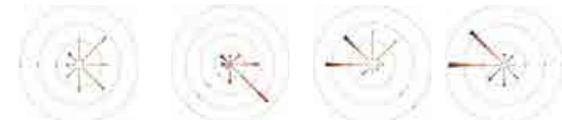
LEGEND

- Site Boundary
- Main Road
- Traffic Hazard
- Pedestrian Link (Schools)
- Trees
- Greenspace
- Road/Pathway
- Heritage Item

CLIMATE ANALYSIS

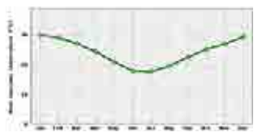


WIND SPEED AND DIRECTION: PATERSON

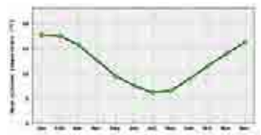


SUMMER JANUARY 9am | SUMMER JANUARY 3PM | WINTER JULY 9AM | WINTER JULY 3PM

TEMPERATURE RANGE: PATERSON



Mean Max. Temperature
Range: 18 - 30 degrees celsius



Mean Min. Temperature
Range: 6 - 18 degrees celsius

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DA1008
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Site Analysis Plan

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 10 20 30 40 50 1:1000 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Catholic Diocese of Maitland-Newcastle

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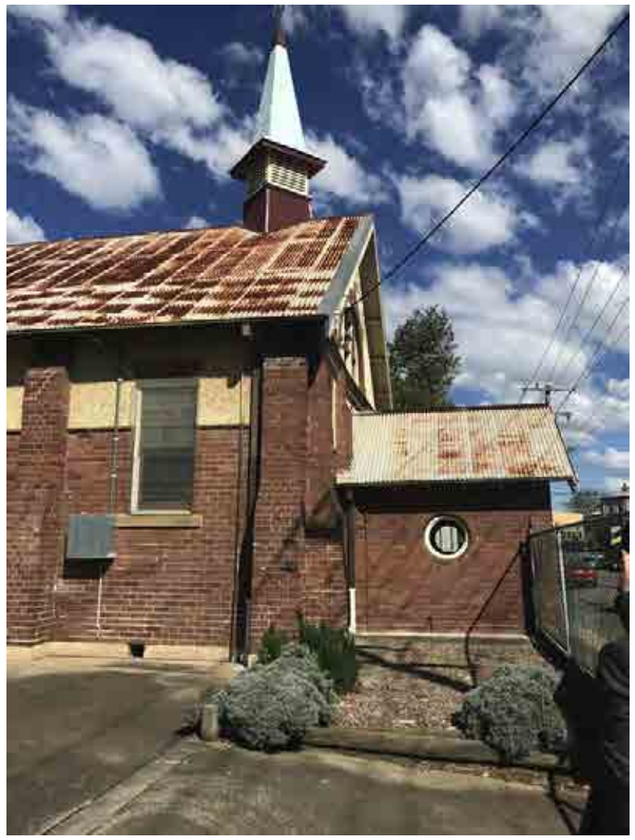

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DA1009
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Photographic Analysis - St Pauls Parish Hall

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

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4367
DA1010
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Photographic Analysis - Site

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

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4367
DA1301
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Existing/Demolition Site Plan

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 5 10 15 20 25 1:500 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

ST PETERS SCHOOL CROSSING

ST NICHOLAS CARPARK

ST NICHOLAS EARLY EDUCATION

ST NICHOLAS CARPARK

NOMINATED WASTE STORAGE AREA; TBC BY SELECTED CONTRACTOR AT TIME OF WORKS

RESTORE & REFURBISH HALL TO HERITAGE ARCHITECTS ADVICE. REPLACE DAMAGED ROOF w/ NEW METAL SHEETING

INDICATIVE LOCATION OF PROPOSED SECURITY FENCE

26,475

6,370

50,600
MPC OVERALL

HUNTER STREET

9,260 COURTYARD

17,320 ST PAULS FRONTAGE

16,820 FORECOURT OVERALL

ST PAULS PARISH HALL

PROPOSED MULTI-PURPOSE CENTRE

WALLS BELOW

39,875
MPC OVERALL

ENTRY FORECOURT

+7.000

EXISTING FIELD

INDICATIVE LOCATION OF PROPOSED SECURITY FENCE

REALIGN CARPARKS TO SUIT PROPOSAL. ALL EXISTING CAR SPACES TO BE RETAINED

NEW MULTI PURPOSE HALL WITH ARAMAX ROOF OVER

PIT

TIERED SANDSTONE SEATING DOWN TO FIELD

REUSE MINIMAL SPOIL FROM PILES TO MITIGATE SITE LEVEL CHANGE

MAINTAIN EXISTING COURTS, CRICKET NETS AND FIELD

+8.600

32,425
FORECOURT OVERALL

50,600
MPC OVERALL

CREATE LANDSCAPED ENTRY FORECOURT BETWEEN BUILDINGS; REFER LANDSCAPE PLAN BY MOIR

MAINTAIN EXISTING SITE FENCE

REPURPOSE EXISTING SANDSTONE ON SITE TO CREATE A SANDSTONE WALL TO SOUTHERN BOUNDARY

PROVIDE A COLONADE OF LARGE NATIVE SHADE TREES TO SOUTHERN ELEVATION; REFER LANDSCAPE PLAN BY MOIR

CRICKET NETS

+6.400

EASEMENT

EXISTING EXTERNAL COURTS

MAINTAIN EXISTING SITE FENCE

PIT

ODD STREET

DEVELOPMENT APPLICATION

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Proposed Site Plan

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

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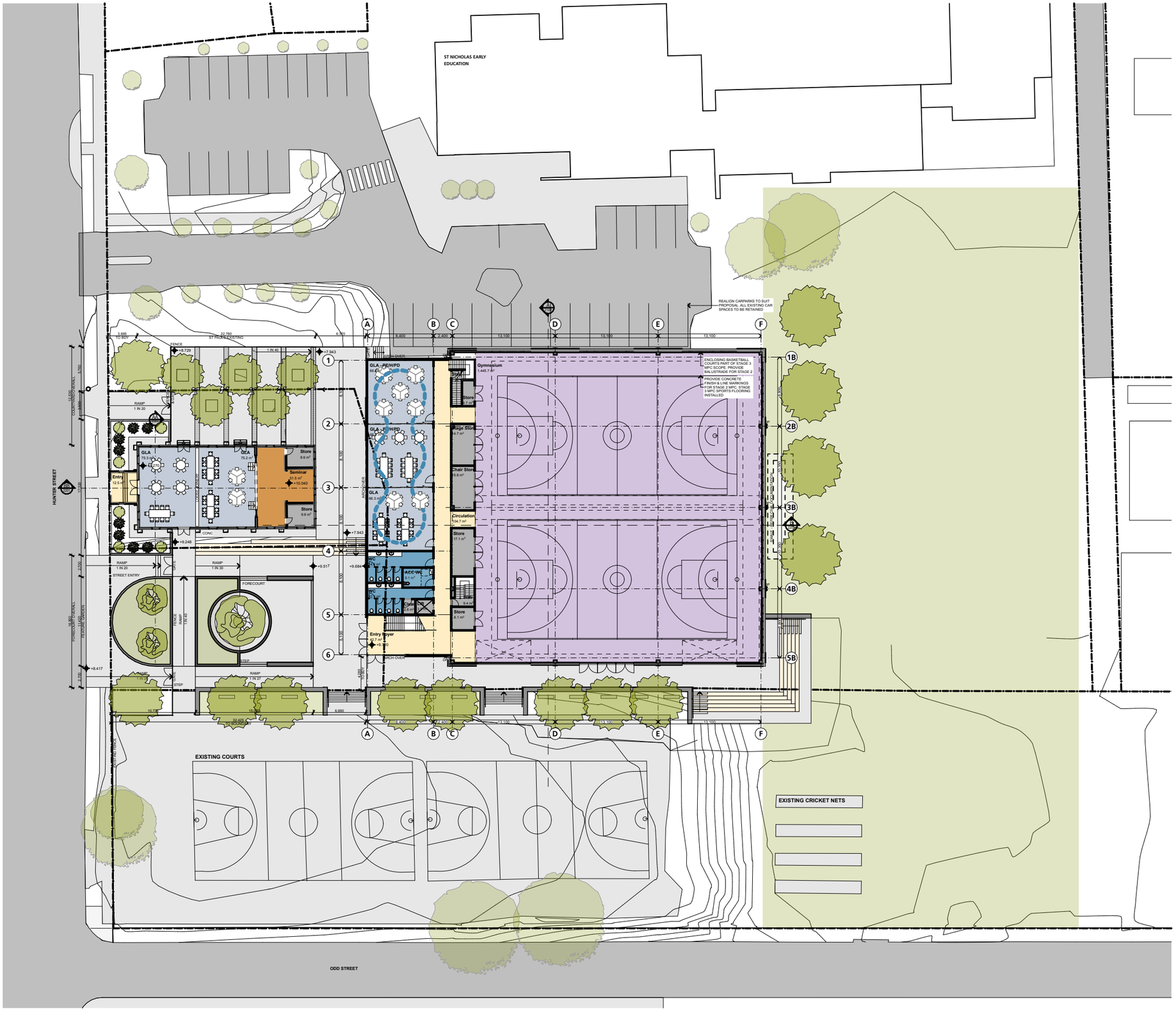

Catholic Diocese of Maitland-Newcastle

DEVELOPMENT APPLICATION

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Proposed Site Plan - Ground Floor

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 5 10 15 20 25 1:500 @A3

SHAC

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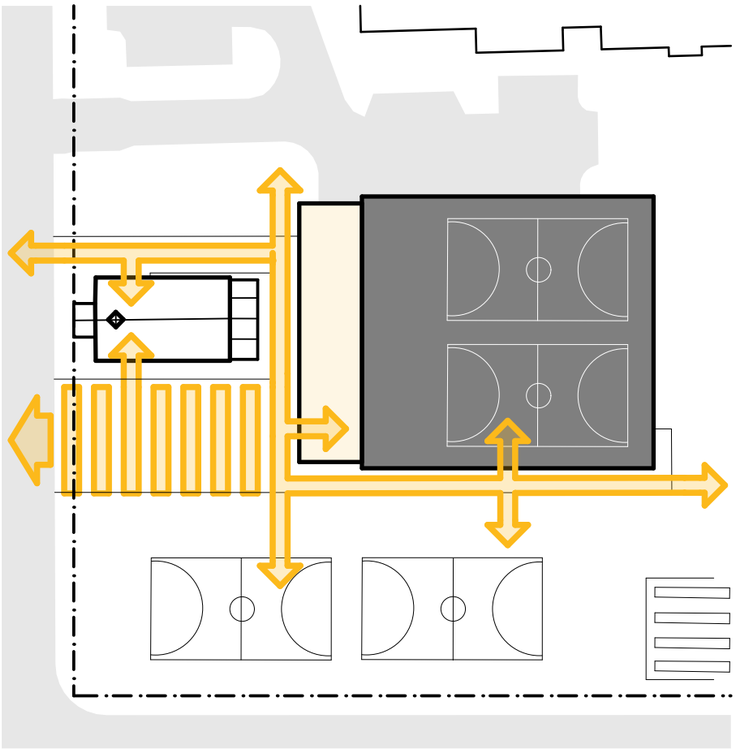

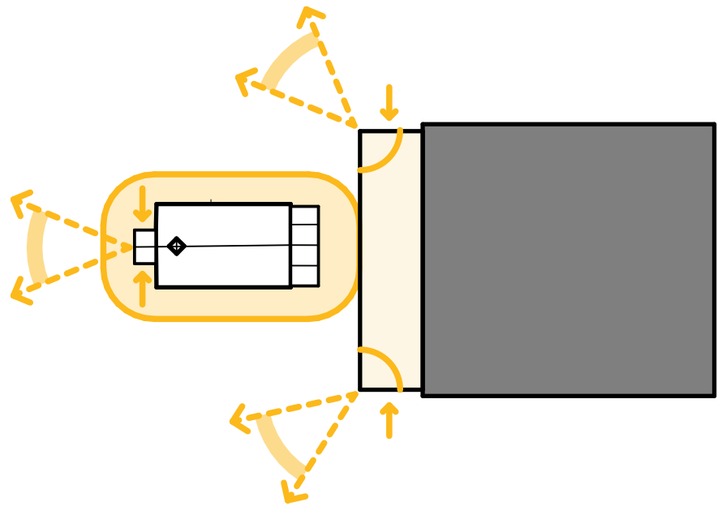

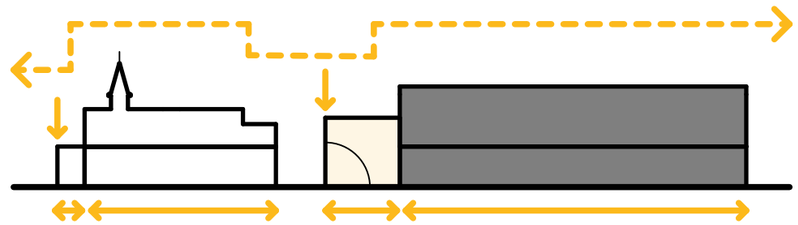

SITE CONNECTIVITY

- Link the existing & proposed buildings to school sports spaces and landscape across the site

- Create a flexible education and sports precinct for All Saint's College

- Improve access across the site with thoughtful and connected landscapes

REFERENCE & HIERARCHY

- The new MPC will reference the form of St Paul's Parish Hall by;
  - Stepping in at the entry/welcome to the building
  - Setting back larger building mass

- The new MPC will reference the materiality of St Paul's Parish Hall by;
  - Utilising a similar limited contrasting material palette, with light and dark finishes
  - Referencing the simple and ornate use of brick

- Not attempting to match the detail of St Paul's Parish Hall, but interpreting the architectural characteristics of the building, in a simple modern interpretation

- The new MPC will be setback and provide a curtilage to the surrounds of St Paul's Parish Hall

- St Paul's Parish Hall forms the central address to Hunter Street, with the new MPC acknowledging links to High Street and All Saint's College St Peter's Campus at it's corners

RHYTHM & SCALE

- The new MPC will reference the scale & proportion of St Paul's Parish Hall by;
  - Incorporating the same principles of height hierarchy
  - Referencing the heights of material breakup
  - Allowing the St Paul's Parish Hall Spire to remain the highest point on site

- The two buildings will create a consistent rhythm of forms on the site

- Allow St Paul's Parish Hall to stand proudly as the detailed feature of the street, and the MPC to be a simplified modern future focussed education facility in the background

4367
DA1305
Revl 31.08.22

Design Diagrams

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

CatholicDiocese OF MAITLAND-NEWCASTLE

DEVELOPMENT APPLICATION

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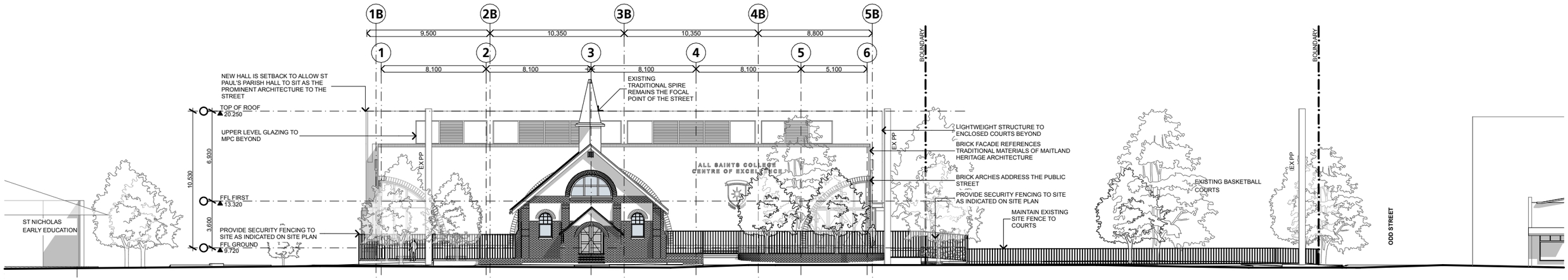
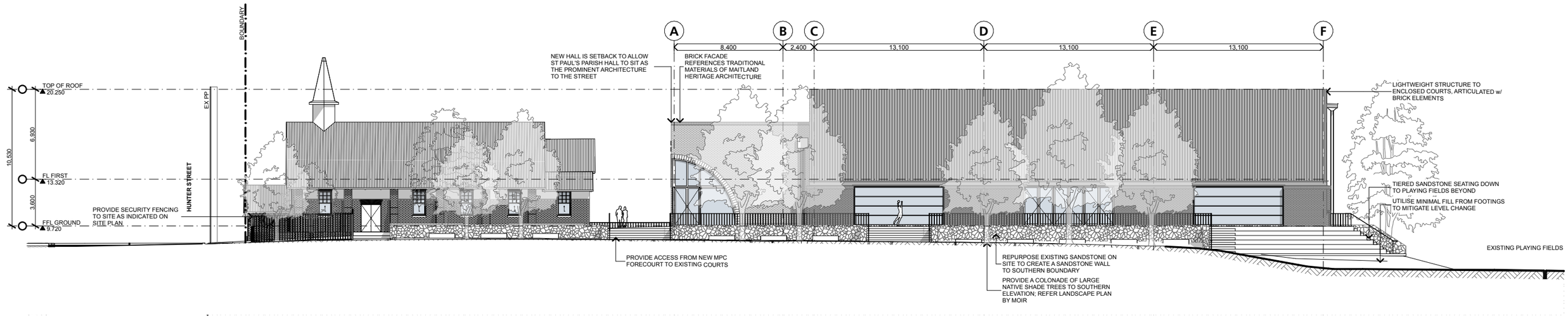


Site - Hunter Street Elevation



Site - Odd Street Elevation

4367
DA1306
RevJ 6.09.22

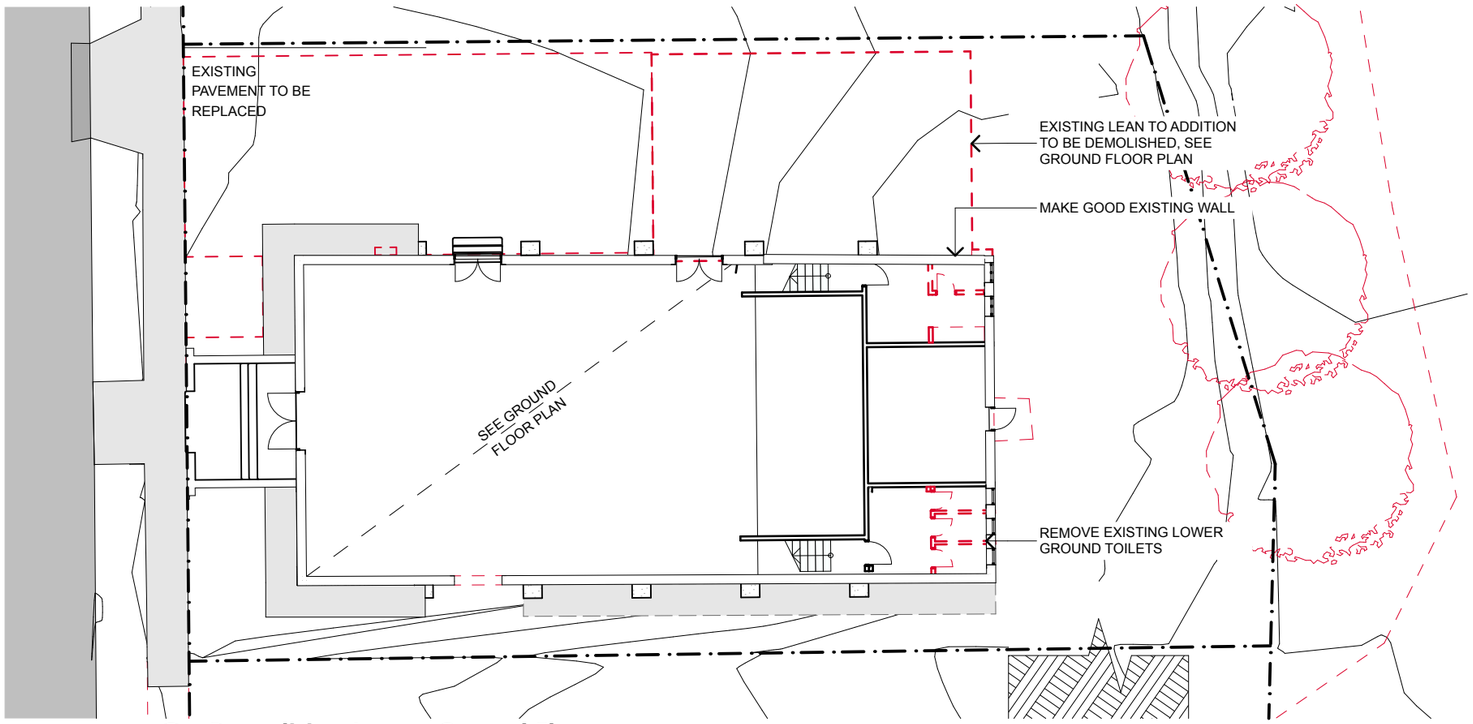
Proposed Site Elevations

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

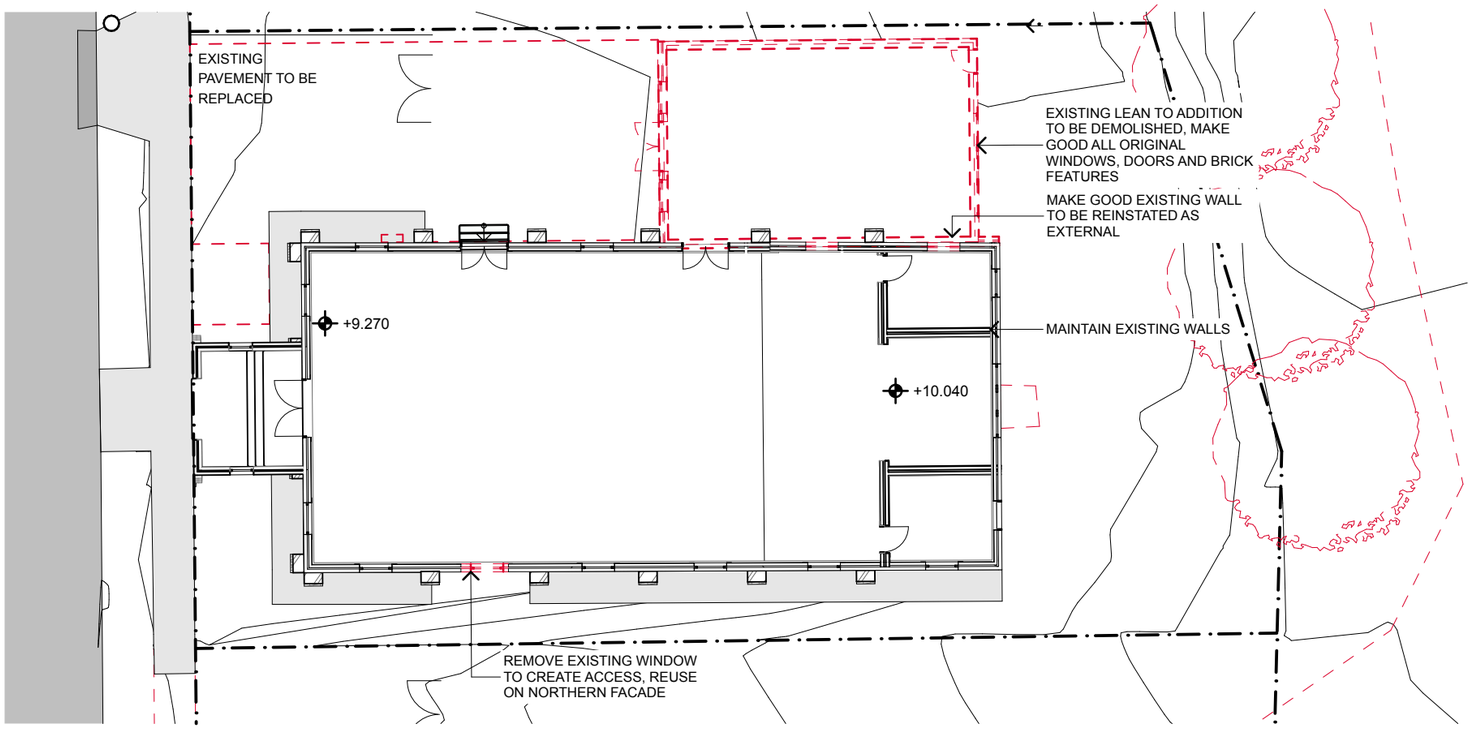
NTS
@A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846



