Nihon University Newcastle Campus Site Audit

Site Audit Report 0088_IDG

DWP Australia Pty Ltd

15 September 2021

→ **The Power of Commitment**

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Site Audit Statement

NSW Site Auditor Scheme

Site Audit Statement

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the *Contaminated Land Management Act 1997* on 12 October 2017.

For information about completing this form, go to Part IV.

Part I: Site audit identification

Site audit statement no. 0088_IDG

This site audit is a:

☑ statutory audit

❑ non-statutory audit

within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details

(As accredited under the *Contaminated Land Management Act 1997*)

Name	Ian Gregson
Company	GHD Pty Ltd
Address	Level 3, 24 Honeysuckle Drive, Newcastle NSW
	Postcode 2300
Phone	02 4979 9904
Email	ian.gregson@ghd.com

Site details

Address	9 Church Street, Newcastle NSW
	Postcode 2300

Property description

(Attach a separate list if several properties are included in the site audit.)

Part Lot 1 DP 1199904 - the area subject to this site audit excludes “Easement C” on the western boundary of Lot 1 DP 1199904, as shown on attached Douglas Partners Drawing 1 “Test Location Plan” and ADW Johnson drawing 239815-DET-001-A “Detail Survey of Lot 1 D.P. 1199904”

Local government area City of Newcastle

Area of site (include units, e.g. hectares) 4,880 m^2

Current zoning B4 Mixed Use

Regulation and notification

To the best of my knowledge:

☐ ~~**the site is** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985,* as follows: (provide the no. if applicable)~~

- ☐ ~~Declaration no.~~
- ☐ ~~Order no.~~
- ☐ ~~Proposal no.~~
- ☐ ~~Notice no.~~

☑ **the site is not** the subject of a declaration, order, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

To the best of my knowledge:

☐ ~~the site **has** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*~~

☑ the site **has not** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*.

Site audit commissioned by

Name	Katherine Daunt
Company	dwp Australia Pty Ltd on behalf of Nihon University
Address	16 Telford Street, Newcastle NSW
	Postcode 2300
Phone	+61 477 709 588
Email	katherine.d@dwp.com

Contact details for contact person (if different from above)

Name as above

Phone

Email

Nature of statutory requirements (not applicable for non-statutory audits)

☐ ~~Requirements under the *Contaminated Land Management Act* 1997 (e.g. management order; please specify, including date of issue)~~

☐ ~~Requirements imposed by an environmental planning instrument (please specify, including date of issue)~~

☑ Development consent requirements under the *Environmental Planning and Assessment Act 1979* (please specify consent authority and date of issue)

State Significant Development (SSD) 9787, granted by the Minister for Planning and Public Spaces 11 December 2019

☐ ~~Requirements under other legislation (please specify, including date of issue)~~

Purpose of site audit

☐ ~~**A1** To determine land use suitability~~

~~Intended uses of the land:~~

OR

☑ **A2** To determine land use suitability subject to compliance with either an active or passive environmental management plan

Intended uses of the land: Educational establishment (University campus)

OR

~~(Tick all that apply)~~

☐ ~~**B1** To determine the nature and extent of contamination~~

☐ ~~**B2** To determine the appropriateness of:~~

- ☐ ~~an investigation plan~~
- ☐ ~~a remediation plan~~
- ☐ ~~a management plan~~

☐ ~~**B3** To determine the appropriateness of a **site testing plan** to determine if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*~~

☐ ~~**B4** To determine the compliance with an approved:~~

- ☐ ~~**voluntary management proposal** or~~
- ☐ ~~**management order** under the *Contaminated Land Management Act 1997*~~

☐ ~~**B5** To determine if the land can be made suitable for a particular use (or uses) if the site is remediated or managed in accordance with a specified plan.~~

~~Intended uses of the land:~~

Information sources for site audit

Consultancies which conducted the site investigations and/or remediation:

Coffey Environments, Prensa, Cardno and Douglas Partners (DP)

Titles of reports reviewed:

- DP (2019), *Sampling, Analysis and Quality Plan Supplementary Detailed Site Investigation (Contamination), Nihon University Australia Newcastle Campus Project, 9 Church Street, Newcastle*, Douglas Partners, Rev 1, December 2019
- DP (2020a), *Detailed Site Investigation, Pre-Demolition, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 3 March 2020
- DP (2020b), *Detailed Site Investigation, Proposed Nihon University, 9 Church Street, Newcastle*, Rev 2, Douglas Partners Pty Ltd, 23 April 2020 [supersedes and incorporates DP 2020a]

- DP (2020c), *Remediation Action Plan, Proposed Nihon University, 9 Church Street, Newcastle,* Rev 1, Douglas Partners Pty Ltd, 23 April 2020
- DP (2021a), *Report on Validation of Remediation, Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 15 September 2021
- DP (2021b), *Long-term Environmental Management Plan, Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 10 September 2021

Other information reviewed, including previous site audit reports and statements relating to the site:

- ADE (2020a), *Waste Analysis & Classification Report, 9 Church Street, Newcastle NSW,* DRD-87-17407 / WAC1 / v1f, ADE Consulting Pty Ltd, 6 March 2020
- ADE (2020b), *Waste Analysis & Classification Report, 9 Church Street, Newcastle NSW,* DRD-87-17407 / WAC2 / v1 final, ADE Consulting Pty Ltd, 30 March 2020
- ADE (2020c), *Recovered Aggregate Report, 9 Church Street, Newcastle NSW*, DRD-87-17407 / WAC3 / v1f, ADE Consulting Pty Ltd, 13 May 2020
- Coffey (2012), *Phase 1 Environmental Site Assessment Newcastle Courthouse and Former Newcastle East Public School,* Coffey Environments, 25 July 2012
- Prensa (2016), *Detailed Site Investigation, 9 Church St, Newcastle, NSW, 2300*, Prensa Pty Ltd, October 2016
- Napier & Blakely (2008), *The Newcastle Courthouse, Church Street, Newcastle NSW, Asbestos Materials Report*, Napier & Blakely Pty Ltd, August 2008
- WSP (2017), Vapour Risk Assessment, decommissioning of underground storage tank at Newcastle Police Station, 1 Church Street, Newcastle NSW, 8 September 2017
- Cardno (2018), *Report on Geotechnical Investigation, Newcastle Courthouse Redevelopment,* Rev 0, Cardno (NSW/ACT) Pty Ltd, 20 December 2018
- Cardno (2019), *Conceptual Remediation Action Plan, 9 Church Street, Newcastle NSW 2300*, Rev 0, Cardno (NSW/ACT) Pty Ltd, 28 May 2019
- DP (2020d), *Long Term Site Management Plan, Proposed Nihon University, 9 Church Street, Newcastle,* Douglas Partners Pty Ltd, 26 March 2020
- DP (2020e), Report on Geotechnical Investigation, Nihon University, 9 Church Street, Newcastle, Douglas Partners Pty Ltd, Rev 1, 2020
- DP (2020f), Report on Mine Subsidence Investigation, Nihon University, 9 Church Street, Newcastle, Douglas Partners Pty Ltd, Rev 0, 2020
- DP (2020g), *Stormwater Easement Management Strategy, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 6 July 2020.

Site audit report details

Title: Nihon University Newcastle Campus Site Audit, Site Audit Report 0088_IDG

Report no. 12519246-REP_Site Audit Report_0088_IDG Date: 15 September 2021

Part II: Auditor's findings

Please complete either Section A1, Section A2 or Section B, not more than one section. (Strike out the irrelevant sections.)

- Use **Section A1** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **without the implementation** of an environmental management plan.
- Use **Section A2** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **with the implementation** of an active or passive environmental management plan.
- Use **Section B** where the audit is to determine:
    - (B1) the nature and extent of contamination, and/or
    - (B2) the appropriateness of an investigation, remediation or management plan[1], and/or
    - (B3) the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or
    - (B4) whether the terms of the approved voluntary management proposal or management order have been complied with, and/or
    - (B5) whether the site can be made suitable for a specified land use (or uses) if the site is remediated or managed in accordance with the implementation of a specified plan.

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

Section A1

I certify that, in my opinion:

The **site is suitable** for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

- ☐ Residential, including substantial vegetable garden and poultry
- ☐ Residential, including substantial vegetable garden, excluding poultry
- ☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- ☐ Day care centre, preschool, primary school
- ☐ Residential with minimal opportunity for soil access, including units
- ☐ Secondary school
- ☐ Park, recreational open space, playing field
- ☐ Commercial/industrial
- ☐ Other (please specify):

_____

OR

- ☐ I certify that, in my opinion, the **site is not suitable** for any use due to the risk of harm from contamination.

Overall comments:

_____

_____

_____

_____

_____

_____

Section A2

I certify that, in my opinion:

Subject to compliance with the **attached** environmental management plan[2] (EMP), the site is suitable for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

❑ ~~Residential, including substantial vegetable garden and poultry~~

❑ ~~Residential, including substantial vegetable garden, excluding poultry~~

❑ ~~Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~

❑ ~~Day care centre, preschool, primary school~~

☑ Residential with minimal opportunity for soil access, including units

❑ ~~Secondary school~~

❑ ~~Park, recreational open space, playing field~~

❑ ~~Commercial/industrial~~

☑ Other (please specify):

Educational establishment (University Campus)

EMP details

Title: Long-term Environmental Management Plan, Nihon University, 9 Church Street, Newcastle

Author: Douglas Partners

Date: 10 September 2021 No. of pages: 43

EMP summary

This EMP (attached) is required to be implemented to address residual contamination on the site.

The EMP: (Tick appropriate box and strike out the other option.)

❑ requires operation and/or maintenance of **active** control systems[3]

☑ requires maintenance of **passive** control systems only[3].

[2] Refer to Part IV for an explanation of an environmental management plan.
[3] Refer to Part IV for definitions of active and passive control systems.

Purpose of the EMP:

The remediation and validation involved on-site management (capping) of contaminated soils to render the site suitable for use as a university campus. The purpose of the LTEMP is to provide awareness of the contamination managed on site and prevent and manage breaching of the cap. The LTEMP promotes awareness of the contamination management and the requirements to avoid disturbance (where possible) of the capping and provides an outline of maintenance requirements.

Description of the nature of the residual contamination:

Contaminated soils/fill containing bonded asbestos-containing materials (ACM) are present across the site, due to uncontrolled historical fill and historical demolition of structures within the site. While polycyclic aromatic hydrocarbons (PAH), heavy metals (lead) and total recoverable hydrocarbon (TRH) impacts were identified within fill on site exceeding the adopted Tier 1 health based and ecological investigation / screening levels, remediation for these contaminants was not warranted based on statistical analysis and consideration of the ecological setting and the nature of the proposed development.

On-site management (capping) of contaminated soils was conducted in a controlled manner with reference to regulatory requirements and the approved RAP for the site (DP 2020c) to render the site suitable for use as a university campus. In summary, significant volumes of fill material were removed from site during construction, and the remaining potentially impacted soils were capped beneath existing and proposed buildings, new pavements and landscape areas, as shown on Geosurv Asbuilt Remediation Layers Plan in Appendix C of the LTEMP.

Summary of the actions required by the EMP:

Long-term management of contaminated soils located within capping across the site will be achieved by maintaining the cap. This will confirm that the site remains suitable for use as a university campus.

Management actions required under the LTEMP are summarised as follows:

- The site management will be responsible for implementation of the LTEMP and for notifying all personnel whose activities may impact on managed areas under building slabs, concrete pavements or capped landscaped areas. All designated personnel must read and understand the provisions of the LTEMP.
- Regular inspections should be conducted within the site to confirm the integrity of capping. Capping should be repaired as soon as possible if damaged.
- Any activities which require excavation/disturbance of greater than the thickness of capping shown on the Geosurv Asbuilt Remediation Layers Plan (191196-AB-R-01 (E) dated 6.09.2021)[4] or which have the potential to penetrate the capping and marker layers (i.e. excavations, repairs or installation of additional services), must be conducted in the manner described within Section 5.3 of the LTEMP.
- The LTEMP should be regularly reviewed to confirm its suitability for continued use. The LTEMP should be revised/updated should its provisions not cover site activities adequately. Any revisions to the LTEMP must be submitted to Council within one month of the update. Any revisions of the LTEMP that decrease the level of site management will require the approval of a NSW EPA accredited site auditor or the NSW EPA.

[4] Date stated in LTEMP. The actual date of Rev. E of this drawing is 02.09.2021

- Records of implementation and review of the LTEMP and submission of revised versions to Council should be maintained together with the LTEMP.

How the EMP can reasonably be made to be legally enforceable:

The LTEMP is legally required to be implemented under the Environmental Planning and Assessment Act 1979 (the 'EP&A Act'), by way of Conditions E34 (Prior to issue of an Occupation Certificate of Commencement of Operation) and F7 (Post Occupation) of the Development Consent (SSD 9787) as below:

E34. Upon completion of remediation works, the Applicant must manage the site in accordance with the LTEMP.

F7: Upon completion of remediation works, the Applicant must manage the site in accordance with the LTEMP approved under condition E32, or an updated version where approved by a NSW EPA Accredited Site Auditor. Any revisions must be submitted to Council within one month of the update.

How there will be appropriate public notification:

The LTEMP must be incorporated into the Nihon University overall property management plans/procedures to allow implementation of the management procedures within the plan for routine maintenance and for targeted subsurface works if and when required within the site. The requirement for ongoing site management must be noted on the appropriate planning certificate. Consideration should be given to recording the requirements on the title information for the site.

Condition E33 of the Development Consent states the approved LTEMP must be provided to Council within one month for notation of the section 10.7 certificate for the site.

Overall comments:

While significant quantities of fill were removed from the site as part of the development works, not all fill or contaminated materials were removed. Previous investigations indicate contaminants presenting a potential risk to health or the environment are limited to ACM, which has not been quantified but is expected to exceed health-screening levels in some parts of the site. The material has been capped as described in the LTEMP and should not be subject to exposure during normal use of the site. Risk can be managed by the procedures described in the LTEMP if material below the capping is required to be disturbed.

The Auditor considers that minor revisions to the LTEMP to keep it current or improve management are consistent with the requirements of the approved LTEMP, and do not require Auditor review, however updates should still be provided to Council as required by Condition F7 of SSD 9787. As noted above, any revisions of the LTEMP that decrease the level of site management will require the approval of a NSW EPA accredited site auditor or the NSW EPA.

Due to the presence of asbestos-containing materials at the site (while managed under the provisions of the LTEMP), an asbestos register and asbestos management plan must be maintained in accordance with Work Health Safety (WHS) regulatory requirements.

Section B

Purpose of the plan[5] which is the subject of this audit:

I certify that, in my opinion:

(B1)

☐ The nature and extent of the contamination **has** been appropriately determined

☐ The nature and extent of the contamination **has not** been appropriately determined

AND/OR (B2)

☐ The investigation, remediation or management plan **is** appropriate for the purpose stated above

☐ The investigation, remediation or management plan **is not** appropriate for the purpose stated above

AND/OR (B3)

☐ The site testing plan:

☐ **is** appropriate to determine

☐ **is not** appropriate to determine

if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*

AND/OR (B4)

☐ The terms of the approved voluntary management proposal* or management order** (strike out as appropriate):

☐ **have** been complied with

☐ **have not** been complied with.

*voluntary management proposal no.

**management order no.

AND/OR (B5)

☐ The site **can be made suitable** for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ Residential, including substantial vegetable garden and poultry

☐ Residential, including substantial vegetable garden, excluding poultry

[5] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

- ❑ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- ❑ Day care centre, preschool, primary school
- ❑ Residential with minimal opportunity for soil access, including units
- ❑ Secondary school
- ❑ Park, recreational open space, playing field
- ❑ Commercial/industrial
- ❑ Other (please specify):

IF the site is remediated/managed* in accordance with the following plan (**attached**):

*Strike out as appropriate

Plan title

Plan author

Plan date No. of pages

SUBJECT to compliance with the following condition(s):

Overall comments:

Part III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority (EPA) under the *Contaminated Land Management Act 1997.*

Accreditation no. 0101

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Signed

Date 15 September 2021

Part IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remediation plan or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use or uses of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A1 or Section A2 or Section B of Part II, **not** more than one section.

Section A1

In Section A1 the auditor may conclude that the land is *suitable* for a specified use or uses OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further investigation or remediation or management of the site was needed to render the site fit for the specified use(s). **Conditions must not be** imposed on a Section A1 site audit statement. Auditors may include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section A2

In Section A2 the auditor may conclude that the land is *suitable* for a specified use(s) subject to a condition for implementation of an environmental management plan (EMP).

Environmental management plan

Within the context of contaminated sites management, an EMP (sometimes also called a 'site management plan') means a plan which addresses the integration of environmental mitigation and monitoring measures for soil, groundwater and/or hazardous ground gases throughout an existing or proposed land use. An EMP succinctly describes the nature and location of contamination remaining on site and states what the objectives of the plan are, how contaminants will be managed, who will be responsible for the plan's implementation and over what time frame actions specified in the plan will take place.

By certifying that the site is suitable subject to implementation of an EMP, an auditor declares that, at the time of completion of the site audit, there was sufficient information satisfying guidelines made or approved under the *Contaminated Land Management Act 1997*

(CLM Act) to determine that implementation of the EMP was feasible and would enable the specified use(s) of the site and no further investigation or remediation of the site was needed to render the site fit for the specified use(s).

Implementation of an EMP is required to ensure the site remains suitable for the specified use(s). The plan should be legally enforceable: for example, a requirement of a notice under the CLM Act or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of *the Environmental Planning and Assessment Act 1979*.

Active or passive control systems

Auditors must specify whether the EMP requires operation and/or maintenance of active control systems or requires maintenance of passive control systems only. Active management systems usually incorporate mechanical components and/or require monitoring and, because of this, regular maintenance and inspection are necessary. Most active management systems are applied at sites where if the systems are not implemented an unacceptable risk may occur. Passive management systems usually require minimal management and maintenance and do not usually incorporate mechanical components.

Auditor's comments

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section B

In Section B the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or whether the terms of an approved voluntary management proposal or management order made under the CLM Act have been complied with, and/or whether the site can be made suitable for a specified land use or uses if the site is remediated or managed in accordance with the implementation of a specified plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement. The condition must not specify an individual auditor, only that further audits are required.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

Part III

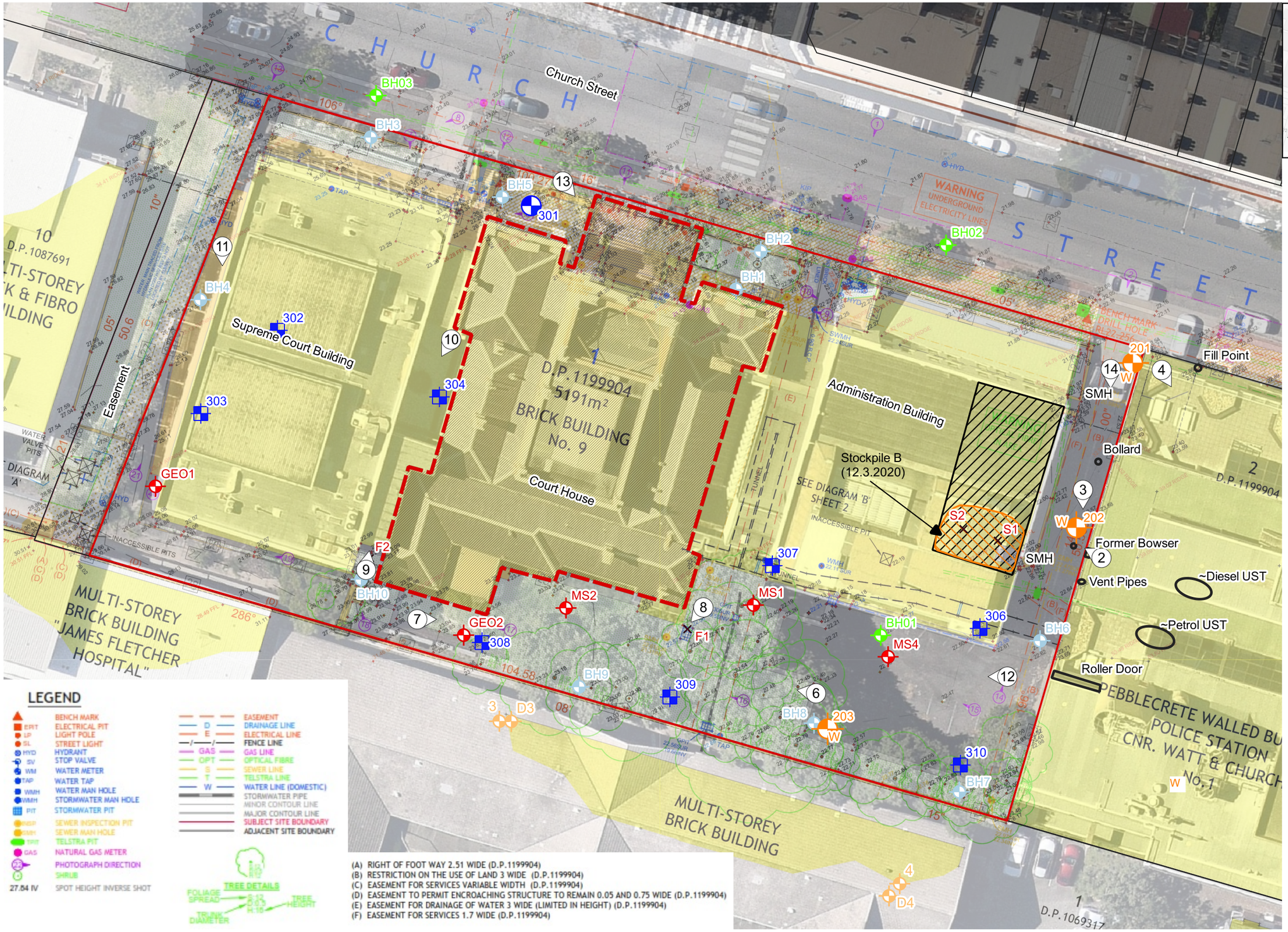
In **Part III** the auditor certifies their standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to

- the **NSW Environment Protection Authority**:
  nswauditors@epa.nsw.gov.au or as specified by the EPA

  AND
- the **local council** for the land which is the subject of the audit.



Drawing adapted from Nearmap Image dated 22.10.2019, plan by ADW Johnson ref 239815-DET-001-A dated 10.09.2018, and plan by Prensa ref 55499 Figures, Figure 2, Rev 1 dated 07.10.2016.

Legend

- Approximate Stockpile Area
- Approximate Excavation Area
- Environmental Pit Location Post-Demolition (DP)
- Environmental Bore Location Post-Demolition (DP)
- Environmental Bore Location Pre-Demolition (DP)
- W Environmental Well Location
- Geotechnical Test Location Pre-Demolition (DP)
- Previous Test Locations (Prensa 2016)
- Previous Test Locations (Cardno 2018)
- Site Boundary
- Proposed Buildings Structures to be Retained
- × Approximate Location of Material Sample Grab Sample
- Approximate Figure & Orientation Location

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Nihon Daigaku Australia Newcastle Pty Ltd	TITLE:	**Test Location Plan** **Proposed Nihon University** **9 Church Street, Newcastle**
OFFICE:	Newcastle	DRAWN BY:	PLH
SCALE:	1:400 @ A3	DATE:	18.March.2020

N

PROJECT No:	91667.02
DRAWING No:	1
REVISION:	2

239815-DET-001-A

DIAL1100
BEFORE YOU DIG

C H U R C H

S T R E E T

WARNING
UNDERGROUND
ELECTRICITY LINES

WARNING
OPTICAL FIBRE
IN AREA

BENCH MARK
DRILL HOLE
RL22.256

N

adw johnson

10
D.P.1087691
MULTI-STOREY
BRICK & FIBRO
BUILDING

1
D.P.1199904
5191m²
BRICK BUILDING
No. 9

2
D.P.1199904

SEE DIAGRAM 'B'
SHEET 2

INACCESSIBLE PIT

TUNNEL

WATER
VALVE
PITS

SEE DIAGRAM
'A'

INACCESSIBLE PITS

106°

16'

100.27

05'

00"

14'

50.565

50.6

10"

21°07'
0.38

286°

104.58

08'

15'

196°

MULTI-STOREY
BRICK BUILDING
"JAMES FLETCHER
HOSPITAL"

MULTI-STOREY
BRICK BUILDING

PEBBLECRETE WALLED BUILDING
POLICE STATION
CNR. WATT & CHURCH
No.1

1
D.P.1069317

BRICK

LEGEND

BENCH MARK	EASEMENT
EPIT ELECTRICAL PIT	D DRAINAGE LINE
LP LIGHT POLE	E ELECTRICAL LINE
SL STREET LIGHT	FENCE LINE
HYD HYDRANT	GAS GAS LINE
SV STOP VALVE	OPT OPTICAL FIBRE
WM WATER METER	S SEWER LINE
TAP WATER TAP	T TELSTRA LINE
WMH WATER MAN HOLE	W WATER LINE (DOMESTIC)
SWMH STORMWATER MAN HOLE	STORMWATER PIPE
PIT STORMWATER PIT	MINOR CONTOUR LINE
INSP SEWER INSPECTION PIT	MAJOR CONTOUR LINE
SMH SEWER MAN HOLE	SUBJECT SITE BOUNDARY
TPIT TELSTRA PIT	ADJACENT SITE BOUNDARY
GAS NATURAL GAS METER	
22 PHOTOGRAPH DIRECTION	
SHRUB	
27.84 IV SPOT HEIGHT INVERSE SHOT	

TREE DETAILS
FOLIAGE SPREAD S:12
TRUNK DIAMETER D:0.5
TREE HEIGHT H:16

(A) RIGHT OF FOOT WAY 2.51 WIDE (D.P.1199904)
(B) RESTRICTION ON THE USE OF LAND 3 WIDE (D.P.1199904)
(C) EASEMENT FOR SERVICES VARIABLE WIDTH (D.P.1199904)
(D) EASEMENT TO PERMIT ENCROACHING STRUCTURE TO REMAIN 0.05 AND 0.75 WIDE (D.P.1199904)
(E) EASEMENT FOR DRAINAGE OF WATER 3 WIDE (LIMITED IN HEIGHT) (D.P.1199904)
(F) EASEMENT FOR SERVICES 1.7 WIDE (D.P.1199904)

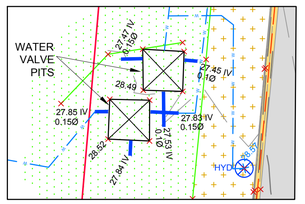


DIAGRAM 'A'
SCALE 1:100

NOTES:-

1. SERVICES HAVE BEEN LOCATED WHERE VISIBLE ONLY. PRIOR TO EXCAVATION OR CONSTRUCTION ALL SERVICES ARE TO BE LOCATED BY THE RELEVANT AUTHORITY.
2. SPOT LEVELS AND CONTOURS SHOWN HEREON ARE FOR DESIGN PURPOSES ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
3. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF DETAIL SURVEY AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE.

ver.	date	comment	surveyed	drawn	checked	pm
A	10.09.18	INITIAL ISSUE	CD	LB/MC	CD	TC

co-ordinate information
CO-ORDINATE SYSTEM: MGA 56
ORIGIN OF CO-ORDINATES: P.M. 19805
DATE OF SURVEY 30.08.18

level information
DATUM: AHD
ORIGIN OF LEVELS: P.M. 190805
CONTOUR INTERVAL: 0.5

scale (A1 original size)
0 5.0 10.0m
SCALE: 1:200 (FULL)

page
1 OF 2

drawing title:
Detail Survey of
Lot 1 D.P. 1199904

location: 9 Church Street, Newcastle
council: Newcastle
dwg ref: 239815-DET-001-A
client: AZUSA SEKKEI CO LTD

adw johnson
central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411
www.adwjohnson.com.au

working beyond expectations

Plotted By: Anthony Morgan Plot Date: 10/09/18 3:25:01 PM Cad File: N:\239815\DWG'S\SURVEY\239815-DET-001-A.DWG
This plan includes coloured information. If you have a black and white copy you do not have all of the information. This note is coloured RED.

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List of abbreviations

ACM	Asbestos Containing Material
AHD	Australian Height Datum
ANZECC	Australian & New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand [and Australian State and Territory] Governments
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ASS	Acid Sulfate Soil
ASSMP	Acid Sulfate Soil Management Plan
BaP	Benzo(a)pyrene
bgl	Below ground level
BTEXN	Benzene, Toluene, Ethyl Benzene, Xylenes, Naphthalene
CLM Act	Contaminated Land Management Act 1997 (incorporating amendments made by the Contaminated Land Management Amendment Act 2003)
CoC	Chain of Custody
COPC	Contaminant of Potential Concern
cRAP	Concept RAP (Cardno 2019)
CSM	Conceptual Site Model
DEC	Department of Environment and Conservation.
DO	Dissolved Oxygen
DP	Deposited Plan (in context of site identification), or Douglas Partners (in reference to the consultant or their reports)
DQI	Data Quality Indicator
DQO	Data Quality Objective
DSI	Detailed Site Investigation
EC	Electrical Conductivity
EIL	Ecological Investigation Level
EMP	Environmental Management Plan
ENM	Excavated Natural Material
EPA	NSW Environment Protection Authority
EPL	Environment Protection License
ESL	Ecological Screening Level
<	Less than (laboratory reporting limit or PQL)
GIL	Groundwater Investigation Level
GME	Groundwater Monitoring Event
GSW	General Solid Waste
Ha	Hectare
HIL	Health Investigation Level (relating to defined land use scenario)
HSL	Health Screening Level
L	Litre
LNAPL	Light non-aqueous phase liquid

LOR	Limit of Reporting (equivalent to PQL)
m	Metre
m bgl	metres below ground level
mg/kg	Milligrams per kilogram (generally equivalent to parts per million)
mg/L	Milligrams per Litre (generally equivalent to parts per million)
µg/L	Micrograms per Litre (generally equivalent to parts per billion)
NATA	National Association of Testing Authorities of Australia
NEHF	National Environmental Health Forum
NEPC	National Environment Protection Council
NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)
NHMRC	National Health and Medical Research Council
NSW	New South Wales
OCPs	Organochlorine Pesticides
OEH	Office of Environment and Heritage
OH&S	Occupational Health and Safety
OPPs	Organophosphate Pesticides
ORP	Oxidation / Reduction Potential
PAHs	Polycyclic Aromatic Hydrocarbons
PASS	Potential Acid Sulfate Soil
PCBs	Polychlorinated Biphenyls
PFAS	Per- and poly-fluoroalkyl substances
PID	Photoionisation Detector
POEO Act	Protection of the Environment and Operations Act 1997
PQL	Practical Quantitation Limit (equivalent to LOR)
QA	Quality Assurance
QC	Quality Control
RAC	Remediation Acceptance Criteria
RAP	Remediation Action Plan
RPD	Relative Percent Difference
RSW	Restricted Solid Waste
SAQP	Sampling Analysis and Quality Plan
SEPP	State Environment Planning Policy
SSD	State Significant Development
SWL	Standing Water Level
TCLP	Toxicity characteristics leaching procedure
TEQ	Toxicity Equivalent Quotient
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
VENM	Virgin Excavated Natural Material
VOC	Volatile Organic Compound

1. Introduction

1.1 Background

This Site Audit Report (Audit Report) relates to the Nihon University development at 9 Church Street, Newcastle, identified as Lot 1 DP 1199904. As described in correspondence in **Appendix D**[1] (GHD letter dated 22 January 2020 and DWP letter dated 23 January 2020), the area which is subject to this Site Audit is limited to "the relevant part of the site" as required by Condition E31 of SSD-9787 (see further discussion in **Section 15**) and excludes an easement identified as "Easement C" on the western boundary of Lot 1 DP 1199904. For convenience in this Audit Report, Lot 1 is referred to as "the property", and the site audit area is referred to as "the site". The site comprises an area of approximately 4,880 m^2. The site locality is presented in Coffey Figure 1 and site boundaries are presented in Douglas Partners Drawing 1 included in **Appendix A**.