Demolition Lower Ground Floor



Demoliton Ground Floor

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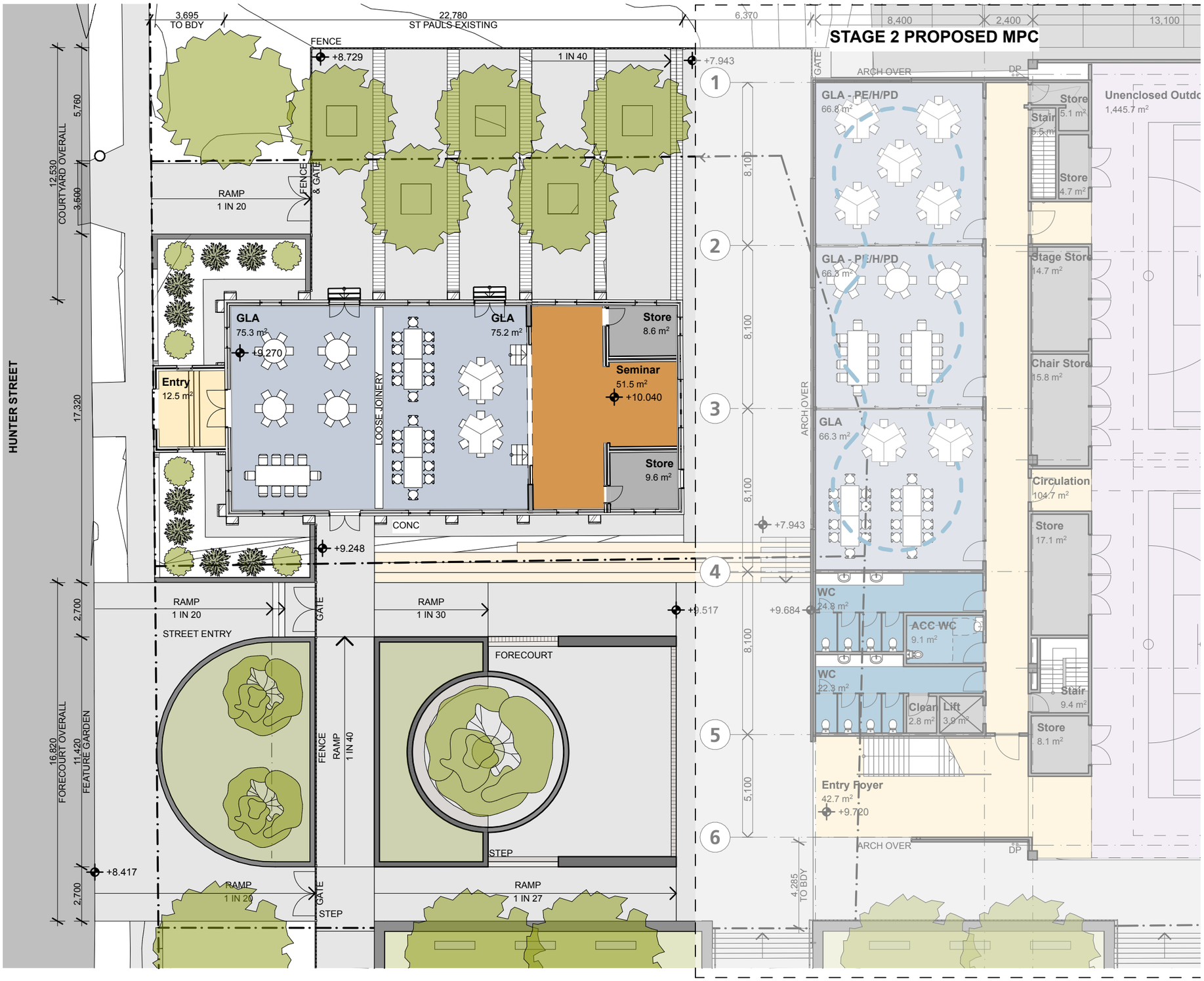
4367
DA2001
RevJ 6.09.22

Demolition Plans St Paul's Parish Hall

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

SHAC
Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846



CatholicDiocese OF MAITLAND-NEWCASTLE

DEVELOPMENT APPLICATION

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4367
DA2002
RevJ 6.09.22

Proposed Ground Floor Plan St Paul's Parish Hall

All Saints College Multi-Purpose Centre

24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

DEVELOPMENT APPLICATION

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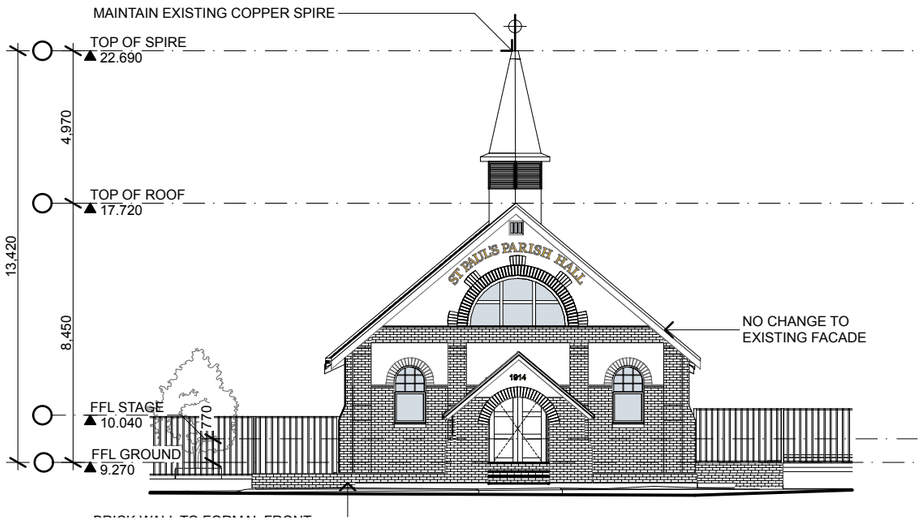
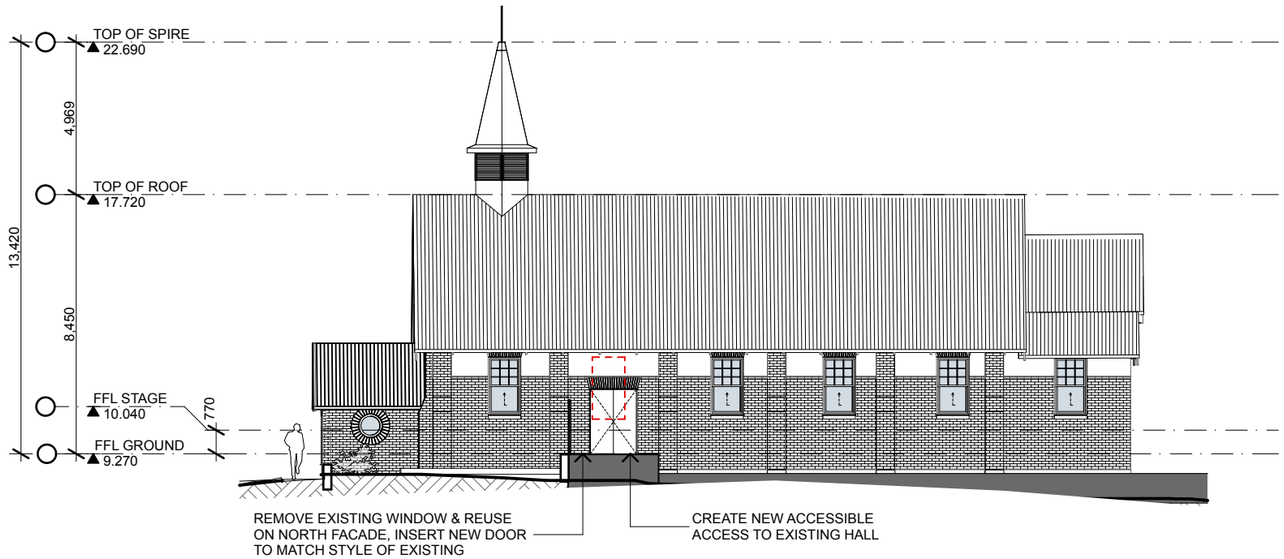
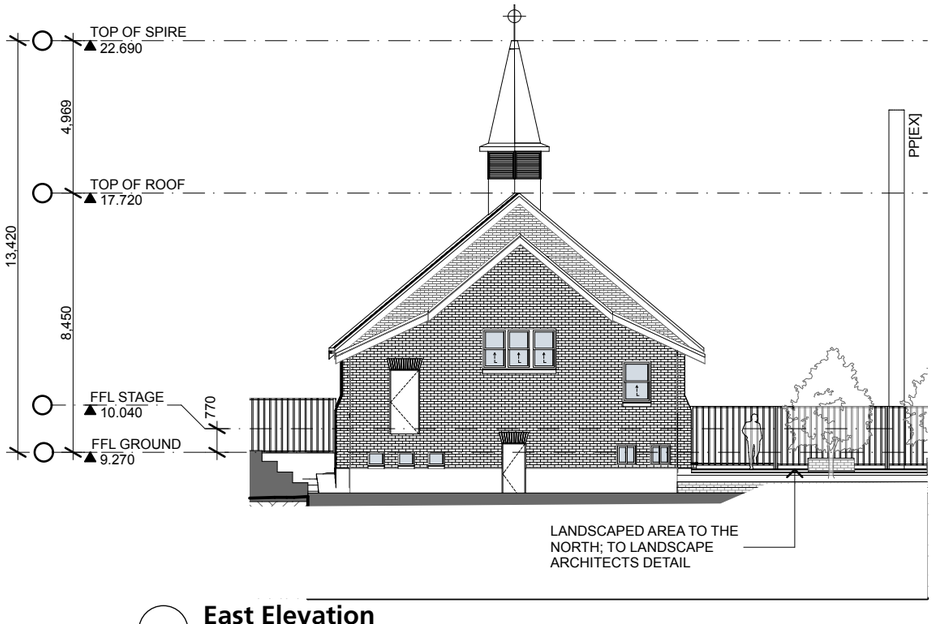


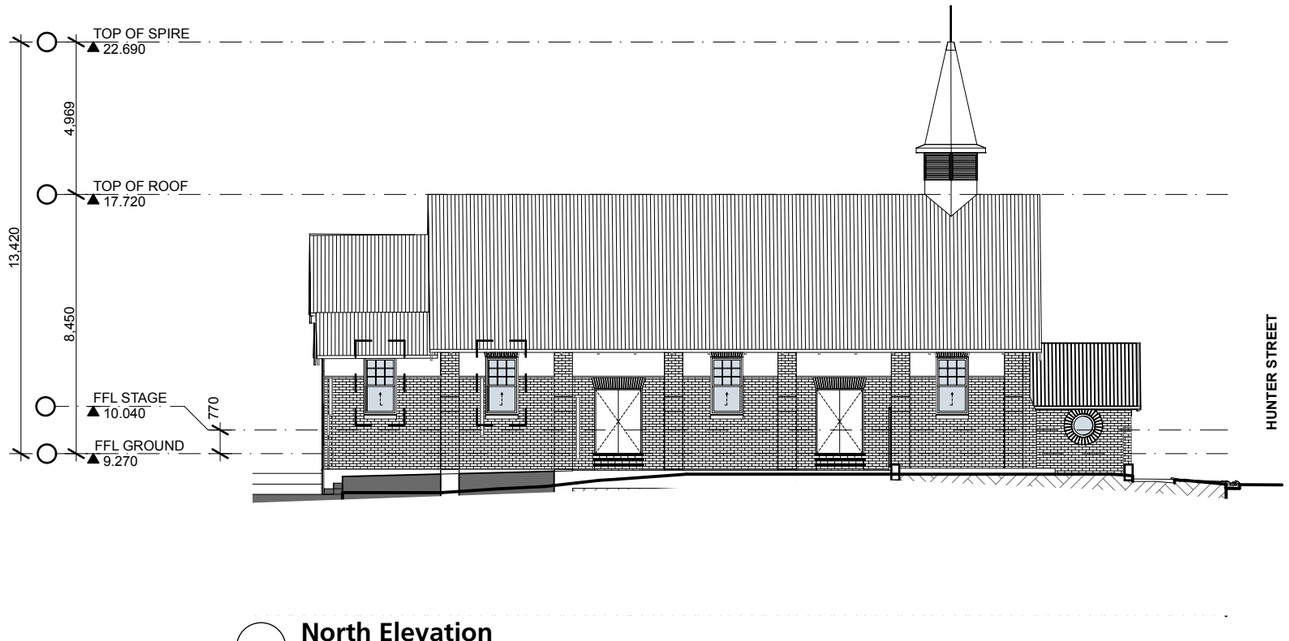
West Elevation



South Elevation



East Elevation



North Elevation

4367
DA2101
RevJ 6.09.22

Elevations St Paul's Parish Hall

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

SHAC

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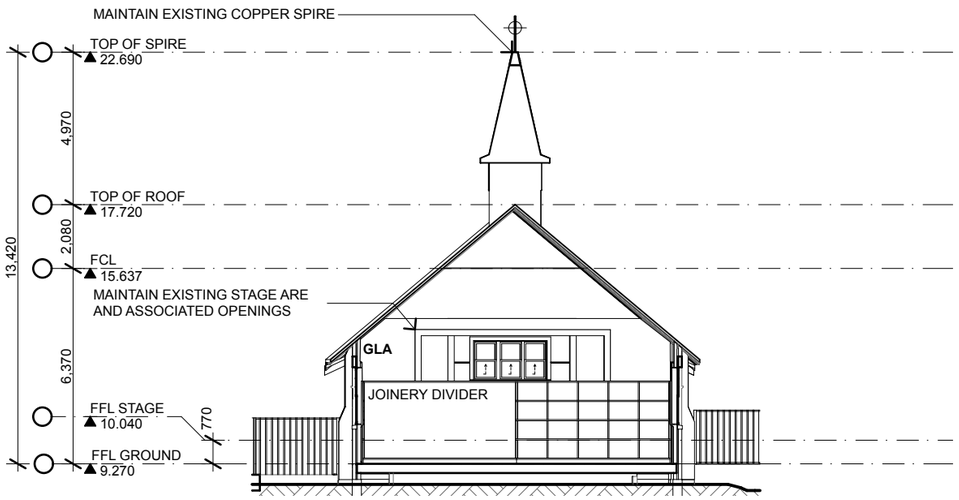
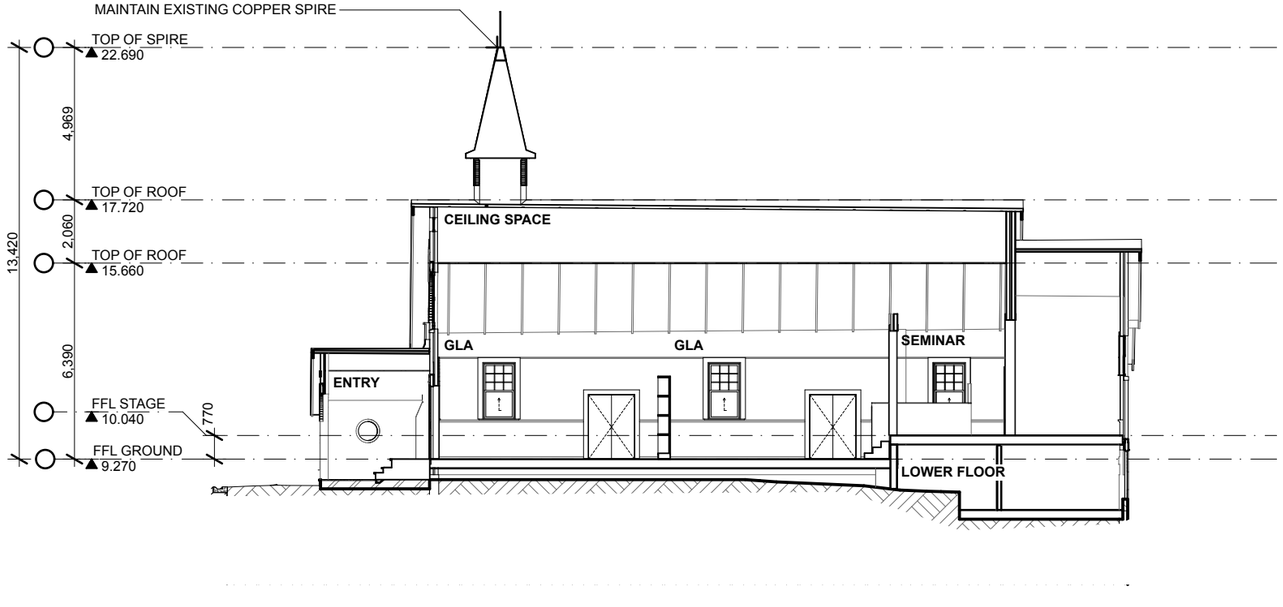


Section AA



Section BB

4367 DA2201

RevJ 6.09.22

Sections St Paul's Parish Hall

All Saints College Multi-Purpose Centre

24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

Catholic Diocese of Maitland-Newcastle

DEVELOPMENT APPLICATION

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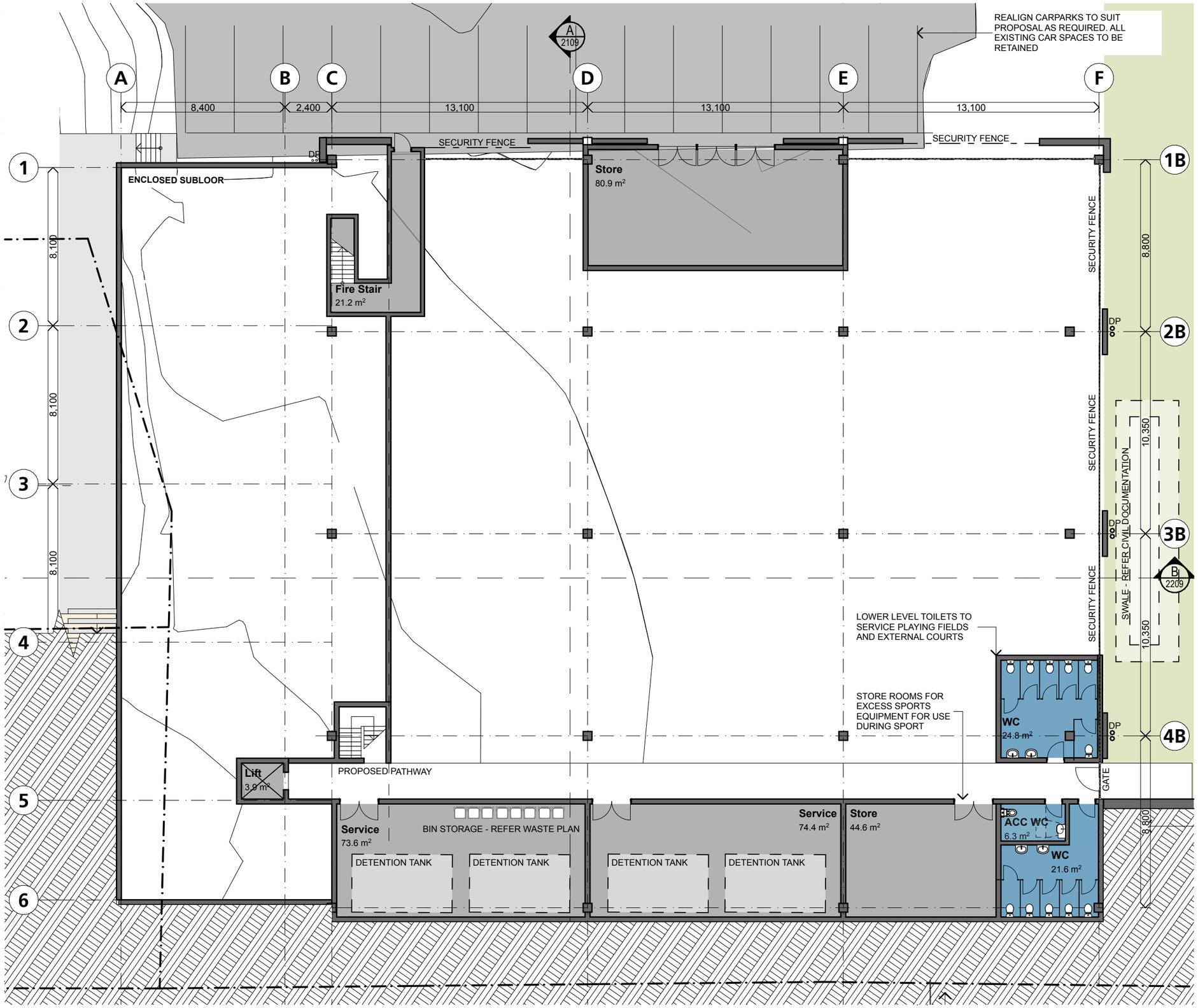

CatholicDiocese OF MAITLAND-NEWCASTLE

DEVELOPMENT APPLICATION

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4367
DA3001
RevJ 6.09.22

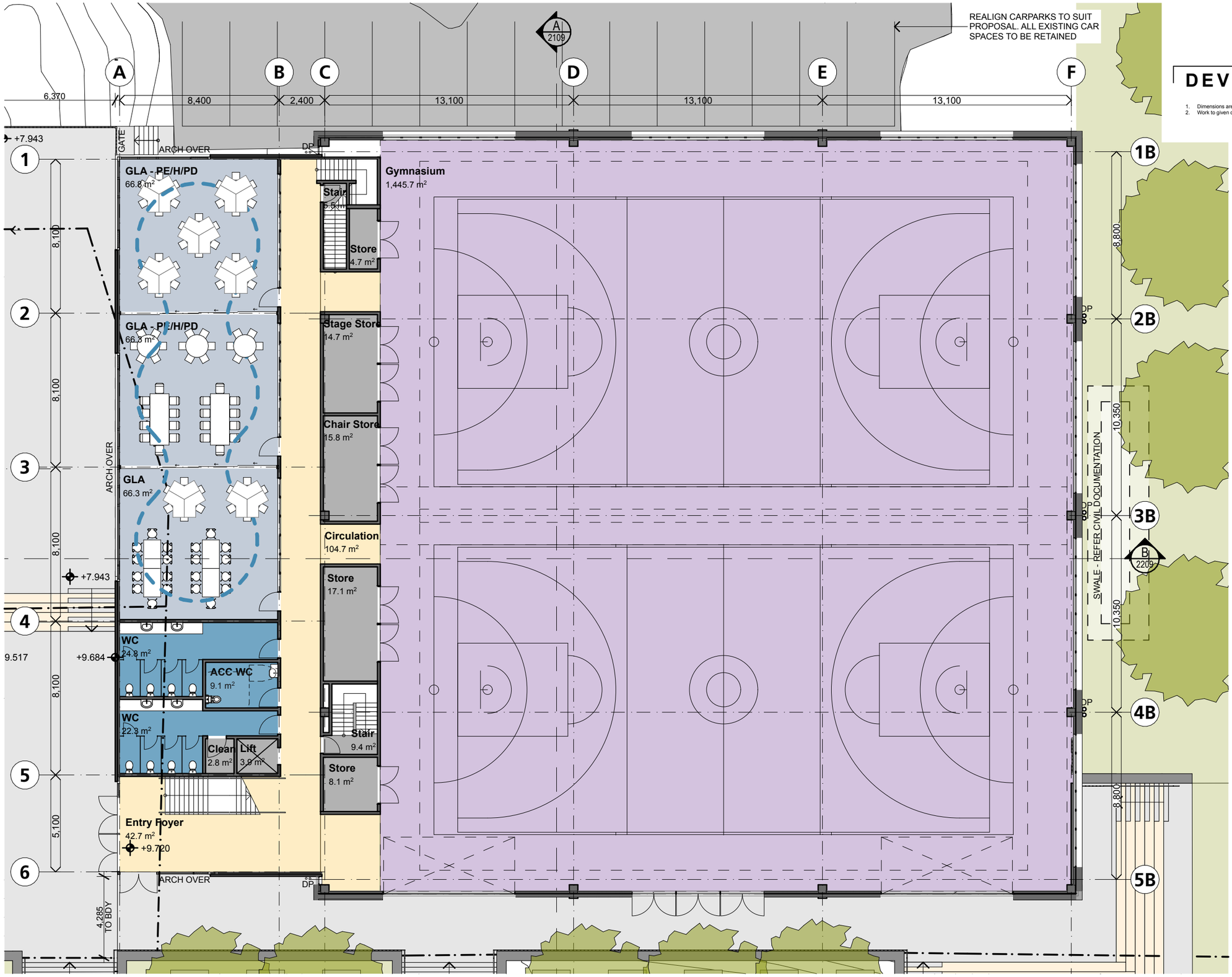
Proposed Lower Ground Floor Plan MPC

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846



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4367
DA3002
RevJ 6.09.22

Proposed Ground Floor Plan MPC

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

SHAC

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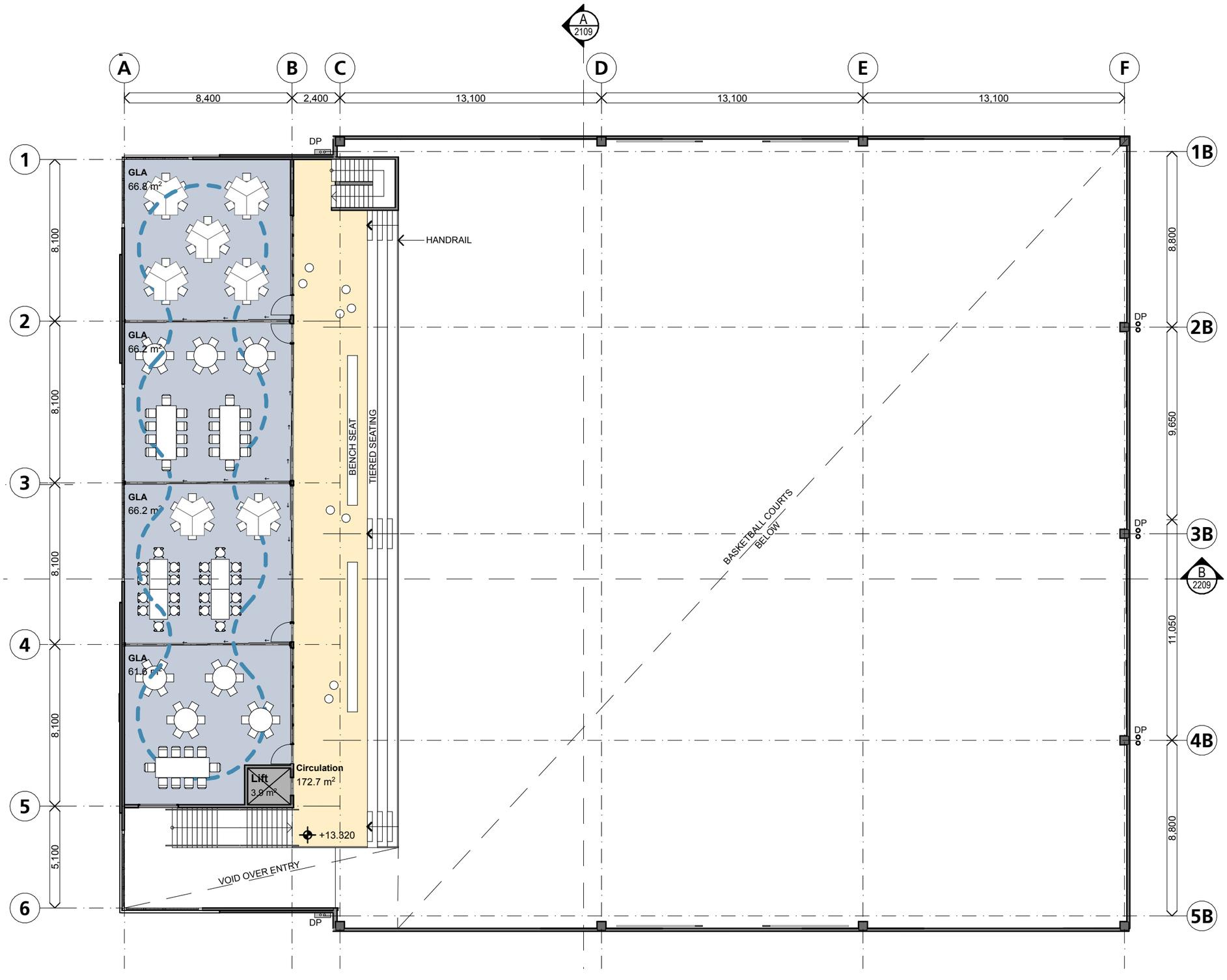

DEVELOPMENT APPLICATION

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4367
DA3003
RevJ 6.09.22

Proposed First Floor Plan MPC

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

SHAC
Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

DEVELOPMENT APPLICATION

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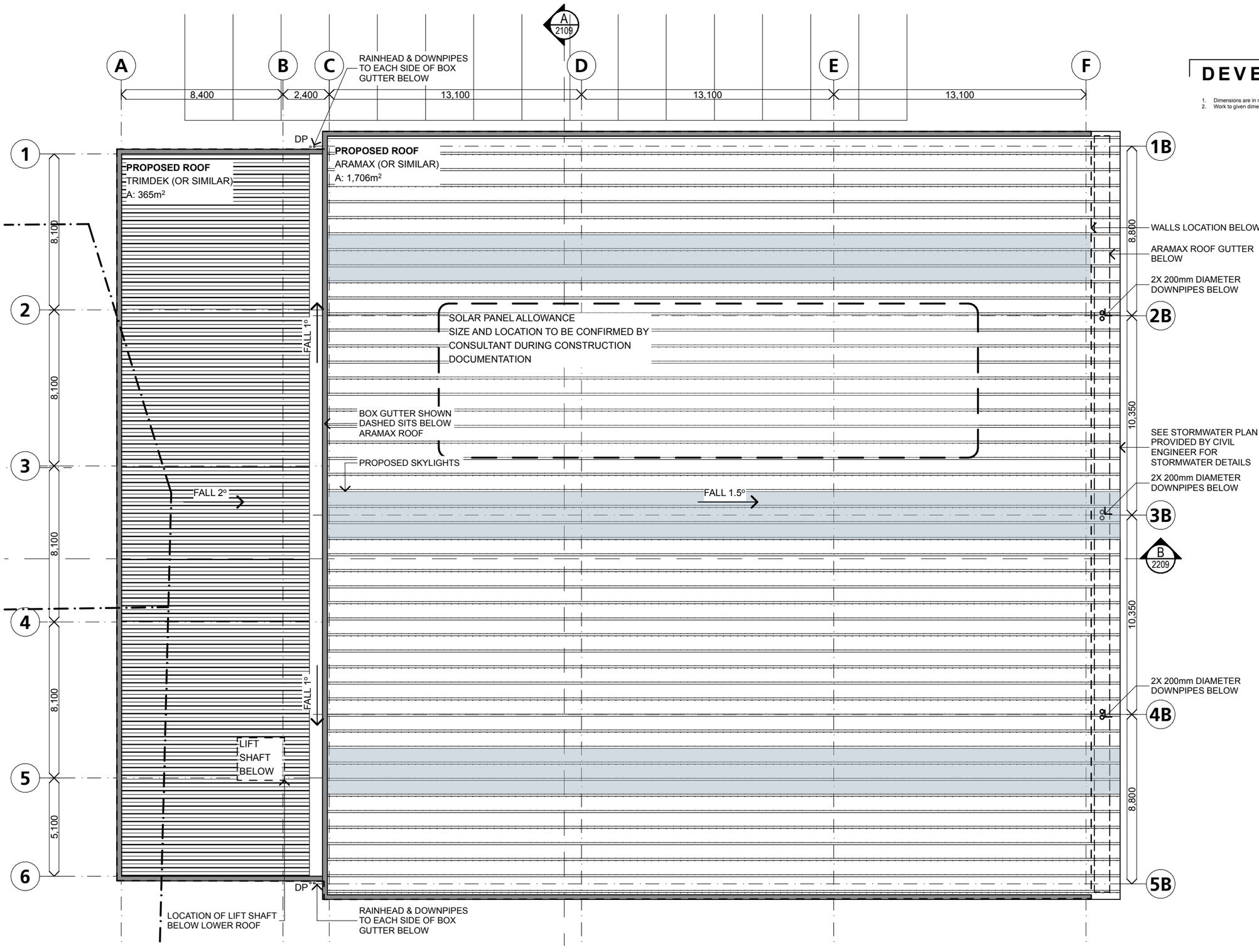

4367
DA3004
RevJ 6.09.22

Proposed Roof Plan

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

SHAC

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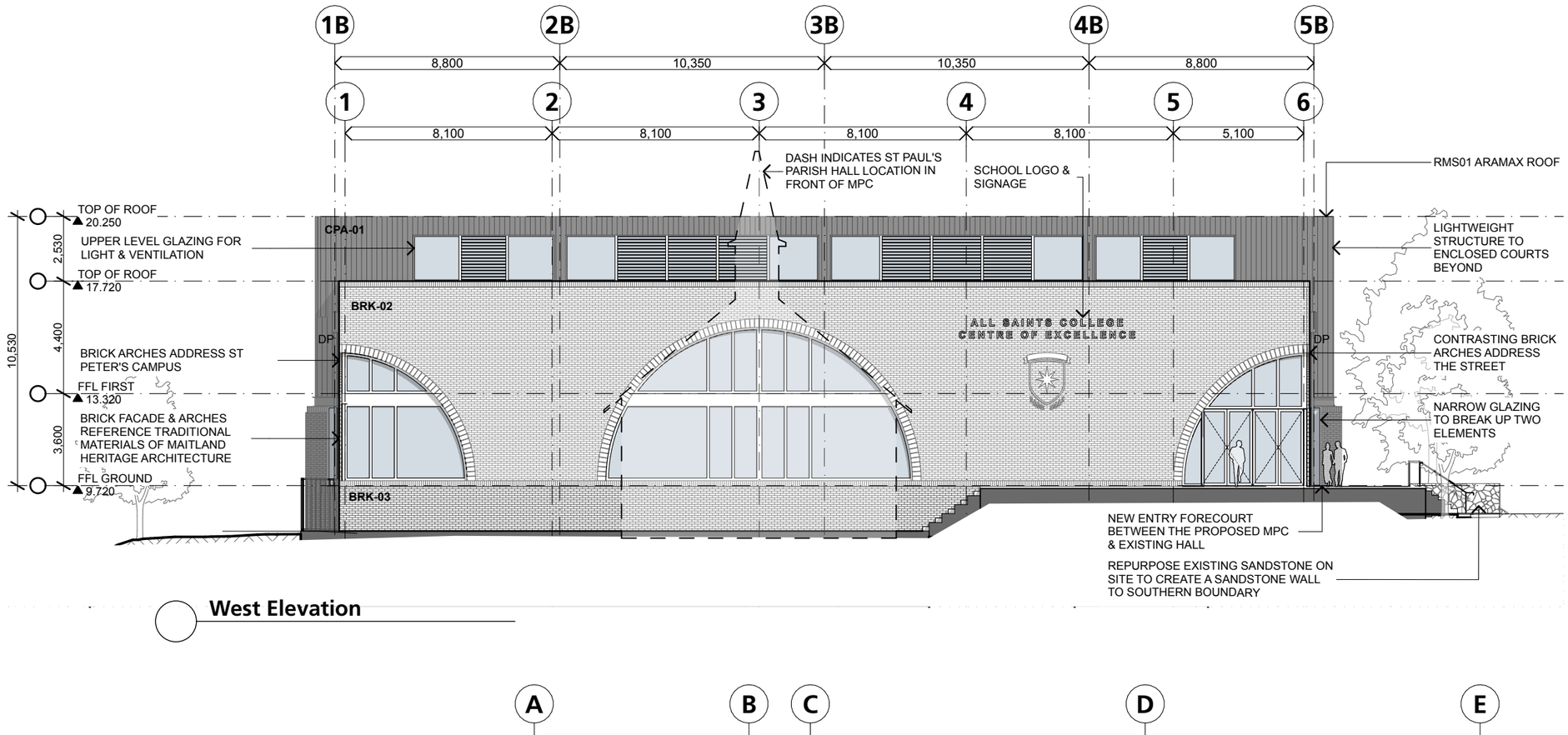
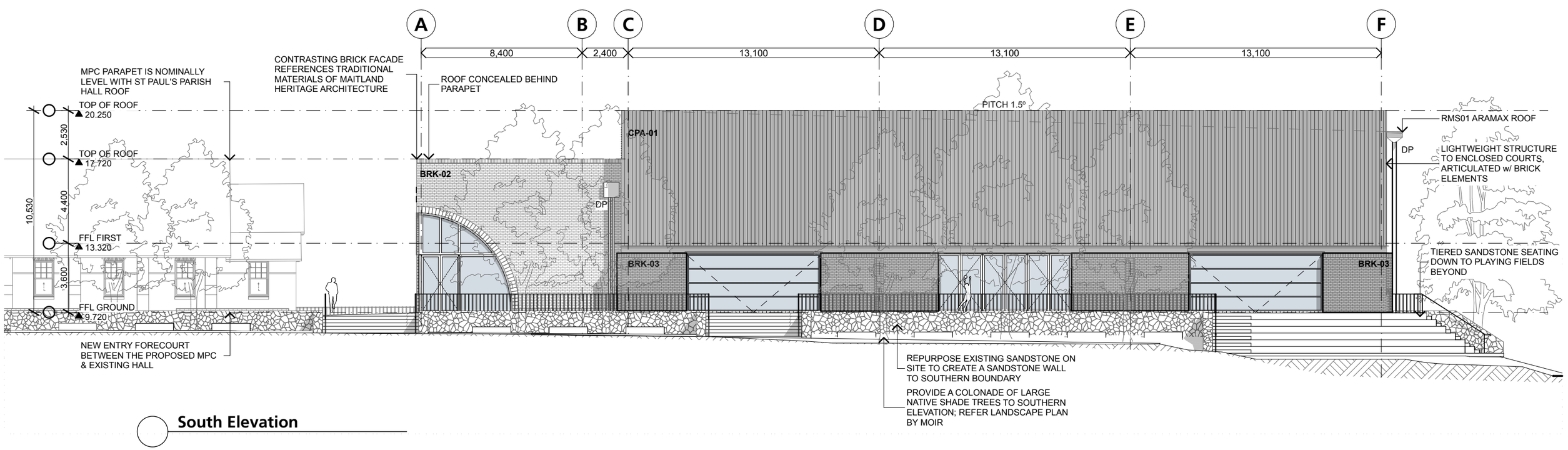


West Elevation



South Elevation

DEVELOPMENT APPLICATION

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4367
DA3101
RevJ 6.09.22

Elevations MPC

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Catholic Diocese of Maitland-Newcastle