A State Significant Development Application (SSD-9787) has been submitted to develop the former Newcastle Courthouse into a new university campus. The proposed development involves the demolition of two buildings on the site, changing the original courthouse building to an educational establishment and construction of two new 4-storey buildings. Previous investigations undertaken at the site have identified elevated PAHs and heavy metals along with bonded asbestos containing materials (ACM) within filling across the site above the adopted site assessment criteria for the proposed land use. Reports describing investigations, remediation, validation and long term environmental management of the site have been prepared by environmental consultants and reviewed by the Site Auditor.

The Site Audit was requested by DWP Australia Pty Ltd (DWP) on 6 November 2019. The Audit is required as a condition of consent for SSD-9787. Notification of this site audit was provided to the EPA on 6 November 2019. This Site Audit constitutes a statutory[2] site audit as defined in the *Contaminated Land Management Act 1997* (the CLM Act 1997)[3].

This Audit Report has been prepared in accordance with the *Guidelines for the NSW Site Auditor Scheme* (3rd edition) issued by the EPA in October 2017.

The details of the site which is subject to this Site Audit are summarised in Table 1.

Table 1 Site audit details

Site auditor	Mr Ian Gregson
NSW EPA site auditor accreditation no.	0101
NSW EPA unique site audit no.	0088_IDG
Audit category	Statutory
Street address	9 Church Street, Newcastle
Legal property description	Part of Lot 1 DP1199904 (the area subject to this site audit is the "relevant part" of Lot 1, excluding "Easement C" as discussed above).
Council	Newcastle City Council
Site area	4,880 m^2. DP Drawing 1 "Test Location Plan" and ADW Johnson drawing 239815-DET-001-A "Detail Survey of Lot 1 D.P. 1199904" showing the boundaries of the site area are included in Appendix A
Site owner	Nihon University
Current land use	Public administration building

[1] References in **bold** refer to sections within this Site Audit Report.
[2] The Site Audit Notification (issued prior to determination of the consent) listed the site as a "non-statutory" audit with a note to state that it was expected to become a statutory audit when consent was granted.
[3] References to the CLM Act in this Audit Report include amendments to the CLM Act 1997 made by the Contaminated Land Management Amendment Act 2003, which commenced on 1 February 2004.

Proposed land use	Educational establishment
Land use zoning	B4 – Mixed Use

1.2 Purpose of the audit

A Site Audit is defined in S.4 of the CLM Act 1997 as a review:

(a) that relates to management (whether under this Act or otherwise) of the actual or possible contamination of land.

(b) that is conducted for the purpose of determining any one or more of the following matters:

(i) The nature and extent of any contamination of the land.

(ii) The nature and extent of any management of actual or possible contamination of the land.

(iii) Whether the land is suitable for any specified use or range of uses.

(iv) What management remains necessary before the land is suitable for any specified use or range of uses.

(v) The suitability and appropriateness of a plan of management, long term management plan or a voluntary management proposal.

The primary purpose of this audit is to determine whether the land is suitable for the specified use (educational establishment (purpose (b) (iii)), however the Site Audit has also considered the nature and extent of any contamination of the land, the appropriateness of a remediation plan, if the land can be made suitable for its proposed use if the site is remediated or managed in accordance with a specified plan, and the appropriateness of a long term management plan (purposes (b) (i) (iv) and (v).

1.3 Proposed and permitted land uses

The site is currently zoned B4 – Mixed Use under Newcastle Local Environmental Plan 2012. The objectives of zone B4 are:

– 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.
– To support nearby or adjacent commercial centres without adversely impacting on the viability of those centres.

Land uses permitted with consent are:

Boarding houses; Centre-based child care facilities; Commercial premises, Community facilities; Educational establishments; Entertainment facilities; Function centres; Hotel or motel accommodation; Information and education facilities; Medical centres; Oyster aquaculture; Passenger transport facilities; Recreation facilities (indoor); Registered clubs; Respite day care centres; Restricted premises; Roads; Seniors housing; Shop top housing; Tank-based aquaculture.

The proposed land use for the site is an educational establishment (University Campus) which is permissible under the current zoning. Details of the proposed development are summarised in **Section 2.2** of this Audit Report.

1.4 Scope of review

The scope of work undertaken by the Auditor included:

– Site inspections undertaken by the Auditor on 8 November 2019, 14 November 2019, 18 March 2020, 4 June 2020, 3 July 2020, 7 July 2020 and 3 September 2021.
– Review of the reports listed in **Section 1.5** of this Audit Report.
– Provision of this Site Audit Report.

1.5 Investigation reports

The reports that form the primary basis of this Site Audit are as follows:

- DP (2019), *Sampling, Analysis and Quality Plan Supplementary Detailed Site Investigation (Contamination), Nihon University Australia Newcastle Campus Project, 9 Church Street, Newcastle*, Douglas Partners, Rev 1, December 2019
- DP (2020a), *Detailed Site Investigation, Pre-Demolition, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 3 March 2020
- DP (2020b), *Detailed Site Investigation, Proposed Nihon University, 9 Church Street, Newcastle*, Rev 2, Douglas Partners Pty Ltd, 23 April 2020 [supersedes and incorporates DP 2020a]
- DP (2020c), *Remediation Action Plan, Proposed Nihon University, 9 Church Street, Newcastle,* Rev 1, Douglas Partners Pty Ltd, 23 April 2020
- DP (2021a), *Report on Validation of Remediation, Nihon University, 9 Church Street, Newcastle,* Douglas Partners Pty Ltd, 15 September 2021
- DP (2021b), *Long-term Environmental Management Plan, Nihon University, 9 Church Street, Newcastle,* Douglas Partners Pty Ltd, 10 September 2021

As part of the Site Audit, the Auditor reviewed and commented on previous versions of some of the above reports, and other reports relating to the site including:

- ADE (2020a), *Waste Analysis & Classification Report, 9 Church Street, Newcastle NSW,* DRD-87-17407 / WAC1 / v1f, ADE Consulting Pty Ltd, 6 March 2020
- ADE (2020b), *Waste Analysis & Classification Report, 9 Church Street, Newcastle NSW,* DRD-87-17407 / WAC2 / v1 final, ADE Consulting Pty Ltd, 30 March 2020
- ADE (2020c), *Recovered Aggregate Report, 9 Church Street, Newcastle NSW,* DRD-87-17407 / WAC3 / v1f, ADE Consulting Pty Ltd, 13 May 2020
- Coffey (2012), *Phase 1 Environmental Site Assessment Newcastle Courthouse and Former Newcastle East Public School,* Coffey Environments, 25 July 2012
- Prensa (2016), *Detailed Site Investigation, 9 Church St, Newcastle, NSW, 2300*, Prensa Pty Ltd, October 2016
- Napier & Blakely (2008), *The Newcastle Courthouse, Church Street, Newcastle NSW, Asbestos Materials Report*, Napier & Blakely Pty Ltd, August 2008
- WSP (2017), Vapour Risk Assessment, decommissioning of underground storage tank at Newcastle Police Station, 1 Church Street, Newcastle NSW, 8 September 2017
- Cardno (2018), *Report on Geotechnical Investigation, Newcastle Courthouse Redevelopment,* Rev 0, Cardno (NSW/ACT) Pty Ltd, 20 December 2018
- Cardno (2019), *Conceptual Remediation Action Plan, 9 Church Street, Newcastle NSW 2300*, Rev 0, Cardno (NSW/ACT) Pty Ltd, 28 May 2019
- DP (2020d), *Long Term Site Management Plan, Proposed Nihon University, 9 Church Street, Newcastle,* Douglas Partners Pty Ltd, 26 March 2020
- DP (2020e), *Report on Geotechnical Investigation, Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, Rev 1, 2020
- DP (2020f), *Report on Mine Subsidence Investigation, Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, Rev 0, 2020
- DP (2020g), *Stormwater Easement Management Strategy, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 6 July 2020.

This information is held in the Auditor's files with DP's responses, and copies of particularly relevant correspondence are included in **Appendix D** of this Audit Report.

1.6 Site visits

The Auditor conducted a series of site visits during the investigations as noted in **Section 1.4** to gain an understanding of the site and surrounding conditions and to view the way the investigation works were being conducted. These are summarised as follows:

- 8 November 2019 – general inspection of site condition as background to reviewing Cardno cRAP (Cardno 2019) and DP SAQP (DP 2019)
- 14 November 2019 – inspection of adjoining police station and its fuel storage and handling facilities
- 18 March 2020 – inspection of eastern portion of site after demolition, during initial earthworks and sampling (summary of inspection is provided in Auditor's email dated 18 March 2020 in **Appendix D**)
- 4 June 2020 – inspection of western portion of site after demolition, during bulk earthworks and footing removal (summary in Aconex correspondence from Auditor dated 4 June 2020 in **Appendix D)**
- 3 July 2020 – inspection of stormwater drain easement and new drain installation to discuss deviation from RAP
- 7 July 2020 – follow up inspection of stormwater drain installation with Council to confirm approach (as documented in DP 2020g)
- 3 September 2021 – inspection of final site condition at the completion of remediation and construction works.

1.7 Guidelines used

This Audit Report was prepared with reference to the following statutory legislation, guidelines and/or standards which have been made or approved under s.105 of the CLM Act, or other relevant and current guidelines which in the Auditor's professional judgement provide an appropriate basis for assessment and management of contamination in NSW.

1.7.1 EPA guidelines

- *Consultants reporting on contaminated land, Contaminated land guidelines*, NSW EPA, May 2020 (EPA, 2020a)
- *Assessment and management of hazardous ground gases, Contaminated land guidelines*, NSW EPA, May 2020 (EPA, 2020b)
- *Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*, NSW EPA, 2015 (EPA, 2015).
- *Guidelines for the Assessment and Management of Groundwater Contamination*, NSW DEC, 2007 (NSW DEC, 2007).
- *Guidelines for the New South Wales Site Auditor Scheme* (3rd edition), NSW EPA, 2017 (EPA 2017).
- *Sampling Design Guidelines*, NSW EPA, 1995 (EPA, 1995).
- *Waste Classification Guidelines, Part 1: Classifying Waste*, NSW EPA 2014 (EPA 2014)

1.7.2 Other Publications

- *National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended in 2013), National Environment Protection Council, 2013 (NEPC, 2013).
- *Health Screening Levels for petroleum hydrocarbons in soil and groundwater. Technical report series No. 10.* Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE). Friebel, E. and Nadebaum, P, 2011 (CRC CARE 2011).
- *Risk-based management and remediation guidance for benzo(a)pyrene. Technical Report No. 39*, CRC CARE January 2017 (CRC CARE 2017).
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian and New Zealand and Australian State and Territory Governments (ANZG 2018).
- *Guidelines for the Assessment, Remediation and Management of Asbestos – Contaminated Sites in Western Australia*, Western Australia Department of Health, (WA DoH 2009)

1.8 Limitations of the site audit report

All information and opinions given in this Audit Report are based on reviewing the information presented in the documentation referenced in **Section 1.5** and other supporting information provided by the client and consultant. The Auditor has not carried out any independent investigations about the condition of the site. The site audit is based on the limitations presented in **Section 18** of this report.

The Auditor assumes no responsibility or liability for any errors or omissions in the information provided in the reports reviewed or that the consultant did not confer any reliance on the statements to the Auditor.

No other warranties, expressed or implied, are made.

This site audit relates only to contamination of land at the site and does not pertain to any other issues such as, but not limited to hazardous building materials present in structures, mine subsidence, geotechnical or ecological issues.

2. Site description

2.1 Existing layout and site condition

DP 2020b stated the site is described as part Lot 1 DP 1199904, 9 Church Street, Newcastle, NSW and comprises a rectangular shaped area of approximately 4880 m^2. The site (investigation area) excludes a variable width easement for services along the western boundary of Lot 1 which falls outside the development footprint. The site was formerly known as the Newcastle Court House and comprises three adjoining structures – the original Court House (Building B), the Administration Building (Building A) and the Supreme Court Building (Building C) with a rear carpark (south-east corner) and landscape areas.

A site inspection was undertaken on 14 November 2019 as a part of the DSI (DP 2020b) to assess pre-demolition site conditions. A summary of observations encountered during this inspection was reported in DP 2020b as follows:

– Landscape areas at the rear and front of the property are overgrown with thick vegetation, grass cover evident in garden areas. Soils, where exposed, appeared to be dark grey silty sands / sands with some building rubble evident (i.e. concrete fragments, asphalt, brick etc) and general rubbish evident in some areas
– Fibro sheeting fragments (potential asbestos containing materials (ACM)) were observed at the ground surface near a service pit (south-east corner of former Court House) and north of the rear staircase between the Court House and Supreme Court Building where building rubble and slag gravel were observed
– Building rubble was also observed at the surface of the internal garden bed between the Court House and Supreme Court Building
– The concrete associated with both the Supreme Court Building and the Administration Building was in poor condition in several places with cracking and chipping of concrete evident
– The rear carpark is asphalt sealed, as is a small area in front of the Court House. Concrete pavements are present around the western and northern perimeter of the Supreme Court Building and the driveway to the east of the Administration Building are in localised areas of landscaping to the south of the Court House and Supreme Court Building with some brick paved areas also present at the front of the site.

Further site inspections were undertaken in March 2020 within the Administration Building area during demolition activities. DP 2020b reported that the upper fill materials observed were generally commensurate with those encountered during the pre-demolition investigations and contained some anthropogenic inclusions (i.e., building waste) including potential ACM at some locations as well as ash and coal.

Auditor's Opinion: DP's site description is consistent with the Auditor's observations of the site.

2.2 Proposed development

As reported in DP 2020b, the proposed development includes the following:

– Demolition of the existing Administration Building and Supreme Court Building
– Change of use to the original heritage listed Court House Building from a 'Public Administration Building' to an 'Educational Establishment'
– Construction of two four-storey buildings consisting of a 108 bed 'Student Accommodation Building' (east wing) and an 'Education Building' (west wing), both connected to the proposed 'Public Building' by atria. A carpark for 20 cars is contained on the lowest level of the 'Education Building'
– Heritage listed retaining walls along the southern and western boundary of the site are to remain
– Construction of retaining walls up to 6 m in height along the southern and western boundaries
– Decommissioning of the existing tunnel which connects the site to the adjacent Police Station.

DP noted that proposed cut / fill drawings were not available at the time of preparing their report, but understood that finished floor levels of approximately RL 22.3 m Australian Height Datum (AHD) are proposed for the two new

buildings, with localised cuts typically up to 1 m to 2 m required. Localised deeper cuts are likely to be required for the proposed rainwater tank and lift wells.

Auditor's Opinion: The Auditor has based consideration of remediation requirements and suitability for end-use of the site on the characteristics of the proposed development.

2.3 Surrounding land uses

The surrounding land uses were not identified within the DP investigation reports, but were described in Coffey 2012, Prensa 2016 and Cardno 2019, and have been summarised by the Site Auditor as follows:

North: The site is bound by Church Street to the immediate north, followed by a mix of high density residential and commercial buildings.

East: Newcastle Police Station, followed by Watt Street, Fletcher Park and the Shortland Esplanade. The Pacific Ocean lies approximately 180 m to the east of the site.

South: James Fletcher Hospital, followed by a recreational oval and car parks.

West: James Fletcher Hospital, A mixture of high density residential and commercial buildings followed by Newcomen Street and Newcastle Grammar School.

Auditor's Opinion: Previous reports have adequately identified surrounding land uses. Fuel storage at the adjacent Police Station is considered the only surrounding land use likely to have potential impact on the site. This has been considered in DP and previous investigations (see also **Section 3** and **Section 6.3**).

2.4 Topography and hydrology

Coffey 2012 stated that the site is located on a spur on the lower slopes of 'The Hill'. The site is relatively level, modified by historical development. Surface water collected into onsite stormwater pits and drained to municipal underground drainage system. Prensa 2016 added that the site was predominantly flat but sloped gradually from west to east in the western portion. The surrounding area sloped south to north and east to west indicating cut and fill activities likely occurred in the past.

DP 2020c stated that the site contains a number of easements including the following:

– A 3 m wide easement for water through the site on the eastern side of the original courthouse building
– A 1.7 m wide easement for services along the northern portion of the eastern site boundary
– A 3 m wide restriction of use easement on the eastern site boundary adjacent to the Police Station.

DP 2020c noted that the stormwater easement through the centre of the site will be diverted as show on Cardno's Stormwater Diversion plans in Appendix B of the RAP.

Auditor's Opinion: The topography and hydrology details were identified in the earlier investigations reviewed by the Site Auditor (Coffey 2012, Prensa 2016 and Cardno 2019) and not re-iterated in the DP reports. Topography and hydrology have been adequately considered.

2.5 Acid sulfate soils

DP 2020b stated that based on acid sulfate soils mapping, there are no known occurrences of ASS In the immediate area of the proposed development.

Auditor's Opinion: Based on the site location and geology, the Auditor agrees it is unlikely that an Acid Sulfate Soil risk exists at the site.

2.6 Site geology and hydrogeology

DP 2020c reported that reference to the Newcastle Coalfields Surface Geology Sheet, published by BHP, indicates that the site is underlain by the Lambton sub-group rocks of the Newcastle Coal Measures. The rocks are of Permian age and typically comprise sandstone, siltstone, claystone and multiple coal seams.

The subsurface conditions encountered in the bores / pits conducted by DP in site investigations [as summarised by the auditor] included:

– Concrete or asphalt encountered in several bores from the ground surface to a depth of 0.09 m to 0.15 m
– Filling was encountered in all bores / pits except Geo2 from the surface to 0.1 m / 3.3 m depth and generally comprised sandy gravel / gravelly sands pavement fill with trace slag, coal, ash, asphalt in some bores. Other inclusion, such as brick, tiles, glass, metal, wood, plastic, geo-fabric, shell and fibro sheeting fragments were observed in some excavations.
– Natural soil materials comprising sands, silty clay and/or sandy clay underlying the fill materials.
– Siltstone/claystone encountered in all bores beneath clays to termination depths of 10 m and 12 m.

A search of the registered bores undertaken in 2009 (Coffey 2012) indicated two registered bores within a 1 km radius. These bores were registered for Irrigation purposes, more than 700 m to the north of the site, most likely in Hunter River alluvial deposits.

DP 2020c reported groundwater to be present as a shallow rock aquifer approximately 8 m below ground level (bgl) to 12 m bgl. It was noted that shallow (perched) groundwater may be present within the fill (or soil) / bedrock interface. It is understood that the Cardno (2018) geotechnical report encountered groundwater inflow during drilling in the south-east corner of the site at a depth of 8 m bgl and seepage during drilling in the north-western corner of the site at about 12 m bgl, both in extremely weathered bedrock.

Gauging of the installed groundwater wells on 7 January 2020 indicated groundwater levels varied from approximately 6.7 m bgl to 11.11 m bgl. Groundwater was not encountered within any of the test pits while they remained open. Based on site topography, DP 2020c stated the groundwater flow direction is likely to be towards the north/north-west.

Auditor's Opinion: Site geology and hydrogeology have been adequately considered for the site. Groundwater flow is likely to be towards the north/north-west of the site discharging towards the Hunter River (approximately 490 m north of the site).

3. Site History

Coffey 2012 undertook a preliminary environmental site assessment (PESA) of the Site in 2012 which included a desktop study and historical review (including historical titles, aerial photographs, planning certificates and OEH heritage listings) of past activities at the site, an assessment of the site topography, geology and hydrogeology and a site walkover. The findings of this investigation are summarised as follows:

- The Site has been under government control for over 100 years
- The Court House was constructed in 1890 and during the 1970s and 1980 eastern and western wings were added to the original courthouse. The original Court House building is heritage listed.
- The potential areas of concern and potential chemicals of concern included:
  - Weathering and/or maintenance/demolition of hazardous building materials;
  - Infiltration of contaminants through poorly maintained pavements;
  - Potential use of fill onsite; and
  - Potential use of pesticides and insecticides.
  - The chemicals of concern were listed as TPH, PAH, BTEX, OCPs, OPPs, metals and asbestos.
- Coffey considered that, given that buildings and pavements cover the majority of the Site, exposure to and/or offsite migration of potential soil contamination is limited. Further investigations would be required if re-development of the sites was proposed.

DP 2020b undertook a brief site history review to update the previous site history information presented in the PSI (Coffey 2012) and DSI (Prensa 2016) for the site. The site history from DP 2020b is summarised as follows:

- A search of the Newcastle City Council on-line development application search portal on 18 November 2019 identified no accessible development applications and building applications for the site.
- The NSW EPA searches did not find any notices issued under the Contaminated Land Management Register or notifications to the NSW EPA to the site or surrounding areas. A search of the NSW EPA POEO Public Register identified a number of licences registered to Newcastle City Council, Port of Newcastle, Hunter and New England Area Health Service, State of NSW and several commercial enterprises in Newcastle. However, DP 2020b stated that these licenced premises are not considered to pose a significant risk to the site given the distance from the site and topography.
- An aerial photograph search undertaken by Coffey 2012 indicated the following:
  - Historical photos from 1959 and 1965 show the central Court House building, a building to the east (apparently different in 1965) and vacant to the west where a building now stands. Buildings to the north-east of the site appeared similar to the current configuration, buildings to the east and south appeared different and land to the west was vacant.
  - In 1974, the eastern wing had changed configuration. The property to the east changed configuration by 1974, with the Police Station developed by 1983.
  - By 1993 large buildings had been added along the neighbouring southern boundary
- The updated aerial photograph search (DP 2020b) for photos between 2010 and 2020 indicated no major changes to the site or immediately surrounding properties with the exception of renovations to the building to the west of the site.
- SafeWork NSW Search for information on storage of hazardous chemicals on site identified no records for the subject site. Dangerous Goods for the adjacent Police Station property indicated a 21,000 L diesel tank located under the second level basement of the Police Station with a bowser along the north-western boundary of the Police Station and a fuel line running parallel to the western property boundary ending at the northern property boundary at the driveway entrance.
- It was noted by DP 2020b that a diesel and petrol UST are located in the second level carpark basement of the Police Station. The diesel UST was decommissioned in 2017 removing remnant fuel and filling with foam. The petrol UST was decommissioned 10 to 15 years ago, however no decommissioning details were available.

Section 6.7 of DP 2020b further describes an inspection of the Police Station basement, including the UST locations, former bowser locations and a diesel generator. DP also reviewed reports relating to the UST as discussed in **Section 6.3** of this Audit Report.

Auditor's Opinion: While Prensa 2016 and Cardno 2019 did not undertake any separate historical review, the review undertaken by Coffey 2016 and supplemented by DP 2020b is considered to be in substantial accordance with relevant guidelines and provides sufficient historical information in relation to potential contamination at the site and adjoining areas.

4. Conceptual Site Model

4.1 Contaminants of potential concern

DP 2019 reported the contaminants of potential concern as follows:

– Asbestos
– Benzene, ethylbenzene, toluene, xylene (BTEX)
– Organochlorine pesticides / organophosphorus pesticides (OCP/OPP)
– Polychlorinated biphenyls (PCB)
– Total recoverable hydrocarbons (TRH)
– Volatile organic compounds (VOCs) including chlorinated hydrocarbons
– Polycyclic aromatic hydrocarbons (PAHs)
– Heavy metals (particularly lead)

DP 2019 considered the potential for Per- and Poly-Fluoroalkyl Substances (PFAS) to be present on site, and concluded PFAS are not considered to be a chemical of concern at the site.

DP 2020b also included methane, carbon monoxide, carbon dioxide and hydrogen sulphide as contaminants of potential concern from former mine workings.

Auditor's Opinion: DP has adequately considered the COPC most likely to be applicable for this site.

4.2 Conceptual site model

The DP 2020b conceptual site model included consideration of known and potential sources of contamination, areas of concern, contaminants of potential concern, potential transport mechanisms, potential exposure pathways and potential receptors.

The potential sources were as follows:

– Filling imported across the site (subject to source)
– USTs, ASTs and associated infrastructure on adjacent site (Police Station)
– Demolition of former structures or maintenance, renovations to existing former buildings, underground services containing ACM
– Wash bay (adjacent Police Station site)
– Potential pesticide use and storage, possible under-slab/structures pesticide treatment
– Hazardous ground gases – former mine workings

Primary and secondary release mechanisms were listed as follows:

– Placement of filling on-site leading to long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure disturbance during proposed development
– Potential leaks and spills from USTs, bowsers and associated pipework leading to long-term leaching of contaminants, percolation, groundwater migration.
– Demolition / maintenance of buildings / structures leading to long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development
– Spills and leaks from the wash bay leading to long term leaching of contaminants, percolation, groundwater migration
– Spraying and application and spills / leaks from stored pesticides leading to long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development
– Migration from former underground mine workings via fractured rock.

Potential exposure pathways were listed as follows:

– Dermal contact
– Inhalation (dust/vapours)
– Ingestion
– Explosion and/or asphyxiation due to the accumulation of hazardous ground gases in structures.

Potential receptors included:

– Site workers (current and future)
– Maintenance workers (current and future)
– Consultants (current and future)
– Trespassers (current and future)
– Surface water bodies
– Groundwater
– Neighbouring properties in the case of groundwater or surface water migration
– Residents (future)

Auditor's Opinion: DP included an appropriate CSM in all relevant stages of reporting, progressively updating the CSM in accordance with s.4, Schedule B2 of NEPC 2013. The updated CSM (see **Section 9**) includes all relevant information from the site investigations.

5. Assessment criteria

5.1 Soil assessment criteria

DP 2020b reported that soil collected during the DSI will be compared to the following site assessment criteria (SAC):

– Generic HIL B and HSL B (residential) assessment criteria.
– EIL and added contaminant limit (ACLs) for residential land use. The following physiochemical properties were applied to soils based on the average of the laboratory testing results:
  - pH of 6 (conservative estimate)
  - CEC value of 2 cmol/kg (conservative estimate based on coarse filling)
  - Clay content of 1% w/w (conservative)
  - Aged (>2 years) source of contamination low for traffic volumes in NSW
– Generic ecological based screening levels (ESLs) for urban residential land use based on coarse filling being the predominant soil type. DP 2020b noted that the NEPM ESL of 0.7 mg/kg for benzo(a)pyrene is understood to be a low reliability value. As such, the higher reliability screening levels from CRC Care (2017) Risk-based Management and Remediation Guidance for Benzo(a)pyrene, CRC Care Technical Report no. 39 were adopted.
– Management Limits for residential land use (calculated for a coarse soil based on coarse filling being the predominant soil type).
– HSLs for asbestos in soil from NEPC 2013 (based on the Western Australian Department of Health (WA DoH) publication *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia 2009.*

DP 2020b stated that although the CSM identified a direct contact pathway and construction worker receptors, the corresponding HSLs are significantly higher than those for the vapour intrusion pathway and are therefore not drivers for further assessment and / or remediation. As such, the direct contact and intrusive maintenance worker HSLs were not listed.

DP 2020c stated that the remediation acceptance criteria would be based on the successful installation of a constructed capping layer over the entire site [asbestos contaminated soil] and would, therefore, not be guided by a set of concentrations for various contaminants. However, Section 7.2 of the RAP states that if remediation/validation of parts of the site are considered (i.e. as an alternative to capping), the remediation acceptance criteria for soils remaining on site with respect to the proposed landuse and identified are as follows:

– NEPC 2013 HIL and HSL for high density residential landuse with minimal access to soils (HIL B / HSL B)
– NEPC 2013 Management limits for residential, parkland and public open space landuse – coarse soil texture
– NEPC 2013 EIL / ESL for urban residential and public open space
– CRC Care 2011 – petroleum based HSL for direct contact for high density residential landuse with minimal access to soils (HSL B)
– CRC Care 2017 – Risk based management and remediation guidance for Benzo(a)pyrene

5.2 Waste Classification

DP 2020b stated that the results of chemical testing were compared against NSW EPA Waste Classification Guidelines (2014) to assess possible off-site disposal options to a licenced facility and the NSW EPA (2014) resource recovery order for excavated natural material (ENM) to assess possible re-use options for excess soil / fill.

5.3 Groundwater assessment criteria

Based on receptors (consistent with those listed in the CSM) and groundwater ultimately discharging to Newcastle Harbour / Newcastle Beach, DP 2020b adopted the Groundwater Investigation Levels (GILs) from NEPC 2013 which are based on:

– NHMRC 2011 Australian drinking water guidelines
– Guidelines for Managing Risk in Recreational Waters (GMRRW 2008)
– Australian and New Zealand guidelines for fresh and marine water quality (ANZECC and ARMCANZ 2000).

DP also included the generic HSL B – residential AB (Low to high density residential) groundwater HSL for vapour intrusion, calculated for a conservative sand soil based on coarse filling and an assumed depth to contamination of 2 - <4 m as an initial screening tool.

5.4 Hazardous gases

DP 2020b adopted the hazardous gas assessment criteria from NSW EPA 2019 [now updated to EPA 2020b] which were modified from Wilson and Card (2007).

5.5 Aesthetics

DP 2020b stated that neither NEPC 2013 or CRC Care 2011 provide numeric aesthetic guidelines, however NEPC 2013 states that site assessment requires balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity.

The proposed education facility while not as sensitive as a standard residential development still needs to consider aesthetics given the exposed soils (landscape areas) and on-site accommodation facilities. The NEPC 2013 considerations for aesthetics were noted in DP 2020b.

Auditor's Opinion: DP has used assessment criteria consistent with relevant guidelines and appropriate for the proposed site use and site characteristics. Where assumptions have been made, these are conservative (i.e. 'worst case').

It is noted that the ANZECC & ARMCANZ 2000 water quality guidelines have been superseded by the ANZG 2018 water quality guidelines, however the criteria for individual toxicants are unchanged.

6. Previous Investigations

A summary of previous investigations reviewed by the Auditor is provided below.

6.1 Coffey 2012, Phase 1 Environmental Site Assessment Newcastle Courthouse and Former Newcastle East Public School

Coffey Environments was commissioned to undertake a phase 1 environmental site assessment to identify current and past potentially contaminated activities on the site, assess areas of environmental concern and chemicals of concern for the site and provide recommendations for further assessment, if required.

The site was assessed as having a low to medium likelihood of soil contamination. Potential contamination relates to:

– Weathering and / or maintenance / demolition of hazardous building materials
– Potential use of fill
– Potential use of pesticides and insecticides

Coffey stated that given buildings and pavements covered the majority of the site [at the time of investigation], exposure to and/or offsite migration of potential soil contamination was limited. Coffey recommended that, should redevelopment be proposed, including demolition of non-heritage listed buildings and pavements, a phase 2 ESA should be carried out targeting the identified areas of concern that are likely to impact on the proposed development.

6.2 Prensa 2016, Detailed Site Investigation, 9 Church St, Newcastle, NSW, 2300

Prensa was commissioned to undertake a detailed site investigation of the site to assess the contamination status of soil associated with the previously identified areas of environmental concern (AEC) (Coffey 2012). The scope of works undertaken in this investigation were as follows:

– Progression of ten boreholes (using a hand auger) and collection of soil samples in accessible portions of the site (see Prensa Figure 2 in **Appendix A**)
– Concrete coring where required
– Laboratory analysis of selected soil samples and quality control samples at NATA accredited laboratories for contaminants of potential concern
– Preparation of the DSI report.

The results of the investigation were as follows:

– Fill material was encountered across the site to depths generally ranging from surface to 1.2 m bgl, underlain by weathered sandstone and clay.
– Groundwater was not encountered and no visual or olfactory evidence of soil contamination, including suspected asbestos containing materials was noted during sampling.
– The highest PID reading was 5.1 ppm indicating VOCs were unlikely to be present.
– Asbestos was not detected and COPC were less than adopted assessment criteria for commercial / industrial or high-density residential land use with the exception of benzo(a)pyrene (BaP), BaP Toxicity Equivalent Quotient (TEQ), TRH and lead in up to three samples.

Prensa considered the concentrations of TRH, benzo(a)pyrene and lead would not preclude an ongoing commercial use of the site. Based on the fieldwork undertaken and analytical results, Prensa concluded that the risk to human health and the environment, in light of the proposed divestment of the site under current land zoning, is low – moderate given the potential for future high density residential land use at the site.

Prensa recommended that, should the site be redeveloped for a more sensitive land use such as high density residential, further assessment, management and/or remediation of fill across the site is recommended in open areas and beneath slabs following any proposed demolition.

6.3 WSP 2017, Vapour Risk Assessment, decommissioning of underground storage tank at Newcastle Police Station, 1 Church Street, Newcastle

A vapour risk assessment was undertaken by WSP Australia Pty Ltd following a UST inspection at the Police Station adjacent the site. The following summary of findings was reported:

– A 5.5 kL steel UST, previously containing diesel, was decommissioned in-situ (filled with inert foam following residual diesel fuel removal) in August 2017by Petrolink Engineering Pty Ltd
– The objective of WSP (2017) was to assess the vapour inhalation risk resulting from the migration of vapours from potentially contaminated soil surrounding the diesel UST into the basement air
– The assessment comprised soil sampling via hand auguring at four locations around the perimeter of the UST and vapour sampling from four sub-slab active soil vapour ports
– The results of the risk assessment concluded that the vapour and soil sampling undertaken indicated that the risk to workers at the site, through vapour intrusion and inhalation, was low and acceptable.

Review of the WSP 2017 report was included in DP 2020b. Further assessment was recommended by DP to assess impacts from possible migration of contaminants from the identified potential sources of contamination along the eastern site boundary with the Police Station site (i.e. USTs, associated infrastructure and washdown bay).

6.4 Cardno 2019, Conceptual Remediation Action Plan, 9 Church Street, Newcastle NSW 2300

Cardno prepared a conceptual RAP (cRAP) for the site to define potential remediation and validation requirements, provide a sampling plan for a DSI to fill data gaps following demolition, evaluate remedial options, recommend the most appropriate remedial strategy, establish validation criteria and outline the remedial process and remediation management requirements.

The risk assessment section of the cRAP noted the following:

– The identified lead and BaP TEQ in fill indicate potential health risk via ingestion and direct contact. Further investigation management or risk assessment required to determine or mitigate the risk and render the site suitable for the proposed land use. Remediation prior to completion of development, potential impact considered to be the depth of fill, pending further investigations.
– BaP and TRH C16-C34 require further assessment to determine whether concentrations are statistically significant and to compare against current guidelines. As the majority of the site is likely to remain as hardstand, potential risks to ecological receptors are considered to be low. [Cardno noted the ESL for BaP used by Prensa was the NEPM low reliability ISL, and CRC CARE has since published a high reliability ecological guideline of 33 mg/kg]
– Data gaps exist due to the inability to conduct complete investigations beneath the building and hardstand footprints.
– There is likely to be variability in the quality and type of fill at the site. Should unidentified areas of soil impacts be discovered in further phases of site work, additional investigations and addition to the cRAP will be required.
– An Unexpected Finds Protocol is to be developed dictating actions and responses.

The cRAP concluded the following:

– The soil quality beneath the hardstand and within building footprints was identified as a data gap requiring investigation during the development process.
– During the above phase of works, additional sampling and inspection to refine the lateral extent of areas of impact for previously and any new identified areas of environmental concern (AECs) can also be undertaken.
– The extent of impact was estimated as to encompass all fill material at the Site, based on initial results.
– Any impacts requiring remediation or management would be addressed and incorporated into the final RAP for the Site.

The remediation strategy for the site included two remedial scenarios in order to mitigate or remove potential human health and/or ecological exposure pathways to the identified impacts, rendering the site suitable for the proposed land use as an educational facility. Remediation strategy 1 involved off-site disposal of soils impacted with COPCs above the adopted assessment criteria and remediation strategy 2 involved a combination of off-site disposal of soil as required for construction, and on-site containment of soils impacted with COPCs above the assessment criteria. Validation reporting would be required for both options, and a Long Term Environmental Management Plan would be required to detail the location and nature of the emplaced soils and the ongoing responsibilities and management requirements for the material [using remediation strategy 2].

6.5 DP (2020e) Geotechnical Investigation and DP (2020f) Mine subsidence investigation

As reported in DP 2020c, DP conducted additional geotechnical and preliminary mine subsidence investigations for the proposed development. Drilling was conducted to locate the depth, condition and extent of mine workings within the site. The geotechnical and mine subsidence assessment consisted of the following:

– Drilling of five bores (MS1, MS2, MS4, GEO1 and GEO2) to assess general geotechnical conditions and preliminary mine subsidence investigation (see Douglas Partners Drawing 1 in **Appendix A**).
– Soil samples were collected from selected bores for contamination testing [reported within the DP 2020b DSI].
– Preliminary monitoring of ground gases was conducted during geotechnical drilling and following installation of casing into mine workings.

The results of the geotechnical and mine subsidence investigation are summarised as follows:

– The mine subsidence investigation found that the Dudley, Yard and Borehole Seams are present beneath the site at depths in the order of 20 m, 40 m and 80 m respectively below existing ground levels, with results indicating that the Dudley Seam is possibly mined under the site and the Borehole Seam has been mined under the site.
– Upper material soils generally comprised clays of relatively low permeability.
– General absence of significant drill fluid loss while rock coring suggesting the general absence of permeable strata above the coal seams.
– General absence of significant highly fractured rock in the geotechnical bores.
– Preliminary gas monitoring indicated the general absence of hazardous ground gases or VOCs during drilling, following well installation and within existing buildings / basements (including sumps / drains).
– Minor hydrocarbon odours were observed, however laboratory testing in soils and groundwater indicated the absence of VOCs.

6.6 DP (2020b) Detailed Site Investigation

A detailed site investigation was undertaken by DP comprising the following scope of work (sample locations are shown on Douglas Partners Drawing 1 in **Appendix A**):

– Review of previous investigations
– Brief site history review to update previous site history information (presented in Coffey 2012 and Prensa 2016)
– Site inspection to identify areas of potential contamination and assess current site conditions

– Pre-demolition drilling of three boreholes [201, 202 and 203] and installation of groundwater monitoring wells in each
– Preliminary monitoring of ground gases within geotechnical and environmental boreholes (during drilling and following installation of casing into mine works and groundwater wells) and across the site using a calibrated landfill gas meter
– Excavation of nine test pits [301 to 304 and 306 to 310] to assess fill / soil conditions across the site (post demolition)
– Inspection and sampling [S1 and S2] of one stockpile to assess fill / soil conditions in the north eastern portion of the site which was inaccessible at the time of test pitting (post-demolition)
– Laboratory testing of selected soil and groundwater samples for a range of potential organic and inorganic compounds
– Preparation of the DSI report.

The DSI identified widespread fill materials across the site to depths up to 3.3 m overlying natural soils and bedrock, with groundwater typically encountered within the underlying bedrock at depths greater than 6 m bgl. Fill materials across the site were identified to contain a range of anthropogenic materials including building materials (with bonded asbestos containing materials) and some ash, slag and asphalt.

An assessment of hazardous ground gases indicated the general absence of hazardous ground gas or volatile organic compounds during drilling, following well installation and within existing buildings / basements (including sumps / drains). Minor hydrocarbon odours were observed within some boreholes, however laboratory testing in soils and groundwater indicated the absence of VOCs.

Groundwater assessment within the eastern portion of the site indicated the general absence of adverse impacts associated with the adjacent decommissioned fuel infrastructure.

The soil investigation identified bonded ACM impacts within filling across the site above the adopted site assessment criteria, which will require remediation to render the site suitable for the proposed development. Statistical analysis of the PAH, heavy metal and TRH impacts indicated that remediation for these contaminants was not warranted. It was also considered that the contaminated fill / soil materials identified on site are unlikely to be having a significant adverse impact on the groundwater quality and down-gradient receiving water quality given the nature of the contaminants, distribution across the site and depth and nature of the groundwater identified on site.

DP concluded that development of the site would require remediation and management of bonded asbestos impacted soil/fill. The site was considered to be suitable for the proposed educational development, subject to appropriate remediation / management of contamination and regulatory approvals.

Auditor's Opinion: The above reports were reviewed by the Auditor as variously described in Interim Advice #1 and Interim Advice #3 in **Appendix D.** Overall the Auditor considers the previous investigations were well presented and in accordance with relevant guidelines. The DSI findings were generally appropriate, although further discussion of post-demolition site conditions and more detailed statistical assessment of chemical contaminants was recommended in Interim Advice #3 (review of the draft DSI). These recommendations were addressed in the final version of the DSI as indicated in Interim Advice #4.

Refer to **Section 7** for detailed review of the adequacy of DP 2020b (DSI) and refer to **Section 11** for a review of the adequacy of the DP RAP (DP 2020c), which was prepared on the basis of the findings of the prior investigations and review.

7. Completeness of the site sampling and analysis program

7.1 Overview

The completeness of the site sampling and analysis program has been reviewed and documented in Interim Advice #1, #2 and #3 (**Appendix D**). As discussed in these letters of Interim Advice, investigations by Prensa and Coffey were limited by the presence of site infrastructure, and therefore, this Site Audit is focussed on the additional detailed site investigations undertaken by Douglas Partners to address data gaps in the site characterisation. Previous results (Prensa 2016) have been considered by DP in their DSI (DP 2020b).

7.2 Data Quality Objectives (DQO)

A seven step DQO process was provided in Section 10.4 of the SAQP (DP 2019) and Section 11 of the DSI (DP 2020b), based on Appendix B of Schedule B2 of the ASC NEPM. A summary of the DQOs is presented in Table 2.

Table 2 Data quality objectives summary

Description	Outcomes
Step 1: State the problem	The SAQP stated the problem to be addressed is that the extent and nature of potential contamination on site is not fully understood. It is unclear whether the site is suitable for the proposed redevelopment and if contamination poses a risk to human health or the environment during and after the redevelopment works. The objective of the supplementary investigation is therefore to characterise the nature and extent of contamination at the site and make recommendations for remediation (where required) to render the site suitable for the proposed redevelopment works. Where required, options for the management or disposal of excess soils from site redevelopment will also be provided.
Step 2: Identify the decision / goal of the study	The decisions for the DSI include the following: • What is the conceptual site model (i.e. sources, receptors, migration pathways, exposure)? • Do the existing fill materials and/or natural soils pose a potential risk to identified receptors?; • Does the existing groundwater beneath the site pose a potential risk to identified receptors?; • Does the existing soil gas/soil vapour beneath the site pose a potential risk (toxic, explosion or asphyxiation) to identified receptors?; • Is the data sufficient to make a decision regarding the abovementioned risks, the compatibility of the site for the proposed development or are additional investigations required?; • Are there any off-site migration issues that need to be considered?; • What are the waste management requirements for excess soils associated with the development?; • Is the data sufficient to enable the preparation of a Remediation Action Plan (RAP) and/or Environmental Management Plan (EMP) should the data suggest these are required?
Step 3: Identify the information inputs	The inputs required to make the above decisions were as follows: • Collection and review of site history information including information regarding previous and current activities undertaken on the site and the surrounding areas; • Review of previous investigations undertaken; • Regional geology, topography, ASS risk mapping and hydrogeology; • Soil, soil gas and groundwater samples will be collected at a combination of targeted and grid-based sampling patterns and analysed for the relevant contaminants of concern;

Description	Outcomes
	• Field screening of ground gases will be conducted during drilling using a calibrated GEM 2000 Plus or GA5000 landfill gas meter, together with screening for potential volatile organic compounds (i.e. soil vapour and groundwater headspace using a PID); • The lithology of the site as described in the borehole logs; • If site conditions suggest additional contaminants of concern, e.g. if the condition of subsurface material encountered whilst drilling encounter particular odours, further analysis may be undertaken; • Field and laboratory QA/QC data to assess the suitability of the environmental data for the assessment; • All analysis undertaken at a NATA accredited laboratory; and • The results will be compared with the SAC and GIL, gas screening value (GSV) and characteristic gas situation (CGS) criteria.
Step 4: Define the boundaries of the study	The lateral limit of the investigation extent is defined by the site boundary as indicated in Drawing 1, Appendix A.
Step 5: Develop a decision rule	The decision rules included: • Laboratory test results for fill/soil will be assessed individually or statistically, if considered appropriate, to determine the 95%UCL of the mean concentration for each analyte or analyte group (of like materials); • Laboratory test results for targeted locations (and identified 'hot spots') will be assessed individually; • The adopted SAC and GIL, GSV and CGS will be from NSW EPA endorsed guidelines; • Where such criteria are not available, other recognised national or international standards will be used; • The contaminant concentrations in fill/ soil should meet the following criteria, or further investigation or remedial action is required if: a. The concentration of the contaminant is more than 2.5 times the SAC. Any location more than 2.5 times the adopted site criteria is classified as a 'hotspot', requiring further assessment /management; and b. The calculated 95% UCL for a relevant area and discrete impacted fill/soil stratum (excluding any 'hotspot' concentrations) exceeds the adopted SAC; c. The standard deviation of the results is greater than 50% of the SAC; • The groundwater will not be considered significantly impacted by a particular contaminant if there is no notable or significant increase in background concentrations and/or there are no analyte concentrations in the groundwater samples significantly exceeding the adopted GIL; • Further investigation, remediation and/or management will be recommended if the site is found to be contaminated or containing contamination 'hot spots' or significantly impacted groundwater; and • The landfill gas data will be evaluated in the context of relevant GSV and CGS and the degree of impact will inform proposed gas mitigations (if required).
Step 6: Specify performance or acceptance criteria	Decision errors for the proposed assessment will be minimised and measured by the following: • Compare new data with available previous investigations to determine the possible range of the parameters of interest; • The sampling regime will target key strata identified to account for site variability; • Sample collection and handling techniques will be with reference to DPs Field Procedures Manual; • Samples will be prepared and analysed by a NATA accredited laboratory with the acceptance limits for laboratory QA/QC parameters based on the laboratory reported acceptance limits and those stated in NEPC (2013); • The analyte selection is based on the available site history, past site activities, site features and the findings of the previous investigations. The potential for contaminants other than those proposed to be analysed is currently considered to be low; • The SAC, GIL, GSV, and CGS will be adopted from established and EPA endorsed guidelines where available. The SAC, GIL, GSV and CGS have risk probabilities already incorporated;

Description	Outcomes
	• A significance level of 0.05 will be adopted for data with statistical analysis of 95%UCL of average concentrations; and • Only NATA accredited laboratories using NATA endorsed methods will be used to perform laboratory analysis. Where NATA endorsed methods are not used, the reasons will be stated. The effect of using non-NATA methods (if relevant) on the decision-making process will be explained.
Step 7: Develop the plan for obtaining data	Sampling design and procedures that will be implemented to optimise data collection for achieving the DQOs included the following: • Only NATA accredited laboratories using NATA endorsed methods are used to perform laboratory analysis whenever possible; • Grid based soil sampling (within access constraints) will generally be used to provide representative coverage of the site where feasible given constraints with the construction process; • Where possible, targeted samples will be incorporated into the grid based sampling; • To optimise the selection of soil samples for chemical analysis, samples collected will be screened using a calibrated PID allowing for site assessment and sample selection. In addition, additional soil samples will be collected but kept 'on hold' pending details of initial analysis and will be analysed if further delineation is required; and • Adequately experienced environmental scientists/ engineers will be chosen to conduct field work and sample analysis interpretation.

Auditor's Opinion: The Auditor considered that the DQOs presented by DP were appropriate to collect appropriate assessment data and evaluate the suitability of the site for the specified future land use of public open space.

7.3 Sampling and Analysis Quality Plans (SAQP)

DP undertook the targeted DSI in accordance with the methodology outlined in the SAQP (DP 2019). The proposed sampling strategy was split into pre-demolition assessment and post demolition assessment. Pre-demolition assessment proposed drilling of a total three groundwater wells and assessment for soil and groundwater. Preliminary monitoring of ground gases was conducted during drilling and following installation.

The sampling strategy for post demolition assessment was undertaken to meet the NSW EPA sampling guidelines (EPA 1995) for characterisation of a 0.49 ha site. The sampling consisted of one borehole and nine test pits to assess general fill conditions across the site following demolition, inspection of the surface post demolition and preliminary monitoring of ground gases during drilling and test pitting.

It was noted in the DSI that, due to time constraints with the construction program, DP were instructed to conduct the post demolition investigation fieldwork prior to the complete demolition of the Administration Building and during demolition of the Supreme Court Building. Due to the associated access constraints and ongoing demolition activities, a systematic site coverage was not able to be achieved in some areas of the site as outlined in the SAQP and one of the ten test pits proposed was not able to be undertaken. DP considered the sampling undertaken exceeded the minimum sampling density with reference to the EPA sampling design guidelines, considering current and previous testing for the site area.

It was also noted that areas that were not accessible during post demolition investigations would be inspected as part of the site validation works with reference to the unexpected finds protocols to be outlined in the RAP.

Auditor's Opinion: The SAQP was considered an appropriate basis for detailed investigations to address data gaps identified in the cRAP (Cardno 2019), as discussed in Interim Advice #2 in **Appendix D**. The sampling plan in the DSI was undertaken in accordance with the minimum sampling density in the NSW EPA 1995 sampling design guidelines. Any deviations from the SAQP were noted and were to be assessed during the site validation. Further inspections of inaccessible areas were carried out as part of the site validation, as discussed in **Section 12** of this Audit Report.

7.4 Scope and methodology of detailed site investigations

Sample collection procedures were documented in the DSI (DP 2020b) and summarised below. Field work was undertaken between 12 December 2019 and 12 March 2020.

7.4.1 Soil Investigations

DP 2020b reported their soil (and concurrent groundwater and soil gas) sampling methodology as follows:

- Checking for underground services at proposed bore locations by a professional service locator.
- Concrete coring of concrete pavements to facilitate drilling (Bores 201 and 202). Bores 201 and 202 were drilled to depths of 10 m and 12 m to intercept potential migration from contamination sources identified within the adjacent Police Station site.
- Drilling of three boreholes to depths of up to 12 m using a track-mounted drill rig utilizing undisturbed push tube drilling methods and solid flight auguring where required.
- Excavation of nine test pits (Pits 301 to 304, 306 to 310) using hand tools (shovel/hand auger) and excavator with mud bucket where access permitted during demolition. DP noted that Built Pty Ltd selected test pit locations and arranged concrete cutting of basement floor slabs within the former Supreme Court Building (western building). Due to access constraints and demolition being underway at the time of test pitting, Pit 305 was inaccessible, and several pits were relocated by the client.
- Logging of the subsurface profile, including visual and olfactory assessment of potential contaminants in filling.
- Collection of discrete soil samples for contamination testing purposes from the three environmental boreholes (Bores 201 to 203), from the upper fill/soil profile of geotechnical boreholes, from the nine test pits (Pits 301 to 304, 306 to 310) and from a soil stockpile (Stockpile B –Samples S1 andS2).
- Collection of two material samples (Samples F1 and F2) from the ground surface for asbestos identification testing prior to demolition.
- Collection of additional material samples (where observed) and adjacent soil sampling from test pits during ‘post demolition’ investigations for asbestos identification testing (i.e. Pits 302, 307 and 310). Soil samples for asbestos identification testing were generally sub-sampled by the laboratory from the soil jars provided. Analysis of 500 mL samples with reference to WA DoH guidelines was not undertaken given a detailed asbestos assessment was not proposed at the time as on-site management of contamination was likely to be the preferred remediation option selected by the client due to the presence of asbestos at numerous locations across the site.
- Installation, development, purging, gauging and sampling of three groundwater wells for contamination testing purposes.
- Measurement and recording of ground gas concentrations from the environmental (bores/wells) and geotechnical (bores/ cased holes) using a calibrated landfill gas meter.
- Measurement and recording of ground gas concentrations within the existing building ground floor / basements, tunnel and selected service pits/drains (i.e. areas which could potentially accumulate ground gases if present).
- Levelling [survey] of groundwater wells.
- Soil samples for contamination assessment were collected at regular depth intervals and/or changes in strata based on field observations, including from the near surface, from near the water table (if encountered) and upon possible signs of obvious contamination such as odours or staining.
- Soil samples were collected from the new push tube sleeves or auger spiral for drilled bores and directly from the pits walls or auger flights during test pitting. Care was taken to remove any extraneous materials deposited on the sample.

Borehole and test pit logs were provided in Appendix A of DP 2020b.

Auditor's Opinion: The Auditor considers the sampling methodology described by DP to be consistent with good industry practice and relevant guidelines and is likely to have resulted in samples representative of the soil being assessed.

7.4.2 Groundwater well installation and development

DP 2020b described the groundwater well installation and development methodology as follows:

- A groundwater well, constructed of 50 mm diameter flush threaded Class 18 PVC was installed in Bores 201 to 203 with reference to current industry standards, using dual push tubes and solid flight augers (where required to penetrate the highly to extremely weathered bedrock) from the drilling rig.
- A 6 m / 7.5 m machine-slotted PVC screen with an end cap was installed from approximately 4 m / 4.5 m bgl (approximately 4 m above the groundwater level observed at the time of installation) in Bores 201 to 203. A filter pack was installed in the bore annulus consisting of 2/5 mm graded washed sand to generally 0.5 m to 0.6 m above the slotted PVC screen. A bentonite seal was placed above the filter pack within the annulus.
- The wells were completed at the surface with a flush-mounted well cover set in concrete.
- Drilling and well installation were undertaken under QA/QC protocols to minimise the risk of cross contamination.
- The wells were designed and installed in order to intercept groundwater and potential contaminant migration from the identified sources of contamination along the eastern site boundary with the Police Station.
- Following installation, the wells were developed by removing groundwater until steady pH and Electricity Conductivity (EC), Oxidation Reduction Potential (ORP), readings were achieved using new dedicated single check valve disposable bailers in order to provide an efficient hydraulic connection between the well and the formation. Regular measurements of the above field parameters were undertaken on groundwater during development using a calibrated portable meter until steady readings were achieved. It is noted that Bore 202 and Bore 203 were bailed dry following removal of 3L and 15 L respectively.

Auditor's Opinion: DP's methodology is considered appropriate and consistent with relevant guidelines.

7.4.3 Groundwater well gauging and sampling

DP 2020b reported the groundwater well gauging and sampling methodology as follows:

- Prior to sampling, the wells were purged until steady pH, EC, ORP, Dissolved Oxygen (DO), temperature, turbidity readings were achieved using a new dedicated single check valve disposable bailer. Due to the slow recharge, purging using a low flow micropurge was not possible.
- Groundwater samples from the wells were collected using new bailers and preserved in laboratory prepared containers for analysis. The samples were delivered to the laboratory within the recommended holding times for analysis. The groundwater level was allowed to recover from the effects of purging prior to sampling. Samples were collected under strict QA/QC protocols.
- The headspace of the well and groundwater collected from the well was also screened for the presence of volatile organic compounds (VOC's) using a calibrated PID following development and purging. Following development and prior to purging, an oil-water interface meter was used to confirm the depth to groundwater in each well for groundwater contouring purposes and to assess the possible presence of floating product within each well.

Auditor's Opinion: While micropurge is preferable to sampling by bailer, given the constraints of low recharge DP's methodology is considered acceptable and samples are likely to be sufficiently representative for the purposes of the investigation.

7.5 Gas monitoring

DP 2020b undertook gas monitoring with the methodology described as follows:

– Monitoring of gas concentrations and flow rates within the wells / boreholes was undertaken using a calibrated GA5000 or GEM2000 landfill gas meter. The monitoring of the wells was conducted according to the following general procedure:
  - Record atmospheric pressure prior to monitoring
  - Connect the inlet hose of a GA5000 to the well gas cap using a 'quick connect' fitting with the pump switched on
  - Record readings of carbon dioxide, methane, hydrogen sulphide, carbon monoxide and oxygen at 30 second intervals for a period of up to five minutes including the peak and stabilized concentrations
  - Allow the well to stabilise for at least 30 minutes
  - Connect the inlet hose of a GA5000 to the well gas cap using a 'quick connect' fitting and measure the gas flow rate.
– Gas monitoring was also conducted periodically during drilling of both the environmental and geotechnical boreholes (i.e. from the top of the open borehole) and following completion of drilling of the geotechnical boreholes from the installed casing / open borehole using the GEM2000 unit. PVC and rubber fittings were utilized where possible for the completed geotechnical boreholes to provide a good seal with the casing/ ground surface.
– Monitoring of gas concentrations within buildings was undertaken on 18 December 2019 using a calibrated GEM2000 landfill gas meter at various locations within the building floor / basements and selected open pits, drains, pipes, cavities and open excavations etc.

Auditor's Opinion: The Auditor considers appropriate methodology has been used for the gas monitoring.

7.5.1 Sample handling and transport

DP 2020b reported their sample handling and transport as follows:

– Decontamination of sampling equipment using a 3% solution of phosphate free detergent (Decon 90) and tap water prior to collecting each sample
– The use of disposable gloves for each sampling event
– Transfer of samples into laboratory-prepared glass jars, and capping immediately
– Collection of 10% replicate samples for QA/QC purposes
– Collection of replicate soil samples in zip-lock plastic bags at each depth for photoionization detector (PID) screening
– Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth
– Placement of the sample jars and replicate sample bags into a cooled, insulated and sealed container for transport to the laboratory
– Use of COC documentation ensuring that sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory.

Auditor's Opinion: The Auditor considers appropriate sample handling and transport procedures have been used during the investigations.

7.5.2 Laboratory analysis

DP 2020b utilised Envirolab Services Pty Ltd, a NATA accredited laboratory for the primary analysis of the soil, and groundwater samples. Selected soil samples were analysed for heavy metals (17 metals), TRH, BTEX, PAH, PCB, OCP, OPP, total phenols, VOCs and asbestos identification. Acid leachability testing (TCLP) was conducted

for waste classification purposes on three selected soil samples and water leachability testing to assess leachability characteristics was undertaken on one selected soil sample.

Groundwater samples were collected and analysed for heavy metals (12), TRH, BTEX, PAH (Low level), VOCs and total phenols.

ALS Environmental, a NATA accredited laboratory, were utilised as the secondary laboratory for the analysis of inter-laboratory samples.

Auditor's Opinion: Appropriate analysis has been undertaken using NATA accredited laboratories, and the analytical program has adequately addressed the COPC identified in the CSM.

7.6 Evaluation of quality control and quality assurance

The QA/QC procedures for the investigations were reviewed with consideration to the recommendations of the following documents:

– Guidelines for the NSW Site Auditor Scheme (EPA 2017)
– Consultants reporting on contaminated land, Contaminated land guidelines, NSW EPA, 2020 (EPA, 2020)
– NEPM Schedule B2 Appendix C – Assessment of data quality (NEPC 2013)
– NEPM Schedule B3 - Guideline on Laboratory Analysis of Potentially Contaminated Soils (NEPC 2013)

DP 2020b presented the QA/QC requirements for the DSI in Section 12 and a data quality assessment was included in Appendix D. Overall, DP concluded that the QA data was considered to be of sufficient quality to be acceptable for the assessment. In addition, the DQIs were complied with and it was concluded that the field and laboratory test data obtained are reliable and useable for the assessment.

A detailed review of QA/QC by the Auditor is presented in **Appendix C** of this Audit Report.

Auditor's Opinion: DP provided comprehensive planning of QA/QC in their SAQP and the work was implemented in general accordance with the SAQP. Any deviations from the sampling plan were justified within the DSI.

DP provided a relatively comprehensive review of QA/QC in the DSI, as indicated by the Auditor's review of relevant elements of the QA/QC program in **Appendix C**, which is considered adequate to justify their conclusions regarding the data quality.

The Auditor notes that no sampling and analysis was undertaken as part of site validation; rather validation of the remediation works was based on inspections, photographic records and survey information documenting the physical works undertaken.

8. Assessment findings

8.1 Summary of identified soil contamination

DP 2020b reported the following soil contamination identified during the DSI:

– Sub-surface conditions identified fill materials across the site.
– Observations of contamination within the bores, test pits and stockpiles included ash, slag, asphalt, coal, hydrocarbon odour, concrete, bricks, tiles, glass, metal, wood and fibre cement sheeting fragments (potential ACM).
– ACM fragments were identified within the fill at Pit 307and in the eastern portion of the site, particularly in the vicinity of the former underground tunnel. ACM was also identified within fill materials in the former car park and beneath the floor slab of the former Supreme Court.
– Exceedance of the lead HIL B in fill sample BH5/0.1 m (during Prensa 2016 DSI).
– Exceedances of benzo(a)pyrene TEQ concentrations in seven samples.
– Presence of detectable bonded asbestos (Amosite and/or chrysotile asbestos) in four fibro fragments (F1, 302/F1, 307/F2 and 310/F1) of the six material samples collected from the ground surface or within test pits.

Table 3 below summarises the number and location of exceedances during the DSI and previous investigations, results of which were included in the statistical analysis within the DSI. Tabulated results from this investigation are included within **Appendix B** of this Audit Report.

Table 3 Samples exceeding assessment criteria

Analyte	Assessment Criteria	Investigation stage	Maximum concentration	Number of exceedances	Area of site
Copper	NEPM 2013 site specific EILs (55 mg/kg)	DP 2020b	360 mg/kg	3	Northern site boundary and southern site boundary
		Prensa 2016	420 mg/kg	2	
Lead	NEPM 2013 site specific EIL and HIL B (1,100 mg/kg / 1,200 mg/kg)	Prensa 2016	1,400 mg/kg	1	Northern site boundary
Nickel	NEPM 2013 site specific EILs (9 mg/kg)	DP 2020b	18 mg/kg	4	Admin building, northern site boundary and southern site boundary
		Prensa 2016	19 mg/kg	3	
Zinc	NEPM 2013 site specific EILs (150 mg/kg)	DP 2020b	620 mg/kg	5	Northern site boundary and southern site boundary
		Prensa 2016	1,100 mg/kg	2	
TRH C_{16}-C_{34}	NEPM 2013 ESLs (300 mg/kg)	Prensa 2016	340 mg/kg	1	Southern site boundary
B(a)P TEQ	NEPM 2013 HIL B (4 mg/kg)	DP 2020b	9.8 mg/kg	4	Admin building, northern site boundary, southern site boundary and eastern site boundary
		Prensa 2016	7.3 mg/kg	3	Northern site boundary and southern site boundary

DP 2020b found that the lead impact identified by Prensa in 2016 at Bore 5/0.1 m was localised and potentially attributed to building waste or potentially lead based paints. Consistent elevated lead concentrations above the HIL criteria were not observed within fill across the site. DP 2020b attributed the PAH impacted soil to a number of factors including the presence of ash / slag within filling and the presence of the asphalt pavement.

Statistical analysis undertaken by DP 2020b found that no 'hot spots' were detected for lead or B(a)P TEQ and 95% UCL of the means were within the HIL-B criteria. Some scenarios showed marginal exceedances of the standard deviation for B(a)P, the results were not considered to be significant based on the fact that no 'hot spots' were detected and the PAH impact was aged. Similarly for lead, given that no 'hot spots' were detected for lead and the 95% UCL values for all scenarios were below the conservatively derived HIL-B criteria, DP considered the elevated lead result at Bore 5/0.1 m did not constitute significant contamination requiring remediation.

As noted above, bonded ACM was confirmed within filling under both buildings and within the car park and landscape areas (i.e. all areas of the site proposed for development). DP 2020b stated that although a detailed asbestos assessment was not conducted, the frequency of ACM observed would exceed WA DoH (2009) concentration limits based on site observations, and site remediation was therefore required to address ACM impacts across the site. Given the widespread distribution of filling across the site containing building rubble and the observed occurrence of ACM within subsurface formwork, DP considered that further ACM was likely to be present within the site, and on this basis, all fill materials across the site should be considered to be impacted with ACM in the absence of a detailed asbestos investigation and validation, as a precautionary measure.

Auditor's Opinion: DP 2020b presented a comprehensive assessment of soil investigation results, which indicated chemical contaminants were not present at the site at concentrations requiring remediation or management for the proposed land use; with bonded ACM being the sole contaminant of concern.

8.2 Summary of identified groundwater contamination

DP 2020b analysed five groundwater samples for heavy metals, TRH, BTEX, VOCs, PAH and phenols. All results were reported below the laboratory limit of reporting with the exception of zinc exceedances in all locations and nickel exceedances in four of the five locations. DP noted these heavy metal concentrations were marginally above the adopted criteria (GILs for marine waters) and that the groundwater concentrations in the up-gradient well (Bore 203) was typically higher or commensurate with concentrations detected in downgradient wells.

Auditor's Opinion: The Auditor considers DP's groundwater investigations were sufficient to indicate there was no significant groundwater contamination at the site.