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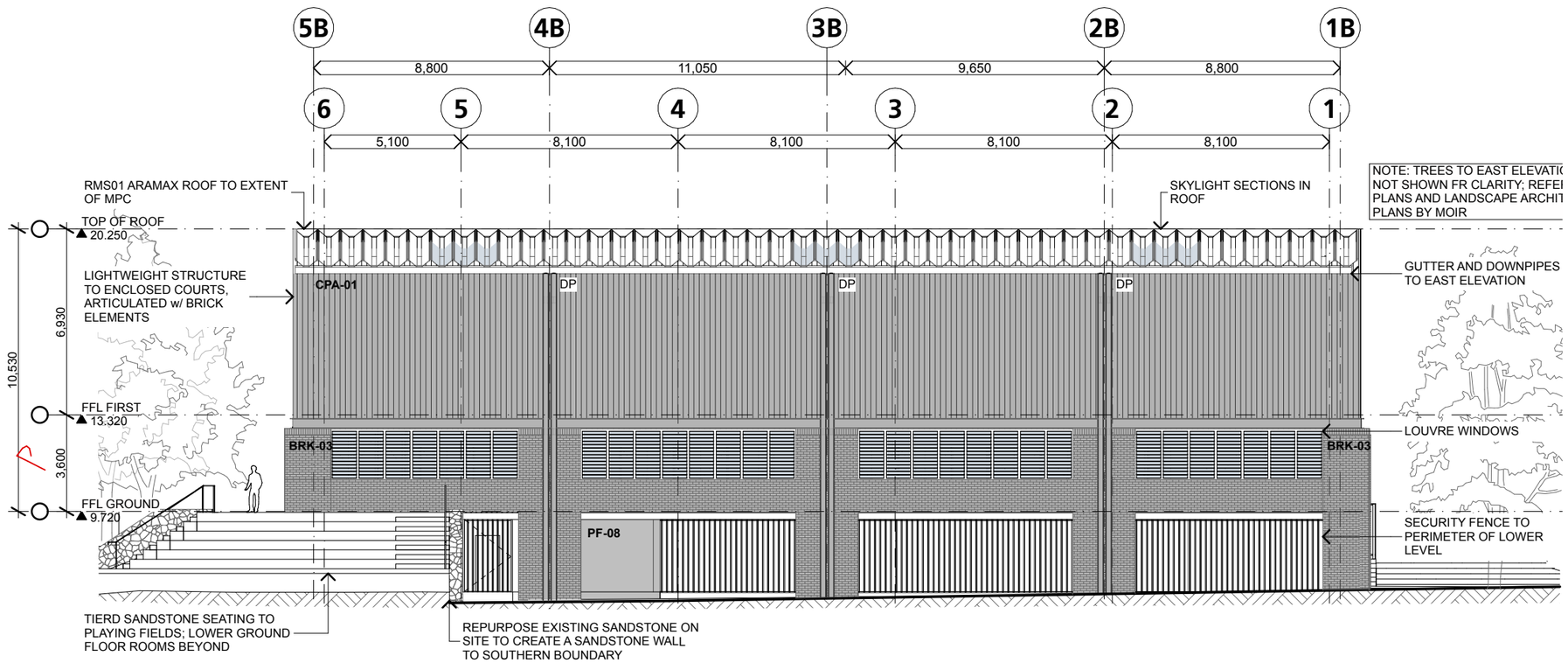
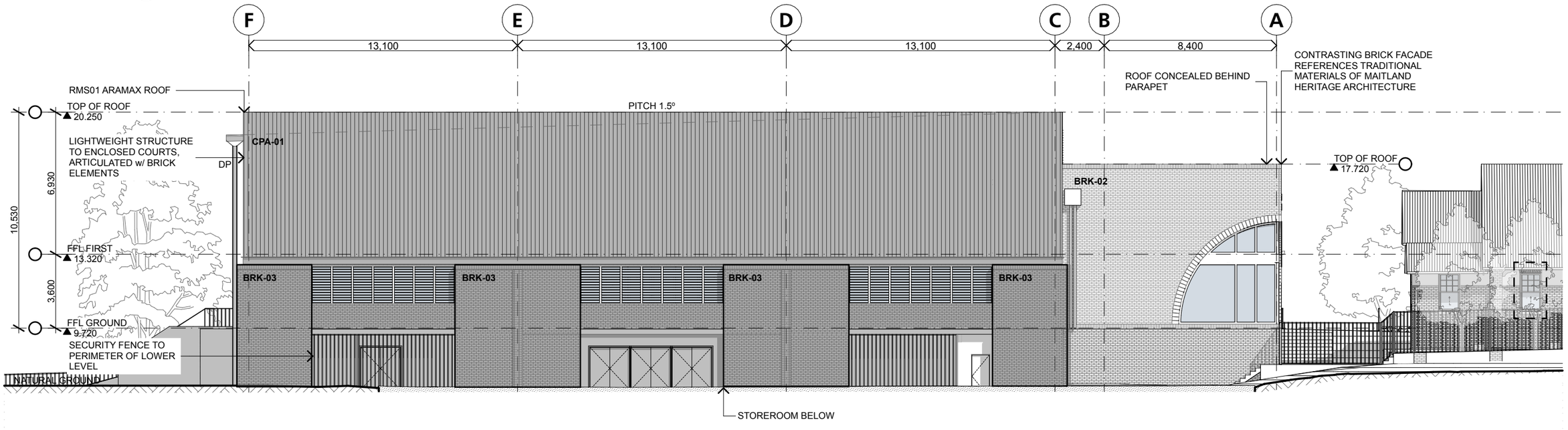


East Elevation



North Elevation

4367
DA3102
RevJ 6.09.22

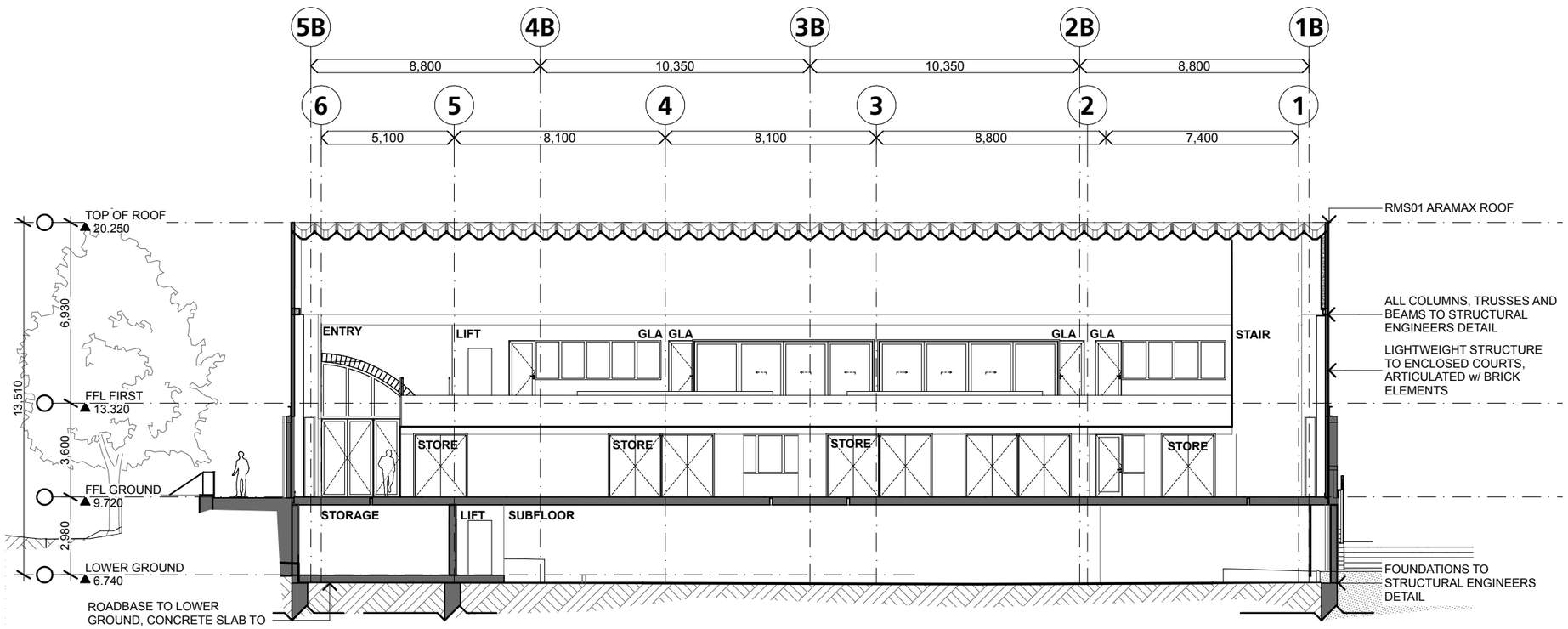
Elevations MPC

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

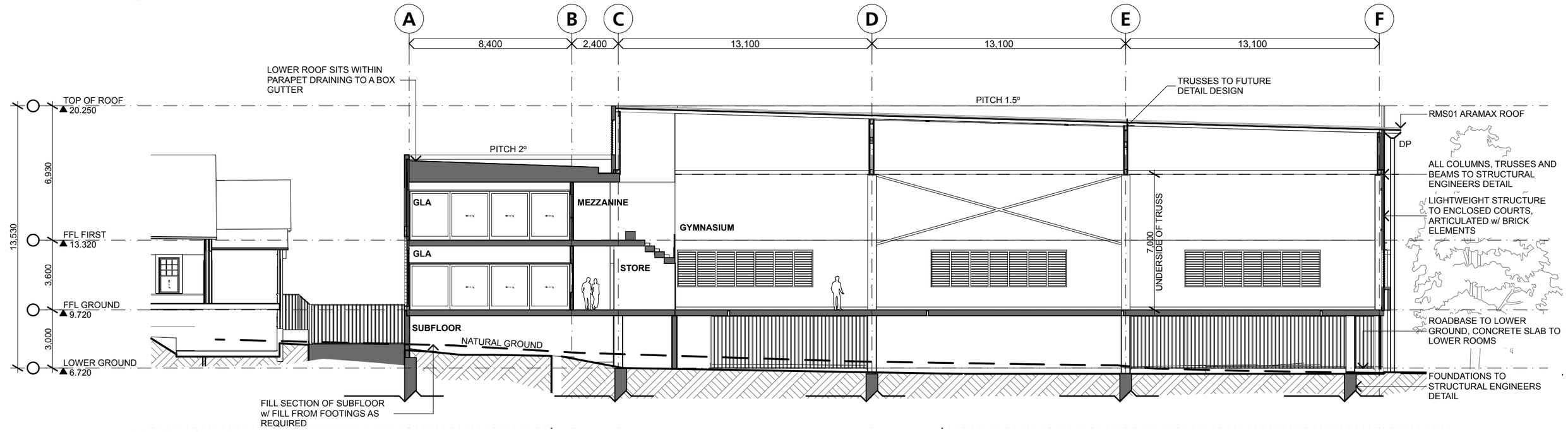
0m 2 4 6 8 10 1:200 @A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846



Section A



Section B

4367
DA3201
Revl 31.08.22

Sections MPC

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

0m 2 4 6 8 10 1:200 @A3

Catholic Diocese of Maitland-Newcastle

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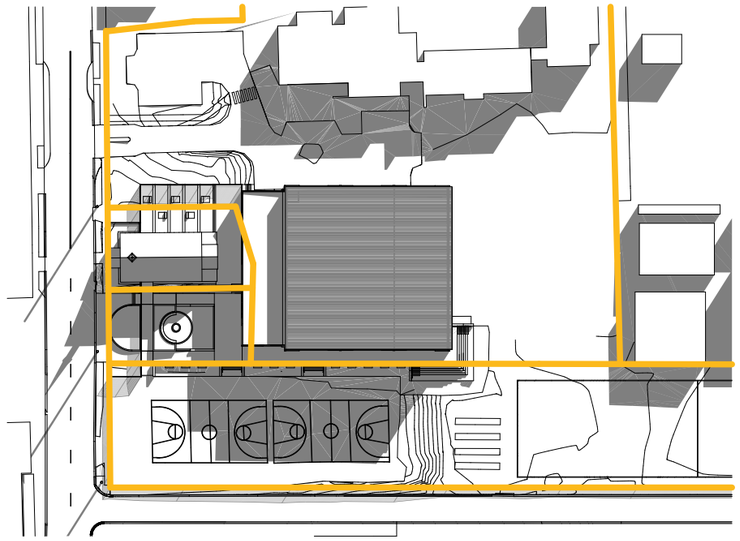
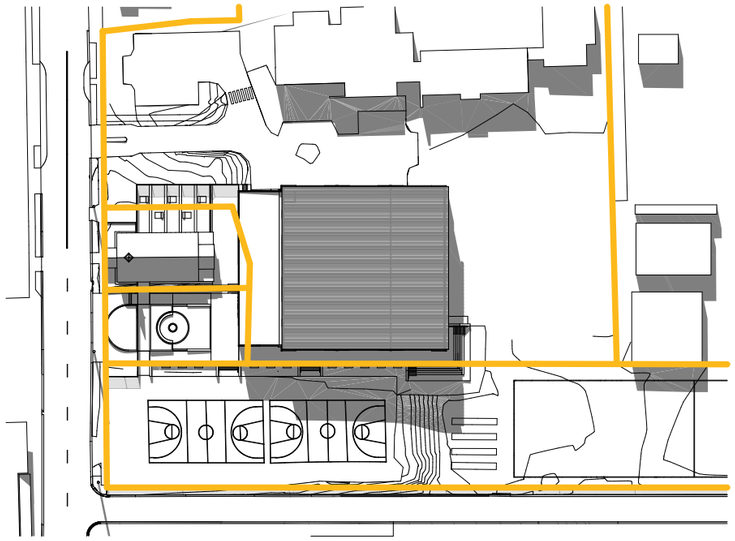
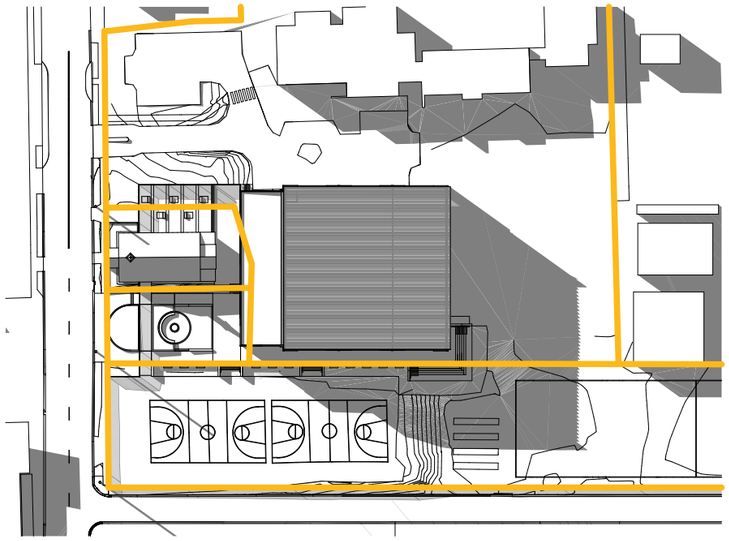
WINTER



21 June 9am

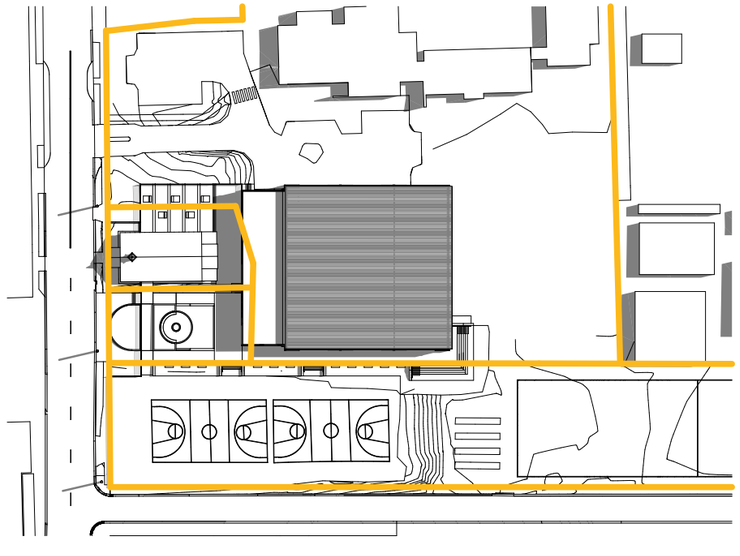


21 June 12pm

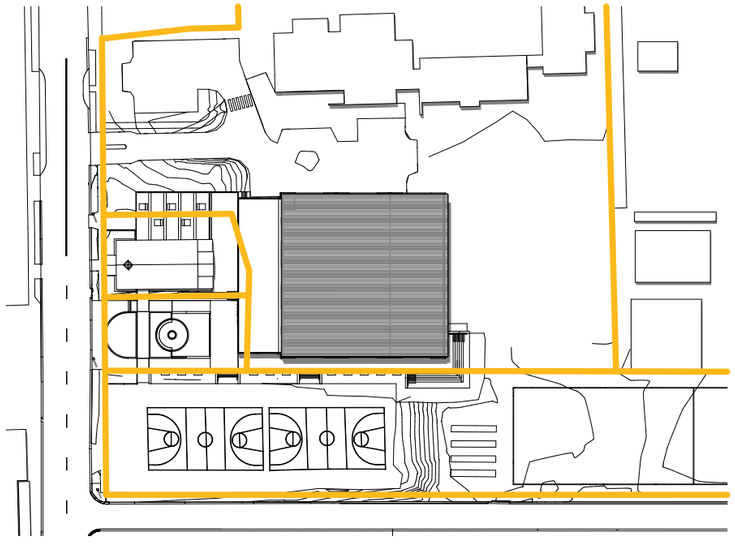


21 June 3pm

SUMMER



21 December 9am



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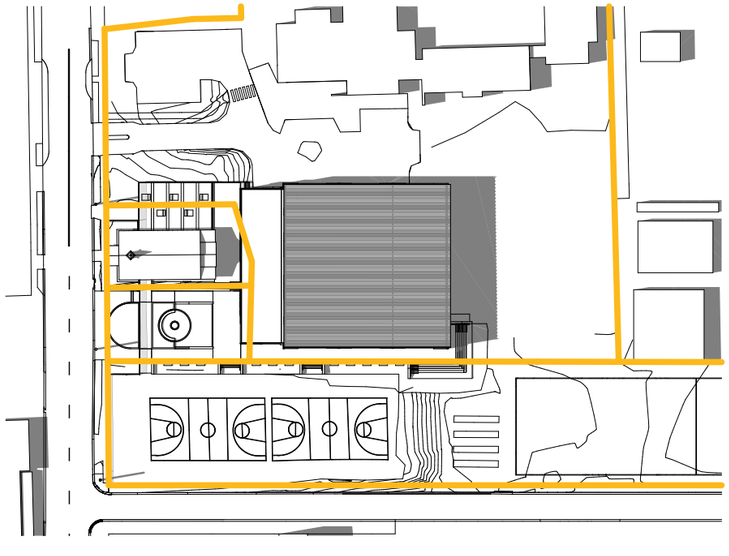

21 December 3pm

4367
DA5001
Revl 31.08.22

Shadow Diagrams

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

NTS
@A3

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Catholic Diocese of Maitland-Newcastle

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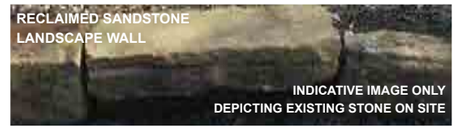
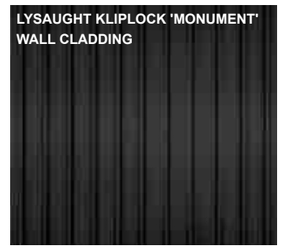
LIGHT BRICK
BOWRAL 'CHILLINGHAM WHITE' OR EQUIVALENT





4367
DA8001
Revl 31.08.22

Materiality

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

SHAC

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4367
DA8002
Revl 31.08.22

Concept Perspective

All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

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4367
DA8003
Revl 31.08.22

Concept Perspective

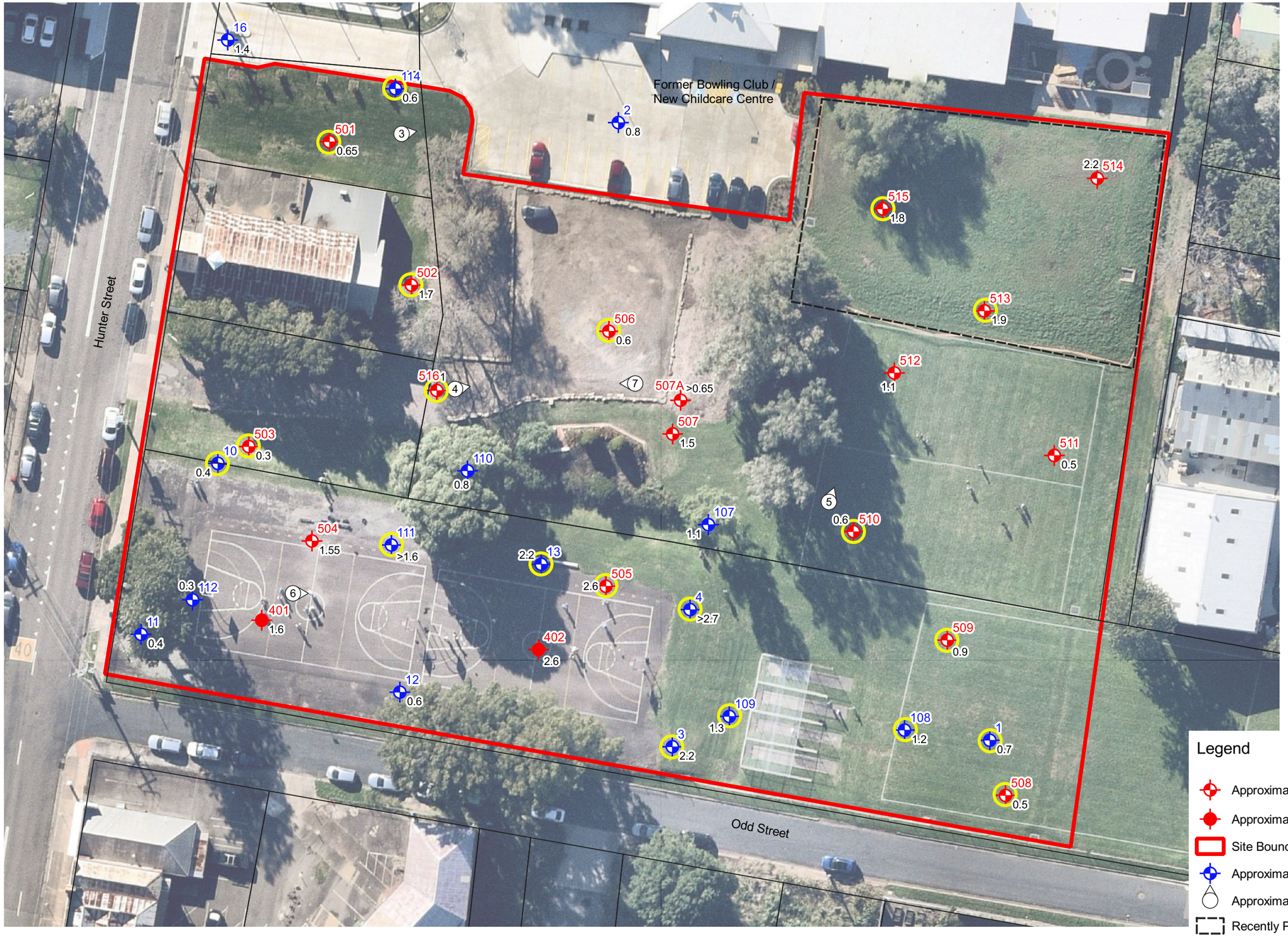
All Saints College Multi-Purpose Centre
24 Hunter Street, Horseshoe Bend

SHAC

Nominated Architect Justin Hamilton (6160) | ABN 32 131 584 846

Appendix B

Previous Test Location Plan



Site Location

0 10 20 30 40 m

Drawing adapted from Nearmap Image dated 165.06.2020.