8.3 Summary of gas contamination

DP 2020b reported the field gas monitoring results from within the existing buildings / surrounding grounds to be absent of methane, carbon dioxide, hydrogen sulphide and carbon monoxide. Low levels of methane and carbon dioxide (0.1%) were reported during the drilling of boreholes.

Field gas monitoring results recorded minor concentrations of gas in the boreholes post well/casing installation. Minor concentrations of methane and hydrogen sulphide were reported in some wells and moderate detections of carbon dioxide and carbon monoxide were detected.

DP concluded the ground gas monitoring has indicated the general absence of mine gases or volatile hydrocarbons associated with USTs associated infrastructure and wash bay on the adjacent Police Station, within the bores and existing buildings / site grounds.

Auditor's Opinion: The Auditor considers DP's investigations of potential gas or vapour contamination was sufficient to demonstrate there were no significant mine gases or volatile hydrocarbons evident at the site.

9. Updated Conceptual Site Model

An updated CSM was included in DP 2020b and DP 2020c following the DSI with the key points summarised below.

The known contamination sources included:

– Filling imported across the site
– Demolition of former structures or maintenance, renovations to existing former buildings, underground formwork containing ACM.

Contaminants of concern were limited to the following:

– Asbestos

The release mechanisms were considered to be placement of filling on-site and demolition / maintenance of buildings / structures leading to exposure / disturbance during proposed development. The exposure pathways were considered to be inhalation (dust) and ingestion.

The potential receptors included:

– Site workers (current and future)
– Residents (future)
– Maintenance workers (current and future)
– Consultants (current and future)
– Trespassers (current and future)
– Surface water bodies
– Groundwater
– Neighbouring properties in the case of groundwater or surface water migration

Auditor's Opinion: The updated CSM is considered appropriate, based on the findings of the DSI.

10. Assessment of risk

10.1 Soil contamination impacts

Prior to remediation

The soil contamination impacts to the site prior to remediation comprised heavy metals and PAHs exceeding assessment criteria in some samples, and ACM encountered across the site. Widespread fill materials were found across the site to depths up to 3.3 metres.

DP 2020b reported human health exceedances of lead and benzo(a)pyrene; however statistical analysis showed that there were no 'hot spots' on the site and the 95% UCLs were below the HIL-B. Therefore, the risk to human receptors from these exceedances was considered to be low and not representative of significant contamination that would require remediation.

DP 2020b reported the bonded ACM materials were identified across all areas of the site (the Administration Building, The Supreme Court Building, landscape areas and the car park). The bonded ACM impacts appeared to be associated with the fill materials across the site which contain extensive building wastes. The ACM impacts were reported broadly across the site within the filling. DP concluded that remediation / management would be required to render the site suitable for the proposed educational facility from a contamination perspective due to the bonded ACM impacts identified in fill materials across the site.

Following remediation

DP 2021a stated that based on the inspections undertaken at the site and information provided by Built, potentially contaminated materials have been successfully capped and managed beneath the existing former Courthouse building slabs, new building slabs, internal pavements and beneath approved landscape capping.

DP concluded that the development is considered to be suitable for the university campus development with respect to site contamination, on the provision that a long-term SMP is implemented.

Auditor's Opinion: The Auditor agrees that soil contamination risk requiring remediation for the proposed land use were limited to ACM in fill materials. All potentially contaminated soils have been capped in accordance with the RAP as part of the development, and this risk is considered to have been adequately addressed subject to appropriate management by means of implementation of the Long-term Environmental Management Plan (LTEMP), as discussed in further detail in **Section 12** of this Audit Report.

10.2 Groundwater contamination impacts

Groundwater monitoring during the DSI (DP 2020b) indicated the general absence of contamination to groundwater at the site. There were some heavy metal exceedances reported within groundwater (nickel and zinc). DP noted the results of testing along the eastern site boundary with the Police Station indicated the general absence of gross impacts to groundwater downgradient of UTSs, fill points, bowsers / fuel lines associated with the adjacent Police Station site. DP's updated CSM stated that groundwater data suggests that while some slightly elevated contaminants (i.e. nickel and zinc) were present in groundwater they appear to be associated with regional or upgradient sources and not on-site activities, and adverse impacts to adjacent surface water bodies are not anticipated based on the DSI findings.

Auditor's Opinion: The Auditor agrees that contamination in fill materials does not appear to have impacted groundwater, and groundwater contamination does not present a risk at the site.

10.3 Vapour impacts

The gas monitoring undertaken during the DSI (DP 2020b) did not detect any gases within the existing buildings and only minor concentrations of methane and carbon dioxide during the drilling of geotechnical and environmental boreholes (0.1%). The results, therefore, indicate there is a low to very low risk of exposure to ground gases at the site.

Following field gas monitoring results post well installation, CGS values of 1 and 2 were assigned to each monitoring location which corresponds to a very low (CGS 1) to low (CGS 2) risk of landfill gas exposure and is typical of natural soils with low to high organic content and typical fill to recent deep fill. CGS 2 was only in bore MS4, a 20.8 m deep geotechnical / mine subsidence bore, based on a peak carbon dioxide concentration of 7.1%.

In addition, the vapour risk assessment undertaken by WSP (2017), in regard to the decommissioned UST in the adjacent Police Station, concluded that the vapour and soil sampling undertaken indicated that the risk to workers at the site, through vapour intrusion and inhalation, was low and acceptable.

Auditor's Opinion: Investigations do not indicate any significant risk of hazardous ground gas or vapour risks at the site.

10.4 Aesthetic impacts

DP 2020b reported the general absence of significant aesthetic issues at the site with the absence of staining, odours and hazardous ground gas. Therefore, the risks to the site from aesthetic impacts was limited to the ACM and anthropogenic inclusions within the fill materials across the site. These risks were addressed within the remediation strategy for the site.

As stated in DP 2021a, potentially contaminated materials have been successfully capped and managed beneath the existing former Courthouse building slabs, new building slabs, internal pavements and beneath approved landscape capping.

Auditor's Opinion: The Auditor agrees that aesthetic impacts were limited to ACM and anthropogenic inclusions within the fill materials, and these have been adequately addressed by capping as part of the site development.

10.5 Chemical mixtures

DP did not specifically examine chemical mixtures during the investigation.

Auditor's Opinion: Based on the general absence of contaminants at the site, the Auditor does not consider any further assessment of chemical mixtures is required.

10.6 Conclusion on risk

DP 2020b concluded that based on the DSI findings, remediation / management would be required to render the site suitable for the proposed educational facility due to the bonded ACM impacts identified in fill materials across the site. While PAH, heavy metal and TRH impacts were identified exceeding the adopted Tier 1 health and ecological investigation / screening levels, remediation for these contaminants is not warranted based on statistical analysis and consideration of the ecological setting and the proposed development. DP also considered that the contaminated fill/soil materials identified on-site are unlikely to be having a significant adverse impact on the groundwater quality and down-gradient receiving water quality given the nature of the contaminants, distribution across the site and the depth and nature of the groundwater identified on-site. DP noted that the results of the investigations suggest that the USTs on the adjacent Police Station have not resulted in significant contamination to the subject site. In addition, the results of preliminary screening for hazardous ground gases suggests a risk classification of very low to low with reference to NSW EPA (2019).

DP 2021a concluded that based on the results of inspections, survey and observations during site remediation and validation, together with information provided by Built as presented in the Validation Report, the potentially

contaminated materials within the investigation area (the site) have been appropriately remediated / managed with reference to the RAP (DP, 2020c), and the development is considered to be suitable for the university campus development with respect to site contamination, on the provision that a long-term SMP is implemented.

Auditor's Opinion: The Auditor agrees that contamination risks requiring remediation or management at the site were limited to the bonded ACM impacts in fill material at the site. These risks have been addressed by capping in accordance with the RAP as part of the development, and the site is considered suitable for its proposed use as an educational facility subject to appropriate management by means of implementation of the LTEMP, as discussed in further detail in **Section 12** of this Audit Report.

The Auditor notes that while significant quantities of fill were removed from the site as part of the development works (as described in **Section 12)**, not all fill or contaminated materials were removed. As noted above, previous investigations indicate contaminants presenting a potential risk to health or the environment are limited to ACM, which has not been quantified but is expected to exceed health-screening levels in some parts of the site. The material has been capped as described in the LTEMP and should not be subject to exposure during normal use of the site. Risk can be managed by the procedures described in the LTEMP if material below the capping is required to be disturbed.

11. Remedial Action Plan

11.1 Overview

DP prepared a RAP (DP 2020c) following the findings of the previous investigations. A previous conceptual RAP (cRAP) was prepared by Cardno (2018), which was subsequently superseded by DP's DSI and RAP. The Auditor reviewed the cRAP as documented in Interim Advice #1 along with draft and final versions of the DP RAP as documented in Interim Advice #3 and #4 (included in **Appendix D** of this Audit Report). The revised RAP (DP 2020c) substantially addressed the Auditor's comments and was considered appropriate given the nature of identified contamination and the proposed development of the site. A summary of the RAP and its implementation and validation is provided below.

11.2 Objectives

DP 2020c stated the objective of the RAP was to ensure that the site is remediated in an acceptable manner, with minimal environmental impact, to a condition suitable for the proposed university development. The objectives of the RAP were therefore to provide a strategy for site remediation which:

– Minimises impacts from the site on the environment and on public health and safety during site remediation
– Maximises the protection of workers involved with site remediation
– Renders the site safe for the proposed landuse and substantially reduces potential exposure pathways to contaminants
– Minimises impacts on the local environment during and following site remediation.

11.3 Remediation goals

DP 2020c stated the remediation goal was to place bonded asbestos contaminated soil beneath a suitable caping layer to prevent exposure and accessibility.

Validation of remediation works against the remediation goals is discussed in **Section 12**.

Auditor's Opinion: Given the contamination presenting a risk at the site was limited to ACM (as discussed in **Section 10** of this Audit Report), the Auditor considers the objectives and goal of the RAP were appropriate.

11.4 Extent of remediation required

DP 2020c stated that given the widespread distribution of filling across the site containing building rubble and the observed occurrence of ACM within subsurface formwork, further ACM is likely to be present within the site. As such capping of the entire site will be required as a precautionary measure in the absence of detailed asbestos assessment and validation.

Auditor's Opinion: DP's assessment of the extent of remediation was precautionary, but considered appropriate given the nature of the proposed development would result in capping of most of the site anyway, and further assessment would not necessarily demonstrate any substantial portion of the site did not require management.

11.5 Remediation options assessment

DP 2020c noted a remediation options review was undertaken as part of the cRAP (Cardno 2019) with reference to the principles and criteria defined in the relevant guidelines including NEPC (2013) and NSW EPA (2017). The two remediation options identified by Cardno that would be suitable for the identified contamination (bonded asbestos) in fill/soil were as follows:

– Option 1: Excavation and off-site disposal of impacted soils
– Option 2: Isolation and management of the soil on-site by containment below a capping layer or hardstand.

DP stated the DSI indicated that bonded ACM impacted soils were situated broadly across the site within filling and within subsurface formwork associated with structures that are proposed to remain in-situ. DP considered remediation via excavation, stripping and off-site disposal of impacted materials was not likely to be feasible from both a practical, cost-effective or time-effective perspective based on discussions with the client/developer. It was also noted that the central building (i.e. Court House Building) will be retained as an 'Educational Establishment'. Potentially impacted soils beneath the building to be retained (if any) will also be effectively capped by the existing building. The adopted remediation approach, subject to Site Auditor and regulatory approval, therefore comprised a combination of Options 1 and 2 above.

Auditor's Opinion: The Auditor's review of the cRAP (Cardno 2019) stated that the proposed remediation strategies were considered reasonable to address currently identified contamination, however further detail would be required to address all relevant aspects of EPA guidelines and policy, potential Council requirements and contingencies if there was groundwater impact or vapour impact, as discussed in Interim Advice #1. DP's detailed RAP (DP 2020c) addressed these deficiencies and superseded the cRAP. While the RAP did not reiterate the remediation options review process presented in the cRAP, the Auditor considered it sufficient to follow on with the selected options, as discussed in Interim Advice #3.

11.6 Selection of preferred remedial option / proposed remediation strategy

Based on the discussion in Section 11.5, the remediation approach adopted by DP (2020c) was as follows:

– Off-site disposal of bonded asbestos impacted soils from the upper fill profile where required as part of earthworks construction (i.e. excess soils not able to be reused on-site) following appropriate waste classification
– On-site management (capping) of bonded asbestos impacted soils.

Auditor's Opinion: As discussed in Interim Advice #3 and #4, the Auditor considers the rationale is appropriate for the contamination identified to date. Asbestos appears to be the governing contaminant and the NEPM (NEPC 2013) notes that management of asbestos in situ is encouraged, which may include covering the contamination with uncontaminated fill or other protective or warning layers. This is consistent with the recommended remedial option.

11.7 Remediation scope of works

DP 2020c summarised the adopted remediation approach scope of works as follows:

– Excavation to invert depth of proposed capping layer
– Placement of excavated contaminated materials in proposed fill areas (i.e. where beneath the invert depth for the proposed capping layer) where applicable ensuring bonded ACM is not left at the ground surface, subject to geotechnical suitability
– Disposal of excess contaminated soils to an appropriately licensed landfill following waste classification
– Capping of contaminated soils with concrete (i.e. building slabs, concrete pavements) or clean soils within landscape areas. It was noted that given the widespread nature of fill materials containing building waste (potential source of hazardous building materials (HBM) including asbestos) and observed bonded ACM across the site, capping of the entire site will be required (precautionary approach) in the absence of detailed asbestos investigation and validation.

DP noted that existing building and construction of the proposed buildings and pavements will largely provide the above capping, with only localised capping within landscape areas.

DP 2020c stated if visible bonded asbestos is encountered during earthworks, the material will either be:

– Immediately covered by clean fill to prevent exposure to personnel and demarcated to prevent future disturbance where possible

– Excavated and placed immediately in proposed fill areas and covered over to prevent exposure to personnel OR
– Collected, bagged and disposed to a licensed landfill by appropriately licensed personnel in accordance with SafeWork NSW Code of Practice, regulatory requirements and with reference to the EMP in Section 13 [of the RAP].

Section 7.1 of the RAP (Remediation Goals) further described the capping layer, summarised by the Auditor as follows:

– A concrete slab/pavement (i.e. proposed concrete building slabs / pavements) of minimum 100 mm thickness; or
– A minimum of 0.3 m of imported material (i.e. landscape areas) classified as VENM or ENM, complying with an appropriate / relevant resource recovery order / exemption (RRO / RRE), or commercially available and certified product. Validated on-site materials could also be utilised as capping subject to detailed testing.
– A minimum capping of 300 mm was suggested for landscape areas with general ground cover (i.e. shallow root system) with increased capping thickness where deep rooted vegetation is proposed (i.e. trees) subject to advice from the landscape designers regarding the required thickness of capping to support the root zone for vegetation within landscape areas.
– Placement of a high visibility orange geo-fabric layer on top of the contaminated fill materials to act as a warning/marker layer and to provide separation from overlying materials. Plastic sheeting could be used as an alternative marker layer beneath concrete slabs/pavements.

Section 10 of the RAP contained a more detailed description of the remediation strategy and methodology.

Auditor's Opinion: The Auditor considers the remediation scope was appropriate and sufficient details were provided to enable effective implementation of the RAP in accordance with the intent of the remediation strategy.

11.8 Validation sampling program

Section 10 of the RAP indicated validation of capped areas would be by a combination of survey before and after capping, and validation inspection by a suitably qualified environmental consultant to confirm placement of the high visibility geo-fabric marker layer. Requirements for clearance inspections and validation of stripped fill surfaces and imported materials were detailed within the sequence of remediation.

DP 2020c reported that, where required, analysis for the validation of stripped/excavated contaminated soils within landscape areas, base of bulk excavations or the stormwater easement must comprise the following:

– TRH
– BTEX
– PAHs
– Heavy metals
– Asbestos (WA DoH – 500 mL)

The analytical programme would be reviewed following excavation, segregation and sampling to confirm analytes for testing. Leachability (TCLP) analysis may be required for stockpile samples if total contaminant levels are found to exceed 'General Solid Waste' Criteria.

In addition, sample analysis for waste classification must be undertaken for any soils that are to be disposed off-site. The waste classification analysis was listed in DP 2020c as follows:

– TRH
– BTEX
– PAH
– Heavy metals
– Asbestos identification

DP 2020c noted that additional analytes (i.e. foreign materials, pH, EC, etc) may be required if assessment against a general RRO is proposed.

Auditor's Opinion: As discussed in Interim Advice #3, the Auditor considers the validation sampling program to be appropriate, however recommended that confirmatory samples of imported material be collected and included within the sampling program, unless the supplier can provide analytical results directly representative of the material in question. This was incorporated in the final RAP as confirmed in Interim Advice #4.

11.9 Validation Reporting

DP 2020c stated that a validation report would be prepared with reference to NSW EPA 2011 and NSW EPA 2017, and other appropriate guidance documentation. An important part of site validation (for on-site capping) will be the inspection to confirm that appropriate capping has been achieved in accordance with the RAP. The following was also noted in DP 2020c:

– The report shall be submitted to the client for submission to the Site Auditor and Council at the completion of the remediation works program. The validation report shall confirm that the site has been remediated to a suitable standard for the proposed university development. It is noted that due to the staged construction program proposed, interim validation reports may be required for each stage.
– The validation report should include details of the total volume of contaminated materials removed from site (if any), indicate the final disposal destination of the materials removed from site (if any), the final location and depth of materials retained on site, present details of the capping procedure and final capping depths, present detailed analytical results, and provide comment on the suitability of the site for the proposed university development.
– Upon the completion of remediation and validation works and construction, a [Site Management Plan] (SMP) will be drafted for long-term management of capped materials on-site (i.e. 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. The SMP will require review and approval by the Auditor and regulator who will also organise for the placement of an appropriate notification on the S10.7 certificate for the site. The SMP and presence of ACM within soils across the site will also be notified in the site asbestos register in accordance with the relevant WHS regulations.

Auditor's Opinion: The Auditor considers validation reporting requirements outlined in the RAP were appropriate, noting NSW EPA 2011 has been superseded by EPA 2020a. Review of the validation reporting completed by DP is presented in **Section 12** of this Audit Report.

11.10 Contingency plan

DP 2020c outlined a contingency plan relating to the remediation as follows:

– If contaminated soil quantities are such that they cannot be accommodated beneath the concrete paved areas or 300mm thick VENM/ENM capping layer (landscape areas), the excess materials will require stockpiling, classification (if required) and off-site disposal to a licensed landfill.
– If indications of gross soil contamination are observed on-site during remediation works (i.e. staining / odours etc.), the materials must 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 must provide further details regarding contingency procedures, including incident management and unexpected finds protocol.

Auditor's Opinion: The remediation strategy is relatively robust, and the Auditor considers the contingency plan was adequate for the site conditions and proposed remediation strategy.

11.11 Unexpected finds protocol

DP 2020c included an unexpected finds protocol which suggested procedures as follows for the assessment and management of potentially impacted filling / soils during remediation / earthworks:

- Excavation, handling, loading and transport of contaminated materials must be undertaken by a licensed contractor in accordance with the appropriate regulatory approvals and legislative requirements.
- The progress of site excavations during construction must be inspected by the contractor during earthworks, and periodically by the contaminated lands consultant (i.e. DP). Potential soil contamination may include stained soils, odorous soils, soils containing excessive fibro fragments, soils containing slag/ash products and building rubble (i.e. bricks, tiles, concrete, timber etc).
- If additional potentially contaminated soils are encountered (i.e. visual or olfactory indication of contamination), excavation of filling should cease, and the extent of the affected filling should be assessed by DP.
- The affected soils may need to be segregated based on visual/olfactory observations, and stockpiled for further assessment, alternatively, the soils may be suitable to remain on-site beneath the cap.
- If the assessment of impacted materials indicates that the materials are not suitable to remain on-site, the materials must be classified for disposal to an appropriately licensed landfill with reference to the NSW EPA (2014).
- The affected area must be stripped and validated by DP.
- Excavation in the affected area cannot recommence until the validation testing indicates the absence of gross impact and no visual or olfactory indicators of contamination).
- Licensed contractor to load classified materials directly into appropriate trucks for transport and disposal to a licensed facility (Note: waste classification is required prior to off-site disposal).

Auditor's Opinion: The Auditor considers the unexpected finds protocol included in the RAP was appropriate.

12. Remediation and validation works

Remedial and validation works were documented in the Validation Report (DP 2021a) as summarised below.

12.1 Responsibilities

DP 2021a stated that the Contractor (Built Pty Ltd) was responsible for on-site operations including the following:

– Overall project management, approvals and liaison
– Demolition of site structures and clearance following demolition
– Disposal of demolition wastes where required (not assessed as part of the validation report)
– Crushing of concrete demolition waste following clearance for hazardous building materials for re-use on site
– Handling of fill materials and disposal of contaminated soil or excess fill to landfill
– Safety and environmental management
– Waste classification inspections and confirmation of ADE / DP waste classifications for extended areas of materials not assessed by ADE / DP
– Collation of waste / import material tracking documentation and submission to the client and DP for review and inclusion in the validation report.

The Occupational Hygienist (ADE Consulting) was responsible for the following:

– Clearance of the removal of hazardous building materials (HBM) from existing buildings prior to demolition
– Air monitoring for air borne asbestos fibres during construction works resulting in the disturbance of fill materials (i.e. any excavations, stockpiling, placement or transport of fill materials), where required
– Waste classification of selected materials requiring off-site disposal.

Douglas Partners Pty Ltd (DP) was responsible for general site validation including:

– Advice on excavation and segregation of contaminated soils (where required)
– Periodic inspections of remediation and validation works
– Waste classification of selected soil / fill requiring off-site disposal
– Review of selected proposed imported material reports / certificates to confirm suitability for use on-site prior to importation
– Provision of a remediation and validation report
– Correspondence/liaison with the Site Auditor throughout the remediation works
– Provision of a long term SMP.

12.2 Summary of remediation works

12.2.1 General activities

DP 2021a expanded on the Remediation Goals discussed in the RAP (see **Section 11.3** above), and stated the main objective of the remediation approach was to place bonded asbestos contaminated soil beneath a suitable capping layer to prevent exposure and accessibility. As discussed [in the DSI summary presented in DP 2021a], given the widespread distribution of filling across the site containing building rubble and the observed occurrence of ACM within subsurface formwork, further ACM was likely to be present within the site. As such capping of the entire site was required as a precautionary measure in the absence of detailed asbestos assessment and validation.

DP 2021a (Section 7, Table 1) presented a chronological summary and description of remediation and validation works carried out at the site based on DP observations and discussions with Built, and summarised by the Auditor as follows:

– Pre-demolition DSI (November / December 2019), documented in DP 2020a

– Demolition of the Administration Building and Supreme Court buildings – progressively completed from January 2020 to June 2020
– Import of recovered aggregate for hardstands (January 2020 to April 2020)
– Post-demolition DSI (March 2020) conducted during demolition, documented in DP 2020b
– RAP (DP 2020c) issued and approved by the Auditor in April 2020
– Crushing of site won concrete, brick and ceramics during demolition following clearance for hazardous building materials, for re-use on site (March 2020 to May 2020) - discussed in **Section 12.5** below
– Intermittent off-site disposal of surplus soils / materials containing impacted upper fill (March 2020 to June 2021) – discussed in **Section 12.6** below
– Importation of roadbase for piling platform and beneath paving (March 2020 to May 2020)
– Importation of flyash for mine grouting works (April 2020 to May 2020)
– Importation of various aggregates, soils and landscape materials for construction and landscaping purposes (June 2020 to April 2021) – discussed in **Section 12.7** below
– Stormwater easement inspections (June / July 2021)
– Inspections during marker layer installation in landscape areas (July 2021)
– Final inspection (20 August 2021).

12.2.2 Tunnel decommissioning

DP 2021a provided details of demolition of the tunnel beneath the former Administration Building (decommissioned as part of the development as noted in **Section 2.2** of this Audit Report). Based on discussions with Built this included the following:

– The tunnel was sealed off at either end, partly demolished to remove the roof and top half of the walls and backfilled with fine crushed rock (FCR) imported as VENM from the Boral Seaham quarry.
– The surrounding excavation resulting from demolition of the tunnel and ex-Administration Building was backfilled using imported FCR from Boral and site-crushed materials (concrete, bricks, ceramics) (ADE, 2020b).
– ACM utilised as formwork for the walls and roof of the tunnel were exposed during the decommissioning works. Where exposed and disturbed during earthworks the ACM sheeting was collected and disposed off-site to a licensed landfill (with other ACM demolition wastes). The remaining ACM formwork was left in-situ and capped beneath the new building slabs.
– Air monitoring was undertaken by ADE during asbestos removal/disturbance works conducted by the licensed contractor (Drumberg) under appropriate SafeWork NSW notification/licenses.

12.2.3 Stormwater easement

The Validation Report (DP 2021a) included discussion of the replacement of the existing stormwater pipe within the easement adjacent to the eastern wall of Building B (central building). The easement and stormwater pipe will be a Council asset. DP noted that the stormwater pipe within the easement was not installed in strict accordance with the RAP, however, a management strategy was developed in consultation with the Site Auditor to achieve the objectives of remediation and minimise the possible contaminated land risks associated with future maintenance / repairs (if required). The strategy (DP 2020g) was summarised in the Validation Report and included in Appendix D of the Validation Report.

The Auditor notes that the strategy was accepted by Council (email dated 7 July 2020) and DP confirmed that they had conducted an inspection and the stormwater easement construction was being undertaken in accordance with the agreed strategy (email dated 16 July 2020). Copies of this correspondence are included in **Appendix D**.

DP2021a provided a description and photographs of completion of the stormwater easement construction, and considered the works were conducted in general accordance with the agreed strategy based on DP's 16 July 2020 site inspection, discussions with Built and information provided by Built including the as-built stormwater diversion and easement plans provided in Appendix A of DP 2021a. DP understood that Council also conducted periodic inspections during the works and that the works were accepted by Council and registered with Land Registry.

12.2.4 Asbestos removal

DP 2021a reported that Built engaged ADE Pty Ltd to conduct asbestos air monitoring and provide occupational hygiene advice during site construction activities. Laboratory test results from the air monitoring conducted by ADE Pty Ltd and provided by Built were provided in Appendix C of the Validation Report. The air monitoring reports by Sydney Laboratory Services are dated between 28 Jan 2020 and 26 August 2020 and made out to Drumderg Services. DP reported that a review of these laboratory reports indicated the reported fibre concentrations were all <0.01 fibres/mL and indicate asbestos concentrations within air monitoring samples collected by ADE Consulting Group were within the acceptable SafeWork NSW exposure standards.

DP 2021a stated that it is understood from discussions with Built that the air monitoring was conducted as a precaution during the initial stages of site excavations within upper fill containing bonded ACM. Based on the results of initial monitoring, the risk of airborne asbestos to be generated at the site was considered to be low by ADE and Built, and further air monitoring was not conducted during construction.

DP reported that based on the information supplied by Built including SafeWork NSW Asbestos Removal Control Plans (ARCP) and Online Notification System records it is understood that works conducted on the site involving potentially asbestos contaminated soil/fill have generally been conducted by licensed contractors with appropriate WorkSafe NSW approvals in place.

Built provided further evidence to the Auditor that these works were carried out in accordance with relevant WHS regulatory requirements, including the following:

– Email inspection report from Douglas Partners dated 16 March 2020, which identified bonded ACM below concrete slabs on top of the tunnel, used as formwork with waterproofing for external tunnel walls, and used as formwork with waterproofing for below ground external walls at Building B (adjunct to tunnel). DP provided a number of recommendations regarding removal and disposal of material, including a recommendation that no ACM impacted material be crushed for reuse on-site.
– Asbestos Removal Control Plan (ARCP) as provided to SafeWork NSW by Drumderg Services Pty Ltd, dated 11/03/2020, estimated completion date 11/6/2020, describing removal of asbestos contaminated soil in the south eastern corner of the site. The ARCP indicated a stockpile of soil, approximately 100 m^3 containing traces of bonded asbestos with reference to ADE WAC DRD-87-17407 [ADE 2020a], and was amended 21/3/2020 to include asbestos removal from the tunnel.
– Copies of EPA consignment details and landfill dockets for four skip loads of mixed asbestos waste sent to Newline Road landfill between 25 March 2020 and 11 May 2020, totalling 7.62 tonnes. Built advised these were associated with subsurface ACM consisting of bonded asbestos sheets, which were disposed with other bonded asbestos removed from internal demolition areas.
– SafeWork NSW acceptance of Notice of intent to remove non-friable asbestos, dated 13/01/2020 for removal of an estimated quantity of 352 m^2 of asbestos from ceiling and flooring at the site, and screenshot of online amendments up to 17/03/2020.
– A copy of Drumderg Services Pty Ltd Friable Asbestos Removal Licence, valid from 17/01/2017 to 16/01/2022.

12.3 Validation

Section 5.2 of DP 2021a (“Remediation Acceptance Criteria”) stated that achievement of the objective of capping and containment of the bonded asbestos contaminated soil were to be demonstrated by the successful installation of a constructed capping layer over the entire site. The existing central building (which will be retained as part of site development) provides the required capping over this area. In the case of contained soils the remediation acceptance criteria (RAC) will not, therefore, take the form of a set of concentrations for various contaminants. Rather, the RAC was deemed to have been attained when the concrete slab/pavements and soil capping has been successfully installed.

In addition to the above, imported fill used to reinstate site excavations and for use in the construction process, pavement or landscape areas was required to be classified as VENM or ENM or a relevant Resource Recovery Order (RRO) / Resource Recovery Exemption (RRE), and accompanied by a certificate from the supplier, otherwise detailed assessment (including analysis of representative samples) will be required prior to use on-site.

RAC criteria for soils proposed to be stripped and validated were provided in DP (2020a), however, this was not undertaken for the development at the client's request [i.e. no areas were stripped of potentially contaminated fill and validated – rather all areas were capped].

DP 2021a Section 8 ("Validation") reported that site validation comprised the following:

- Periodic inspection by DP to allow visual assessment of remediation procedures, including
  - Classification of selected stockpiles (prior to off-site disposal)
  - In-situ classification of selected areas prior to excavation
  - During selected piling excavations (for waste classification purposes)
  - During stormwater easement construction/management of the stormwater easement area
  - During placement of geofabric marker layer in landscape areas
  - Final inspection of 20 Aug 2021 after completion of landscaping.
- Review of documentation provided by Built (contractor) confirming the source and suitability of imported materials
- Waste classification of materials proposed to be disposed off-site to landfill
- Brief review of tracking documentation provided by Built for imported and exported materials
- Brief review of photographs provided by Built showing various stages of construction, marker layer placement and imported and exported materials
- Review of Moir - LP17 (Rev M) - Remediation Action Plan showing landscape areas and capping layer types
- Review of the survey plan from Geosurv Asbuilt Remediation Layers Plan showing top of marker and capping layers.

DP noted that they were not on-site full-time during construction activities and did not observe all materials that were exported or imported to the site, but periodic inspections were conducted by DP during the work, and for the assessment / classification of materials proposed to be removed from the site as nominated by Built.

DP 2021a stated that Built site personnel conducted the following to supplement inspections and observations by DP:

- Attended inception meeting by DP to confirm inspection requirements and observations (i.e. trained to make observations relating to potential contamination such as staining, odours and typical inclusions identified within site soils)
- Inspection of all excavated areas and stockpiles to confirm contaminant observations and consistency with existing waste classification documents, prior to disposal from site
- Inspection of all imported materials to confirm consistency with import documents
- Photos during construction relating to export and import materials, capping and general construction
- Built personnel confirmed that fill materials observed during construction were consistent with soils investigated and classified by DP during the course of the work (i.e. no observations of additional contamination (i.e. staining, odours))
- Built indicated that all surplus/excess materials containing site fill were removed from the site for disposal to a licensed landfill as General Solid Waste containing bonded asbestos (due to the results of the site investigations and the observations of building rubble and bonded asbestos materials in fill across the site)
- Built indicated that no subsurface materials were removed from the site for beneficial off-site use.

DP 2021a Section 8.3 included representative photographs of internal pavements confirming the placement of the black plastic marker layer at the base of concrete slabs, noting that an inspection by DP on 4 September 2020 confirmed the placement of the marker layer for internal pavements within the Education Building. Photographs were also provided of the orange high-visibility geofabric marker layer placed with landscaped areas and the electrical kiosk north of the Education Building, as well as placement of various landscaping materials.

DP conducted a final inspection of the site on 20 August 2021 which confirmed that capping materials at the surface were consistent with those provided in the Moir LP02 - General Arrangement Plan in Appendix A of the Validation Report, although DP noted that roadbase and crushed granite was not overlaid on concrete footpaths in the south-western corner adjacent to the Education Building as shown on this plan.

12.4 Compliance with the RAP

12.4.1 'As Built' Development

Section 8.9 of DP 2021a reported that the Geosurv Asbuilt Remediation Layers survey plan (in Appendix A of the Validation Report) shows the surveyed levels prior to and following capping, the capping type (concrete over a plastic marker layer OR clean imported soil over an orange geofabric marker layer), capping thickness and the general development layout.

DP 2021a reported that surveyed levels confirmed the following:

– A minimum of 125 mm of pavement thickness, comprising concrete, was placed over the black plastic marker layer within the internal pavements / building slabs / footpaths / some landscape areas and raised garden beds. Some of these concrete pavements were further overlaid with landscaping materials (i.e. roadbase and white granite in pathways, imported soil and mulch in garden beds etc – refer to Geosurv survey plans and Moir landscape plans for details).
– Within landscape areas capping was generally greater than 300 mm. Minor exceptions to this occurred in the landscape area immediately south of the Atrium (minimum 193 mm) and the localised landscape area immediately north of the Atrium (minimum 191 mm) (Refer to Geoserv Asbuilt Survey Plan in Appendix A) Garden beds comprised imported soil (Hills premium garden mix) and either surficial woodchips (mulch) or white scoria gravel over an orange geo-fabric marker layer which was placed over the ground surface in the landscape beds across the site. DP stated that Moir Landscape Architecture (Moir, 2021) indicated that sufficient landscape depths were present to sustain the planting installed as per the landscape design.
– Approximately 219 mm to 382 mm (average thickness for each area) of imported roadbase and asphalt was placed over an orange geofabric marker layer which was placed over the ground surface in asphalt footpaths along the northern (front) site boundary.
– Approximately 396 mm (average thickness) of imported roadbase from Boral Seaham and 10 mm blue metal gravel from Saddingtons - Quarry Products (Newcastle) was placed over an orange geofabric marker layer over the ground surface in the vicinity of the electrical kiosk in the north western portion of the site.

DP reported that the provided survey information (in Appendix A) confirms that appropriate capping has generally been achieved as required by the RAP. The minimum thickness of capping as presented in the RAP has generally been achieved across the site with the minor exception of the two landscape areas to the north and south of the Atrium (min 191mm as shown on Geosurv Asbuilt Plan in Appendix A of DP 2021a). The survey plan provides accurate levels indicating the depth to the geofabric marker layer. This depth should be considered during any future disturbance / maintenance of soils within the site on the Geosurv Asbuilt Remediation Layers survey plan.

DP 2021a stated that the observed capped areas (i.e. pavement and landscaped area), were consistent with the proposed and 'as built' development for the proposed university development.

12.4.2 Assessment of Remediation

DP 2021a Section 9 stated that the objective of remediation and validation was to manage the identified ACM contamination in an acceptable manner on site, with minimal environmental impact, to a condition suitable for the proposed university development.

DP stated that based on the inspections undertaken at the site and information provided by Built, potentially contaminated materials have been successfully capped and managed beneath the existing former Courthouse building slabs, new building slabs, internal pavements and beneath approved landscape capping as shown on the provided survey plan in Appendix A of DP 2021a.

The on-going success of the remediation and validation requires the implementation of the long-term SMP for the site, which has been prepared by DP (2021) and placement of a notice on the s10.7 planning certificate (to be added by NCC following completion of SMP) indicating that contaminated soils are present and capped on-site, and any works that may breach the cap must be conducted in accordance with the SMP. The SMP provides procedures for long-term management of contaminated soils at the site and should be implemented at the site by the site owners and managers.

DP 2021a concluded that based on the results of inspections, survey and observations during site remediation and validation, together with information provided by Built as presented in the Validation Report, the potentially contaminated materials within the investigation area (the site) have been appropriately remediated / managed with reference to the RAP (DP, 2020c), and the development is considered to be suitable for the university campus development with respect to site contamination, on the provision that a long-term SMP is implemented.

12.4.3 OHS and Environmental Management

DP 2021a stated that it is understood that all employees and contractors on the site had received a site-specific induction from the contractor, which covered site hazards, safe work practices and emergency response.

DP 2021a stated that as far as DP is aware, the relevant regulations pertaining to occupational health and safety, and environmental and human health issues associated with the remediation works were adhered to for the site works.

Auditor's Opinion: The remediation strategy was relatively robust and simple, and the Auditor is satisfied that DP's inspections combined with Built's records as documented in the Validation Report (DP 2021a) are sufficient to demonstrate completion of the remediation works in accordance with the RAP. Photographic records in the Validation Report were relatively comprehensive, and combined with the as-built and survey drawings (also included in **Appendix A** of this Audit Report) support DP's conclusions regarding the remediation. The Auditor's final inspection of the site on 3 September 2021 revealed all areas of the site were covered by buildings, pavements or landscaping as documented in DP 2021a and there was no potentially contaminated soil subject to exposure.

As noted by DP 2021, the minimum thickness of cover (as specified in the RAP) was not achieved in some of the landscaped areas, however the landscape architect (Moir Landscape Architecture Pty Ltd) has confirmed that the depths of soil are sufficient for the landscaping requirements (see letter dated 9 September 2021 in **Appendix D** of this Audit Report). On this basis the Auditor is satisfied that despite this non-compliance, the remediation has achieved the objectives of the RAP. The Auditor agrees with DP's conclusions regarding the suitability of the site subject to implementation of a long-term EMP.

12.5 On-site re-use of materials

As noted in **Section 12.2** above, crushing of site-won material for re-use on site was completed by Built during the demolition of former buildings.

DP 2021a reported that approximately 500 m^3 (900 tonnes) of crushed and stockpiled aggregate generally consisting of concrete, bricks and ceramics generated from the ex-Administration Building were classified by ADE as suitable to remain on the site from a contamination perspective (i.e. concentration of contaminants tested were within medium density residential landuse health based and ecological criteria (refer to ADE (2020b)). Re-use of the materials in landscape areas, public open spaces or below or close to the water table was not recommended due to the elevated pH of the material.

Approximately 1800 m^3 (3240 tonnes) of crushed and stockpiled aggregate generally consisting of concrete, brick and ceramics generated from the ex-Supreme Court were classified by ADE as Recovered Aggregate (refer to ADE (2020c)).

DP reported that it is understood the material was re-used on site beneath concrete slabs for the new Student Accommodation and Education Buildings (i.e. materials placed below site capping) as per Built's marked up plan Ref DWP-AR-A020 Rev 15 (included in **Appendix A** of this Audit Report).

Auditor's Opinion: Review of ADE 2020b and 2020c indicate the crushed demolition material was suitable for use on site for structural purpose (i.e. sub-slab fill as indicated by Built). ADE's reports included copies of asbestos clearance certificates undertaken prior to demolition, and sampling and analysis of the crushed materials did not detect any asbestos. In addition, the material has been placed below capping and will not be subject to exposure. The Auditor considers this was appropriate use of the material, and as it was reported that no material was exported from site for re-use, more detailed review was not considered warranted.

12.6 Waste management and disposal

DP 2021a stated that disposal of surplus fill/soil materials (impacted by upper fill materials containing bonded asbestos) and intermixed building and demolition materials including concrete, brick and steel reinforcement (typically removed from the sub-surface and potentially impacted by asbestos from fill materials) to appropriately licensed landfills was conducted during remediation and validation works to June 2021 at the site as follows:

– 10 March 2020 to 28 June 2021 – Disposal of fill/soil to Raymond Terrace Waste Management Centre (Suez) – 7282 tonnes (GSW with bonded ACM)
– 12 March 2020 to 1 April 2021 – Disposal of fill/soil to Summerhill Waste Management Centre – 5804 tonnes (GSW with bonded ACM).

DP 2021a stated the soils/materials were classified prior to disposal based on the following:

– Waste classification sampling and testing conducted as part of the DSI across the site (pre and post demolition) testing (DP, 2020c), including the testing of stockpiled materials excavated during earthworks in areas which were not accessible during pre-demolition investigation, and
– Supplementary visual inspections conducted by DP (including email waste classifications reports following each inspection), supplemented by visual inspection by Built personnel throughout the project to ensure surplus materials requiring off-site disposal to the licensed landfill were commensurate with materials previously identified and assessed during the DSI, and did not contain evidence of additional contamination (i.e. staining, odours etc) which may impact on the waste classification.

DP noted that the intermixed building and demolition materials are pre-classified as General Solid Waste in accordance with NSW EPA (2014). Where such materials were impacted by on-site soil/fill containing possible asbestos, these materials were also classified 'Special Waste - asbestos', commensurate with the soil/fill classification.

As indicated in **Table 5** below, waste classification was primarily based on in-situ results from the DSI (as stated by DP), with limited supplementary sampling and analysis during the site works. DP 2021a noted that soil sampling and testing for the DSI included both total and leachable (TCLP) testing, with TCLP testing conducted on selected samples collected by DP with the highest total concentrations. The majority of the fill/soil samples tested fell within the total concentration limits for classification as General Solid Waste (CT1), while some localised elevated concentrations of lead and B(a)P required TCLP testing to allow comparison to SCC1/TCLP1 criteria. DP noted that previous testing by Presna (2016) also identified elevated lead and B(a)P is some soil samples, however, TCLP testing was not conducted [by Presna] for waste classification purposes. DP drilled additional bores in the vicinity of these locations for the DSI, identified similar fill conditions with elevated lead and B(a)P concentrations and confirmed low TCLP results and a low propensity for these materials to leach (which is also supported by the water leachability conducted by Presna (2016)). DP tested acid leachable (TCLP) concentrations of lead and B(a)P on the highest concentrations detected by DP (770 mg/kg for lead and 6.4 mg/kg B(a)P)[4] which were well above the average concentrations and also the more conservative 95%UCL for all fill and all fill/natural materials (i.e. ~490mg/kg [fill] and 407 mg/kg [fill and natural samples within upper 3 m] respectively for lead and ~2.4mg/kg [fill] and 2.3 mg/kg [fill and natural samples] respectively for B(a)P). In addition ADE (2020) also conducted TCLP testing for B(a)P on fill in the south east corner of the site for waste classification purposes and confirmed a low leachability (<PQL) result. Based on the above DP considered that sufficient sampling and testing (including leachability testing) has been conducted to confirm the low leachability characteristics of the materials on-site and the waste classification of the fill/soils across the site.

On-site material movements and reconciliation of waste removed offsite during remediation works were documented by Built on a daily basis by load and were summarised in an exported materials register (Table A2 in Appendix B of the Validation Report), with waste classification documentation, EPA consignment records and waste receipts provided digitally by Built for review by the Auditor.

[4] The Auditor notes that, from the DSI (DP 2020b), TCLP lead was 0.08 m/L for the sample with 770 mg/kg total lead (well below the 5 mg/L TCLP1 threshold for GSW), and the 95% UCLav concentration for lead was well below the SCC1 of 1500 mg/kg for GSW. Similarly TCLP B(a)P was <0.001 m/L for the sample with 6.4 mg/kg total B(a)P (well below the 0.04 mg/L TCLP1 threshold for GSW), and the 95% UCLav concentration for B(a)P was well below the SCC1 of 10 mg/kg for GSW.

The exported materials register indicated approximately 13,086 tonnes of waste was disposed off-site from the areas shown in Table 4 [tallied per area by the Site Auditor from the exported material register – Built recorded disposal in order of date and load].

DP 2021a stated that the approximate material volumes provided in DP waste classification emails shown in Table A2 are generally commensurate with the disposal weights recorded at the licensed landfill considering the bulk density and approximate nature of volume estimates (i.e. not conducted by survey). DP noted that in some cases the materials classified in-situ were not all disposed to landfill (i.e. re-use of materials on site was partly feasible) and as such the estimated material volumes provided in the waste classification emails do not match the corresponding disposal weights (i.e. disposal weights appear lower than the estimated volume classified). With regards to the materials inspected by Built, DP understand materials were inspected during excavation and loading of materials for disposal to confirm the absence of gross contamination (i.e. staining, odours etc) and to ensure materials were commensurate with material description of previously classified materials on site. DP were not on site during these disposal events and as such cannot verify the quantity of materials disposed off site to landfill. Built have indicated that the materials outlined in Table A2 are an accurate summary of what occurred and have also stated that the 13,086 tonnes of materials disposed to landfill broadly correlates to the anticipated basement/footing excavation volumes for the Education and Student Accommodation Buildings and surrounds.

DP 2021a noted that EPA transport consignments were not provided by Woodbury Civil for the disposal of materials from site in May and June 2021. No visible ACM was observed by Woodbury Civil in the upper fill materials and therefore it was not expected to trigger regulatory requirements for the removal of ACM. The materials were disposed as GSW with trace bonded ACM as a precautionary measure in accordance with the previous advice and consistent with materials removed from the site. The landfill (Suez) provided EPA with appropriate regulatory documentation relating to the disposal of asbestos containing materials by Woodbury Civil.

Based on correspondence with Built DP understands that no liquid waste disposal was required.

DP 2021a stated that on this basis, DP believe that the disposal of surplus fill/soil from the site during construction has been conducted in general accordance with the approved RAP (DP, 2020a) and the relevant waste management regulatory requirements, based on the following:

– The findings of the DSI (DP 2020b) and the requirements stated in the approved RAP (DP 2020c)[5]
– Periodic inspections by DP during construction
– DP's waste classification inspections and email reports
– Supplied documentation from Built (including ADE (2020) waste classification report, Table A2 and supplied tip dockets, EPA consignments and associated photographs.

[5] Report references aligned by the Auditor to correspond with Sections 1.5 and 17 of this Audit Report

Table 4 Summary of waste disposal

Source location* / Description	Quantity (tonnes)	Classification	Waste classification documentation**
Stockpile A – stockpile of excavated fill on SE portion of site	115.88	General Solid Waste (non-putrescible) with trace bonded ACM (Special Waste – Asbestos)	ADE (2020a) (WAC 1) & DP waste class email dated 10/03/2020
Stockpile B – stockpile of excavated fill on eastern portion of site	359.58		DP In-situ waste class email dated 13/03/2020 (inspection date 12/03/2020)
Building C Site Stockpile – Bldg C photos show extensive B&D waste and excavations of fill	3,916.66		Building C site photographs provided
Stockpile C – surplus soil / fill and demolition waste from the tunnel area (SE portion of site)	189.52		DP In-situ waste class email dated 18/03/2020 (inspection date 18/03/2020)
Building A & C Site Stockpile – Bldg A & C photos show extensive B&D waste and excavations of fill	1,450.28		DP email dated 10/3/2020 referring to classification of "upper fill" based on DSI in-situ results. Building A & C site photographs provided
Building A Site Stockpile – Bldg A photos show extensive B&D waste and excavations of fill	3,638.44		Building A site photographs provided
Area E & Area E Stockpile D – anticipated pile spoil from retaining wall construction	117.42		Area E - DP In-situ waste class email dated 01/05/2020 (inspection date 30/04/2020) and Stockpile D – DP In-situ waste class email dated 30/04/2020 (inspection date 30/04/2020)
Area F – anticipated pile spoil from retaining wall construction	88.94		DP In-situ waste class email dated 15/05/2020 (inspection date 14/05/2020)
Area G – anticipated excavation of fill and natural material from NW portion of site	337.6		DP In-situ waste class email dated 02/06/2020 (inspection date 02/06/2020)
Area G1 – anticipated excavation of fill and natural material from NW portion of site, extension of Area G	295.84		DP In-situ waste class email dated 09/06/2020 (inspection date 03/06/2020)
Area G & Area G1 – as above	647.46		As above
Area G2 & Area G3 & Building A - anticipated excavation of fill and natural material from western portion of site	1,162.88		DP In-situ waste class email dated 16/06/2020 (inspection date 15/06/2020) & refer to Building A site photographs
Building B Site Stockpile	178.5		Building B site photographs provided
Area I – anticipated excavation of fill, natural soils and concrete for driveway on eastern side of site	157.06		DP In-situ waste class email dated 30/03/2021 (inspection date 30/03/2021)
Area H1, H2 – anticipated excavation of fill and natural material from rear of Building B	429.9		DP In-situ waste class email dated 23/06/2020 (inspection date 22/06/2020)
Total	**13,085.96**		

* Reference to source location taken from DP export materials register – "DP Report / Email reference" column. Descriptions taken from waste classification documentation to supplement "Description" in export materials register.

** Waste classification reports typically referenced the in-situ classification results from the DSI (DP 2020b).

A brief summary of the Auditor's review of the considerations called for in NSW EPA 2017 is provided in Table 5 below.

Table 5 Summary of waste classification

Consideration	Source area and waste classification report identification									
	Stockpile A	Stockpile B	Building C Site Stockpile	Stockpile C	Building A & C Site Stockpile	Building A Site Stockpile	Area E & Area E Stockpile D	Area F	Area G	Area G1
Estimated Volume (m^3)	71.82 (ADE) & 100 (DP)	40 – 60	No estimate	80 – 100	No estimate	No estimate	30 (Area E) & 40 (Stockpile D)	70	450	375
Is the waste pre-classified?	No	No	No	No	No	No	No	No	No	No
Is the sampling density adequate? (# samples, rate m^3/sample)	Yes (4)	Yes (2)	Additional samples were not collected for the waste classification. In-situ results were taken from DSI (DP 2020b) and, as such, sampling density, pattern and method considered adequate as per the DSI as justified in DP 2021a.							
Is the sampling pattern and method appropriate?*	Yes – soil was sampled in-situ	Yes								
Is the selection of contaminants appropriate?*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Leachate analysis undertaken?	Yes – for PAHs	No	Leachate analysis undertaken on select samples for Lead and B(a)P in the DSI							
Determined waste classification	GSW – Special waste (bonded asbestos)									
Disposal quantity (tonnes)	115.88	359.58	3,916.66	189.52	1,450.28	3,638.44	117.42	88.94	337.6	295.84
Reuse Location / Disposal Destination	Disposed at Raymond Terrace	Disposed at Raymond Terrace and Summerhill WMC		Disposed at Raymond Terrace	Disposed at Raymond Terrace and Summerhill	Disposed at Raymond Terrace		Disposed at Summerhill WMC		
Is the waste classification adequately justified?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Consideration	Source area and waste classification report identification				
	Area G & G1	Area G2 & G3	Building B Site Stockpile	Area I	Area H 1 & H2
Estimated Volume (m^3)	No further estimate	500 (G2) and 240 (G3)	No estimate	132	195 (H1) and 265 (H2)
Is the waste pre-classified?	No	No	No	No	No
Is the sampling density adequate? (# samples, rate m^3/sample)	Additional samples were not collected for the waste classification. In-situ results were taken from DSI (DP 2020b) and, as such, sampling density, pattern and method considered adequate as per the DSI as justified in DP 2021a.				
Is the sampling pattern and method appropriate?					
Is the selection of contaminants appropriate?	Yes	Yes	Yes	Yes	Yes
Leachate analysis undertaken?	Leachate analysis undertaken on select samples for Lead and B(a)P in the DSI				
Determined waste classification	GSW – Special waste (bonded asbestos)				
Disposal quantity (tonnes)	647.46	1,162.88*	178.5	157.06	429.9
Reuse Location / Disposal Destination	Disposed at Summerhill WMC	Disposed at Raymond Terrace	Disposed at Summerhill WMC		Disposed at Raymond Terrace and Summerhill WMC
Is the waste classification adequately justified?	Yes	Yes	Yes	Yes	Yes

*It is noted that this included material from Building A site stockpile and is therefore greater in volume than the estimated volume of the stockpiles.

Further information on the above considerations is as follows:

– DP's waste classification reports during the site works were generally in the form of emails including material identification (including location and photographs), approximate volume and material description, with the classification primarily based on the previous testing conducted as reported in the DSI. Inspections were recommended to trigger further assessment if material was encountered that was not consistent with previous investigations. Asbestos was assumed to be present as a precautionary approach.
– Significant volumes of material were disposed of from Building A Stockpile, Building B Stockpile and Building A and C Site Stockpile without inspections from DP or prior estimates of quantities. The Auditor understands this material was classified by Built based on similarity with other fill material on the site and based on an email from DP dated 10 March 2020 stating the expected classification of shallow fill materials on the site. Photographs provided by Built in connection with disposal documentation from these areas indicated a large volume of material was building and demolition (B&D) waste (bricks, concrete etc). As noted by DP, such material is pre-classified as General solid waste (non-putrescible), and hence the material was appropriately classified for disposal as GSW Special waste (bonded asbestos), assuming a mixture of B&D waste and fill materials (as previously classified by DP), with the potential presence of ACM.

A summary of the facility waste disposal and the Auditor's review of the corresponding considerations called for in NSW EPA 2017 is provided in Table 6 below.

Table 6 Facility waste disposal summary

Information	**Facility**	
	Summerhill Waste Management Facility	Newline Road Landfill (Raymond Terrace Landfill)
Licensee	Newcastle City Council	(SUEZ Recycling and Recovery (Port Stephens) Pty Ltd
Facility address	141 Minmi Road, Wallsend NSW	330 Newline Road, Raymond Terrace NSW
Facility Environment Protection License (EPL) no.	5897	7628
Facility waste disposal has EPL in accordance with waste classification showed in receipts	Yes	Yes
Estimated volume of waste taken off-site	5804 tonnes [landfill receipts]	7282 tonnes [landfill receipts]
Receipts showing the waste classification received by facility	Yes	Yes
Receipts showing the volume of waste received by facility	Yes	Yes
Reconciliation documents showing consistency between the waste taken off-site and generated from site	Yes	Yes

Copies of the facilities' EPLs were provided in Appendix B of the Validation Report (DP 2021a), and show that the facilities can lawfully receive the solid waste disposed of from the site in accordance with the respective waste classifications. Both facilities are licensed to receive General solid waste (non-putrescible) and Asbestos waste.

Table A2 in Appendix B of the Validation Report documents the volume (weight) of each load exported from the site. Transport documentation (EPA Consignment records except for Woodbury Civil disposal as noted by DP) was provided by Built and reviewed by the Auditor, which confirmed the pickup address (Nihon University) and respective planned and actual destinations (the respective waste management facilities), supported by weighbridge dockets from the landfills.

Auditor's Opinion: While not all excavated material was individually sampled for waste classification, the Auditor is satisfied that the in-situ classification completed by DP as part of the DSI (DP 2020b) demonstrated the soils were sufficiently consistent to be classified as General solid waste; and all soils were classified as special waste

(asbestos) as a conservative measure (as it would have been difficult to verify that any particular waste was free of asbestos). Subsequent classification sampling, where undertaken, was consistent with these results.

The records provided by Built are consistent with the summary provided in the Validation Report and the Auditor is satisfied that waste soils from the site were appropriately classified and disposed of to facilities licensed to accept the waste. Minor discrepancies identified by the Auditor during review were subsequently corrected by Built and incorporated in the Validation Report (Revision 1), and are not considered to affect the veracity of the waste disposal records.

Based on the timing of works and description of materials removed by Woodbury (email from Built dated 15 September 2021 in **Appendix D**), it is likely that disposal of this material would not have actually triggered transport consignment requirements despite the classification of the material as special waste asbestos as a precautionary measure. On this basis the Auditor is satisfied regulatory requirements were met.

While much of the exported material did not have prior estimates of disposal volume (thus hindering reconciliation of excavation and disposal volumes), the Auditor assumes that Built would have been recompensed based on records of disposal, so it is unlikely that any waste was generated from the remediation works that was not tracked for disposal as demonstrated in Table A2. DWP also advised the Auditor that submissions from Built were assessed by a quantity surveyor, which leads to further confidence that no waste was likely to have been inappropriately disposed of from the site.

The Auditor notes that review of disposal records for demolition materials from the two buildings was not part of the scope of the site validation nor the site audit.

12.7 Imported fill materials

The following requirements for imported fill materials were highlighted in the RAP (DP 2020c):

– Imported fill must be classified as VENM or ENM (refer to NSW EPA 2014) or a relevant Resource Recovery Order (RRO) / Resource Recovery Exemption (RRE) and must be accompanied by a certificate from the supplier, otherwise detailed assessment (including analysis of representative samples) will be required prior to use on site.

DP 2021a stated that based on the results of periodic inspections by DP, discussions with Built, and the supplied documentation (Table A1 – Imported Materials Register in Appendix B of DP 2021a and corresponding letters/dockets from suppliers and tracking documentation from Built provided digitally), imported materials utilised for construction purposes comprised those shown in **Table 7**.

DP 2021a stated that based on DP inspection and the supplied documentation from Built (including VENM certificates and resource recovery classification reports), the imported materials are considered to meet the imported fill requirements of the approved RAP (DP, 2020a) (i.e. VENM, relevant RRO/RRE materials or a commercially available and certified product (suitable for on-site use)). The imported materials are therefore considered to be suitable for use at the proposed university development with respect to site contamination and waste management regulatory requirements.

Table 7 Summary of imported materials (from DP 2021b Table 3)

Material	**Approximate Quantity Imported (as indicated)**	Supplier, **use (as stated by DP 2021a s.8.6)**	Documentation *
20 mm minus recovered aggregate	257 tonnes	Central Waste Station - temporary hardstand beneath final capping	ADE, 2020 – DRD-80-17200/WAC1 v1 final dated 21 Jan 2020 – Recovered Aggregate – Routine Sampling Classification Report. See comment below.
Roadbase (FCR – VENM)	5517 tonnes	Boral Seaham quarry - piling and grouting platform beneath final capping	Boral letter dated 23 March 2020 – certifies the material is VENM as defined by the NSW EPA waste classification guidelines.
Flyash	662 tonnes	Eraring Power Station - mine grout below final capping	Origin Energy Eraring Pty Ltd letter dated 15 April 2020 and Feb 2020 ash test

Material	Approximate Quantity Imported (as indicated)	Supplier, **use (as stated by DP 2021a s.8.6)**	Documentation *
			results. Verified compliance with the Coal Ash Order 2014.
10-14 mm aggregate (VENM)	164 tonnes	Quarry Products (Newcastle) Allandale quarry - general construction purposes	Quarry Products (Newcastle) Pty Ltd letter dated 10 June 2020 – Quarried products classified as VENM, quarried from virgin bushland at Allandale.
Packing Sand	195 tonnes	Metromix Teralba quarry - general construction purposes	Qualtest, 2016 – QUAL-13-00030-AF dated 12 February 2016 – VENM assessment for Teralba Quarry, material testing reports for quarry products. In-situ residual soil and weathered bedrock material considered VENM in accordance with Schedule 1 of the POEO Act.
NGB20-2C aggregate	50 tonnes		
Sewer Mix	97 tonnes		
20 mm roadbase (VENM)	20 tonnes		
Fill Sand (VENM)	161 tonnes	Mackas Sand & Soil Williamtown quarry - general construction purposes	Cardno, 2016 – CGS3146-002.0 dated 25 July 2016 – VENM assessment including inspection, analysis of one sample for a contaminant suite and one sample for acid sulfate soil sPOCAS suite.
Packing Sand (VENM	67 tonnes		
Hills Premium Garden Mix	304 tonnes	The Hills (Tremline Pty Ltd) - garden soil in landscaping	Soil Mix Test Certs_combined - from Origin Energy (ash), SGS Australia (ash), SESL Australia (Premium Garden Mix). Tested to AS 4419: 2018 Soils for Landscaping and Garden Use, including analysis for inorganic and organic contaminants and asbestos.
Mulch	10 tonnes	Oz Landscape Supplies - garden beds in landscaping	Oz Landscape Supplies letter dated 26 August 2021 – Certification ID 1081-21 – verifies compliance with AS4454, and states no known contaminants outside of acceptance parameters.
Drainage Sand	39 tonnes	The Hills (Tremline Pty Ltd) - landscaping	Coffey, 2020 - CANB20S-01290-1 – material test report verifying the material met requirements for 10 mm aggregate. Material described as rounded quartzite river gravel from Glenella Quarry, Cowra.
10-14 mm Scoria White & Crushed Granite	7.5 tonnes	Coastal Quarry Products - landscaping	Coastal Quarry Products letter undated – states materials are natural quarry products

* Documentation listed in s.8.6 of DP 2021a, provided digitally by Built and cross-checked against DP 2021a by the Auditor.

The Auditor reviewed the ADE 2020 Recovered Aggregate report, which documented routine sampling (on 14 January 2020) of approximately 4,000 tonnes of stockpiled recovered aggregate produced as part of a continuous process. Built's imported material register indicated this material was received on site between 31 January and 21 March 2020, and also referenced RCA Australia letter 13809-004/0 dated 3/02/2020 (which was limited to physical testing parameters). ADE stated the stockpiled aggregate materials generally consisted of fine crushed gravels, concrete, brick, asphalt, ceramics and natural rock. Asbestos Containing Materials (ACM), sulfidic ores, hydrocarbon staining / odours and paint chips were not observed within the materials inspected. Five samples were analysed for chemical characterisation and electrical conductivity (EC) and five samples for Foreign Materials analysis (FM), to classify the stockpile in accordance with the Recovered Aggregate Order (2014). ADE's results showed that all analytes were within the maximum average criteria for characterisation, and within the maximum average and absolute maximum for routine testing. The Auditor considers ADE's testing has met the requirements of the Recovered Aggregate Order (2014), and hence the material could be lawfully received at the site. The Auditor notes that the Recovered Aggregate Order does not specifically require laboratory analysis for asbestos, and ADE's assessment for asbestos was based on visual inspection. While the Auditor does not consider this process conclusively verifies there was no asbestos in the recovered aggregate, as it has been placed below the

capping layer with other fill material that is being managed for potential asbestos contamination, the Auditor does not consider it would present a risk to site users even if asbestos is present in the recovered aggregate.

Auditor's Opinion: Documentation referenced by DP 2021a was generally consistent with that provided digitally by Built and supports the respective classification of the materials. Some minor inconsistencies were identified by the Auditor, but these did not affect the type or source of materials documented by DP, and were relatively insignificant in regard to quantities. The Auditor notes that "products" are not strictly classified as waste and are thus not required to be verified as part of the site audit process, except for waste-derived material (such as recovered aggregate and fly ash). The Auditor is satisfied that such materials applied at the site were in compliance with the relevant orders and exemptions and agrees with DP that the imported materials were suitable for use with respect to site contamination and waste management regulatory requirements.

12.8 Long term environmental management

Following completion of remedial and validation works, DP prepared a long-term environmental management plan (LTEMP) (DP 2021b). A copy of the LTEMP is included in Appendix E of this Audit Report.

12.8.1 Purpose of LTEMP

The remediation and validation plan (as discussed in **Section 12**) involved on-site management (capping) of contaminated soils to render the site suitable for use as a university campus. The purpose (objective) of the LTEMP, as stated by DP (2021b), is to provide awareness of the contamination managed on site and prevent and manage breaching of the cap. The LTEMP promotes awareness of the contamination management and the requirements to avoid disturbance (where possible) and provides an outline of maintenance requirements. The LTEMP notes that only passive management measures are required.

12.8.2 Nature of the residual contamination:

DP (2021b) states that contaminated soils/fill containing bonded ACM are present across the site due to uncontrolled historical fill and historical demolition of structures within the site. While PAH, heavy metals and TRH impacts were identified within fill on site exceeding the adopted Tier 1 health based and ecological investigation / screening levels, remediation for these contaminants was not warranted based on statistical analysis and consideration of the ecological setting and the proposed development.

On-site management (capping) of contaminated soils was conducted in a controlled manner with reference to regulatory requirements and the approved RAP for the site (DP, 2020c) to render the site suitable for use as a university campus. In summary, significant volumes of fill material were removed from site during construction, and the remaining potentially impacted soils were capped beneath existing and proposed buildings, new pavements and landscape areas, as shown on Geosurv Asbuilt Remediation Layers Plan in Appendix C of the LTEMP.