Legend

- Approximate Borehole Location (current investigation)
- Approximate CPT Location (current investigation)
- Site Boundary
- Approximate Borehole Location (previous investigation)
- Approximate Photo Location & Orientation
- Recently Placed Fill Platform
- 1.0 Depth to Fill
- Exccedance of Landuse Criteria

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Catholic Diocese of Maitland Newcastle	
OFFICE:	Newcastle	DRAWN BY: PLH
SCALE:	1:500 @ A3	DATE: 04.September.2020

TITLE: **Test Location Plan - Exceedances and Depth of Fill**
Proposed Multi-Purpose Building
Odd Street, Horseshoe Bend

N

PROJECT No:	81916.05
DRAWING No:	1
REVISION:	0

Appendix C

Tabulated Summary Results from Previous Reports

Table 6: Summary of Laboratory Results – Metals, TRH, BTEX, PAH - Landuse

				Metals										TRH						BTEX				PAH			
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	Manganese	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
		Investigation period	PQL	4	0.4	1	1	1	0.1	1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.05
Sample ID	Depth		Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1	0.5 m	Previous Investigations	24/02/2016	32	2	31	590	340	0.4	37	4100	530	<25	<50	<25	<50	470	<100	<0.2	<0.5	<1	<1	<1	7.6	12	85
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
3	1 m		24/02/2016	25	0.7	27	34	480	0.4	33	410	530	<25	<50	<25	<50	330	100	<0.2	<0.5	<1	<1	<1	4.8	6.8	47
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
4	2.5 m		24/02/2016	<4	<0.4	23	18	130	0.4	25	130	1400	<25	<50	<25	<50	260	<100	0.3	<0.5	<1	<1	<1	4.2	6.1	38
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
D1/JPS	-		24/02/2016	4	1	13	17	78	0.4	17	470	210	<25	<50	<25	<50	160	<100	<0.2	<0.5	<1	<1	<1	3.5	5.1	45
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
10	0.2 m		25/02/2016	5	0.8	32	30	120	0.4	35	470	640	<25	<50	<25	<50	320	170	<0.2	<0.5	<1	<1	<1	7.3	11	83
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
11	0.5 m		25/02/2016	<4	<0.4	21	12	8	<0.1	22	36	390	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	NT
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
12	0.5 m		25/02/2016	<4	<0.4	26	13	54	0.1	24	120	350	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.3	<0.5	2.8
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
13	0.5 m		25/02/2016	15	1	20	29	330	0.5	26	510	360	<25	<50	<25	<50	270	<100	<0.2	<0.5	<1	<1	<1	6.2	9	71
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
16	0.2 m		25/02/2016	<4	<0.4	25	20	430	0.3	29	110	420	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.7	0.9	8.2
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
107	0.5 m		13/06/2018	<4	<0.4	19	12	22	<0.1	18	54	250	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.08	<0.5	1.1
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
108	0 - 0.1 m		13/06/2018	<4	<0.4	21	29	94	0.2	22	150	380	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.7	0.9	7.5
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
108	1 m		13/06/2018	<4	<0.4	39	45	140	3.1	43	580	640	<25	<50	<25	<50	160	<100	<0.2	<0.5	<1	<1	<1	2	2.9	19
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
109	0.65 m		13/06/2018	6	0.7	21	29	230	0.7	26	410	310	<25	<50	<25	<50	480	110	<0.2	<0.5	<1	<1	<1	7.8	11	72
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
109	1 m		13/06/2018	<4	<0.4	26	12	12	<0.1	16	290	150	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	<0.05	<0.5	<0.05
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
110	0.5 m		13/06/2018	<4	<0.4	29	20	65	0.3	28	54	480	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.2	<0.5	2
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
D104	0 m		13/06/2018	<4	<0.4	23	16	52	0.5	22	46	370	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.4	<0.5	3.8
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
111	0 - 0.1 m		13/06/2018	5	<0.4	9	9	75	<0.1	10	130	110	<25	<50	<25	<50	310	<100	<0.2	<0.5	<1	<1	<1	5.5	7.4	39
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
112	0.2 m		13/06/2018	4	<0.4	6	6	11	<0.1	3	14	44	<25	<50	<25	<50	120	160	<0.2	<0.5	<1	<1	<1	0.1	<0.5	0.98
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
114	0.2 m		13/06/2018	4	<0.4	25	24	260	0.7	25	270	420	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	1.8	2.3	16
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
501	0.3 m	Current investigation	15/07/2020	<4	<0.4	24	23	210	0.2	25	270	390	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	2	2.9	22
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
502	0.5 m		15/07/2020	5	0.6	20	32	260	0.3	18	250	290	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	1.6	2.2	17
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
503	0.1 m		15/07/2020	<4	<0.4	23	17	49	0.1	24	81	390	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	1.5	2.1	13
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
504	0.1 m		15/07/2020	5	4	19	11	22	<0.1	10	180	150	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.1	<0.5	0.4
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
505	0.5 m		15/07/2020	8	<0.4	16	35	790	0.3	19	420	230	<25	<50	<25	<50	330	100	<0.2	<0.5	<1	<1	<1	5.4	7.9	48
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
D2/JRK	-		15/07/2020	5	0.4	10	8	25	<0.1	6	75	87	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.06	<0.5	0.3
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
505	1.5 m		15/07/2020	37	0.8	26	75	460	0.5	36	760	440	<25	50	<25	<50	1000	270	<0.2	<0.5	<1	<1	1.4	20	29	250
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
505	2.8 m		15/07/2020	<4	<0.4	41	33	33	0.1	42	90	720	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.62	0.8	7.1
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
506	0.5 m		15/07/2020	5	<0.4	8	9	13	<0.1	11	36	280	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.95	1.3	8.2
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
507	0.1 m		16/07/2020	<4	<0.4	19	14	27	<0.1	21	55	400	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.5	0.7	5.5
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
508	0.4 m		15/07/2020	<4	<0.4	23	23	96	0.1	25	150	400	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	2.4	3.3	25
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
509	0.5 m		15/07/2020	5	<0.4	25	37	240	0.4	36	220	400	<25	<50	<25	<50	140	<100	<0.2	<0.5	<1	<1	<1	3.4	4.9	35
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
510	0.1 m		15/07/2020	4	<0.4	22	28	130	0.1	26	200	330	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.84	1.1	9
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
511	0.4 m		15/07/2020	<4	<0.4	25	18	49	0.6	28	190	330	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.2	<0.5	1.4
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
511	1 m		15/07/2020	<4	<0.4	33	27	12	<0.1	37	59	870	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.2	<0.5	1.6
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
513	0.5 m		23/07/2020	<4	0.6	23	24	140	0.2	24	1800	460	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	1.2	1.7	12
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
515	1.5 m		23/07/2020	4	<0.4	17	33	150	0.2	27	260	250	<25	<50	<25	<50	300	130	<0.2	<0.5	<1	<1	<1	15	21	150
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC
516	0.5 m		16/07/2020	<4	<0.4	15	18	88	<0.1	21	92	230	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	3.1	4.3	35
				300 100	90 NC	300 580	17000 230	600 1100	80 NC	1200 310	30000 910	19000 NC	NC NC	NC NC	NL 180	NL 120	NC 300	NC 2800	NL 50	NL 85	NL 70	NL 105	NL 170	NC 0.7	3 NC	300 NC

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance | EIL/ESL exceedance | HIL/HSL and EIL/ESL exceedance | ML exceedance | ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL C (high school), HSL C (high schoo), DC HSL C (high school)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (high school), ESL UR/POS (high school)
ML	NEPC, Schedule B1 - ML R/P/POS (high school)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite
c	criteria applies to DDT only

Table 7: Summary of Laboratory Results – OCP, OPP, PCB, Asbestos - Landuse

				OCP											OPP	PCB	Asbestos		
				DDT+DDE+DDD[c]	DDD	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Total Endosulfan	Endrin	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
		Investigation period	PQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Sample ID	Depth		Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
1	0.5 m	Previous Investigations	24/02/2016	NT 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
3	1 m		24/02/2016	NT 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
4	2.5 m		24/02/2016	NT 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
D1/JPS	-		24/02/2016	NT 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
10	0.2 m		25/02/2016	NT 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
11	0.5 m		25/02/2016	NT 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
12	0.5 m		25/02/2016	NT 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
13	0.5 m		25/02/2016	NT 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
16	0.2 m		25/02/2016	NT 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
107	0.5 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
108	0 - 0.1 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
108	1 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
108	1 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
109	0.65 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.5 1 NC	NT	NT	NT
109	1 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
110	0.5 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
D104	0 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
111	0 - 0.1 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.5 1 NC	NT	NT	NT
112	0.2 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
114	0.2 m		13/06/2018	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
501	0.3 m	Current investigation	15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
502	0.5 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
503	0.1 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
504	0.1 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
505	0.5 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
D2/JRK	-		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
505	1.5 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
505	2.8 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
506	0.5 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
507	0.1 m		16/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
508	0.4 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
509	0.5 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
510	0.1 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
511	0.4 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT
511	1 m		15/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
513	0.5 m		23/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
515	1.5 m		23/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NAD	NAD	NAD
516	0.5 m		16/07/2020	<0.1 400 180	<0.1 NC NC	<0.1 NC NC	<0.1 NC 180	<0.1 10 NC	<0.1 70 NC	<0.1 340 NC	<0.1 20 NC	<0.1 10 NC	<0.1 10 NC	<0.1 400 NC	<0.1 250 NC	<0.1 1 NC	NT	NT	NT

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance | EIL/ESL exceedance | HIL/HSL and EIL/ESL exceedance | ML exceedance | ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL C (high schoo), HSL C (high schoo), DC HSL C (high schoo)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (high schoo), ESL UR/POS (high schoo)
ML	NEPC, Schedule B1 - ML R/P/POS (high schoo)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite
c	criteria applies to DDT only

Table 8: Summary of Laboratory Results – Additional metals, Complete PAH suite, TRH, Complete OCP suite, Complete OPP suite - Landuse

				Additional metals	Complete PAH suite													TRH		Complete OCP suite										Complete OPP suite			
				Iron	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	TRH C6 - C9	C10-C36 recoverable hydrocarbons	alpha-BHC	beta-BHC	Bromophos-ethyl	Chlorpyriphos-methyl	delta-BHC	Diazinon	Dimethoate	Endrin Aldehyde	Lindane	Heptachlor Epoxide	Azinphos methyl (Guthion)	Ethion	Fenitrothion	Ronnel (fenchlorphos)
		Investigation period	PQL	10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	25	50	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sample ID	Depth		Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1	0.5 m	Previous Investigations	24/02/2016	26000	0.2	14	2.4	6.8	4.9	9	14	12	0.6	5.3	9	12	<25	510	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
3	1 m		24/02/2016	25000	0.1	0.5	0.9	3.6	3.7	4.9	0.7	7.6	0.2	3.6	3.6	7.3	<25	370	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
4	2.5 m		24/02/2016	20000	0.1	0.5	13	3.4	2.8	4.2	0.8	4.7	0.5	2.8	3.3	4.7	<25	300	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
D1/JPS	-		24/02/2016	13000	0.2	0.6	2.1	4.8	14	5.1	0.5	7.5	0.7	15	5	7.1	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
10	0.2 m		25/02/2016	30000	0.3	0.4	11	5.2	8.4	7.3	12	13	0.3	8	6.6	12	<25	430	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
11	0.5 m		25/02/2016	19000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
12	0.5 m		25/02/2016	22000	<0.1	<0.1	<0.1	0.3	0.2	0.5	<0.1	0.4	<0.1	0.1	0.1	0.4	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
13	0.5 m		25/02/2016	41000	0.5	0.7	17	5.3	4.7	7.1	0.7	11	0.4	4.5	6.9	11	<25	290	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
16	0.2 m		25/02/2016	21000	<0.1	<0.1	0.2	0.6	0.4	0.9	<0.1	17	<0.1	0.4	0.8	16	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
107	0.5 m		13/06/2018	15000	<0.1	<0.1	<0.1	0.1	<0.1	0.2	<0.1	0.3	<0.1	<0.1	0.1	0.3	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
108	0 - 0.1 m		13/06/2018	19000	<0.1	<0.1	0.1	0.7	0.4	0.8	<0.1	14	<0.1	0.3	0.5	13	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
108	1 m		13/06/2018	32000	<0.1	0.1	0.3	2.2	0.6	2.1	0.2	3.1	<0.1	0.7	12	3	<25	110	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
109	0.65 m		13/06/2018	22000	0.2	0.3	11	8	2.4	7.4	0.9	12	0.3	2.5	4.5	11	<25	520	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
109	1 m		13/06/2018	14000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
110	0.5 m		13/06/2018	25000	<0.1	<0.1	<0.1	0.2	0.2	0.2	<0.1	0.4	<0.1	<0.1	0.2	0.4	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
D104	0 m		13/06/2018	20000	<0.1	<0.1	<0.1	0.3	0.2	0.3	<0.1	0.8	<0.1	0.2	0.4	0.7	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
111	0 - 0.1 m		13/06/2018	11000	<0.1	0.2	0.9	5.3	0.9	3.2	0.4	5.9	0.1	0.9	2.7	5.2	<25	230	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
112	0.2 m		13/06/2018	8300	<0.1	<0.1	<0.1	0.1	<0.1	0.1	<0.1	0.2	<0.1	<0.1	0.1	0.2	<25	120	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
114	0.2 m		13/06/2018	21000	<0.1	<0.1	0.2	13	0.8	11	<0.1	3.1	<0.1	0.6	13	2.7	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
501	0.3 m	Current investigation	15/07/2020	22000	<0.1	0.2	0.5	18	13	17	0.2	4.5	<0.1	11	18	4.1	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
502	0.5 m		15/07/2020	14000	<0.1	0.2	0.4	13	1	13	0.2	3.2	<0.1	0.8	13	3	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
503	0.1 m		15/07/2020	22000	<0.1	0.3	0.3	1	12	1	0.2	2.1	<0.1	0.9	0.6	2.1	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
504	0.1 m		15/07/2020	14000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.2	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
505	0.5 m		15/07/2020	22000	0.1	0.6	14	5.9	2.4	5	0.7	6.4	0.2	2	2.6	6.9	<25	470	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
D2/JRK	-		15/07/2020	14000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
505	1.5 m		15/07/2020	28000	0.7	7.4	10	24	9.1	21	2.7	42	2.4	8.4	31	41	<25	1450	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
505	2.8 m		15/07/2020	38000	<0.1	0.1	0.2	0.8	0.3	0.7	<0.1	12	<0.1	0.2	0.8	12	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
506	0.5 m		15/07/2020	15000	<0.1	0.1	0.1	0.6	0.8	0.6	0.1	13	<0.1	0.5	0.3	14	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
507	0.1 m		16/07/2020	19000	<0.1	0.2	0.2	0.5	0.3	0.4	<0.1	1	<0.1	0.3	0.4	1	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
508	0.4 m		15/07/2020	22000	<0.1	0.3	0.5	2	14	19	0.2	4.8	<0.1	12	2	4.5	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
509	0.5 m		15/07/2020	22000	0.1	0.6	1	3.6	2	2.8	0.4	6	0.2	16	2.4	5.8	<25	120	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
510	0.1 m		15/07/2020	19000	<0.1	0.1	0.2	0.7	0.6	0.7	<0.1	17	<0.1	0.5	0.6	17	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
511	0.4 m		15/07/2020	25000	<0.1	<0.1	<0.1	0.1	0.1	0.2	<0.1	0.3	<0.1	<0.1	<0.1	0.3	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
511	1 m		15/07/2020	31000	<0.1	<0.1	<0.1	0.1	0.1	0.2	<0.1	0.3	<0.1	0.1	0.1	0.3	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
513	0.5 m		23/07/2020	22000	<0.1	0.2	0.3	0.9	0.8	0.9	0.1	2	<0.1	0.6	0.6	2	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
515	1.5 m		23/07/2020	13000	1	1	3	12	11	9.6	14	27	0.7	8.1	10	26	<25	450	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
516	0.5 m		16/07/2020	14000	0.3	0.4	0.9	2.5	2.2	2.5	0.3	6.4	0.3	17	3.4	6.2	<25	<50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
				NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Lab result
HIL/HSL value EIL/ESL value

HIL/HSL exceedance | EIL/ESL exceedance | HIL/HSL and EIL/ESL exceedance | ML exceedance | ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab below the PQL, refer to the lab report **Blue** = DC exceedance

Bold = Lab detections NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable NAD = No asbestos detected

Notes:

HIL/HSL/DC	NEPC, Schedule B1 - HIL C (high school), HSL C (high school), DC HSL C (high school)
EIL/ESL	NEPC, Schedule B1 - EIL UR/POS (high school), ESL UR/POS (high school)
ML	NEPC, Schedule B1 - ML R/P/POS (high school)
a	QA/QC replicate of sample listed directly below the primary sample
b	reported naphthalene laboratory result obtained from BTEXN suite
c	criteria applies to DDT only

Table 9: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, OCP, OPP, PCB, Asbestos - Waste Classification