12.8.3 LTEMP enforceability

The LTEMP (as approved by the Auditor) is legally required to be implemented under the Environmental Planning and Assessment Act 1979 (the 'EP&A Act'), by way of Conditions E34 (Prior to issue of an Occupation Certificate of Commencement of Operation) and F7 (Post Occupation) of the Development Consent (SSD 9787) as below:

E34. Upon completion of remediation works, the Applicant must manage the site in accordance with the LTEMP.

F7: Upon completion of remediation works, the Applicant must manage the site in accordance with the LTEMP approved under condition E32, or an updated version where approved by a NSW EPA Accredited Site Auditor. Any revisions must be submitted to Council within one month of the update.

12.8.4 LTEMP public notification

DP 2021a states that the LTEMP must be incorporated into the Nihon University overall property management plans/procedures to allow implementation of the management procedures within the plan for routine maintenance and for targeted subsurface works if and when required within the site. The requirement for ongoing site

management must be noted on the appropriate planning certificate. Consideration should be given to recording the requirements on the title information for the site.

Condition E33 of the Development Consent states the approved LTEMP must be provided to Council within one month for notation of the section 10.7 certificate for the site.

12.8.5 Actions required under LTEMP

The LTEMP states that long-term management of contaminated soils located within capping across the site will be achieved by maintaining the cap. This will confirm that the site remains suitable for use as a university campus.

Management actions required under the LTEMP are summarised as follows:

- The site management will be responsible for implementation of the LTEMP and for notifying all personnel whose activities may impact on managed areas under building slabs, concrete pavements or capped landscaped areas. All designated personnel must read and understand the provisions of the LTEMP.
- Regular inspections should be conducted within the site to confirm the integrity of capping. Capping should be repaired as soon as possible if damaged.
- Any activities which require excavation/disturbance of greater than the thickness of capping shown on the Geosurv Asbuilt Remediation Layers Plan (191196-AB-R-01 (E) dated 6.09.2021)[6] or which have the potential to penetrate the capping and marker layers (i.e. excavations, repairs or installation of additional services), must be conducted in the manner described within Section 5.3 of the LTEMP.
- The LTEMP should be regularly reviewed to confirm its suitability for continued use. The LTEMP should be revised/updated should its provisions not cover site activities adequately. Any revisions to the LTEMP must be submitted to Council within one month of the update. Any revisions of the LTEMP that decrease the level of site management will require the approval of a NSW EPA accredited site auditor or the NSW EPA.
- Records of implementation and review of the LTEMP and submission of revised versions to Council should be maintained together with the LTEMP.

12.8.6 Compliance with EMP checklist (EPA 2020)

The DP LTEMP has been compared against the EPA 2020 checklist for EMPs and summarised in Table 8.

Table 8 Compliance with EMP checklist (EPA 2020)

Element	Addressed in EMP
Document status page	Yes
Title (uses environmental management plan)	Long-term Environmental Management Plan
Purpose	
Reason for and purpose of the plan and time period	Objective in Section 1 as discussed above in **Section 12.8.1**. Section 1 also states the time period of the plan (i.e. until review by an auditor or the NSW EPA approves additional assessment that finds the LTEMP is no longer required).
How the plan will be made enforceable	As discussed in **Section 12.8.3**
Active or passive EMP?	Passive, as stated in Section 1.
Parties responsible for implementation and review/maintenance of the plan	Section 5.2 Table 1 (Nihon University staff). As noted in Section 1, the draft LTEMP was reviewed by Nihon, who agreed to implement it.
Where the plan will be recorded	Section 1 (the plan must be incorporated into the Nihon University overall property management plans/procedures, and on the Section 10.7 certificate for the site)
Background	

[6] The Auditor notes the actual date of Rev E is 02.09.2021

Element	Addressed in EMP
Site identification	Section 2
Summary of the site history	Brief description of former site use in Section 2. More detailed site history not considered relevant to the site management requirements.
Current/future site use and layout	Figure 1 and Section 3.
Description of existing / residual contamination	
Identify the contaminants of concern	Section 4
Summary of the geology and hydrogeology	Section 4
Management Activities	
Outline the activity(s) and detail procedures that are to be applied	Section 5
Management structure and responsibilities	Section 5.2 Table 1
Monitoring of site conditions and site management measures	Sections 5.3 and 5.5, Appendix B Table 3 (Capping / Condition Inspection Guide)
Approval and licensing requirements	Not applicable
How the EMP is consistent with conditions of consent under a planning instrument	Described in Section 1 – see also **Section 12.8.7** below.
Reporting requirements for EMP implementation	Section 5.6
Communications protocol	Sections 5.2 and 5.3
Emergency contacts and response	Appendix B Table 2 – details TBC
Operating hours	Not applicable
Contingency plans	Section 5.2 – unexpected finds protocol
Inspection, maintenance and environmental sampling, analysis and reporting	
Integrity inspection or testing or maintenance inspection program and frequency	Section 5.3 and Appendix B Table 3
Monitor and review of EMP	
Schedule for EMP review	Section 5.4
Monitoring checklist	Appendix B Table 3
Description of corrective actions and triggers for these actions	Not applicable
Notification to the regulator and/or consent authority with request to amend or end management activities	Section 5.4
Communications and notifications	
List of stakeholders	Section 5.2 Table 1
Details for how affected stakeholders will be notified of the LTEMP	Sections 5.2 and 5.3
How the EMP is communicated and made enforceable	Sections 1 and 5.3 (see **Sections 12.8.312.8.4** above)
Details for informing stakeholders of changes to activities and/or responsible parties	Section 5.3

12.8.7 Compliance with requirements of SSD 9787 Condition E32

The LTEMP compliance with requirements of SSD 9878 Condition E32 (see **Section 15** of this Audit Report) is summarised in **Table 9**.

Table 9 EMP compliance with requirements of SSD 9787 Condition E32

Requirement (LTEMP must include…)		Comment
(i)	A description of the nature and location of any contamination remaining on site	Described in Section 4 in sufficient detail to be stand-alone.
(ii)	Provisions to manage and monitor any remaining contamination including details of any restrictions placed on the land to prevent development over the containment cell	Section 5. There are no restrictions to development over capped areas, however capping is not to be disturbed. Management requirements are provided in the event disturbance is required; however this is not expected for routine use of the site.
(iii)	A description of the procedures for managing any leachate generated from the containment cell, including any requirements for testing, pumping, treatment and/or disposal	Not considered applicable. The contained material is limited to remaining soils and fill material, and there is no evidence of impact to groundwater from site contamination (discussed in Section 4).
(iv)	A description of the procedures for monitoring the integrity of the containment cell	Covered in Section 5 and Appendix B Table 3.
(v)	A surface and groundwater monitoring program	Not considered necessary based on results of detailed site investigations.
(vi)	Mechanisms to report results to relevant agencies	Not considered applicable, as there is no monitoring.
(vii)	Triggers that would indicate if further remediation is required	Not considered applicable, as there is no monitoring.
(viii)	Details of any contingency measures that the Applicant is to carry out to address any ongoing contamination	Provisions for review of LTEMP in Section 5.4.

Auditor's Opinion: The Auditor considers the LTEMP is in accordance with relevant guidelines and sufficient to meet the relevant requirements of Condition E32 of SSD 9878. The Auditor considers the LTEMP is appropriate for management of the contamination remaining at the site, and that the site is suitable for the proposed land use subject to implementation of the LTEMP.

13. Compliance with regulatory guidelines and directions

The Auditor has reviewed the contents of the Detailed Site Investigations, RAP, Validation Report and Long Term Environmental Management Plan reports with respect to the requirements of relevant EPA guidelines, particularly NEPC (2013), EPA (2020a) and EPA (2017). Opinions on the completeness of the various aspects of the investigation, assessment and reporting have been noted in the preceding sections of this Audit Report.

Auditor's Opinion: The Auditor considers the reports reviewed as a primary basis for this Site Audit have been in substantial compliance with regulatory guidelines and directions. Further review of compliance with relevant legislation and approvals is provided in **Section 15** below.

14. Evidence or potential for migration of contaminants from the site

The identified contamination at the site prior to remediation was limited to heavy metals and PAHs exceeding criteria in some samples, and ACM encountered across the site. Widespread fill materials were found across the site to depths up to 3.3 metres. The site was largely covered with buildings or pavements, and remediation works were managed to prevent the migration of sediment or contaminated surface water. Remediation and development works have reinstated capping, structures and landscaping on the site.

Groundwater monitoring during the DSI (DP 2020b) indicated the general absence of contamination to groundwater at the site. DP's updated CSM stated that groundwater data suggests that while some slightly elevated contaminants (i.e. nickel and zinc) were present in groundwater they appear to be associated with regional or upgradient sources and not on-site activities, and adverse impacts to adjacent surface water bodies are not anticipated based on the DSI findings.

No significant risk of hazardous ground gas or vapour was identified at the site.

Auditor's Opinion: Based on the findings of site investigations, contamination in fill materials at the site do not appear to have impacted groundwater and there is no evidence or potential for migration of contaminants from the site.

15. Licence and notification requirements

The RAP (DP 2021c) included a list of legislative requirements and guidelines, including the following:

– Conditions outlined in the SSD [SSD 9787]
– Notifications of the consent authority
– EPA licences or permits for the transportation and disposal of wastes under the POEO Act
– WorkCover NSW asbestos removal work licence under the WHS Regulation 2011 and appropriate notification prior to commencement
– Site asbestos register to include reference to ACM impacts in soil and the long term SMP in accordance with the relevant WHS regulations
– A groundwater interference permit through the NOW may need to be obtained prior to construction commencing if groundwater dewatering was proposed as per the requirements of the NSW Aquifer Interference Policy September 2012. Given mine workings requiring grouting have been shown to be dry, groundwater extraction / dewatering is not likely to be required for the development.

The RAP s.9 “Regulatory approvals and licences” stated that in accordance with Clause 9 of SEPP 55 and the Newcastle City Council letter dated 10 October 2019, the on-site containment of contamination would be classified as Category 1: remediation works which require development consent.

Development consent was approved by the NSW Government (Minister for Planning and Public Spaces) under State Significant Development (SSD) 9787 on 11 December 2019. SSD 9787 consent conditions relevant to this Site Audit Report are listed in **Table 10** below, with the Auditor’s opinion on compliance based on documentation reviewed as part of this Site Audit. (Note, the Auditor has not verified submission of documents to external parties such as the Planning Secretary or the Certifier, but reasonably assumes this will have been verified by these parties as part of the approval process).

Table 10 Compliance with requirements of SSD 9787

Relevant conditions from SSD 9787	Auditor’s opinion on compliance
Part A Administrative Conditions	
Site Contamination A18. Following the completion of demolition works and prior to the commencement of all other construction, additional site investigations of previously untested or inaccessible areas of the site must be undertaken in accordance with: (a) interim advice dated 12 November 2019 and prepared by NSW EPA Accredited Site Auditor Ian Gregson, Principal Environmental Consultant, GHD; (b) the recommendations provided in the Phase 1 Environmental Site Assessment – Technical Note dated 29 April 2019 and prepared by Cardno; (c) NSW EPA Sampling Design Guidelines; (d) Guidelines for the NSW Site Auditor Scheme (3rd edition) 2017; (e) Guidelines for Consultants Reporting on Contaminated Sites, 2011; (f) The National Environment Protection (assessment of contamination) Measures 2013 as amended; and (g) testing must include assessment of both the soil and groundwater profile	Completed as documented in DP 2020b, as verified by Interim Advice #2, #3 and #4 (see **Appendix D** of this Audit Report).
A19. The additional site investigations report must be reviewed by a NSW EPA Accredited Site Auditor and the Conceptual Remediation Action	Completed, updated RAP is DP 2020c, verified by Interim Advice #3 and #4 (see **Appendix D**).

Relevant conditions from SSD 9787	Auditor's opinion on compliance
Plan dated 28 May 2019, prepared by Cardno must be updated to reflect the findings of the additional site investigations required by condition A18. The updated remediation action plan must be approved by a NSW EPA Accredited Site Auditor and submitted to the Planning Secretary prior to the commencement of remediation works.	
A20. Remediation works approved as part of this development consent must be carried out in accordance with the remediation action plan approved by a NSW EPA Accredited Site Auditor pursuant to condition A19.	Completed as documented in DP 2021a, verified as documented in this Audit Report (particularly **Section 12**).
Part D During Construction	
Imported Soil D22. The Applicant must: (a) ensure that only VENM, ENM, or other material approved in writing by EPA is brought onto the site; (b) keep accurate records of the volume and type of fill to be used; and (c) make these records available to the Certifier upon request.	Verified in DP 2021a, records provided by Built (see **Section 12.7** of this Site Audit).
Part E Prior to issue of an Occupation Certificate of Commencement of Operation	
Site Contamination E30. The Applicant must prepare a Validation Report, where required by the remediation action plan approved by a NSW EPA Accredited Site Auditor pursuant to condition A19, for the development. The Validation Report must: (a) be prepared by a Certified Contaminated Land Consultant; (b) be submitted to the Site Auditor, the Planning Secretary and the Certifier for information within one month after the completion of remediation works; and (c) be prepared in accordance with the remediation action plan approved by a NSW EPA Accredited Site Auditor pursuant to condition A19.	DP 2021a, as reviewed in this Site Audit.
Site Audit Statement E31. Prior to issue of an Occupation Certificate, the Applicant must submit a Site Audit Report and Section A Site Audit Statement for the relevant part of the site prepared by a NSW EPA accredited Site Auditor. The Site Audit Report and Section A Site Audit Statement must verify the relevant part of the site is suitable for the educational establishment land use and be provided for the information of the Planning Secretary and the Certifier.	This Site Audit Report and accompanying Site Audit Statement. Note that "the relevant part of the site" is limited to the development area, and excludes "Easement C" on the western side of Lot 1 DP 1199904, as documented in correspondence in **Appendix D**.
Long Term Environmental Management Plan E32. The Applicant must prepare a Long-Term Environmental Management Plan (LTEMP), where identified as required by the remediation action plan approved by a NSW EPA Accredited Site Auditor pursuant to condition A19, and submit a copy to the Planning Secretary. The plan must: (a) be prepared by a certified Contaminated Land Consultant; (b) be submitted to the Planning Secretary within one month of the completion of remediation works, unless otherwise agreed by the Planning Secretary; and	DP 2021b, reviewed by the Auditor as documented in **Section 12.8** of this Audit Report, and considered by the Auditor to meet the relevant requirements of Condition E32 (see **Section 12.8.7**).

Relevant conditions from SSD 9787	Auditor's opinion on compliance
(c) include, but not be limited to: (i) a description of the nature and location of any contamination remaining on site; (ii) provisions to manage and monitor any remaining contamination, including details of any restrictions placed on the land to prevent development over the containment cell; (iii) a description of the procedures for managing any leachate generated from the containment cell, including any requirements for testing, pumping, treatment and/or disposal; (iv) a description of the procedures for monitoring the integrity of the containment cell; (v) a surface and groundwater monitoring program; (vi) mechanisms to report results to relevant agencies; (vii) triggers that would indicate if further remediation is required; and (viii) details of any contingency measures that the Applicant is to carry out to address any ongoing contamination.	
E33. The approved LTEMP must be provided to Council within one month for notation of the section 10.7 certificate for the site.	The Auditor assumes the LTEMP will be provided to Council within the required time.
E34. Upon completion of remediation works, the Applicant must manage the site in accordance with the LTEMP.	The Applicant has committed to manage the site in accordance with the LTEMP, as documented in the LTEMP. This is an enforceable requirement under the EP&A Act.
Part F Post Occupation	
Long Term Environmental Management Plan F7. Upon completion of remediation works, the Applicant must manage the site in accordance with the LTEMP approved under condition E32, or an updated version where approved by a NSW EPA Accredited Site Auditor. Any revisions must be submitted to Council within one month of the update.	These provisions are incorporated in the LTEMP, and the Auditor assumes will be undertaken.
Appendix 1 Advisory Notes	
Handling of Asbestos AN10. The Applicant must consult with SafeWork NSW concerning the handling of any asbestos waste that may be encountered during construction. The requirements of the Protection of the Environment Operations (Waste) Regulation 2014 with particular reference to Part 7 – 'Transportation and management of asbestos waste' must also be complied with.	Based on DP 2021a and information provided to the Auditor by Built, asbestos removal and disposal works associated with the remediation were carried out by an appropriately licensed contractor in accordance with SafeWork NSW and NSW EPA regulatory requirements.

Auditor's Opinion: Based on information provided and reviewed as part of this Site Audit, the Auditor considers that licence and notification requirements, including the relevant conditions of consent, have been met or (for future / ongoing requirements) can reasonably be expected to be met.

16. Auditor's conclusions

16.1 Context of conclusions

These conclusions present a summary of the Auditor's review, to briefly present the basis for conclusions as to whether the site is suitable for the proposed development as an educational establishment (University Campus). The conclusions should be read in the context of the more detailed review and opinions presented in the preceding sections of this Audit Report, and the purpose and limitations of the Report discussed in **Section 18.**

16.2 Summary of investigations and assessment

16.2.1 Extent of investigations

The site which has been subject to investigations and this site audit comprises an area of approximately 4,880 m^2 and comprises Lot 1 DP 1199904 with the exclusion of an easement identified as "Easement C" on the western boundary of Lot 1 DP 1199904. A State Significant Development Application (SSD-9787) has been submitted to develop the former Newcastle Courthouse into a new university campus. The subject site is shown on DP Drawing 1 included in **Appendix A**.

A preliminary environmental site assessment was undertaken by Coffey in 2012 in which the desktop review identified that the site had been under government control for over 100 years and the Court House was constructed in 1890. The site was assessed as having a low to medium likelihood for soil contamination with potential contamination relating to weathering and/or maintenance/demolition of hazardous building materials, potential use of fill and potential use of pesticides and insecticides.

A detailed site investigation was undertaken by Prensa in 2016 in which ten boreholes were advanced to depths between 0.3 and 3.3 mbgl for collection of soil samples for assessment of contamination and field screening for volatile organic compounds.

As documented by DP in their detailed site investigation (DSI) (DP 2020b), a vapour risk assessment at the Police Station adjacent the site was undertaken by WSP Australia in 2017 following a UST inspection at the Police Station, which involved soil sampling via hand auguring at four locations around the perimeter of the UST and vapour sampling from four sub-slab active soil vapour ports.

Following these investigations, DP undertook a geotechnical and mine subsidence investigation and further detailed site investigations in 2020. The DSI comprised pre-demolition drilling of three boreholes and installation of groundwater monitoring wells in each, preliminary monitoring of ground gases within geotechnical and environmental boreholes and across the site, excavation of nine test pits post-demolition to assess fill / soil conditions across the site and inspection and sampling of one stockpile post demolition. The investigation was undertaken to target data gaps from pre-demolition conditions.

The Auditor considers that overall the investigations were sufficient to determine the nature and degree of soil and groundwater contamination at the site and to define relevant remediation or management requirements for the proposed development.

16.2.2 Key findings

The Prensa DSI in 2016 identified fill material across the site to depths generally ranging from surface to 1.2 mbgl. Concentrations of benzo(a)pyrene Toxicity Equivalent Quotient (TEQ), TRH and lead in soil were found to exceed the adopted assessment criteria for high density residential land use. Prensa recommended that, should the site be redeveloped for a more sensitive land use, such as high density residential, further assessment, management and / or remediation of fill across the site should be undertaken.

The vapour risk assessment undertaken by WSP in 2017 identified that the UST at the adjacent Police Station, previously containing diesel, had been decommissioned in situ in August 2017. The results of the risk assessment concluded that the risk to workers at the site, through vapour intrusion and inhalation, was low and acceptable. Review of the WSP 2017 report was included in DP 2020b. Further assessment was recommended by DP to

assess impacts from possible migration of contaminants from the identified potential sources of contamination along the eastern site boundary with the Police Station site (subsequently completed by DP, as noted below).

The DSI (DP 2020b) identified widespread fill materials across the site to depths up to 3.3 m. Fill materials across the site were identified to contain a range of anthropogenic materials including building materials (with bonded asbestos containing materials) and some ash, slag and asphalt.

An assessment of hazardous ground gases indicated the general absence of hazardous ground gas or volatile organic compounds during drilling, following well installation and within existing buildings / basements (including sumps / drains). Minor hydrocarbon odours were observed within some boreholes, however laboratory testing in soils and groundwater indicated the absence of VOCs.

Groundwater assessment within the eastern portion of the site indicated the general absence of adverse impacts associated with the adjacent decommissioned fuel infrastructure.

The soil investigation identified bonded ACM impacts within filling across the site above the adopted site assessment criteria. However, statistical analysis of the PAH, heavy metal and TRH impacts indicated that remediation for these contaminants was not warranted. It was also considered that the contaminated fill / soil materials identified on site are unlikely to be having a significant adverse impact on the groundwater quality and down-gradient receiving water quality given the nature of the contaminants, distribution across the site and depth and nature of the groundwater identified on site.

DP concluded that development of the site would require remediation and management of bonded asbestos impacted soil/fill. The site was considered to be suitable for the proposed educational development, subject to appropriate remediation / management of contamination and regulatory approvals

16.2.3 Remediation or management requirements

Remediation or management was required at the site due to the widespread distribution of filling across the site containing building rubble and ACM. As such, capping of the entire site was required as a precautionary measure in the absence of detailed asbestos assessment and validation. The remediation approach adopted by DP in accordance with the Remedial Action Plan (RAP) (DP 2020c) was:

– Off-site disposal of bonded asbestos impacted soils from the upper fill profile where required as part of earthworks construction (i.e. excess soils not able to be reused on-site) following appropriate waste classification;
– On-site management (capping) of bonded asbestos impacted soils.

Validation of the remediation and management works was documented in the Validation Report (DP 2021a), which concluded that based on the results of inspections, survey and observations during site remediation and validation, together with information provided by Built as presented in the Validation Report, the potentially contaminated materials within the investigation area (the site) have been appropriately remediated / managed with reference to the RAP (DP, 2020c), and the development is considered to be suitable for the university campus development with respect to site contamination, on the provision that a long-term site management plan (SMP) is implemented.

The contaminated fill material was capped with concrete over a plastic marker, or clean imported soil over an orange geofabric marker layer (in landscaped areas). DP reported that survey information confirms appropriate capping has generally been achieved as required by the RAP, with the minor exception of the two landscape areas to the north and south of the Atrium. The landscape architect has subsequently confirmed the depths of soil are sufficient for the landscaping requirements.

Remaining contamination at the site is to be managed through the Long-term Environmental Management Plan (LTEMP) prepared by DP (2021b). The LTEMP requirements, as per the EPA 2017 guidelines are summarised as follows:

– The purpose of the LTEMP is to provide awareness of the contamination managed on site and prevent and manage breaching of the cap. The LTEMP promotes awareness of the contamination management and the requirements to avoid disturbance (where possible) and provides an outline of maintenance requirements.
– Description and nature of residual contamination at the site is as discussed in **Section 16.2.2** above.

– The LTEMP is legally required to be implemented under the Environmental Planning and Assessment Act 1979 (the 'EP&A Act'), by way of Conditions E34 (Prior to issue of an Occupation Certificate of Commencement of Operation) and F7 (Post Occupation) of the Development Consent (SSD 9787).
– Appropriate public notification of the LTEMP is available by incorporating the LTEMP into the Nihon University overall property management plans/procedures. In addition, the requirement for ongoing site management must be noted on the Section 10.7 certificate for the site.

The LTEMP states that long-term management of contaminated soils located within capping across the site will be achieved by maintaining the cap. This will confirm that the site remains suitable for use as a university campus.

Management actions required under the LTEMP are summarised as follows:

– The site management will be responsible for implementation of the LTEMP and for notifying all personnel whose activities may impact on managed areas under building slabs, concrete pavements or capped landscaped areas. All designated personnel must read and understand the provisions of the LTEMP.
– Regular inspections should be conducted within the site to confirm the integrity of capping. Capping should be repaired as soon as possible if damaged.
– Any activities which require excavation/disturbance of greater than the thickness of capping shown on the Geosurv Asbuilt Remediation Layers Plan (191196-AB-R-01 (E) dated 02.09.2021) or which have the potential to penetrate the capping and marker layers (i.e. excavations, repairs or installation of additional services), must be conducted in the manner described within Section 5.3 of the LTEMP.
– The LTEMP should be regularly reviewed to confirm its suitability for continued use. The LTEMP should be revised/updated should its provisions not cover site activities adequately. Any revisions to the LTEMP must be submitted to Council within one month of the update. Any revisions of the LTEMP that decrease the level of site management will require the approval of a NSW EPA accredited site auditor or the NSW EPA.
– Records of implementation and review of the LTEMP and submission of revised versions to Council should be maintained together with the LTEMP.

16.3 Findings of Review

As noted in **Section 1.2,** the primary purpose of this Statutory Site Audit is to determine whether the land is suitable for the specified use (educational establishment). The Site Audit has also considered the nature and extent of any contamination of the land, the appropriateness of the remediation plan, if the land can be made suitable for its proposed use if the site is remediated or managed in accordance with a specified plan, and the appropriateness of a long term management plan.

On the basis of the information presented in the reports reviewed, inspections of the site by the Auditor, and in the context of current EPA made or endorsed guidelines and regulations, the Auditor considers the site is suitable for the proposed land use as an educational facility (which includes a residential building), subject to the management requirements within the LTEMP (DP 2021b).

The Auditor notes that while significant quantities of fill were removed from the site as part of the development works, not all fill or contaminated materials were removed. Previous investigations indicate contaminants presenting a potential risk to health or the environment are limited to ACM, which has not been quantified but is expected to exceed health-screening levels in some parts of the site. The material has been capped as described in the LTEMP and should not be subject to exposure during normal use of the site. Risk can be managed by the procedures described in the LTEMP if material below the capping is required to be disturbed.

The Auditor considers that minor revisions to the LTEMP to keep it current or improve management are consistent with the requirements of the approved LTEMP, and do not require Auditor review, however updates should still be provided to Council as required by Condition F7 of SSD 9787. As noted above, any revisions of the LTEMP that decrease the level of site management will require the approval of a NSW EPA accredited site auditor or the NSW EPA.

Due to the presence of asbestos-containing materials at the site (while managed under the provisions of the LTEMP), an asbestos register and asbestos management plan must be maintained in accordance with Work Health Safety (WHS) regulatory requirements.

17. References

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ADE (2020b), Waste Analysis & Classification Report, 9 Church Street, Newcastle NSW, DRD-87-17407 / WAC2 / v1 final, ADE Consulting Pty Ltd, 30 March 2020

ADE (2020c), Recovered Aggregate Report, 9 Church Street, Newcastle NSW, DRD-87-17407 / WAC3 / v1f, ADE Consulting Pty Ltd, 13 May 2020

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DP (2020a), *Detailed Site Investigation, Pre-Demolition, Proposed Nihon University, 9 Church Street, Newcastle,* Douglas Partners Pty Ltd, 3 March 2020

DP (2020b), *Detailed Site Investigation, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, Rev 2, 23 April 2020

DP (2020c), *Remediation Action Plan, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, Rev 1, 23 April 2020

DP (2020d), *Long Term Site Management Plan, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 26 March 2020

DP (2020e), *Report on Geotechnical Investigation, Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, Rev 1, 2020

DP (2020f), *Report on Mine Subsidence Investigation, Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, Rev 0, 2020

DP (2020g), *Stormwater Easement Management Strategy, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 6 July 2020.

DP (2021a), *Report on Validation of Remediation, Nihon University, 9 Church Street, Newcastle,* Douglas Partners Pty Ltd, 15 September 2021

DP (2021b), *Long-term Environmental Management Plan, Nihon University, 9 Church Street, Newcastle,* Douglas Partners Pty Ltd, 10 September 2021

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EPA (2020a), *Consultants reporting on contaminated land, Contaminated land guidelines*, NSW EPA, 2020.

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NEPC (2013), *National Environment Protection (Assessment of Site Contamination) Measure 1999*, as amended by the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1), National Environment Protection Council, May 2013.

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Prensa (2016), *Detailed Site Investigation, 9 Church St, Newcastle, NSW, 2300*, Prensa Pty Ltd, October 2016.

WA DoH (2009), *Guidelines for the Assessment, Remediation and Management of Asbestos – Contaminated Sites in Western Australia*, Western Australia Department of Health, 2009.

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18. Purpose and Limitations of the Report

This Site Audit Report ("Report") and accompanying Site Audit Statement have been prepared in accordance with relevant provisions of Part 4 of the *Contaminated Land Management Act 1997* (CLM Act). The purpose of this Site Audit is to certify whether the land is suitable for the proposed land use, being an educational establishment (University Campus).

This Report:

– Has been prepared by Ian Gregson and his support team as indicated in the appropriate sections of this Report ("GHD") for DWP Australia Pty Ltd (DWP)
– May be used and relied on by DWP
– May be used by and provided to the EPA and the relevant planning authority for the purpose of meeting obligations in accordance with the relevant sections of the CLM Act 1997 or the Environment Planning and Assessment (EP&A) Act 1979.
– May be provided to other third parties but such third parties' use of or reliance on the Report is at their sole risk, as this Report must not be relied on by any person other than those listed in 1-3 above without the prior written consent of GHD
– May only be used for the purpose as stated in **Section 1.2** of the Report (and must not be used for any other purpose).

GHD and its servants, employees and officers (including the Auditor) otherwise expressly disclaim responsibility to any person other than DWP arising from or in connection with this Report.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Report are excluded unless they are expressly stated to apply in this Report.

The services undertaken by the Auditor, his team and GHD in connection with preparing this Report were undertaken in accordance with current profession practice and by reference to relevant guidelines made or approved by the EPA under Section 105 of the CLM Act 1997.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by the Auditor, his team and GHD when undertaking services and preparing the Report ("Assumptions"), as specified throughout this Report.

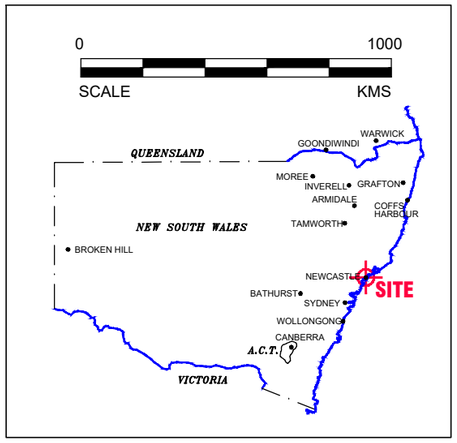
GHD and the Auditor expressly disclaim responsibility for any error in, or omission from, this Report arising from or in connection with any of the Assumptions being incorrect.

Subject to the paragraphs in this section of the Report, the opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of preparation of this Report and are relevant until such times as the site conditions or relevant legislations changes, at which time, GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with those opinions, conclusions and any recommendations.

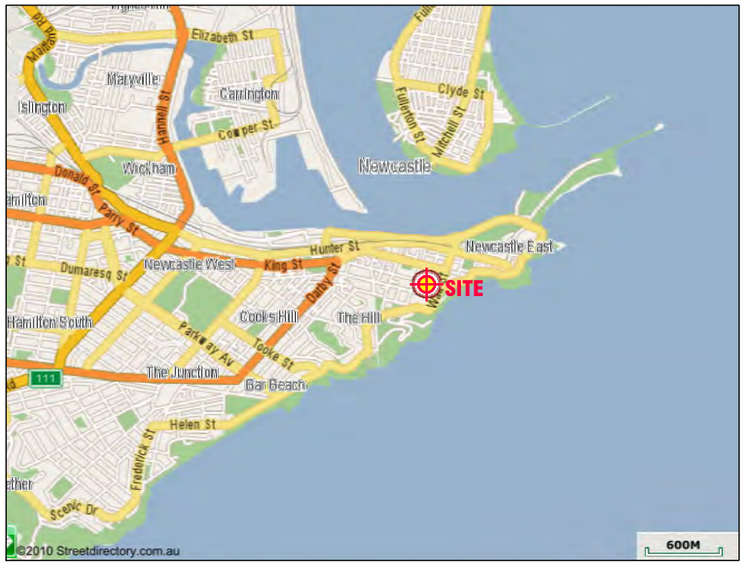
Appendices

Appendix A

Figures



GENERAL AREA MAP



REGIONAL AREA MAP

Aerial image source: Google Earth Pro 2012
Aerial image ©: Sinclair Knight Merz 2012

revision	description	drawn	approved	date

0 50 100 150 200 250
SCALE 1:5000 (A3) METRES

drawn	CGT
approved	JM
date	14.06.2012
scale	AS SHOWN
original size	

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

client: NSW DEPARTMENT OF ATTORNEY GENERAL AND JUSTICE

project: STAGE 1 ENVIRONMENTAL SITE ASSESSMENT - NEWCASTLE COURTHOUSE, AND FORMER NEWCASTLE EAST PUBLIC SCHOOL, NEWCASTLE, NSW

title: SITE LOCALITY PLAN

job no: ENAUWARA04292AA-D01

figure no: FIGURE 1

prensa

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Client:
GOVERNMENT PROPERTY NSW

Project:
DETAILED SITE INVESTIGATION (DSI)

Address:
9 CHURCH ST, NEWCASTLE NSW

Drawing Title:
BOREHOLE LOCATION PLAN

Job No.: 55499 | Client No.: G0038

0 5 10 m

Legend:

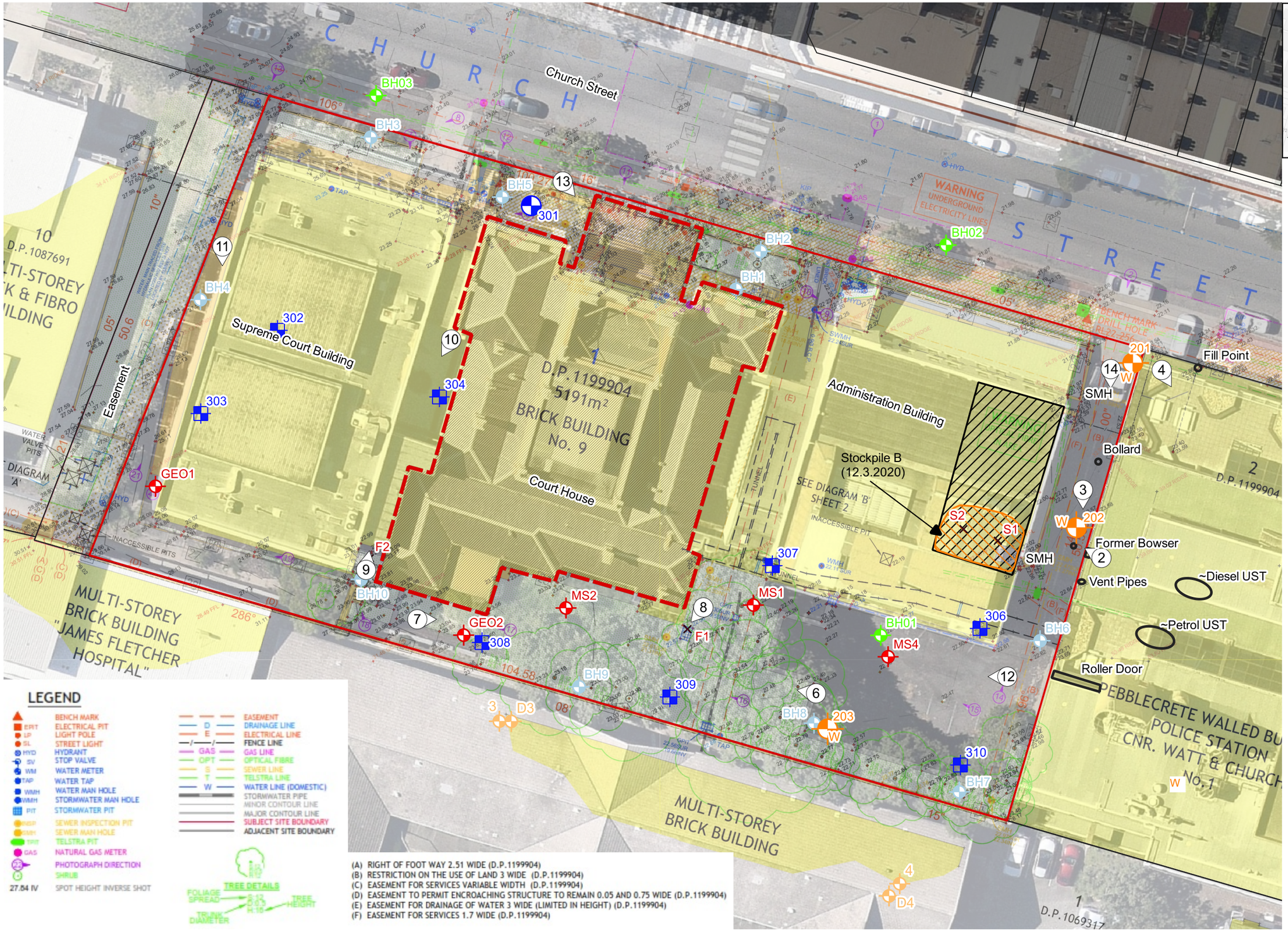
- Property Boundary
- Site Boundary
- Boreholes
- Boreholes (Garden Bed)

Note: All locations are approximate

Image Source: Six Maps
Viewed: 12/08/2016

Drawn by:	Date:	Checked by:	Date:
RBB	07/10/2016	AXP	07/010/2016

File name:	Figure number:	Revision:
55499 Figures	2	A



Drawing adapted from Nearmap Image dated 22.10.2019, plan by ADW Johnson ref 239815-DET-001-A dated 10.09.2018, and plan by Prensa ref 55499 Figures, Figure 2, Rev 1 dated 07.10.2016.

Legend

- Approximate Stockpile Area
- Approximate Excavation Area
- Environmental Pit Location Post-Demolition (DP)
- Environmental Bore Location Post-Demolition (DP)
- Environmental Bore Location Pre-Demolition (DP)
- W Environmental Well Location
- Geotechnical Test Location Pre-Demolition (DP)
- Previous Test Locations (Prensa 2016)
- Previous Test Locations (Cardno 2018)
- Site Boundary
- Proposed Buildings Structures to be Retained
- × Approximate Location of Material Sample Grab Sample
- Approximate Figure & Orientation Location

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Nihon Daigaku Australia Newcastle Pty Ltd	TITLE:	**Test Location Plan** **Proposed Nihon University** **9 Church Street, Newcastle**
OFFICE:	Newcastle	DRAWN BY:	PLH
SCALE:	1:400 @ A3	DATE:	18.March.2020

N

PROJECT No:	91667.02
DRAWING No:	1
REVISION:	2

239815-DET-001-A

DIAL1100
BEFORE YOU DIG

C H U R C H

S T R E E T

WARNING
UNDERGROUND
ELECTRICITY LINES

WARNING
OPTICAL FIBRE
IN AREA

BENCH MARK
DRILL HOLE
RL22.256

N

adw johnson

10
D.P.1087691
MULTI-STOREY
BRICK & FIBRO
BUILDING

1
D.P.1199904
5191m²
BRICK BUILDING
No. 9

2
D.P.1199904

SEE DIAGRAM 'B'
SHEET 2

INACCESSIBLE PIT

TUNNEL

WATER
VALVE
PITS

SEE DIAGRAM
'A'

INACCESSIBLE PITS

106°

16'

100.27

05'

00"

14'

50.565

50.6

10"

21°07'
0.38

286°

104.58

08'

15'

196°

MULTI-STOREY
BRICK BUILDING
"JAMES FLETCHER
HOSPITAL"

MULTI-STOREY
BRICK BUILDING

PEBBLECRETE WALLED BUILDING
POLICE STATION
CNR. WATT & CHURCH
No.1

1
D.P.1069317

BRICK

LEGEND

BENCH MARK	EASEMENT
EPIT ELECTRICAL PIT	D DRAINAGE LINE
LP LIGHT POLE	E ELECTRICAL LINE
SL STREET LIGHT	FENCE LINE
HYD HYDRANT	GAS GAS LINE
SV STOP VALVE	OPT OPTICAL FIBRE
WM WATER METER	S SEWER LINE
TAP WATER TAP	T TELSTRA LINE
WMH WATER MAN HOLE	W WATER LINE (DOMESTIC)
SWMH STORMWATER MAN HOLE	STORMWATER PIPE
PIT STORMWATER PIT	MINOR CONTOUR LINE
INSP SEWER INSPECTION PIT	MAJOR CONTOUR LINE
SMH SEWER MAN HOLE	SUBJECT SITE BOUNDARY
TPIT TELSTRA PIT	ADJACENT SITE BOUNDARY
GAS NATURAL GAS METER	
22 PHOTOGRAPH DIRECTION	
SHRUB	
27.84 IV SPOT HEIGHT INVERSE SHOT	

TREE DETAILS
FOLIAGE SPREAD S:12
TRUNK DIAMETER D:0.5
TREE HEIGHT H:16

(A) RIGHT OF FOOT WAY 2.51 WIDE (D.P.1199904)
(B) RESTRICTION ON THE USE OF LAND 3 WIDE (D.P.1199904)
(C) EASEMENT FOR SERVICES VARIABLE WIDTH (D.P.1199904)
(D) EASEMENT TO PERMIT ENCROACHING STRUCTURE TO REMAIN 0.05 AND 0.75 WIDE (D.P.1199904)
(E) EASEMENT FOR DRAINAGE OF WATER 3 WIDE (LIMITED IN HEIGHT) (D.P.1199904)
(F) EASEMENT FOR SERVICES 1.7 WIDE (D.P.1199904)

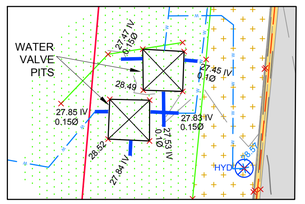


DIAGRAM 'A'
SCALE 1:100

NOTES:-

1. SERVICES HAVE BEEN LOCATED WHERE VISIBLE ONLY. PRIOR TO EXCAVATION OR CONSTRUCTION ALL SERVICES ARE TO BE LOCATED BY THE RELEVANT AUTHORITY.
2. SPOT LEVELS AND CONTOURS SHOWN HEREON ARE FOR DESIGN PURPOSES ONLY AND ARE TO BE CONFIRMED ON SITE PRIOR TO ANY EXCAVATION OR CONSTRUCTION.
3. THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF DETAIL SURVEY AND SHOULD NOT BE USED FOR ANYTHING OTHER THAN THAT PURPOSE.

ver.	date	comment	surveyed	drawn	checked	pm
A	10.09.18	INITIAL ISSUE	CD	LB/MC	CD	TC

co-ordinate information
CO-ORDINATE SYSTEM: MGA 56
ORIGIN OF CO-ORDINATES: P.M. 19805
DATE OF SURVEY 30.08.18

level information
DATUM: AHD
ORIGIN OF LEVELS: P.M. 190805
CONTOUR INTERVAL: 0.5

scale (A1 original size)
0 5.0 10.0m
SCALE: 1:200 (FULL)

page
1 OF 2

drawing title:
Detail Survey of
Lot 1 D.P. 1199904

location: 9 Church Street, Newcastle
council: Newcastle
dwg ref: 239815-DET-001-A
client: AZUSA SEKKEI CO LTD

adw johnson
central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
sydney office ph: (02) 8046 7411
www.adwjohnson.com.au

working beyond expectations

Plotted By: Anthony Morgan Plot Date: 10/09/18 3:25:01 PM Cad File: N:\239815\DWG'S\SURVEY\239815-DET-001-A.DWG
This plan includes coloured information. If you have a black and white copy you do not have all of the information. This note is coloured RED.

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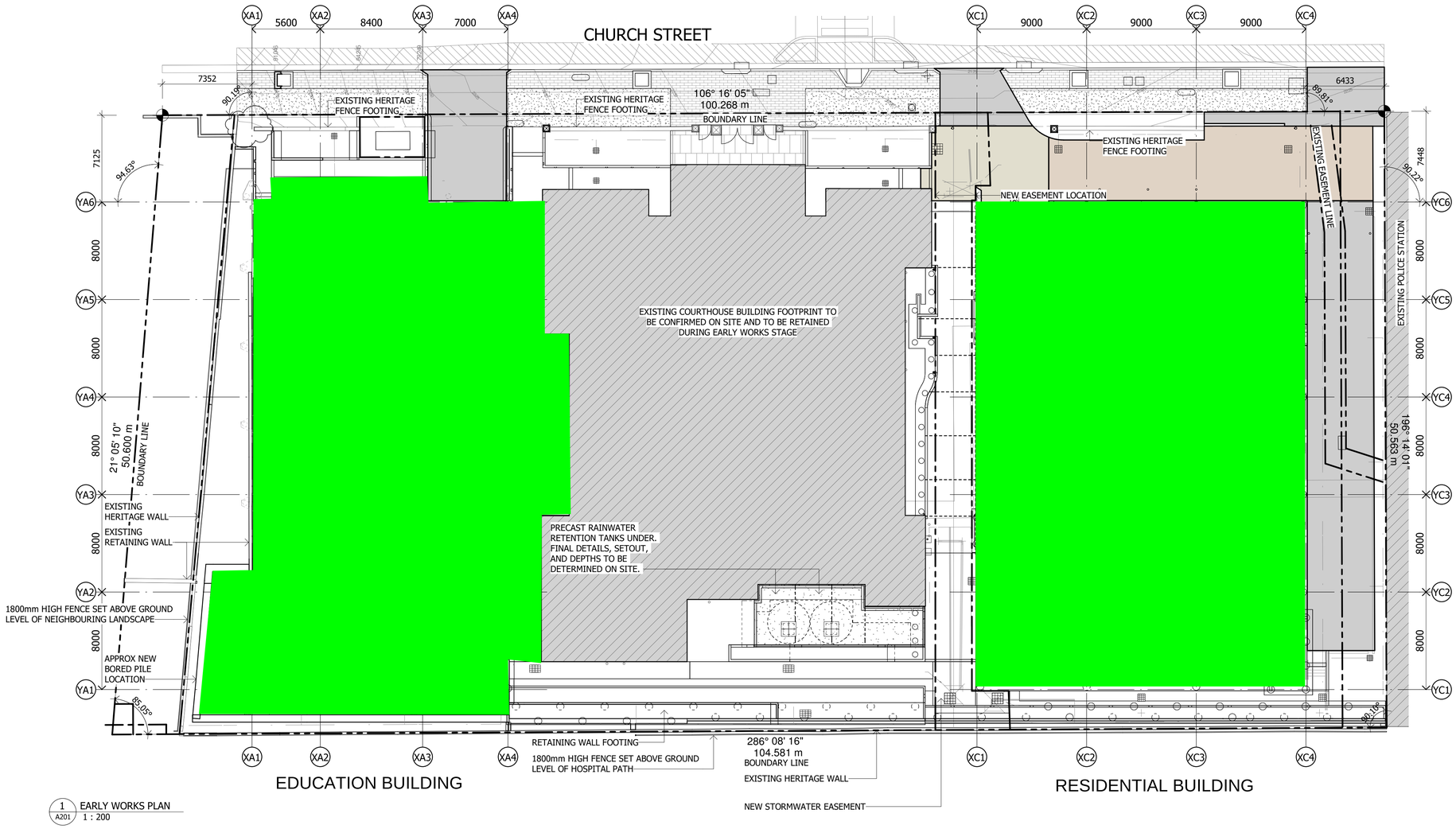
CRUSHED AGGREGATE MATERIAL (REFER TO ADE REPORTS DRD-87-17407/WAC2 & WAC3) RE-USED ONSITE AS FILL BENEATH BUILDING CONCRETE SLABS ON GROUND (CAPPED)



1 / A201 EARLY WORKS PLAN
1 : 200

NOTE: REFER TO SHEETS A022-A024 FOR RETAINING WALL DIMENSIONS AND TOP OF WALL HEIGHTS.

Notes

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David Rose Nominated Architect NSW ARB 4882

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FOR USE DURING CONSTRUCTION

Issue	Description	Date	Chk	Auth
15	DRAWINGS REVISED	16.07.21	EC	CB
14	DRAWINGS REVISED	25.09.20	EC	CB
13	DRAWINGS REVISED	11.09.20	EC	CB
12	DRAWING REVISED	31.07.20	EC	CB
11	DRAWING REVISED	17.07.20	EC	CB
10	ISSUED FOR CONSTRUCTION PURPOSES	13.05.20	DH	JG
9	ISSUE FOR COORDINATION	24.04.20	DH	CB
8	ISSUE FOR COORDINATION	16.04.20	DH	JG
7	ISSUE FOR COORDINATION	05.03.20	KD	BW
6	ISSUE FOR COORDINATION	04.03.20	EC	BW
5	ISSUE FOR COORDINATION	27.02.20	KD	BW
4	ISSUE FOR COORDINATION	14.02.20	EC	BW
3	ISSUE FOR CONSTRUCTION	12.02.20	KD	BW
2	ISSUE FOR COORDINATION	30.01.20	KD	JG

Architect/ Designer
dwp
www.dwp.com

Client / Project Architect
Azusa Sekkei Co Ltd
AZUSA SEKKEI Architects, Engineers & Consultants

Project
NEWCASTLE COURTHOUSE

Location
1 Church St
Newcastle, NSW, 2300

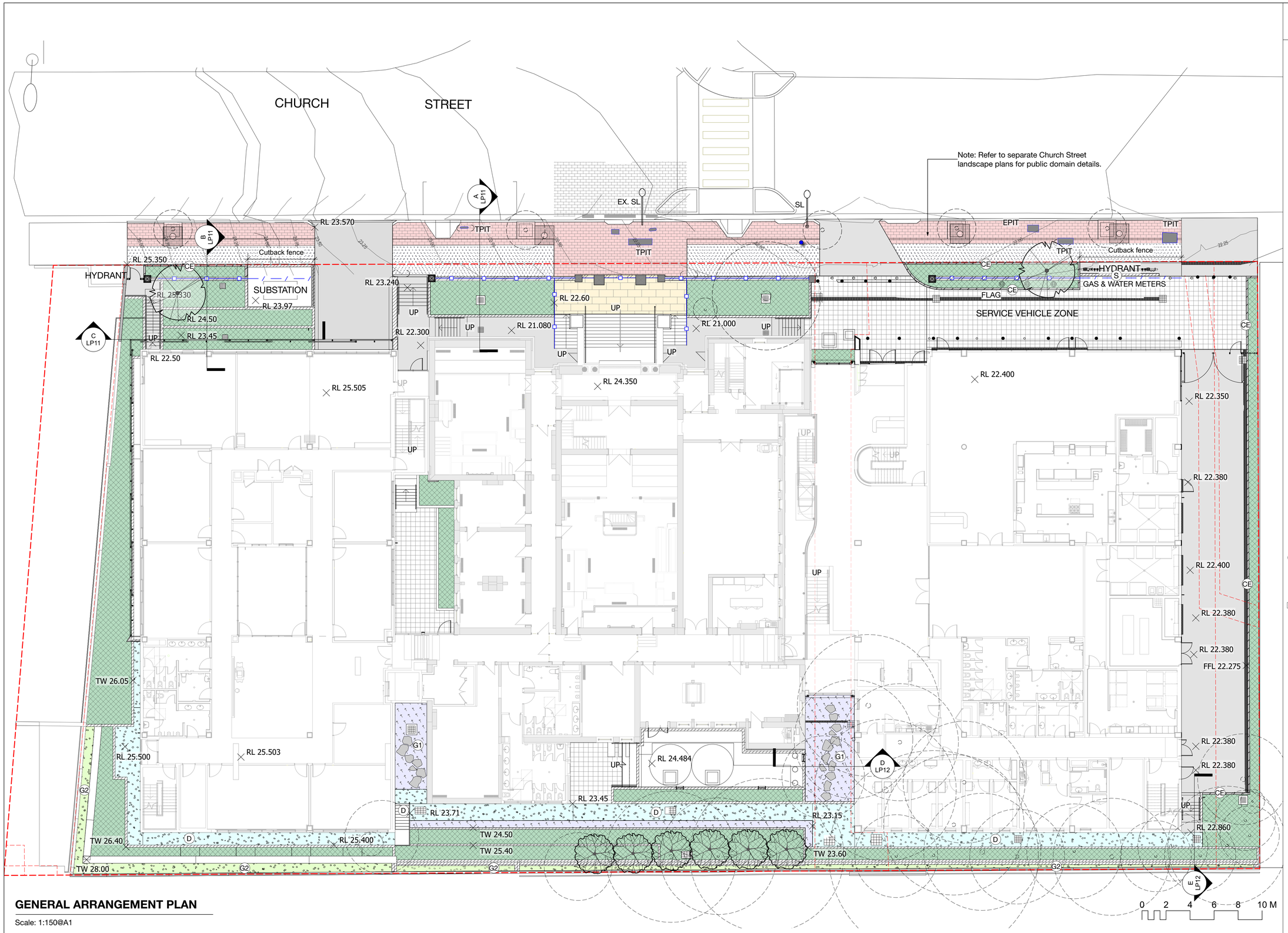
Project Number
17-0347

Drawing
EARLY WORKS + PIER LOCATION

Scale (A1) 1 : 200
Date Printed 7/16/2021 11:09:54 AM

Drawing Number A020
Issue 15

File Name: BIM 360://17-0347_Newcastle Courthouse/17-0347_NEWCASTLE COURTHOUSE_CENTRAL_R2019.rvt



GENERAL ARRANGEMENT PLAN

Scale: 1:150@A1

LEGEND

- Lot boundary
- Easement line
- 22.25 Proposed level refer to Engineer's detail
- Existing heritage fence & sandstone footing to be retained
- Existing heritage fence & sandstone footing to be cut
- Heritage brick paving refer to 6/LP14
- Bluestone paving refer to 4/LP14
- Concrete paving refer to Engineer's detail. Colour: Natural.
- Asphalt paving refer to Engineer's detail
- Pavement refer to Architect's detail
- D Decomposed granite - refer to 3/LP14
- G1 White crushed gravel -refer to specification
- G2 Blue metal -refer to specification
- Random stepping stones -refer to 1/LP14
- CE Concrete edge refer to Engineer's detail
- S Signage wall by Architect
- Existing plinth to be retained
- Proposed removable bollards
- FLAG Proposed flag pole
- SL New street light refer to Engineer's detail
- EX. SL Existing street light to be retained
- Existing sandstone pillar to be retained & relocated
- EPIT Existing electrical pit
- TPIT Existing Telstra pit
- Tactile ground surface indicator Colour: Black
- Drainage refer to Engineers detail.
- Stormwater pit refer to Engineers detail.
- Existing trees to be removed
- Landscape planting - refer to Detail Planting Plan
- New tree pit - refer to 4/LP13

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www.moirlandscapearchitecture.com.au

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2. VERIFY ALL DIMENSIONS ON SITE.
3. TO BE READ IN CONJUNCTION WITH THE SPECIFICATION.
4. READ IN CONJUNCTION WITH ALL ARCHITECTURAL, CIVIL, STRUCTURAL, HYDRAULIC, MECHANICAL AND ELECTRICAL ENGINEER'S DRAWINGS AND SPECIFICATIONS.
5. CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO EXCAVATION.
6. DRAWINGS TO BE PRINTED IN COLOUR ONLY

Architect: AZUSA SEKKEI Architects, Engineers & Consultants; dwp

Engineer: Cardno Shaping the Future

No.	Date	REVISION	By
M	21/5/21	FOR CONSTRUCTION	AL

North

Status: FOR CONSTRUCTION

NIHON UNIVERSITY AUSTRALIA
NEWCASTLE CAMPUS
9 CHURCH STREET, NEWCASTLE

NIHON UNIVERSITY

GENERAL ARRANGEMENT PLAN

SCALE: 1:150@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. 1691

Drawing No. LP02 Rev M

CHURCH STREET

Type 2 Civil Pavement/Asphalt detail - refer to Cardno Drawing CI-551

Note: Refer to separate Church Street landscape plans for public domain details.

Type 4 Civil Pavement detail (typical for concrete pavement) - refer to Cardno drawing CI-551.

Type 3 Civil Pavement - refer to Cardno Drawing CI-551

GAS & WATER METERS

FLAG

EX. SL

SL

EPIT

TPIT

Cutback fence

RL 25.350
RL 25.330
RL 24.50
RL 23.97
RL 23.570
RL 23.240
RL 22.60
RL 22.300
RL 21.080
RL 21.000
RL 22.50
RL 25.505
RL 24.350
RL 22.400
RL 22.350
RL 22.380
RL 22.400
RL 22.380
RL 22.380
FFL 22.275
RL 22.380
RL 22.380
RL 22.860
TW 26.05
RL 25.500
RL 25.503
RL 24.484
RL 23.45
RL 23.71
TW 24.50
TW 25.40
TW 23.60
TW 26.40
RL 25.400
TW 28.00

A LP11 · B LP11 · C LP11 · D LP11 · E LP12

1 LP14 · 2 LP13 · 3 LP14 · 4 LP14 · 5 LP13 · 7 LP14 · D LP12 · 1 LP13 · 3 LP13 · 5 LP13

0 2 4 6 8 10 M

GENERAL ARRANGEMENT PLAN

Scale: 1:150@A1

LEGEND

- Lot boundary
- Easement line
- 22.25 Proposed level refer to Engineer's detail
- Existing heritage fence & sandstone footing to be retained
- Existing heritage fence & sandstone footing to be cut
- Heritage brick paving refer to 6/LP14
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- Concrete paving refer to Engineer's detail. Colour: Natural.
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- D Decomposed granite - refer to 3/LP14
- G1 White crushed gravel -refer to specification
- G2 Blue metal -refer to specification
- Random stepping stones -refer to 1/LP14
- CE Concrete edge refer to Engineer's detail
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- Existing plinth to be retained
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- EPIT Existing electrical pit
- TPIT Existing Telstra pit
- Tactile ground surface indicator Colour: Black
- Drainage refer to Engineers detail.
- Stormwater pit refer to Engineers detail.
- Existing trees to be removed
- Landscape planting - refer to Detail Planting Plan
- New tree pit - refer to 4/LP13

- Landscape and paved areas with concrete capping and plastic marker below
- Landscape and paved areas with orange geofabric marker and minimum 300mm clean fill above

M

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5. CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO EXCAVATION.
6. DRAWINGS TO BE PRINTED IN COLOUR ONLY

Architect: AZUSA SEKKEI Architects, Engineers & Consultants · dwp

Engineer: Cardno Shaping the Future

No.	Date	REVISION	By
M	21/5/21	FOR CONSTRUCTION	AL

North

Status
FOR CONSTRUCTION
NIHON UNIVERSITY AUSTRALIA
NEWCASTLE CAMPUS
9 CHURCH STREET, NEWCASTLE

NIHON UNIVERSITY

REMEDIATION ACTION PLAN

SCALE: 1:150@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. 1691

Drawing No. LP17 M Rev

Min Depth = 237mm
Max Depth = 539mm
Avg Depth = 400mm

Min Depth = 396mm
Max Depth = 396mm
Avg Depth = 396mm

Concrete Capping
200mm thick

Concrete Capping
150mm thick

Asphalt Capping Avg.
382mm Depth

Min Depth = 480mm
Max Depth = 735mm
Avg Depth = 610mm

Concrete Capping
150mm thick

Asphalt Capping
Avg. 219mm Depth

Min Depth = 414mm
Max Depth = 603mm
Avg Depth = 515mm

Concrete Capping
150mm thick

Concrete Capping
125mm thick

Min Depth = 688mm
Max Depth = 803mm
Avg Depth = 726mm

Min Depth = 1002mm
Max Depth = 1729mm
Avg Depth = 1439mm

Concrete Cap 250mm thick

Concrete Capping
125mm thick

Min Depth = 191mm
Max Depth = 317mm
Avg Depth = 274mm

Education Building
Concrete Capping 125mm
thick

Concrete Capping
300mm thick

Concrete Capping
125mm thick

Concrete Capping
300mm thick

Concrete Capping
125mm thick

Concrete Capping
125mm thick

Courthouse Terrace
Concrete Capping
200mm thick

Concrete Capping
600mm thick

Concrete Capping
500mm thick

Concrete Capping
500mm thick

Min Depth = 302mm
Max Depth = 594mm
Avg Depth = 424mm

Min Depth = 193mm
Max Depth = 325mm
Avg Depth = 275mm

ADJOINS PAGE 1
ADJOINS PAGE 2

RL 23.570
RL 23.240
RL 22.60
RL 22.330
RL 21.080
RL 21.000
RL 23.45
RL 22.50
RL 25.505
RL 24.350
RL 25.500
RL 25.503
RL 23.71
RL 25.400
RL 23.15
TW 26.05
TW 26.40
TW 28.00
TW 24.50
TW 25.40
TW 23.60

NORTH[APPROX]

LEGEND

22.000 GEOFAB

22.000 FINISHED CAPPING/SURFACE LEVEL

22.000 PLASTIC

LANDSCAPE & PAVED AREAS WITH CONCRETE CAPPING & PLASTIC MARKER BELOW

LANDSCAPE & PAVED AREAS WITH ORANGE GEOFABRIC MARKER & NOMINAL CLEAN FILL ABOVE

ASPHALT CAPPED AREA WITH GEOFABRIC MARKER LAYER

GREGORY IRETON GIBSON SURVEY ID 1101
SURVEYOR REGISTERED UNDER THE SURVEYING AND SPATIAL INFORMATION ACT,2002 (NSW)

NOTES:

1. ALL SPOT LEVEL HEIGHTS SHOWN ARE ACCURATE AT TIME OF SURVEY

2. GEOSURV TAKES NO RESPONSIBILITY FOR THE ACCURACY OF THE SPOT LEVELS POST SURVEY DATA

3. THIS SURVEY IS FOR PURPOSE OF REMEDIATION LAYERS SPOT LEVEL AS-BUILT CHECKS ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE

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5.FINISHED CAPPING/SURFACE LEVELS ARE COMBINED POINTS SURVEYED ON PAVING, TILES, CONCRETE CAPPING BEAM, BITUMEN & NATURAL SURFACE AREAS.

PLANS USED:

1691_CC_20210719_AL.dwg

REV.	DATE	AMENDMENTS	INT.
E	02.09.21	HATCHING ADDED & POINT LAYERS COMBINED	GPAP
D	30.08.21	HATCHING & LEGEND UPDATED	GPAP
C	26.08.21	ADDITIONAL DATA & PAGE 2 ADDED	GPAP
B	16.08.21	ADDITIONAL DATA ADDED	GPAP
A	20.07.21	ISSUED FOR INFORMATION	BTP

PREPARED BY:

geosurv. with you from beginning to end

locating surveying 3Dscanning access

www.geosurv.com.au 1300 554 675

PREPARED FOR:

Built.