				Metals						TRH		BTEX						PAH																OCP		OPP	PCB	Asbestos		
				Arsenic	Cadmium	Total Chromium	Lead	Mercury (inorganic)	Nickel	TRH C6 - C9	TRH C10-C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Benzo(a)pyrene (BaP)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Total PCB	Asbestos ID in soil >0.1g/Kg	Trace Analysis	Total Asbestos
		Investigation Period	PQL	4	0.4	1	1	0.1	1	25	50	0.2	0.5	1	2	1	3	0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	1	0.1	0.1	0.05	0.1	0.1	0.1	0.1			
Sample ID	Depth		Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
1	0.5 m		24/02/2016	32	2	31	340	0.4	37	<25	510	<0.2	<0.5	<1	<2	<1	NT	7.6	0.2	14	2.4	6.8	12	4.9	9	14	12	0.6	5.3	<1	9	12	85	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
3	1 m		24/02/2016	25	0.7	27	480	0.4	33	<25	370	<0.2	<0.5	<1	<2	<1	NT	4.8	0.1	0.5	0.9	3.6	5.4	3.7	4.9	0.7	7.6	0.2	3.6	<1	3.6	7.3	47	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
4	2.5 m		24/02/2016	<4	<0.4	23	130	0.4	25	<25	300	0.3	<0.5	<1	<2	<1	NT	4.2	0.1	0.5	13	3.4	4.3	2.8	4.2	0.8	4.7	0.5	2.8	<1	3.3	4.7	38	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
D1/JPS	-		24/02/2016	4	1	13	78	0.4	17	<25	<50	<0.2	<0.5	<1	<2	<1	NT	3.5	0.2	0.6	2.1	4.8	4.4	14	5.1	0.5	7.5	0.7	15	<1	5	7.1	45	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
10	0.2 m		25/02/2016	5	0.8	32	120	0.4	35	<25	430	<0.2	<0.5	<1	<2	<1	NT	7.3	0.3	0.4	11	5.2	11	8.4	7.3	12	13	0.3	8	<1	6.6	12	83	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
11	0.5 m		25/02/2016	<4	<0.4	21	8	<0.1	22	<25	<50	<0.2	<0.5	<1	<2	<1	NT	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	NT	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
12	0.5 m		25/02/2016	<4	<0.4	26	54	0.1	24	<25	<50	<0.2	<0.5	<1	<2	<1	NT	0.3	<0.1	<0.1	<0.1	0.3	0.4	0.2	0.5	<0.1	0.4	<0.1	0.1	<1	0.1	0.4	2.8	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
13	0.5 m		25/02/2016	15	1	20	330	0.5	26	<25	290	<0.2	<0.5	<1	<2	<1	NT	6.2	0.5	0.7	17	5.3	9.9	4.7	7.1	0.7	11	0.4	4.5	<1	6.9	11	71	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
16	0.2 m		25/02/2016	<4	<0.4	25	430	0.3	29	<25	<50	<0.2	<0.5	<1	<2	<1	NT	0.7	<0.1	<0.1	0.2	0.6	0.9	0.4	0.9	<0.1	17	<0.1	0.4	<1	0.8	16	8.2	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
107	0.5 m	Previous Investigations	13/06/2018	<4	<0.4	19	22	<0.1	18	<25	<50	<0.2	<0.5	<1	<2	<1	<1	0.08	<0.1	<0.1	<0.1	0.1	<0.2	<0.1	0.2	<0.1	0.3	<0.1	<0.1	<1	0.1	0.3	1.1	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
108	0 - 0.1 m		13/06/2018	<4	<0.4	21	94	0.2	22	<25	<50	<0.2	<0.5	<1	<2	<1	<1	0.7	<0.1	<0.1	0.1	0.7	1	0.4	0.8	<0.1	1.4	<0.1	0.3	<1	0.5	1.3	7.5	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
108	1 m		13/06/2018	<4	<0.4	39	140	3.1	43	<25	110	<0.2	<0.5	<1	<2	<1	<1	2	<0.1	0.1	0.3	2.2	3.6	0.6	2.1	0.2	3.1	<0.1	0.7	<1	1.2	3	19	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
109	0.65 m		13/06/2018	6	0.7	21	230	0.7	26	<25	520	<0.2	<0.5	<1	<2	<1	<1	7.8	0.2	0.3	1.1	8	13	2.4	7.4	0.9	12	0.3	2.5	<1	4.5	11	72	<0.1	<0.1	<0.1	<0.5	NT	NT	NT
109	1 m		13/06/2018	<4	<0.4	26	12	<0.1	16	<25	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
110	0.5 m		13/06/2018	<4	<0.4	29	65	0.3	28	<25	<50	<0.2	<0.5	<1	<2	<1	<1	0.2	<0.1	<0.1	<0.1	0.2	0.4	0.2	0.2	<0.1	0.4	<0.1	<0.1	<1	0.2	0.4	2	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
D104	0 m		13/06/2018	<4	<0.4	23	52	0.5	22	<25	<50	<0.2	<0.5	<1	<2	<1	<1	0.4	<0.1	<0.1	<0.1	0.3	0.6	0.2	0.3	<0.1	0.8	<0.1	0.2	<1	0.4	0.7	3.8	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
111	0 - 0.1 m		13/06/2018	5	<0.4	9	75	<0.1	10	<25	230	<0.2	<0.5	<1	<2	<1	<1	5.5	<0.1	0.2	0.9	5.3	7.7	0.9	3.2	0.4	5.9	0.1	0.9	<1	2.7	5.2	39	<0.1	<0.1	<0.1	<0.5	NT	NT	NT
112	0.2 m		13/06/2018	4	<0.4	6	11	<0.1	3	<25	120	<0.2	<0.5	<1	<2	<1	<1	0.1	<0.1	<0.1	<0.1	0.1	0.2	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<1	0.1	0.2	0.98	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
114	0.2 m		13/06/2018	4	<0.4	25	260	0.7	25	<25	<50	<0.2	<0.5	<1	<2	<1	<1	18	<0.1	<0.1	0.2	13	2.8	0.8	11	<0.1	3.1	<0.1	0.6	<1	1.3	2.7	16	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
501	0.3 m		15/07/2020	<4	<0.4	24	210	0.2	25	<25	<50	<0.2	<0.5	<1	<2	<1	<3	2	<0.1	0.2	0.5	18	3.1	13	17	0.2	4.5	<0.1	11	<1	18	4.1	22	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
502	0.5 m		15/07/2020	5	0.6	20	260	0.3	18	<25	<50	<0.2	<0.5	<1	<2	<1	<3	16	<0.1	0.2	0.4	13	2.4	1	13	0.2	3.2	<0.1	0.8	<1	13	3	17	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
503	0.1 m		15/07/2020	<4	<0.4	23	49	0.1	24	<25	<50	<0.2	<0.5	<1	<2	<1	<3	15	<0.1	0.3	0.3	1	2.2	12	1	0.2	2.1	<0.1	0.9	<1	0.6	2.1	13	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
504	0.1 m		15/07/2020	5	4	19	22	<0.1	10	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<1	<0.1	0.2	0.4	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
505	0.5 m		15/07/2020	8	<0.4	16	790	0.3	19	<25	470	<0.2	<0.5	<1	<2	<1	<3	5.4	0.1	0.6	1.4	5.9	8.2	2.4	5	0.7	6.4	0.2	2	<1	2.6	6.9	48	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
D2/JRK	-		15/07/2020	5	0.4	10	25	<0.1	6	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.06	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<1	<0.1	0.1	0.3	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
505	1.5 m		15/07/2020	37	0.8	26	460	0.5	36	<25	1450	<0.2	<0.5	<1	<2	<1	<3	20	0.7	7.4	10	24	30	9.1	21	2.7	42	2.4	8.4	14	31	41	250	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
505	2.8 m		15/07/2020	<4	<0.4	41	33	0.1	42	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.62	<0.1	0.1	0.2	0.8	1	0.3	0.7	<0.1	1.2	<0.1	0.2	<1	0.8	1.2	7.1	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
506	0.5 m	Current investigation	15/07/2020	5	<0.4	8	13	<0.1	11	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.95	<0.1	0.1	0.1	0.6	1	0.8	0.6	0.1	1.3	<0.1	0.5	<1	0.3	1.4	8.2	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
507	0.1 m		16/07/2020	<4	<0.4	19	27	<0.1	21	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.5	<0.1	0.2	0.2	0.5	0.8	0.3	0.4	<0.1	1	<0.1	0.3	<1	0.4	1	5.5	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
508	0.4 m		15/07/2020	<4	<0.4	23	96	0.1	25	<25	<50	<0.2	<0.5	<1	<2	<1	<3	2.4	<0.1	0.3	0.5	2	3.5	1.4	1.9	0.2	4.8	<0.1	1.2	<1	2	4.5	25	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
509	0.5 m		15/07/2020	5	<0.4	25	240	0.4	36	<25	120	<0.2	<0.5	<1	<2	<1	<3	3.4	0.1	0.6	1	3.6	5.3	2	2.8	0.4	6	0.2	1.6	<1	2.4	5.8	35	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
510	0.1 m		15/07/2020	4	<0.4	22	130	0.1	26	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.84	<0.1	0.1	0.2	0.7	1	0.6	0.7	<0.1	1.7	<0.1	0.5	<1	0.6	1.7	9	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
511	0.4 m		15/07/2020	<4	<0.4	25	49	0.6	28	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.2	<0.1	<0.1	<0.1	0.1	0.3	0.1	0.2	<0.1	0.3	<0.1	<0.1	<1	<0.1	0.3	1.4	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
511	1 m		15/07/2020	<4	<0.4	33	12	<0.1	37	<25	<50	<0.2	<0.5	<1	<2	<1	<3	0.2	<0.1	<0.1	<0.1	0.1	0.3	0.1	0.2	<0.1	0.3	<0.1	0.1	<1	0.1	0.3	1.6	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
513	0.5 m		23/07/2020	<4	0.6	23	140	0.2	24	<25	<50	<0.2	<0.5	<1	<2	<1	<3	12	<0.1	0.2	0.3	0.9	2	0.8	0.9	0.1	2	<0.1	0.6	<1	0.6	2	12	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
515	1.5 m		23/07/2020	4	<0.4	17	150	0.2	27	<25	450	<0.2	<0.5	<1	<2	<1	<3	15	1	1	3	12	20	11	9.6	1.4	27	0.7	8.1	<1	10	26	150	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
516	0.5 m		16/07/2020	<4	<0.4	15	88	<0.1	21	<25	<50	<0.2	<0.5	<1	<2	<1	<3	3.1	0.3	0.4	0.9	2.5	4.7	2.2	2.5	0.3	6.4	0.3	1.7	<1	3.4	6.2	35	<0.1	<0.1	<0.1	<0.1	NT	NT	NT
Waste Classification Criteria [f]																																							
CT1				100	20	100	100	4	40	650	10000	10	288	600	N/A	N/A	1000	0.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	200	60	<50	4	<50	N/A	N/A	N/A
SCC1				500	100	1900	1500	50	1050	650	10000	18	518	1080	N/A	N/A	1800	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	200	108	<50	7.5	<50	N/A	N/A	N/A
TCLP1				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CT2				400	80	400	400	16	160	2600	40000	40	1152	2400	N/A	N/A	4000	32	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	800	240	<50	16	<50	N/A	N/A	N/A
SCC2				2000	400	7600	6000	200	4200	2600	40000	72	2073	4320	N/A	N/A	7200	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	800	432	<50	30	<50	N/A	N/A	N/A
TCLP2				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

CT1 exceedance | TCLP1 and/or SCC1 exceedance | CT2 exceedance | TCLP2 and/or SCC2 exceedance | Asbestos detection

NT = Not tested NC = No criteria AD = Asbestos detected NAD = No asbestos detected

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
d	Criteria for scheduled chemicals used as an initial screen
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid

Table 10: Laboratory Results for Leachability Testing (TCLP and ASLP)

Sample ID	Sample Depth	Investigtion Period	Benzo(a) Pyrene			Total PAH		Lead			Nickel	
			Total	TCLP	ASLP	Total	TCLP	Total	TCLP	ASLP	Total	TCLP
			mg/kg	mg/L	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/L	mg/kg	mg/L
1	0.5	Previous Investigation	7.6	NT	NT	85	NA	340	NT	NT	37	NT
3	1		4.8	NT	NT	47	NA	480	NT	NT	33	NT
4	2.5		4.2	NT	NT	38	NA	130	NT	NT	25	NT
D1/JPS	-		3.5	NT	NT	45	NA	78	NT	NT	17	NT
10	0.2		7.3	NT	NT	83	NA	120	NT	NT	35	NT
11	0.5		<0.05	NT	NT	<0.05	NA	8	NT	NT	22	NT
12	0.5		0.3	NT	NT	2.8	NA	54	NT	NT	24	NT
13	0.5		6.2	NT	NT	71	NA	330	NT	NT	26	NT
107	0.5		0.08	NT	NT	1.1	NA	22	NT	NT	18	NT
108	0.0-0.1		0.7	NT	NT	7.5	NA	94	NT	NT	22	NT
108	1		2	<0.001	NT	19	NA	140	<0.03	NT	43	0.02
109	0.65		7.8	<0.001	<0.0001	72	NA	230	<0.03	NT	26	NT
109	1		<0.05	NT	NT	<0.05	NA	12	NT	NT	16	NT
110	0.5		0.2	NT	NT	2	NA	65	NT	NT	28	NT
D104	-		0.4	NT	NT	3.8	NA	52	NT	NT	22	NT
111	0.0-0.1		5.5	<0.001	NT	39	NA	75	NT	NT	10	NT
112	0.2		0.1	NT	NT	0.98	NA	11	NT	NT	3	NT
114	0.2		1.8	<0.001	NT	16	NA	260	<0.03	NT	25	NT
501	0.3	Current Investigation	2	NT	NT	22	NA	210	NT	NT	25	NT
502	0.5		1.6	NT	NT	17	NA	260	0.06	NT	18	NT
503	0.1		1.5	NT	NT	13	NA	49	NT	NT	24	NT
504	0.1		0.1	NT	NT	0.4	NA	22	NT	NT	10	NT
505	0.5		5.4	NT	<0.0001	48	NA	790	3.7	0.064	19	NT
D2/JRK	-		0.06	NT	NT	0.3	NA	25	NT	NT	6	NT
505	1.5		20	NT	<0.0001	250	NA	460	NT	NT	36	NT
505	2.8		0.62	NT	NT	7.1	NA	33	NT	NT	42	<0.02
506	0.5		0.95	NT	NT	8.2	NA	13	NT	NT	11	NT
507	0.1		0.5	NT	NT	5.5	NA	27	NT	NT	21	NT
508	0.4		2.4	NT	<0.0001	25	NA	96	NT	NT	25	NT
509	0.5		3.4	NT	<0.0001	35	NA	240	<0.03	NT	36	NT
510	0.1		0.84	NT	NT	9	NA	130	<0.03	NT	26	NT
511	0.4		0.2	NT	NT	1.4	NA	49	NT	NT	28	NT
511	1		0.2	NT	NT	1.6	NA	12	NT	NT	37	NT
513	0.5		1.2	NT	NT	12	NA	140	<0.03	NT	24	NT
515	1.5		15	NT	<0.0001	150	NA	150	0.07	NT	27	NT
516	0.5		3.1	NT	<0.0001	35	NA	88	NT	NT	21	NT
Laboratory PQL			0.05	0.001	0.0001	0.05	NA	1	0.003	0.001	1	0.02
NSW EPA - General Solid Waste Guidelines - CT1			0.8 / 10*	0.04	NA	200	NC	100 / 1500*	5	NA	40 / 1050*	2
NSW EPA - Restricted Solid Waste Guidelines - CT2			3.2 / 23*	0.16	NA	800	NC	400 / 6000*	20	NA	160 / 4200*	8
ANZECC 2000 Trigger Values Slightly to Mod. Disturbed - Fresh			NA	NA	0..0001	NA	NA	NA	NA	0.0034	NA	NA

Notes to Table 9:

Total concentrations in mg/kg on a dry w eight basis

CT – Concentration Threshold

TCLP – Results in mg/L

ASLP – Results in mg/L

Shaded	results exceed NSW EPA Waste Classification Guidelines for General Solid Waste considering leachability testing
Shaded	results exceed ANZECC 2000 Trigger Values for Slightly to Moderatly disturbed systems -Fresh Water

* Criteria w hen used in conjunction w ith leachability (TCLP) results

NC – No Criteria

Appendix D

Borehole Logs from Previous Reports

BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 8.21 AHD
EASTING: 365129.165
NORTHING: 6377145.045
DIP/AZIMUTH: 90°/--

BORE No: 501
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.1	FILL / SANDY SILT (ML) - Low plasticity, grey with fine to medium grained sand, trace rootlets, fine subrounded gravels, W<PL		D	0.05	E	PID <1		
		FILL / SILTY CLAY (CL) - Low plasticity, brown with silt, trace rootlets, tile, coal reject, W<PL		D	0.3	E	PID <1		
	0.4	FILL / GRAVELLY SAND - Fine to medium grained, pale brown with fine to coarse subrounded gravels, dry		D	0.5	E	PID <1		
	0.65	SILTY CLAY - Low plasticity, brown with silt, trace fine to medium subrounded gravels, W>PL							
7	1			D	1.0	E	PID <1		1
				D	1.5	E	PID <1		
	2			D	2.0	E	PID <1		2
6	2.1	Bore discontinued at 2.1m, limit of investigation							

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight Auger to 2.1m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 7.87 AHD
EASTING: 365139.724
NORTHING: 6377126.575
DIP/AZIMUTH: 90°/--

BORE No: 502
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
7	0	FILL / SILTY CLAY (CL) - Low plasticity, brown with silt, trace glass, brick, coal reject, rootlets, W<PL		D	0.1	E	PID <1		
				D	0.5	E	PID <1		
	1			D	1.0	E	PID <1		1
				D	1.5	E	PID <1		
6	1.7	SILTY CLAY - Low plasticity, brown with silt, trace fine to medium subrounded gravels, W>PL							
	2			D	2.0	E	PID <1		2
				D	2.5	E	PID <1		
5	2.9	Bore discontinued at 2.9m, limit of investigation							

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight Auger to 2.9m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 8.35 AHD
EASTING: 365118.766
NORTHING: 6377105.776
DIP/AZIMUTH: 90°/--

BORE No: 503
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.3	FILL / SILTY CLAY (CL) - Low plasticity, brown with silt, trace rootlets, fine to coarse subrounded gravels, W<PL		D	0.1	E	PID <1		
		SILTY CLAY - Low plasticity, brown with silt, trace fine to medium subrounded gravels, W>PL		D	0.5	E	PID <1		
	1			D	1.0	E	PID <1		1
7	1.2	SILTY SAND - Fine to medium grained, brown with silt, trace fine subrounded gravels, dry		D	1.5	E	PID <1		
	1.9	Bore discontinued at 1.9m, limit of investigation							
6	2								2

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight Auger to 1.9m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 8.67 AHD
EASTING: 365126.906
NORTHING: 6377093.611
DIP/AZIMUTH: 90°/--

BORE No: 504
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.01	ASPHALT							
		FILL / SANDY CLAY (CL) - Low plasticity, pale brown with medium to coarse sand, fine to coarse gravels, trace ash/slag, coal reject		D	0.1	E	PID <1		
		From 0.25m, intermixed grey, red and white		D	0.5	E	PID <1		
	1			D	1.0	E	PID <1		1
				D	1.5	E	PID <1		
	1.55	SILTY CLAY (CL) - Low plasticity, brown with silt, W>PL		D	1.6	E	PID <1		
7	1.65	SILTY SAND - Fine to medium grained, brown with silt, trace fine subrounded gravels, moist		D	1.8	E	PID <1		
	2	2.0 Bore discontinued at 2.0m, limit of investigation							2
6									

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased

TYPE OF BORING: 90mm diameter Push Tube to 2m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 8.21 AHD
EASTING: 365164.795
NORTHING: 6377087.78
DIP/AZIMUTH: 90°/--

BORE No: 505
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
8	0.01	ASHALT							
		FILL / SILTY SANDY CLAY (CL) - Low plasticity, brown with fine to medium grained sand, fine to coarse gravels, silt, trace coal, ash, brick, metal, W<PL		D	0.1	E	PID <1		
				D	0.5	E	PID <1		
	1			D	1.0	E	PID <1		1
7		From 1.5m, with ash, coal		D	1.5	E	PID <1		
	2			D	2.0	E	PID <1		2
6	2.4	FILL / SANDY CLAY (CL) - Dark grey, fine to medium grained with silt, fine to coarse gravels, trace coal, ash, W<PL		D	2.5	E	PID <1		
	2.6	SILTY CLAY (CL) - Low plasticity, brown with silt, W>PL		D	2.8	E	PID <1		
	2.9	Bore discontinued at 2.9m, limit of investigation							

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased

TYPE OF BORING: 40mm diameter Push Tube to 1.5m, 100mm diameter solid flight auger to 2.9m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Difficulty with auger, heavy fill encountered jarring auger, difficult attaching next length, Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 6.96 AHD
EASTING: 365165.187
NORTHING: 6377120.633
DIP/AZIMUTH: 90°/--

BORE No: 506
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL / SANDY GRAVEL (GP) - Fine to coarse gravels, pale brown with fine to coarse grained sand, trace brick, slag, moist		B	0.0				
				D	0.1		PID <1		
				D	0.5		PID <1		
	0.6	SILTY CLAY - (CL) - Low plasticity, brown with silt, W>PL, trace fine subrounded gravels, coal							
6	1			D	1.0		PID <1		1
				D	1.5		PID <1		
5	2			D	2.0		PID <1		2
	2.1	Bore discontinued at 2.1m, limit of investigation							
4									

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased

TYPE OF BORING: 90mm diameter Push Tube to 1m, 100mm diameter solid flight auger to 2m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: --
EASTING: 365173.4
NORTHING: 6377107.4
DIP/AZIMUTH: 90°/--

BORE No: 507
PROJECT No: 81916.05
DATE: 16/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL / SILTY CLAY (CL) - Low plasticity, brown with silt, fine to medium gravels, trace brick, fine to medium grained sand, slag, metal, W>PL		D	0.1	E	PID <1		
				D	0.5	E	PID <1		
	1			D	1.0	E	PID <1		1
		From 1.3m, brown mottled pale brown		D	1.4	E	PID <1		
	1.5	SILTY CLAY (CL) - Low plasticity, brown with silt, W<PL							
	2			D	2.0	E	PID <1		2
				D	2.4	E	PID <1		
	2.5	Bore discontinued at 2.5m, limit of investigation							

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight Auger to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 6.15 AHD
EASTING: 365216.317
NORTHING: 6377060.829
DIP/AZIMUTH: 90°/--

BORE No: 508
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
6	0.2	FILL / SANDY SILT (ML) - Low plasticity, brown with fine to medium grained sand, trace rootlets, coal, moist		D	0.1	E	PID <1		
	0.5	FILL / SILTY CLAY (CL) - Low plasticity, brown with silt, trace fine to coarse grained sand, brick, fine to medium gravels, W<PL		D	0.4	E	PID <1		
5	1	SILTY CLAY (CL) - Low plasticity, brown with silt, W>PL		D	1.0	E	PID <1		1
		From 1.5m, W<PL		D	1.5	E	PID <1		
4	2 2.0	Bore discontinued at 2.0m, limit of investigation							2

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased

TYPE OF BORING: 90mm diameter Push Tube to 2m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 6.31 AHD
EASTING: 365208.808
NORTHING: 6377080.833
DIP/AZIMUTH: 90°/--

BORE No: 509
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
6	0.15	FILL / SANDY SILT (ML) - Low plasticity, brown with fine to medium grained sand, trace rootlets, coal, moist		D	0.1	E	PID <1		
		FILL / SILTY CLAY (CL) - Low plasticity, brown with silt, trace coal, slag, fine to medium gravels, fine to medium grained sand, W>PL		D	0.5	E	PID <1		
	0.9	SILTY CLAY (CL) - Low plasticity, brown with silt, W>PL		D	1.0	E	PID <1		1
5	1			D	1.5	E	PID <1		
				D	1.9	E	PID <1		
	2 2.0	Bore discontinued at 2.0m, limit of investigation							2
4									

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: 90mm diameter Push Tube to 2m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 6.22 AHD
EASTING: 365196.72
NORTHING: 6377094.816
DIP/AZIMUTH: 90°/--

BORE No: 510
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
6	0.0	FILL / SILTY CLAY (CL) - Low plasticity, brown mottled dark grey with silt, trace fine to medium grained sand, coal, slag, W>PL		D	0.1	E	PID <1		
				B D	0.5	E	PID <1		
	0.6	SILTY CLAY (CL) - Low plasticity, brown with silt, W>PL							
5	1			D	1.0	E	PID <1		1
				D	1.5	E	PID <1		
	1.6	Bore discontinued at 1.6m, limit of investigation							
4	2								2

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight Auger to 1.6m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 6.38 AHD
EASTING: 365222.602
NORTHING: 6377104.625
DIP/AZIMUTH: 90°/--

BORE No: 511
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
6	0.0	FILL / SILTY CLAY (CL) - Pale brown, intermixed low plasticity with silt, brown, trace slag, glass, fine to medium subrounded gravels, W>PL		D	0.1	E	PID <1		
				D	0.4	E	PID <1		
	0.5	SILTY CLAY (CL) - Low plasticity, brown with silt, W>PL		B					
	1			D	1.0	E	PID <1		1
5	1.4	Bore discontinued at 1.4m, limit of investigation							
	2								2
4									

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight Auger to 1.4m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 6.49 AHD
EASTING: 365201.982
NORTHING: 6377115.261
DIP/AZIMUTH: 90°/--

BORE No: 512
PROJECT No: 81916.05
DATE: 15/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
6		FILL / SILTY CLAY (CL) - Low plasticity, brown with silt, trace brick, fine to medium gravels, slag, glass, W>PL		D	0.1	E	PID <1		
				D	0.5	E	PID <1		
		From 0.8m, with fine to coarse gravels							
	1			D	1.0	E	PID <1		1
	1.1	SILTY CLAY (CL) - Low plasticity, brown with silt, W>PL							
5				D	1.5	E	PID <1		
		From 1.9m, with fine to medium grained sand							
	2			D	2.0	E	PID <1		2
	2.1	Bore discontinued at 2.1m, limit of investigation							
4									

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight Auger to 2.1m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 7.33 AHD
EASTING: 365213.583
NORTHING: 6377123.257
DIP/AZIMUTH: 90°/--

BORE No: 513
PROJECT No: 81916.05
DATE: 23/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
7		FILL / SILTY CLAY (CI): Medium plasticity, brown, with silt, trace brick, coal reject, slag, fine to coarse grained gravels, concrete, W<PL		D	0.1	E	PID<1		
				D	0.5	E	PID<1		
	1			D	1.0	E	PID<1		1
6				D	1.5	E	PID<1		
	1.9	SILTY CLAY (CI): Medium plasticity, brown, with silt, W<PL							
	2			D	2.0	E	PID<1		2
5	2.4	Bore discontinued at 2.4m, limit of investigation							

RIG: Push tube rig **DRILLER:** Kramer **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: Push tube
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 7.56 AHD
EASTING: 365228.135
NORTHING: 6377140.323
DIP/AZIMUTH: 90°/--

BORE No: 514
PROJECT No: 81916.05
DATE: 23/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
7		FILL / SILTY CLAY (CI): Medium plasticity, brown, with silt, trace brick, slag, plastic, W<PL		D	0.1	E	PID<1		
				D	0.5	E	PID<1		
	1			D	1.0	E	PID<1		1
6				D	1.5	E	PID<1		
	2			D	2.0	E	PID<1		2
	2.2	SILTY CLAY (CI): Medium plasticity, brown, with silt, W<PL							
5				D	2.5	E	PID<1		
	2.8	Bore discontinued at 2.8m, limit of investigation							

RIG: Push tube rig **DRILLER:** Kramer **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: Push tube
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: 7.54 AHD
EASTING: 365200.476
NORTHING: 6377136.393
DIP/AZIMUTH: 90°/--

BORE No: 515
PROJECT No: 81916.05
DATE: 23/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
7		FILL / SILTY CLAY (CI): Medium plasticity, brown, with silt, trace brick, rootlets, slag, concrete, W<PL		D	0.1	E	PID<1		
				D	0.5	E	PID<1		
	1			D	1.0	E	PID<1		1
6				D	1.5	E	PID=1.2		
	1.8	SILTY CLAY (CI): Medium plasticity, brown, with silt, W<PL							
	2			D	2.0	E	PID<1		2
5	2.5	Bore discontinued at 2.5m, limit of investigation							

RIG: Push tube rig **DRILLER:** Kramer **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: Push tube
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: --
EASTING: 365143
NORTHING: 6377113
DIP/AZIMUTH: 90°/--

BORE No: 516
PROJECT No: 81916.05
DATE: 16/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILL / GRAVELLY SAND (SP) - Fine to medium grained, pale brown with fine to medium gravels, dry (possible roadbase)		D	0.1	E	PID <1		
	0.3	FILL / SILTY SAND (SP) - Fine to medium grained, dark grey with silt, fine to medium gravels, trace coal, dry (possible ash layer)		D	0.5	E	PID <1		
	0.65	FILL / SILTY CLAY (CL) - Low plasticity, brown with silt, trace ash, W<PL							
1				D	1.0	E	PID <1		1
	1.1	SILTY CLAY (CL) - Medium plasticity, brown with silt, W<PL							
				D	1.5	E	PID <1		
2	2.0	Bore discontinued at 2.0m, limit of investigation		D	2.0	E	PID <1		2

RIG: Truck mounted **DRILLER:** Campbell **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: 100mm diameter solid flight Auger to 2m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Catholic Diocese of Maitland Newcastle
PROJECT: Proposed Hall
LOCATION: Odd Street, Horseshoe Bend

SURFACE LEVEL: --
EASTING: 365174.4
NORTHING: 6377112
DIP/AZIMUTH: 90°/--

BORE No: 507A
PROJECT No: 81916.05
DATE: 16/7/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.03	FILL / SILTY SAND - Fine to medium grained, brown with silt, woodchips, organics, moist (garden mulch material)		D	0.02	E	PID <1		
		FILL / SILTY CLAY - Low plasticity, brown with silt, trace plastic, tile, brick, slag, W>PL		D	0.5	E	PID <1		
	0.65	Bore discontinued at 0.65m, limit of investigation							
	1								1
	2								2

RIG: Hand tools **DRILLER:** Kramer **LOGGED:** Kramer **CASING:** Uncased
TYPE OF BORING: Hand auger
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Coordinates and levels obtained using a differential GPS with a typical accuracy of ± 0.1m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Appendix E

Remediation Options Assessment and Evaluation

Appendix E
Remediation Options Assessment
Corner Hunter and Odd Streets, Horseshoe Bend

E1.0 Introduction

The following key guidelines and technical reports were consulted in the preparation of this remediation options assessment:

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]) (NEPC, 2013); and
- CRC CARE Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment (CRC CARE, 2019a).

The first stage of developing a remediation strategy is to establish clear and measurable remediation objectives and remediation criteria (clean-up levels). These will form the requirements against which remediation options are assessed.

The next stage of the remediation options assessment is to select technology and management options, or combinations of options, that have the potential to reduce contaminant concentrations and/or apply management controls as necessary so that the remediation objectives are achieved and no unacceptable risk is posed by the contamination in the context of the current and proposed site use. Where several viable options have been identified, an assessment of each of the options will be required to determine which option will most adequately and sustainably meet the remediation objectives (CRC CARE, 2019a).

The remediation objectives are to:

- Address potentially unacceptable risks to relevant environmental values from contamination (refer to the CSM in Section 7); and
- Render the site suitable, from a contamination perspective, for the proposed development (refer to Section 2).

E2.0 Hierarchy of Remediation Options

NEPC (2013) stipulates the preferred hierarchy of options for site clean-up (remediation) and/or management which is outlined as follows:

- On-site treatment of the contamination so that it is destroyed, or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil, so that the contamination is destroyed, or the associated risk is reduced to an acceptable level, after which soil is returned to the site;

or, if these two options are not practicable;

- Consolidation and isolation of the soil on site by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material;

or,

- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

When deciding which option to choose, the sustainability (environmental, economic and social) of each option should be considered, in terms of achieving an appropriate balance between the benefits and effects of undertaking the option. In cases where no readily available or economically feasible method is available for remediation, it may be possible to adopt appropriate regulatory controls or develop other forms of remediation (NEPC, 2013).

E3.0 Remediation Options Assessment

E3.1 Introduction

PAH and minor TRH impacted fill have been identified at the site which require remediation.

A potential for heavy metals and bonded asbestos containing materials is also present within the site based on the previous findings directly adjacent to the site.

E3.2 Remediation Options

Given the straightforward nature of the contamination issues at the site and the necessary earthworks (final landform) as part of the proposed development, only the following options for the soil contamination have been considered, as follows:

1. Do nothing;
2. Excavation / stripping and offsite disposal; and
3. On-site management (cap and contain);
4. A combination of Options 2 and 3.

The following key guidelines have therefore been consulted:

- CRC CARE Technology Guide: Soil - Excavation (CRC CARE, 2019b);
- CRC CARE Technology Guide: Soil - Containment (CRC CARE, 2019c);
- WA DoH Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (WA DoH, 2021); and
- WorkCover NSW Managing Asbestos in or on Soil (WorkCover NSW, 2014).

As the proposed development will comprise a concrete slab (building footprint) across a large portion of the proposed development area / remediation area and minor landscaped areas with consideration of the above, the adopted remediation approach for the development is on-site management (capping) of minor TRH and PAH impacted fill.

Option 3 - On-site management and of minor TRH and PAH impacted fill and possible asbestos contaminated fill would generally comprise the following:

- Placement of contaminated materials beneath a concrete pavement comprising a marker layer between the impacted materials and the pavement/capping;
- Off-site disposal of excess contaminated soils (i.e. to an appropriately licensed landfill following waste classification where applicable).

It is noted that the fill within the proposed landscaped areas proposed to be capped (ie minor TRH and PAH impact) could be excavated, placed and compacted within a smaller footprint of the site (ie. consolidated beneath the proposed building) to reduce the total capped area and therefore the area of the site subject to ongoing management requirements in accordance with a long term environmental management plan (EMP) and Section 10.7 planning certificate notification. Where this option is considered the impacted fill materials requiring capping should be maintained above the groundwater table and the existing fill materials as a precaution.

Option 2 - Off-site disposal of contaminated soils would generally comprise the following:

- Excavation of the localised impacted fill comprising PAH and minor TRH impact described as follows:
- Temporary stockpiling of excavated and segregated fill materials within suitable concrete paved soils bays to allow waste classification;
- Direct disposal of contaminated soils to an appropriately licensed waste disposal facility;
- Validation of the stripped surface/remaining soils to confirm appropriate removal of this contaminated fill material;
- Re-instatement of site soils (if required) to achieve design levels with ‘clean’ soil (ENM/VENM or appropriate RRO exempt material).

A combination of excavation and disposal and on-site management of contaminated soils (Option 4) is also considered to be a feasible remediation option to protect human health and the environment, and minimise constraints on the future use of the site for the proposed facility upgrades.

It is noted that Option 1 - Do nothing, is not a viable option to address the source pathway receptors for the identified contaminants.

E4.0 Summary of Preferred Remediation Strategy

Based on the outcome of the options assessment, the preferred remediation strategy is Option 4 – A combination of on-site management and excavation / stripping of localised landscaped areas comprising minor TRH and PAH impacted fill and possible asbestos and heavy metal contaminated fill.

E5.0 References

CRC CARE. (2019a). *Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment.* National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2019b). *Technology Guide: Soil - Excavation.* National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2019c). *Technology Guide: Soil - Containment.* National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

WA DoH. (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.* WA Department of Health.

WorkCover NSW. (2014). *Managing Asbestos in or on Soil.* March 2014: WorkCover NSW, NSW Government.

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Appendix F

Site Assessment Criteria / Remediation Acceptance Criteria

Appendix F
Site Assessment Criteria / Remediation Action Criteria
Corner Hunter and Odd Streets, Horseshoe Bend

F1.0 Introduction

F1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)* [NEPM] (NEPC, 2013).

F1.2 General

The SAC applied to any contingency or unexpected finds scenarios during site remediation are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following SAC will also be utilised as remediation acceptance criteria (RAC) for areas requiring stripping and validation. It is noted that if two criteria exist (ie HIL and EIL for metals) then the lower of the two values should be utilised for the RAC.

The following inputs are relevant to the selection and/or derivation of the SAC:

- Land use: secondary school with buildings and landscape areas.
    - Corresponding to land use category 'C', public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. To allow for the assessment of soil vapour intrusion) within the areas of the proposed building a residential land use category (ie HSL A/B) has been adopted as per NEPC (2013) requirements for secondary schools.
- Soil type: silt / clay.

F2.0 Soils

F2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health Investigation Levels (mg/kg)

Contaminant	HIL-C
Metals	
Arsenic	300
Cadmium	90
Chromium (VI)	300
Copper	17 000
Lead	600
Mercury (inorganic)	80
Nickel	1200
Zinc	30 000
PAH	
B(a)P TEQ	3
Total PAH	300
Phenols	
Phenol	40 000
Pentachlorophenol	120
OCP	
DDT+DDE+DDD	400
Aldrin and dieldrin	10
Chlordane	70
Endosulfan	340
Endrin	20
Heptachlor	10
HCB	10
Methoxychlor	400
OPP	
Chlorpyrifos	250
PCB	
PCB	1

For areas within the proposed building footprint HSL A/B should be used to assess petroleum hydrocarbons and soil vapour risk, for landscaped areas HSL C will be adopted.

Table 2: Health Screening Levels (mg/kg)

Contaminant	HSL-A&B	HSL-A&B	HSL-A&B	HSL-A&B
SILT	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	0.6	0.7	1	2
Toluene	390	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	95	210	NL	NL
Naphthalene	4	NL	NL	NL
TRH F1	40	65	100	190
TRH F2	230	NL	NL	NL
CLAY	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	0.7	1	2	3
Toluene	480	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	110	310	NL	NL
Naphthalene	5	NL	NL	NL
TRH F1	50	90	150	290
TRH F2	280	NL	NL	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

For landscaped areas HSL C should be adopted to assess petroleum hydrocarbons and soil vapour risk, for landscaped areas HSL C will be adopted.

Table 3: Health Screening Levels (mg/kg)

Contaminant	HSL-C	HSL-C	HSL-C	HSL-C
	0 m to <1 m	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	NL	NL	NL	NL
Toluene	NL	NL	NL	NL
Ethylbenzene	NL		NL	NL
Xylenes	NL	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TRH F1	NL	NL	NL	NL
TRH F2	NL	NL	NL	NL
SILT	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	NL	NL	NL	NL
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	NL	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TRH F1	NL	NL	NL	NL
TRH F2	NL	NL	NL	NL
CLAY	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	NL	NL	NL	NL
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	NL	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TRH F1	NL	NL	NL	NL
TRH F2	NL	NL	NL	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table 4.

Table 4: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-C	DC HSL-IMW
Benzene	120	1100
Toluene	18 000	120 000
Ethylbenzene	5300	85 000
Xylenes	15 000	130 000
Naphthalene	1900	29 000
TRH F1	5100	82 000
TRH F2	3800	62 000
TRH F3	5300	85 000
TRH F4	7400	120 000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene
IMW intrusive maintenance worker

F2.2 Asbestos in Soil

The SAC applied to any unexpected finds scenarios during site remediation for asbestos in soil are based on likely exposure levels for different scenarios published in NEPC (2013) for the following forms of asbestos:

- Bonded asbestos containing material (ACM); and
- Fibrous asbestos and asbestos fines (FA and AF).

The HSL are in Table 5.

Table 5: Health Screening Levels for Asbestos

Form of Asbestos	HSL-C
ACM	0.02%
FA and AF	0.001%
FA and AF and ACM	No visible asbestos for surface soil *

Notes: Surface soils defined as top 10 cm.
* Based on site observations at the sampling points and the analytical results of surface samples.

F2.3 Ecological Investigation Levels

The SAC applied to any contingency or unexpected finds scenarios during site remediation will use ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, as per NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 7, with inputs into their derivation shown in Table 6.

Table 6: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years) / "new" (<2 years)	Values consistent with previous investigations and measures parameters from the site
pH	7.8	
CEC	25 $cmol_c/kg$	
Clay content	30%	
Traffic volumes	low	
State / Territory	NSW	

Table 7: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-A-B-C
Metals	
Arsenic	100
Copper	230
Nickel	310
Chromium III	580
Lead	1100
Zinc	910
PAH	
Naphthalene	170
OCP	
DDT	180

Notes:
EIL-A-B-C urban residential and public open space

F2.4 Ecological Screening Levels

The SAC applied to any contingency or unexpected finds scenarios during site remediation will use ecological screening levels (ESL) to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 8.

Table 8: Ecological Screening Levels (mg/kg)

Contaminant	Soil Type	ESL-A-B-C
Benzene	Fine	65
Toluene	Fine	105
Ethylbenzene	Fine	125
Xylenes	Fine	45
TRH F1	Coarse/ Fine	180*
TRH F2	Coarse/ Fine	120*
TRH F3	Fine	1300
TRH F4	Fine	5600
B(a)P	Fine	0.7 / 33

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene
EIL-A-B-C urban residential and public open space

The NEPM ESL of 0.7 mg/kg is understood to be based on a single invertebrate species referenced in the 1999 Canadian Soil Quality Guidelines (since updated) and is considered conservative in the Australian context. These guidelines were updated in 2010 and now suggest a B(a)P concentration of 20 mg/kg for the protection of environmental health based on the soil contact exposure pathway.

It is also noted that the benzo(a)pyrene ESL is a low reliability value. Higher reliability screening levels have been published in CRC CARE (2017), Risk-based Management and Remediation Guidance for Benzo(a)pyrene, CRCCARE Technical Report no. 39. The high reliability value of 33 mg/kg for aged contamination recommended in CRC CARE (2017) has therefore been adopted.

F2.5 Management Limits

The SAC applied to any contingency or unexpected finds scenarios during site remediation for TRH, in addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards;
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

These management limits are in Table 9.

Table 9: Management Limits (mg/kg)

Contaminant	Soil Type	ML-A-B-C
TRH F1	Fine	800
TRH F2	Fine	1000
TRH F3	Fine	3500
TRH F4	Fine	10 000

Notes: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene
ML-A-B-C residential, parkland and public open space

F3.0 References

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater.* Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

HEPA. (2020). *PFAS National Environmental Management Plan (NEMP).* Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

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Appendix G

Data Quality Objectives

Appendix G
Data Quality Objectives
Corner Hunter and Odd Streets, Horseshoe Bend

G1.0 Introduction

The objective of the validation plan is to assess whether the capping layer has been constructed in accordance with the RAP, to assess whether areas subject to stripping/excavation of contaminated fill have been appropriately remediated and assess the resultant suitability of the site for the intended land use, and to provide information on any environmental impacts which may have resulted from the works.

The validation assessment will be conducted with reference to the seven step data quality objectives (DQOs) as outlined in NEPC (2013), described below. The DQO in NEPC (2013) is in turn, based on the DQO process outlined in USEPA (2006), and associated guidelines.

G2.0 Data Quality Objectives

Table 1: Data Quality Objectives

Step	Summary
1: State the problem	The site requires remediation and validation of remediation in order to render it suitable for the secondary (high) school land use. The objective of the validation plan is to confirm the successful implementation of this remediation action plan. A conceptual site model (CSM) for the proposed development has been prepared (Section 7).
2: Identify the decisions / goal of the study	The decision is to determine the site is suitable for the proposed and existing secondary (high) school land use following remediation of the site. The CSM identifies contamination at the site which posed potentially unacceptable risks to human health and the environment. The remediation strategy requires a combination of the placement of a marker layer above the fill and construction of a capping layer and localised excavation / stripping within landscaped areas. The decision is to establish whether the capping layer has been placed in general accordance with the RAP and whether the site has been remediated in general accordance with the RAP. The success of the remediated and subsequent validation of excavated / stripped areas will be based on a comparison of the analytical results for all CoPC to the adopted RAC and, if necessary, compared to the 95% UCL of the mean concentrations along with

Step	Summary
3: Identify the information inputs	Relevant inputs to the decision include: • The CSM identifying CoPC and affected media; • Results analysed for the relevant CoPC using NATA accredited laboratories and methods, where possible; • Field and laboratory QA/QC data to assess the suitability of the environmental data for the validation assessment; • Results compared with the RAC; • Inspections of the maker layer prior to capping works; • Assessments of aggregates, soil, etc imported as part of the capping; • Inspections of the capping; • Review of the survey of the installed capping; • An enforceable long term environmental management plan (LTEMP) has been prepared for implementation during use of the land for the proposed and existing secondary (high) school purposes; and • Details of the proposed development.
4: Define the study boundaries	The lateral boundaries of the site are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment, site observations and previous investigations used to inform the RAP.
5: Develop the analytical approach (or decision rule)	The decision rule is the construction of the capping to at least the minimum thicknesses included in Section 12. In regard to excavation / stripping of localised areas, the decision rule is to compare all analytical results with RAC. Initial comparisons will be with individual results then, where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL) to assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field and laboratory duplicate results, RPDs should generally be below 30%; for field blanks, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Section 16.
6: Specify the performance or acceptance criteria	Baseline condition: The capping has not been constructed in accordance with this RAP (null hypothesis). Alternative condition: The capping has not been constructed in accordance with this RAP (alternative hypothesis) and /or : contaminants at the site and/or statistical analysis of data exceed the RAC and pose a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site and statistical analysis of data complies with the RAC and as such, do not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true.
7: Optimise the design for obtaining data	Sampling design and procedures to be implemented to optimise data collection for achieving the DQOs include the following: • Sampling frequencies in accordance with Section 13; • Analysis for the CoPC at NATA accredited laboratories using NATA endorsed methods will be used to perform laboratory analysis whenever possible; • Adequately experienced environmental scientists/engineers will conduct field work and sample analysis interpretation; • Visual inspections of the cap construction by the Environmental Consultant in accordance with Section 12; and • Registered survey of the capping layer in accordance with Section 13.

G3.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

USEPA. (2006). *Guidance on systematic planning using the data quality objectives process, EPA QA/G-4.* Washington DC.: United States Environmental Protection Agency, Office of Environmental Information.

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Appendix H

Site Management Plan

Appendix H
Site Management Plan
Corner Hunter and Odd Streets, Horseshoe Bend

H1.0 Introduction

This site management plan (SMP) has been developed to minimise potentially adverse impacts on the environment, and worker and public health as a result of the proposed remediation works.

The Remediation Contractor must have in place a construction environmental management plan (CEMP) (or similar) which is specific to the equipment used for the remediation and the proposed methods to be adopted by the Remediation Contractor. This SMP has been prepared to augment the Remediation Contractor's CEMP and contains general details for aspects of the work, as per reporting requirements for a remediation action plan (RAP) under NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

Apart from the management principles outlined in this SMP, the Remediation Contractor must also ensure compliance with all relevant environmental legislation and regulations, including (but not limited to) the following:

- *Contaminated Land Management Act 1997* NSW (CLM Act);
- *Protection of the Environment Operations Act 1997* NSW (POEO Act);
- *Protection of the Environment Legislation Amendment Act 2011* NSW;
- *Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008* NSW.
- *Environmentally Hazardous Chemicals Act 1985* NSW;
- *Environmental Offences and Penalties Act 1989* NSW;
- *Pesticide Act 1999* NSW and *Pesticides Regulation 2017*; and
- *Work Health and Safety Act 2011* Cth (WHS Act) and *Work Health and Safety Regulations 2011* Cth.

H2.0 Roles and Responsibilities

H2.1 Principal

The Principal is responsible for the environmental performance of the proposed remediation works, including implementation of acceptable environmental controls during remediation works. The Principal will retain the overall responsibility for ensuring this RAP is appropriately implemented. The Principal is to nominate a representative (the Principal's Representative), who is responsible for overseeing the implementation of this RAP. The actual implementation of the RAP will, however, be conducted by the Principal Contractor on behalf of the Principal.

The Principal is responsible for providing appropriate information to the Contractor to allow them to safely plan the required works. This includes the asbestos register for the site and this RAP.

The Principal is also responsible for implementing an appropriate communications plan.

H2.2 Principal Contractor

The Principal Contractor ('the Contractor') will be the party responsible for daily implementation of this RAP and shall fulfil the responsibilities of the Contractor as defined by SafeWork NSW. It is noted that the Contractor may appoint appropriately qualified sub-contractors or sub-consultants to assist in fulfilling the requirements of the procedures. The Contractor will appoint a Site Manager.

In addition to the implementation of the RAP it will be the Contractors responsibility to:

- Obtain/ensure relevant sub-contractors obtain specific related approvals as necessary to implement the earthworks including permits for removal of asbestos-containing material, SafeWork NSW notification etc.;
- Develop or request and review any site plans to manage the works to be conducted;
- Ensure that all remediation works and other related activities are undertaken in accordance with this RAP;
- Maintain all site records related to the implementation of this RAP;
- Ensure sufficient information is provided to engage or direct all required parties, including sub-contractors, to implement the requirements of the RAP other than those that are the direct responsibility of the Contractor;
- Manage the implementation of any recommendation made by those parties in relation to work undertaken in accordance with the RAP;
- Inform, if appropriate, the relevant regulatory authorities of any non-conformances with the procedures and requirements of the RAP in accordance with the procedures outlined in this document;
- Retain records of any contingency actions;
- On completion of the project, to review the RAP records for completeness and update as necessary; and
- Recommend any modification to general documentation which would further improve the environmental outcomes of this RAP.

H2.3 Surveyor

The project surveyor will be a registered surveyor engaged by the Contractor to undertake surveying works as required by this RAP.

H2.4 Asbestos Contractor (if required)

The Asbestos Contractor will be responsible for undertaking all asbestos work involving any asbestos impacted fill and will hold a Class A licence for the removal of asbestos (issued by SafeWork NSW), on the basis that the asbestos identified at the site to date has included both friable and bonded asbestos. It Is noted that testing to date has not identified friable asbestos within the site.

The Asbestos Contractor can be the same entity as the Principal Contractor.

H2.5 Sub-contractors

All sub-contractors will be inducted onto the site, informed of their responsibilities in relation to this RAP and sign their agreement to abide by the RAP requirements. Where necessary, sub-contractors will also be trained in accordance with the requirements of this document. All sub-contractors must conduct their operations in accordance with the RAP as well as all applicable regulatory requirements.

H2.6 Environmental Consultant

The Environmental Consultant will provide advice on implementing the RAP. The Environmental Consultant will be responsible for:

- Undertake any required assessments where applicable (e.g. waste classification, validation);
- Provide advice and recommendations arising from monitoring and/or inspections, including unexpected finds; and
- Notify the Client with any results of assessments, and any observed non-conformances.

H2.7 Licenced Asbestos Assessor (if required)

A Licenced Asbestos Assessor will be required to be engaged independently of the Asbestos Contractor to undertake the following:

- Review and approve documentation prepared by the Asbestos Contractor;
- Prepare any WHS plans and advice required by the Contractor;
- Undertake airborne asbestos monitoring;
- Undertake clearance inspections;
- Provide advice and recommendations arising from monitoring and/or inspections; and
- Notify the client with the results of any assessments and any observed non-conformances.

H2.8 Site Workers

All workers on the site are responsible for observing the requirements of this RAP and other management plans. These responsibilities include the following:

- Being inducted on the site and advised of the general nature of the remediation/environmental issues at the site;
- Being aware of the requirements of this plan;
- Wearing appropriate personal protective equipment (PPE) as required by this plan;
- Only entering restricted areas when permitted; and
- Requesting clarification when unclear of requirements of this or any other plans (e.g. safe work method statements (SWMS)).

H3.0 Stormwater Management

H3.1 Stormwater

Stormwater must be managed during the remediation works such that potential adverse impacts from surface runoff (e.g. cross contamination, mobilisation of contaminants in soil particles, etc.) are appropriately mitigated. Accordingly, the Remediation Contractor will take appropriate measures which may include:

- Construction, where necessary, of stormwater diversion channels, bunding and linear drainage sumps with catch pits in and around the remediation areas to divert stormwater from the contaminated areas;
- Provision of appropriately located sediment traps including geotextiles; and
- Discharge of excess water in excavations / low points on a regular basis to limit the potential for flooding.

H3.2 Dewatering of Excavations

Any runoff or seepage water accumulated in site excavations that requires removal must initially be sampled and tested for suspended solids, pH and any contaminants of potential concern (CoPC) as identified by the Environmental Consultant. The options for management of excavation pump-out water, dependent upon the test results, are for disposal of the water as follows:

- Discharge to stormwater with prior approval from Council. Provided the test results comply with relevant ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018), or any other compliance requirements stipulated by Council. The Environmental Consultant must consider the most appropriate criteria to be used; or
- Discharge to sewer, as industrial trade wastewater, with prior approval from Hunter Water. This option would require the analysis of a larger list of analytes, and compliance with the Hunter Water acceptance standards; or
- Pumping by a liquid waste contractor for removal of the water off-site, in accordance with regulatory requirements.

Note that, depending on the type and scale of the dewatering required, a permit (water use approval) may need to be obtained through NSW Water.

H4.0 Soil Management Plan

H4.1 Excavation and Stockpiling of Contaminated Material

Contaminated material shall be excavated and stockpiled at a suitably segregated location(s) away from sensitive areas (e.g. water bodies, drainage lines, stormwater pits, etc.) and ongoing excavations, and in a manner that will not cause nuisance to the neighbouring properties. Soil stockpiles are to be managed as follows:

- All stockpiles of contaminated material shall be surrounded by star pickets and marking tape or other suitable material to clearly delineate their boundaries;
- Stockpiles shall be lightly conditioned by sprinkler or covered by geotextile or similar cover to prevent dust generation;
- Any stockpile to remain on-site overnight should be adequately secured in order to reduce the risk of sediment runoff; and
- Should the stockpile remain on-site for over 24 hours, geotextile silt fences must be erected to prevent losses by surface erosion.

All movement of soil within the site and off-site is to be tracked by the Remediation Contractor, from cradle to grave. Copies of tracking records must be provided to the Environmental Consultant.

H4.2 Loading and Transport of Contaminated Material

Transport of contaminated material from the site shall be via a clearly delineated haul route and this route shall be used exclusively for entry and egress of vehicles used to transport contaminated materials within and away from the site. The proposed waste transport route (to be determined by the Remediation Contractor) will be notified to Council and truck dispatch shall be logged and recorded by the Remediation Contractor for each load leaving the site. A record of the truck dispatch will be provided to the Environmental Consultant.

All haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site should be selected to meet the following objectives:

- Comply with all road traffic rules;
- Minimise noise, vibration and dust to adjacent premises; and
- Utilise State roads and minimise use of local roads as far as practicable.

The remediation work will be conducted such that all vehicles:

- Conduct deliveries of soil, materials, equipment or machinery only during the specified hours of remediation;

- Have securely covered loads to prevent any dust or odour emissions during transportation; and
- Exit the site in a forward direction.

In addition, measures will be implemented to ensure no contaminated material is spilled onto public roadways or tracked off-site on vehicle wheels. Roadways will be kept clean throughout the remediation works and will be broomed, if necessary, to achieve a clean environment.

All loads will be securely covered and may be lightly wetted, if required, to ensure that no materials or dust are dropped or deposited outside or within the site. Prior to exiting the site each truck should be inspected by Remediation Contractor personnel and either noted as clean (wheels and chassis) or broomed prior to leaving the site. Any soil spilled onto surrounding streets will be cleaned by mechanical or hand methods, on a daily basis.

Removal of waste materials from the site shall only be carried out contractors holding the appropriate license(s), consent or approvals to dispose the waste materials according to the waste classification and with the appropriate approvals obtained from the EPA, were required.

H5.0 Noise and Vibration Control Plan

All equipment and machinery should be operated in an efficient manner to minimise the emission of noise. The use of any plant and/or machinery should not cause unacceptable vibrations to nearby properties and should meet Council requirements.

H6.0 Dust Control Plan

Dust emissions must be confined within the site boundary as far as is practicable. The following example dust control procedures could be employed to comply with this requirement, as necessary:

- Erection of dust screens around the perimeter of the site (as applicable);
- Securely covering all loads entering or exiting the site;
- Use of water sprays across the site to suppress dust;
- Covering of all stockpiles of contaminated soil remaining on site more than 24 hours;
- Include wheel wash (if applicable); and
- Keeping excavation and stockpile surfaces moist.

Regular checking of the fugitive dust issues is to be undertaken. Remedial measures are to be undertaken to rectify any cases of excessive dust.

H7.0 Odour Control Plan

No odours should be detected at any boundary of the site during remediation works by an authorised Council Officer relying solely on sense of smell. The following example procedures could be employed to comply with this requirement as required:

- Use of appropriate covering techniques such as plastic sheeting, polythene or geotextile membranes to cover excavation faces or stockpiles;
- Fine spray of water and/or hydrocarbon mitigating agent on the impacted areas/materials;
- The use of water spray, as and when appropriate;
- Use of sprays or sprinklers on stockpiles or loads to lightly condition the material;
- Restriction of stockpile heights to ~4 m above surrounding site level. If required, restrict uncovered stockpiles to appropriate sizes to minimise odour generation;
- Ceasing works during periods of inclement weather such as high winds or heavy rain;
- Regular checking of the fugitive dust and odour issues to ensure compliance. Undertake immediate remediation measures to rectify any cases of excessive dust or odour (e.g. use of misting sprays or odour masking agent); and
- Adequate maintenance of equipment and machinery to minimise exhaust emissions.

H8.0 Work Health and Safety Plan

H8.1 General

It is the Remediation Contractor's responsibility to devise a SWMS[1] (or series thereof, for various respective tasks) and to implement proper controls that enable the personnel undertaking the remediation to work in a safe environment. This RAP and SMP does not relieve the Remediation Contractor or other contractors of their ultimate responsibility for occupational health and safety of their workforce and to prevent contamination of areas outside the 'remediation' workspace. This RAP and SMP sets out general procedures and the minimum standards and guidelines for remediation that will need to be used in preparing the safe work method statement.

This work health safety plan (WHSP) has been prepared with refence to CRC CARE *Remediation Action Plan: Implementation - Guideline on Health and Safety* (CRC CARE, 2019). The requirements of this WHSP must be incorporated into the Remediation Contractor's SWMS.

All site work must be undertaken in a controlled and safe manner with due regard to potential hazards, training and safe work practices. To attain this the SWMS developed by the Remediation Contractor must comply with policies specified in the Work Health and Safety Regulation 2011.

All appropriate permits, licences and notifications required for the remediation activities must be obtained prior to the commencement of remediation works.

[1] Either a SWMS or construction environmental management plan (CEMP), or other equivalent document incorporating health and safety aspects of the proposed remedial works.

H8.2 Site Access

Appropriate fencing and signage must be installed around and within the site to prevent unauthorised access and restrict access to remediation areas and/or deep excavations. Access restrictions and administrative arrangements for management of entry of workers or related personnel on site is the responsibility of the Remediation Contractor.

Any existing pits or unstable areas on site that may generate potential safety, or operational risk should be demarcated and taped off, with appropriate rectification action undertaken (e.g. backfilling of pits).

H8.3 Personnel and Responsibilities

Before undertaking works on site, all personnel will be made aware of the officer responsible for implementing WHS procedures. All personnel must read and understand this WHSP and over-arching SWMS prior to commencing site works and sign a statement to that effect. Contractors employed at the site will be responsible for ensuring that their employees are aware of, and comply with, the requirements of this WHSP and Remediation Contractor's SWMS.

H8.4 Chemical Contamination Hazards

Chemical compounds or substances that may be present in the soils at the site include the key CoPC TRH, PAH, given the presence of fill and testing outside the site footprint, heavy metals and asbestos. There is also a lower probability of other contaminants being present.

The risks associated with the identified contaminants to site personnel and workers involved in the remediation are considered to be low due to the limited exposure durations. These risks are associated with:

- Ingestion of contaminated soil and/or water;
- Dermal contact with contaminated soil and/or water; and
- Inhalation of dusts or vapours of the CoPC.

If asbestos is encountered in fill, this risk evaluation should be revised.

Personnel will endeavour, wherever possible, to avoid direct contact with potentially contaminated material. Workers must avoid the potential exposures listed above as far as is practicable. Appropriate personal protective equipment (PPE) must be used to mitigate potential risks.

H8.5 Physical Hazards

The following physical hazards are associated with conditions that may be created during remediation works:

- Heat exposure;
- Excavations;

- Buried services;
- Noise;
- Dust;
- Electrical equipment;
- Heavy equipment and truck operation; and
- Asbestos.

Safe work practices must be employed to manage the physical risks identified above. For the most part these risks can be managed through appropriate demarcation, access controls and the use of appropriate PPE.

H8.6 Safe Work Practices

The appropriate safe work practices should be clearly defined by the Remediation Contractor in their SWMS. As a minimum, all personnel on site will be required to wear the following PPE:

- Steel-capped boots (mandatory);
- High visibility clothing / vest (mandatory);
- Safety glasses or safety goggles with side shields requirements (as necessary);
- Hard hat (as necessary);
- Appropriate respiratory and protective equipment for any works involving asbestos (as necessary); and
- Hearing protection when working in the vicinity of machinery or plant equipment if noise levels exceed exposure standards (as necessary).

Each item of PPE should meet the corresponding relevant Australian Standard(s).

Specific safe work practices will be adopted when working with asbestos, in accordance with (but not limited to) the following codes of practice:

- SafeWork NSW *Code of Practice, How to Manage and Control Asbestos in the Workplace* (SafeWork NSW, 2019a)
- SafeWork NSW *Code of Practice, How to Safely Remove Asbestos* (SafeWork NSW, 2019b);
- WorkCover NSW *Managing Asbestos in or on Soil* (WorkCover NSW, 2014);
- NOHSC *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Ed* (NOHSC, 2005).

H9.0 Remediation Schedule and Hours of Operation

The remediation works will be conducted within the days and hours specified in the development consent.

H10.0 Response to Incidents

The key to effective management of incidents is the timely action taken before any situation reaches a reportable or critical level. Therefore, surveillance activities are extremely important, and should be conducted for the measures prescribed herein and any other measures prescribed in any additional environmental management plan developed subsequently. During construction activities on the site, the following inspection or preventative actions should be performed by the Remediation Contractor:

- Regular inspection of works;
- Completion of routine environmental checklists and follow-up of non-compliance situations;
- Maintenance and supervision on-site; and
- An induction process for site personnel involved in the remediation works that includes relevant information on the contamination status of the site, the remediation works being undertaken, worker health and environmental protection requirements and ensures that all site personnel are familiar with the site emergency procedures.

An emergency response plan will be in place for all aspects of site works. Any emergency will be reported immediately to the site office and/or the Site Manager (and Safety Officer), and the appropriate emergency assistance should be sought. The Site Manager should be responsible for initiating an immediate emergency response using the resources available on the site. Where external assistance is required, the relevant emergency services should be contacted. A table such as that below, containing contact details for key personnel who may be involved in an environmental emergency response should be completed and be readily available to personnel at all times. The table should be completed, and thereafter amended, as required.

The Remediation Contractor will be responsible for ensuring that site personnel are aware of the emergency services available and the appropriate contact details. A site Safety Officer should be contactable, or available, on-site during remediation and development works.

Contact details for key utilities are included in the event of needing to respond to incidents. Blank cells are ‘to be confirmed’ and should be completed prior to works commencing when all entities are confirmed.

Table 1: Summary of Roles and Contact Details

Role	Personnel / Contact	Phone Contact Details
Principal	To be confirmed	-
Principal's Representative	To be confirmed	-
Site Manager	To be confirmed	-
Remediation Contractor and Builder	To be confirmed	-
Site Office	To be confirmed	-
Environmental Consultant	To be confirmed	-
Consent Authority	To be confirmed	-
Regulator	NSW EPA (pollution line and general enquiries)	131 555
Utility Provider	Water (Sydney Water Corporation)	13 20 92
Utility Provider	Power (Ausgrid)	13 13 88
Utility Provider	Gas (Jemena Limited)	131 909
Utility Provider	Telecommunications (Telstra Corporation Limited)	13 22 03
Utility Provider	Telecommunications (Optus)	1800 505 777
Utility Provider	Telecommunications (NBN Co Limited)	1800 687 626

H11.0 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.

CRC CARE. (2019). *Remediation Action Plan: Implementation - Guideline on Health and Safety.* National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

NOHSC. (2005). *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Ed.* Canberra, April 2005, NOHSC:3003: National Occupational Health and Safety Commission, Commonwealth of Australia.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

SafeWork NSW. (2019a). *Code of Practice, How to Manage and Control Asbestos in the Workplace.* August 2019.

SafeWork NSW. (2019b). *Code of Practice, How to Safely Remove Asbestos.* August 2019: SafeWork NSW, NSW Government.

WorkCover NSW. (2014). *Managing Asbestos in or on Soil.* March 2014: WorkCover NSW, NSW Government.

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Appendix I

Contingency Plan and Unexpected Finds Protocol

Appendix I
Unexpected Finds Protocol
Corner Hunter and Odd Streets, Horseshoe Bend

I1.0 General

Where the site conditions are found to be different than that anticipated during the remediation works, the proposed remediation approach may not be appropriate for the contamination encountered. In such cases the Environmental Consultant is to re-assess the contamination and remediation approach. Where necessary the Environmental Consultant will prepare an addendum to, or revision of, this RAP.

I2.0 Contingency Plan

This contingency plan has been developed to provide guidance on processes to follow if contamination (or indicators of contamination), other than that included in the remediation strategy, (Section 10) is encountered during the remediation works. Any such finds shall be surveyed and the location documented.

Although the site has been subject to previous investigation(s), there remains a potential for soil contamination to be present between sampled locations and in areas previous inaccessible. In the event that signs of soil contamination, other than that included in the remediation strategy, are encountered during remediation e.g. evidence of asbestos containing material (ACM), petroleum, or other chemical odours which weren't previously identified the following protocols will apply:

- The Site Manager is to be notified and the affected area closed off by the use of barrier tape and warning signs;
- The Environmental Consultant is to be notified to inspect the area and assess the significance of the potential contamination and determine extent of remediation works (if deemed necessary) to be undertaken. An assessment report and management plan detailing this information will be compiled by the Environmental Consultant and provided to the Principal's Representative;
- The assessment results together with a suitable management plan shall be provided by the Principal's Representative to the Consent Authority (if required by the development consent);
- The agreed management / remedial strategy, based on the RAP and relevant guidelines (e.g. WA DoH (2021), for asbestos issues), shall be implemented; and
- All details of the assessment and remedial works are to be included in the site validation report.

I3.0 Unexpected Finds Protocol

This unexpected finds protocol (UFP) has been developed to provide guidance on processes to follow if any unexpected find is encountered during the remediation or future civil and construction works. Any unexpected finds should be surveyed and the location documented.

All site personnel are to be inducted into their responsibilities under this (UFP), which should be included or referenced in the Contractors Environmental Management Plan.

All site personnel are required to report unexpected signs of environmental concern to the Site Manager if observed during the course of their works e.g. presence of potential unexploded ordinance, unnatural staining, potential contamination sources (such as buried drums or tanks) or chemical spills.

Should signs of concern be observed, the Site Manager, as soon as practical, will:

- Stop work in the affected area and ensure the area is barricaded to prevent unauthorised access;
- Notify authorities needed to obtain emergency response for any health or environmental concerns (e.g. fire brigade);
- Notify the Principal's Representative of the occurrence;
- Notify any of the authorities that the Contractor is legally/ contractually required to notify (e.g. EPA, Council); and
- Notify the Environmental Consultant.

The Principal's Representative is to notify any of the authorities which the Principal is legally/ contractually required to notify (e.g. EPA, Council).

The Environmental Consultant will assess the extent and significance of the find and develop an investigation, remediation or management approach using (where possible) the principles and procedures already outlined in the RAP. Where a Site Auditor is involved, the proposed approach will be discussed and agreed with the Site Auditor prior to implementation.

I4.0 Reference

WA DoH. (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.* WA Department of Health.

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