PLAN OF:

ASBUILT
REMEDIATION LAYERS
NIHON UNIVERSITY NEWCASTLE
9 CHURCH STREET
NEWCASTLE
NSW

ORIGINAL SIZE: A1 Page 1 of 2

SCALE:	1:100	CO-ORD:	SITE
DATUM:	SITE	ORIG DATUM:	PM 19805
SURVEY BY:	SJF	DATE:	VARIOUS
DRAWN BY:	GPAP	DATE:	20.07.21
CHECKED BY:	SJF	DATE:	20.07.21
APPROVED BY:	ADF	DATE:	20.07.21

DRAWING #:

191196-AB-R-01 [E]

Plot Date: 3 September 2021 - 12:00 PM
Cad File No: 191196-AB-R-01 (E).dwg

Asphalt Capping
Avg. 382mm Depth

Min Depth = 480mm
Max Depth = 735mm
Avg Depth = 610mm

Concrete Capping
150mm thick

Asphalt Capping
Avg. 219mm Depth

Min Depth = 414mm
Max Depth = 603mm
Avg Depth = 515mm

Concrete Capping
150mm thick

Min Depth = 249mm
Max Depth = 403mm
Avg Depth = 327mm

Min Depth = 299mm
Max Depth = 502mm
Avg Depth = 421mm

RL 22.60

RL 21.080

RL 21.000

RL 24.350

RL 22.400

RL 22.350

RL 22.380

RL 22.400

Concrete Capping
125mm thick

Concrete Capping
125mm thick

Min Depth = 191mm
Max Depth = 317mm
Avg Depth = 274mm

Concrete Capping
150mm thick

Concrete Capping
300mm thick

ADJOINS PAGE 1
ADJOINS PAGE 2

Residential Building
Concrete Capping
125mm thick

Atrium Area Concrete
Capping 125mm
thick

Concrete Capping
125mm thick

Min Depth = 277mm
Max Depth = 402mm
Avg Depth = 350mm

FFL 22.275

Courthouse Terrace
Concrete Capping
200mm thick

Concrete Capping
300mm thick

Min Depth = 302mm
Max Depth = 594mm
Avg Depth = 424mm

Min Depth = 193mm
Max Depth = 325mm
Avg Depth = 275mm

Atrium Area
Concrete Capping
600mm thick

Concrete Capping
500mm thick

Atrium Area
Concrete Capping
125mm thick

RL 23.71

TW 24.50

TW 25.40

RL 23.15

TW 23.60

Concrete Capping
600mm thick

Concrete Capping
125mm thick

Min Depth = 312mm
Max Depth = 553mm
Avg Depth = 447mm

RL 22.380

NORTH[APPROX]

LEGEND

22.000 GEOFAB

22.000 FINISHED CAPPING/SURFACE LEVEL

22.000 PLASTIC

LANDSCAPE & PAVED AREAS WITH CONCRETE CAPPING & PLASTIC MARKER BELOW

LANDSCAPE & PAVED AREAS WITH ORANGE GEOFABRIC MARKER & NOMINAL CLEAN FILL ABOVE

ASPHALT CAPPED AREA WITH GEOFABRIC MARKER LAYER

GREGORY IRETON GIBSON SURVEY ID 1101
SURVEYOR REGISTERED UNDER THE SURVEYING AND SPATIAL INFORMATION ACT,2002 (NSW)

NOTES:

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3. THIS SURVEY IS FOR PURPOSE OF REMEDIATION LAYERS SPOT LEVEL AS-BUILT CHECKS ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE

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5.FINISHED CAPPING/SURFACE LEVELS ARE COMBINED POINTS SURVEYED ON PAVING, TILES, CONCRETE CAPPING BEAM, BITUMEN & NATURAL SURFACE AREAS.

PLANS USED:

1691_CC_20210719_AL.dwg

REV.	DATE	AMENDMENTS	INT.
E	02.09.21	HATCHING ADDED & POINT LAYERS COMBINED	GPAP
D	30.08.21	HATCHING & LEGEND UPDATED	GPAP
C	26.08.21	ADDITIONAL DATA & PAGE 2 ADDED	GPAP
B	16.08.21	ADDITIONAL DATA ADDED	GPAP
A	20.07.21	ISSUED FOR INFORMATION	BTP

PREPARED BY:

geosurv. with you from beginning to end

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PREPARED FOR:

Built.

PLAN OF:

ASBUILT
REMEDIATION LAYERS
NIHON UNIVERSITY NEWCASTLE
9 CHURCH STREET
NEWCASTLE
NSW

ORIGINAL SIZE: A1 Page 2 of 2

SCALE:	1:100	CO-ORD:	SITE
DATUM:	SITE	ORIG DATUM:	PM 19805
SURVEY BY:	SJF	DATE:	VARIOUS
DRAWN BY:	GPAP	DATE:	20.07.21
CHECKED BY:	SJF	DATE:	20.07.21
APPROVED BY:	ADF	DATE:	20.07.21

DRAWING #:

191196-AB-R-01 [E]

Plot Date: 3 September 2021 - 11:58 AM
Cad File No: 191196-AB-R-01 [E].dwg

Appendix B

Results Tables

Table 10: Results of Chemical Analysis of Soil (Contamination)

Analyte	Units	PQL	NSW EPA 2014 - General Solid Waste CT1 (No TCLP)	NSW EPA 2014 - Restricted Solid Waste CT2 (No TCLP)	CRC Care Direct Contact HSL-B	CRC Care Direct Contact Intrusive Maintenance Worker	CRC Care Intrusive MW Soil HSL Vapour Sand 0-2m	2-4m	>4m	NEPM 2013 Table 1A(1) HILs Res B Soil	NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand 0-1m	1-2m	2-4m	>4m	NEPM 2013 ESLs Res/Open Space Aged	NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil	NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil	Field_ID	201/0.9-1.2	201/7.9	202/4.8	202/7.0	203/0-0.05	203/0.5	203/11-12/19	MS4 / 0.02	MS4 / 0.2	F1	F2	301/0.05	301/0.2	301/0.4	03 - 3-3-20	T2 -3-3-20	301/0.7	302/F1	302/0.3	303/0.2	304/0.2	306/0.5	307/F1	307/F15	307/F2	307/F25	308/0.1	309/0.3	309/15	310/F1	310/0.2	51	52	SS499_BH1	SS499_BH4	SS499_BH5	SS499_BH6	SS499_BH7	SS499_BH8	SS499_BH9	SS499_BH10
																		LocCode	201	201	202	202	203	203	203	MS4	MS4	F1	F2	301	301	301	301	301	301	302	302	303	304	304	306	307	307	307	307	308	309	309	310	310	Stockpile B	Stockpile B	BH1	BH4	BH5	BH6	BH7	BH8	BH9	BH10
																		Fill (F) / Natural (N)	F	N	N	N	Asphalt	N	N	Asphalt	F	Material	Material	F	F	F	F	F	F	N	F	F	F	F	N	F	F	F	F	F	F	N	F	N	F	F	F	F	F	F	F	F
																		Sample	0.9-1.2	7.9	4.8	7	0-0.05	0.5	0.5	0.02	0.2	Surface	Surface	0.05	0.2	0.4	0.4	0.4	0.7	0.5	0.3	0.2	0.2	0.5					0.1	0.3	0.5	0.05	0.2			0.3	0.5	0.1	0.1	0.1	0.6	0.4	
																		Depth																																							
																		Sample Date	12/12/2019	12/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	19/11/2019	19/11/2019	22/11/2019	22/11/2019	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	12/03/2020	12/03/2020	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016
[Coal Tar Identification	-																		-	-	-	-	ND	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																																																										
Aluminium	mg/kg	10																	5000	7000	9000	8900	-	7000	6400	-	-	-	-	5000	5400	3300	2700	3320	1400	-	3400	11000	2600	18000	-	-	-	-	-	5700	5800	9500	-	9400	10000	6600	-	-	-	-	-	-	-	-
Antimony	mg/kg	7																	<7	<7	<7	<7	-	<7	<7	-	-	-	-	<7	<7	<7	<7	<5	<7	-	<7	<7	<7	<7	-	-	-	-	-	<7	<7	<7	-	<7	<7	<7	-	-	-	-	-	-	-	-
Arsenic	mg/kg	4	100	400						500					100				<4	5	10	<4	-	<4	<4	-	-	-	-	<4	<4	<4	<4	<5	<4	-	<4	5	<4	10	-	-	-	-	-	<4	7	6	-	5	8	5	5	<4	7	<4	<4	<4	4	5
Boron	mg/kg	3								40000									<5	<3	<3	<3	-	<3	<3	-	-	-	-	5	<3	<3	<3	<50	<3	-	<3	<3	<3	<3	-	-	-	-	-	4	<3	4	-	<3	<3	<3	-	-	-	-	-	-	-	-
Cadmium	mg/kg	0.4	20	80						150									<0.4	<0.4	<0.4	<0.4	-	<0.4	2	-	-	-	-	1	1	<0.4	<0.4	<1	<0.4	-	<0.4	<0.4	<0.4	<0.4	-	-	-	-	-	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	-	-	-	-	-	-	-	-
Chromium (III+VI)	mg/kg	1	100	400						500					190				4	9	12	11	-	7	10	-	-	-	-	21	15	7	5	7	2	-	4	12	4	23	-	-	-	-	-	11	9	12	-	15	11	7	9	9	27	10	17	18	9	22
Cobalt	mg/kg	1								600									1	4	<1	2	-	1	3	-	-	-	-	4	5	1	1	<2	<1	-	2	2	2	<1	-	-	-	-	-	3	11	15	-	<1	2	<1	-	-	-	-	-	-	-	-
Copper	mg/kg	1								30000					55				7	17	27	41	-	29	46	-	23	-	-	170	140	26	16	26	8	-	15	32	15	3	-	-	-	-	-	30	18	360	-	<1	14	7	19	17	420	10	65	20	39	9
Iron	mg/kg	10																	4900	15,000	28,000	27,000	-	11,000	11,000	-	-	-	-	8500	8700	6000	5500	6660	2700	-	8400	14000	4600	36000	-	-	-	-	-	7800	17000	19000	-	17000	23000	14000	-	-	-	-	-	-	-	-
Lead	mg/kg	1	100	400						1200					1100				6	16	9	12	-	100	240	-	4	-	-	770	670	190	54	163	14	-	75	68	44	10	-	-	-	-	-	19	50	180	-	5	44	22	58	40	1400	8	38	25	70	14
Magnesium	mg/kg	10																	1500	1700	820	1700	-	510	920	-	-	-	-	1500	1200	610	490	500	270	-	310	410	260	780	-	-	-	-	-	1800	1700	2100	-	380	1200	600	-	-	-	-	-	-	-	-
Manganese	mg/kg	1								14000									60	81	15	43	-	64	130	-	-	-	-	260	290	60	34	56	19	-	140	130	53	6	-	-	-	-	-	270	500	1100	-	3	580	210	-	-	-	-	-	-	-	-
Mercury	mg/kg	0.1	4	16						120									<0.1	<0.1	<0.1	<0.1	-	0.2	0.2	-	<0.1	-	-	0.3	0.4	1.4	0.3	0.3	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	0.3	-	<0.1	0.2	0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	-
Nickel	mg/kg	1	40	160						1200					9				3	9	1	8	-	5	8	-	18	-	-	10	9	5	3	5	1	-	4	5	3	2	-	-	-	-	-	6	13	11	-	<1	4	2	4	4	15	4	16	19	7	3
Selenium	mg/kg	2	20	80						1400									<3	<2	<3	<3	-	<2	<2	-	-	-	-	<2	<2	<2	<2	<5	<2	-	<2	<2	<2	<4	-	-	-	-	-	<2	<2	<2	-	<2	<2	<2	-	-	-	-	-	-	-	-
Tin	mg/kg	1																	<1	<1	<1	<1	-	6	6	-	-	-	-	3	3	1	<1	<5	<1	-	1	1	<1	<1	-	-	-	-	-	<1	<1	3	-	<1	3	1	-	-	-	-	-	-	-	-
Zinc	mg/kg	1								60000					150				15	120	12	49	-	170	500	-	34	-	-	620	470	110	39	150	14	-	89	50	46	4	-	-	-	-	-	58	85	280	-	2	58	31	48	39	1100	35	210	75	85	13
TPH																																																									
C10-C16	mg/kg	50			4200	62000												1000	<50	<50	<50	<50	-	<50	<50	-	<50	-	-	-	-	-	-	-	-	-	-	<50	<50	<50	-	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34	mg/kg	100			5800	85000										300		2500	<100	<100	<100	<100	-	<100	290	-	300	-	-	-	190	-	-	-	-	-	-	<100	<100	<100	-	-	-	-	-	<100	<100	220	-	<100	<100	<100	120	<100	240	<100	<100	340	<100	-
C34-C40	mg/kg	100			8100	120000										2800		10000	<100	<100	<100	<100	-	<100	<100	-	110	-	-	-	<100	-	-	-	-	-	-	<100	<100	150	-	-	-	-	-	<100	<100	<100	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	-
F2-NAPHTHALENE	mg/kg	50					NL	NL	NL		110	240	440	NL		120			<50	<50	<50	<50	-	<50	<50	-	-	-	-	<50	<50	<50	<50	<50	<50	-	<50	<50	<50	<50	-	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9	mg/kg	25	650	2600															<25	<25	<25	<25	-	<25	<25	-	-	-	-	<25	<25	<25	<25	<25	<25	-	<25	<25	<25	<25	-	-	-	-	-	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
C10 - C14	mg/kg	50																	<50	<50	<50	<50	-	<50	<50	-	-	-	-	<50	<50	<50	<50	<50	<50	-	<50	<50	<50	<50	-	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28	mg/kg	100																	<100	<100	<100	<100	-	<100	210	-	240	-	-	-	120	-	-	-	-	-	-	<100	<100	<100	-	-	-	-	-	<100	<100	130	-	<100	<100	<100	<100	160	<100	<100	240	<100	<100	-
C29-C36	mg/kg	100																	<100	<100	<100	<100	-	<100	110	-	130	-	-	-	100	-	-	-	-	-	-	<100	<100	<100	-	-	-	-	-	<100	<100	130	-	<100	<100	<100	<100	120	<100	<100	130	<100	<100	-
>C10 - C36 (Sum of total)	mg/kg		10000	40000															<250	<250	<250	<250	-	<250	346	-	396	-	-	-	245	-	-	-	-	-	-	<250	<250	285	-	-	-	-	-	<250	<250	285	-	<250	<250	<250	<250	305	<250	<250	396	<250	<250	-
C10 - C40 (Sum of total)	mg/kg	50																	<50	<50	<50	<50	-	<50	290	-	410	-	-	-	190	-	-	-	-	-	-	<50	<50	360	-	-	-	-	-	<50	<50	360	-	<50	<50	<50	<50	360	<50	<50	410	<50	<50	-
C6-C10 less BTEX (F1)	mg/kg	25					NL	NL	NL		45	70	110	200		180			<25	<25	<25	<25	-	<25	<25	-	<25	-	-	-	<25	-	-	-	-	-	-	<25	<25	<25	-	-	-	-	-	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
>C10 -C16	mg/kg	25			5600	82000												700	<25	<25	<25	<25	-	<25	<25	-	<25	-	-	-	<25	-	-	-	-	-	-	<25	<25	<25	-	-	-	-	-	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
BTEX																																																									
Benzene	mg/kg	0.2	10	40	140	1100	77	160	NL		0.5	0.5	0.5	0.5		50			<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	-	-	-	<0.2	-	-	-	-	-	-	<0.2	<0.2	<0.2	-	-	-	-	-	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	mg/kg	1	600	2400	5900	85000	NL	NL	NL		55	NL	NL	NL		70			<1	<1	<1	<1	-	<1	<1	-	<1	-	-	-	<1	-	-	-	-	-	-	<1	<1	<1	-	-	-	-	-	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	mg/kg	0.5	288	1152	21000	120000	NL	NL	NL		160	220	310	540		85			<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	-	-	-	<0.5	-	-	-	-	-	-	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	mg/kg	2																	<2	<2	<2	<2	-	<2	<2	-	<2	-	-	-	<2	-	-	-	-	-	-	<2	<2	<2	-	-	-	-	-	<2	<2	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	<1	-	-	-	<1	-	-	-	-	-	-	<1	<1	<1	-	-	-	-	-	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Xylene Total	mg/kg	3	1000	4000	17000	130000	NL	NL	NL		40	60	95	170		105			<3	<3	<3	<3	-	<3	<3	-	<3	-	-	-	<3	-	-	-	-	-	-	<3	<3	<3	-	-	-	-	-	<3	<3	<3	-	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
MAH																																																									
1,2,4-trimethylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,3,5-trimethylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
n-butylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
n-propylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
p-isopropyltoluene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
sec-butylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Styrene	mg/kg	1	60	240															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
tert-butylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chlorinated Hydrocarbons																																																									
1,1,1,2-tetrachloroethane	mg/kg	1	200	800															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	mg/kg	1	600	2400															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	1	26	104															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1,2-trichloroethane	mg/kg	1	24	96															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloroethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloroethene	mg/kg	1	14	56															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloropropene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2,3-trichloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dichloroethane	mg/kg	1	10	40															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dichloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,3-dichloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
2,2-dichloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromoform	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	1	10	40															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chloroform	mg/kg	1	120	480															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
cis-1,2-dichloroethene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
cis-1,3-dichloropropene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	1	10	40															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1	14	56															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
trans-1,2-dichloroethene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
trans-1,3-dichloropropene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	1	4	16															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Halogenated Hydrocarbons																																																								
1,2-dibromoethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Halogenated Benzenes																																																								
1,2,3-trichlorobenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dichlorobenzene	mg/kg	1	86	344															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,3-dichlorobenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,4-dichlorobenzene	mg/kg	1	150	600															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
2-chlorotoluene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-

Table 11: Results of Chemical Analysis of Soil (Waste Classification)

Analyte	Units	PQL	NSW EPA 2014 - General Solid Waste CT1 (No TCLP)	NSW EPA 2014 - Restricted Solid Waste CT2 (No TCLP)	ENM RRD Max Avg	ENM RRD Abs Max	Field_ID	203/0.9-1.2	203/7.9	203/24.8	202/7.0	203/0.0-0.05	203/0.5	203	MS4 / 0.02	MS4 / 0.2	F1	F2	301/0.05	301/0.25	301/0.4	03 - 3-3-20	T2 - 3-3-20	301/0.7	302/F1	302/0.3	303/0.2	304/0.2	306/0.5	307/F1	307/F2	307/F3	307/F25	308/0.1	309/0.3	309/0.5	310/F1	310/0.2	51	52	SS499_BH1	SS499_BH4	SS499_BH5	SS499_BH5	SS499_BH7	SS499_BH8	SS499_BH9	SS499_BH10
							LocCode	201	201	202	202	Asphalt	203	203	Asphalt	F	Material	Material	F	F	F	F	F	F	N	F	F	F	F	F	F	F	F	F	F	N	F	N	F	F	F	F	F	F	F	F	F
							Fill (F) / Natural (N)	F	N	N	N		N	N																																			
							Sample Depth	0.9-1.2	7.9	4.8	7	0-0.05	0.5	0.5	0.02	0.2	Surface	Surface	0.05	0.2	0.4	0.4	0.4	0.7	0.5	0.3	0.2	0.2	0.5					0.1	0.3	0.5	0.05	0.2			0.3	0.5	0.1	0.5	0.1	0.1	0.1	0.6	0.4
							Sample Date	12/12/2019	12/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	19/11/2019	05/11/2019	22/11/2019	22/11/2019	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	1/01/2020	12/05/2020	12/05/2020	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/08/2016	22/09/2016
Coal Tar Identification	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																																															
Aluminium	mg/kg	10						5000	7000	9000	8900	-	7000	6400	-	-	-	-	5000	5400	3300	2700	3320	1400	-	3400	11000	2600	18000	-	-	-	-	5700	5800	9500	-	9400	10000	6600	-	-	-	-	-	-	-	-
Antimony	mg/kg	5						<7	<7	<7	<7	-	<7	<7	-	-	-	-	<7	<7	<7	<7	<5	<7	-	<7	<7	<7	<7	-	-	-	-	<7	<7	<7	-	<7	<7	<7	-	-	-	-	-	-	-	-
Arsenic	mg/kg	4	100	400	20	40		<4	5	30	<4	-	24	14	-	<4	-	-	<4	<4	<4	<4	<5	<4	-	<4	5	<4	10	-	-	-	-	<4	7	6	-	5	8	5	5	<4	7	<4	<4	<4	4	5
Boron	mg/kg	3						<5	<5	<5	<5	-	<5	<5	-	-	-	-	5	4	<3	<3	<3	<3	-	<3	<3	<3	<3	-	-	-	-	4	<3	4	-	<3	<3	<3	-	-	-	-	-	-	-	-
Cadmium	mg/kg	0.4	20	80	0.5	1		<0.4	<0.4	<0.4	<0.4	-	<0.4	2	-	-	-	-	1	1	<0.4	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	-	-	-	-	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium (trivvi)	mg/kg	1	100	400	75	150		4	9	12	11	-	7	30	-	24	-	-	21	15	7	5	7	2	-	6	12	4	23	-	-	-	-	11	9	12	-	15	11	9	-	27	10	27	18	9	22
Cobalt	mg/kg	1						1	4	<1	2	-	1	3	-	-	-	-	1	1	1	1	<2	<1	-	2	2	2	<1	-	-	-	-	3	11	15	-	<1	2	<1	-	-	-	-	-	-	-	-
Copper	mg/kg	1	100	200				7	17	27	41	-	16	46	-	23	-	-	170	140	26	16	26	8	-	15	30	15	3	-	-	-	-	30	18	360	-	<1	14	7	19	17	420	10	65	20	39	9
Iron	mg/kg	10						4900	15,000	26,000	27,000	-	11,000	11,000	-	-	-	-	8500	8700	6000	5500	6660	2700	-	8400	14000	4600	36000	-	-	-	-	7800	17000	13000	-	17000	23000	14000	-	-	-	-	-	-	-	-
Lead	mg/kg	1	100	400	50	100		6	16	9	52	-	102	260	-	4	-	-	170	170	130	54	310	14	-	75	38	44	10	-	-	-	-	33	50	180	-	5	44	22	58	40	1400	8	38	25	70	14
Magnesium	mg/kg	10						1500	1700	820	1700	-	510	920	-	-	-	-	1500	1200	610	490	500	270	-	310	410	260	780	-	-	-	-	1800	1700	2100	-	380	1300	650	-	-	-	-	-	-	-	-
Manganese	mg/kg	1						60	81	35	41	-	54	130	-	-	-	-	260	270	60	34	56	19	-	140	130	51	6	-	-	-	-	270	500	1100	-	3	580	210	-	-	-	-	-	-	-	-
Mercury	mg/kg	0.1	4	16	0.5	1		<0.1	<0.1	<0.1	<0.1	-	0.2	0.2	-	<0.1	-	-	0.3	0.4	1.4	0.3	0.3	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	<0.1	0.2	0.1	-	<0.1	0.2	<0.1	0.2	<0.1	<0.1	<0.1	0.4	<0.1
Nickel	mg/kg	1	40	160	30	60		3	9	1	8	-	5	8	-	18	-	-	10	9	5	3	5	1	-	4	5	3	2	-	-	-	-	6	13	11	-	<1	4	2	4	4	5	4	35	7	3
Selenium	mg/kg	2	20	80				<3	<2	<3	<3	-	<2	<2	-	-	-	-	<3	<3	<2	<2	<5	<2	-	<2	<2	<2	<2	-	-	-	-	<2	<2	<2	-	<2	<2	<2	-	-	-	-	-	-	-	-
Tin	mg/kg	1						<1	<1	<1	<1	-	6	6	-	-	-	-	3	3	1	<1	<5	<1	-	1	1	<1	<3	-	-	-	-	<1	3	3	-	<1	3	1	-	-	-	-	-	-	-	-
Zinc	mg/kg	1			150	300		15	120	12	49	-	170	500	-	14	-	-	620	470	130	39	150	14	-	89	50	46	4	-	-	-	-	58	85	280	-	2	58	31	48	39	1100	35	210	75	85	13
TRH																																															
C10-C16	mg/kg	50						<50	<50	<50	<50	-	<50	<50	-	<50	-	-	<50	-	-	-	-	-	-	<50	<50	<50	<50	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34	mg/kg	100						<100	<100	<100	<100	-	<100	290	-	300	-	-	190	-	-	-	-	-	-	<100	<100	<100	<100	-	-	-	-	<100	<100	230	-	<100	<100	<100	120	<100	240	<100	<100	340	<100
C34-C40	mg/kg	100						<100	<100	<100	<100	-	<100	<100	-	110	-	-	<100	-	-	-	-	-	-	<100	<100	<100	<100	-	-	-	-	<100	<100	150	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F2-NAPHTHALENE	mg/kg	50						<50	<50	<50	<50	-	<50	<50	-	<50	-	-	<50	-	-	-	-	-	-	<50	<50	<50	<50	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9	mg/kg	25	650	2600				<25	<25	<25	<25	-	<25	<25	-	<25	-	-	<25	-	-	-	-	-	-	<25	<25	<25	<25	-	-	-	-	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
C10 - C14	mg/kg	50						<50	<50	<50	<50	-	<50	<50	-	<50	-	-	<50	-	-	-	-	-	-	<50	<50	<50	<50	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28	mg/kg	100						<100	<100	<100	<100	-	<100	210	-	240	-	-	120	-	-	-	-	-	-	<100	<100	<100	<100	-	-	-	-	<100	<100	130	-	<100	<100	<100	<100	<100	160	<100	<100	240	<100
C29-C36	mg/kg	100						<100	<100	<100	<100	-	<100	110	-	130	-	-	<100	-	-	-	-	-	-	<100	<100	<100	<100	-	-	-	-	<100	<100	130	-	<100	<100	<100	<100	<100	120	<100	<100	100	330	<100
>C10 - C36 (Sum of total)	mg/kg		10000	40000	250	500		<250	<250	<250	<250	-	<250	345	-	395	-	-	245	-	-	-	-	-	-	<250	<250	<250	<250	-	-	-	-	<250	<250	285	-	<250	<250	<250	<250	<250	305	<250	<250	395	<250	
C10 - C40 (Sum of total)	mg/kg	50						<50	<50	<50	<50	-	<50	260	-	410	-	-	190	-	-	-	-	-	-	<50	<50	<50	<50	-	-	-	-	<50	<50	360	-	<50	<50	<50	-	-	-	-	-	-	-	-
C6-C10 less BTEX (F1)	mg/kg	25						<25	<25	<25	<25	-	<25	<25	-	<25	-	-	<25	-	-	-	-	-	-	<25	<25	<25	<25	-	-	-	-	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
C6-C10	mg/kg	25						<25	<25	<25	<25	-	<25	<25	-	<25	-	-	<25	-	-	-	-	-	-	<25	<25	<25	<25	-	-	-	-	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
BTEX																																															
Benzene	mg/kg	0.2	10	40		0.5		<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	-	-	<0.2	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	-	-	-	-	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	mg/kg	1	600	2400		25		<1	<1	<1	<1	-	<1	<1	-	<1	-	-	<1	-	-	-	-	-	-	<1	<1	<1	<1	-	-	-	-	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	mg/kg	0.5	288	1152		65		<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	-	-	<0.5	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	mg/kg	2						<2	<2	<2	<2	-	<2	<2	-	<2	-	-	<2	-	-	-	-	-	-	<2	<2	<2	<2	-	-	-	-	<2	<2	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	<1	-	-	<1	-	-	-	-	-	-	<1	<1	<1	<1	-	-	-	-	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Xylene Total	mg/kg	3	1000	4000		35		<3	<3	<3	<3	-	<3	<3	-	<3	-	-	<3	-	-	-	-	-	-	<3	<3	<3	<3	-	-	-	-	<3	<3	<3	-	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
VOCs																																															
1,2,4-trimethylbenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,3,5-trimethylbenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
isopropylbenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
n-butylbenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
n-propylbenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
p-isopropyltoluene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
sec-butylbenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Styrene	mg/kg	1	60	240				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
tert-butylbenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chlorinated Hydrocarbons																																														
1,1,1,2-tetrachloroethane	mg/kg	1	200	800				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	mg/kg	1	600	2400				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	1	26	104				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1,2-trichloroethane	mg/kg	1	24	96				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloroethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloroethene	mg/kg	1	14	56				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloropropene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2,3-trichloropropane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dichloroethane	mg/kg	1	10	40				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dichloropropane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,3-dichloropropane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
2,2-dichloropropane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromoform	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	1	10	40				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chloroform	mg/kg	1	120	480				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
cis- 1,2-dichloroethene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
cis- 1,3-dichloropropene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	1	10	40				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	1	14	56				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
trans-1,2-dichloroethene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
trans-1,3-dichloropropene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	1	4	16				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Halogenated Hydrocarbons																																														
1,2-dibromoethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Halogenated Benzenes																																														
1,2,3-trichlorobenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dichlorobenzene	mg/kg	1	86	344				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,3-dichlorobenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,4-dichlorobenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
2-chlorotoluene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
4-chlorotoluene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1	2000	8000				<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Hexachlorobenzene	mg/kg	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
Solvents																																														
Cyclohexane	mg/kg	1						<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
PAH/Phenols																																														
Total Positive PAHs	mg/kg	0.05	200	800	20	40		<0.05	42	<0.05	<0.05	-	30	77	-	100	-	-	23	10	12	10	21.8	0.1	-	4.4	6.4	1.8	<0.05	-	-	-	-	7	4.8	25	-	<0.05	8	6.9	50	1.3	62	1.7	<0.05	0.58	61	19
Acenaphthene	mg/kg	0.5						<0.5	0.3	<0.5	<0.5	-	0.1	0.1	-	5.7	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	mg/kg	0.5						<0.5	<0.5	<0.5	<0.5	-	0.1	0.8	-	0.2	-	-	0.3	0.6	0.2	0.2	0.6	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	<0.5	0.3	0.6	-	<0.5	<0.5	<0.5	0.6	<0.5	0.7	1.2	<0.5	<0.5	1.3	0.4
Anthracene	mg/kg	0.5						<0.5	0.8	<0.5	<0.5	-	0.3	2.2	-	4.2	-	-	0.3	0.7	0.2	0.2	0.8	<0.5	-	0.3	0.2	<0.5	<0.5	-	-	-	-	0.3	0.5	0.5	-	<0.5	0.3	0.4	1.6	<0.5	1.7	1.4	<0.5	<0.5	2.1	0.6
Benz[a]anthracene	mg/kg	0.5						<0.5	2.7	<0.5	<0.5	-	2	8	-	8.5	-	-	1.9	3.5	1.3	1.2	2.1	<0.5	-	0.4	0.7	0.2	<0.5	-	-	-	-	0.6	0.

Table 12: Results of Leachability Analysis

Sample ID	PID (ppm)	Metals			PAHs					
		Lead (Pb)			Total PAH			Benzo(a)pyrene		
		Total	TCLP	ASLP	Total	TCLP	ASLP	Total	TCLP	ASLP
		(mg/kg)	(mg/L)	(mg/L)	(mg/kg)	(mg/L)	(mg/L)	(mg/kg)	(mg/L)	(mg/L)
203/0.5	<1	100	0.03	-	20	NIL (+)VE	-	1.8	<0.001	-
D3 (203/0.5)	<1	240			77			6.4		
MS4 / 0.2		4	-	-	100	0.064	-	4.6	<0.001	-
301/0.05	<1	770	0.08	0.041	23	NIL (+)VE	<0.001 each	2.1	<0.001	<0.001
Laboratory PQL		1	0.1	0.001	0.05	0.001	0.001	0.05	0.001	0.001
NSW EPA 2014 - Waste Classification Guidelines	**General Solid Waste**	1500 (1)	5	NC	200	NC	NC	10 (1)	0.04	NC
	Restricted Solid Waste	6000 (1)	20	NC	800	NC	NC	23 (1)	0.16	NC
ANZG (2018) - MW 95%	**Marine**	NC	NC	0.0044	NC	NC	NC	NC	NC	0.0001

Notes to Table:
Total concentrations in mg/kg on a dry weight basis
TCLP and ASLP concentrations in mg/L
(1) - Waste Classification Criteria for Total Concentrations when used with TCLP Results
PQL - practical quantitation limit
NC - No Criteria
- Not Tested
TCLP - standard NSW EPA acid leaching test
ASTM - TCLP test using distilled water as extracting fluid
(L) - 95% Low Reliability Trigger Values (99% protection level applied where recommended (ie benzo(a)pyrene))
Shaded Results Exceed Criteria Shaded

Table 13: Results of Chemical Analysis of Groundwater

Analyte	Units	PQL	ANZG 2018 MW 95%	NEPM 2013 Table 1A(4) Res HSL A & B GW for Vapour Intrusion, Sand			NEPM 2013 Table 1C GILs, Marine Waters	NEPM 2013 Table 1C GILs, Drinking Water	Field_ID	201	202	203	DW1	TW1
				2-4m	4-8m	>8m			Sample Date	7/01/2020	7/01/2020	7/01/2020	7/01/2020	7/01/2020
Metals														
Arsenic (Filtered)	mg/L	0.001	0.0023					**0.01**		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium (Filtered)	mg/L	0.0001	0.0007				0.0007	**0.002**		<0.0001	<0.0001	0.0001	0.0001	0.0001
Chromium (III+VI) (Filtered)	mg/L	0.001	0.0044					**0.05**		<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Filtered)	mg/L	0.001	0.0013				0.0013	**2**		<0.001	<0.001	<0.001	<0.001	<0.001
Lead (Filtered)	mg/L	0.001	0.0044				0.0044	**0.01**		<0.001	<0.001	<0.001	<0.001	<0.001
Mercury (Filtered)	mg/L	0.00005	0.0001				0.0001	**0.001**		<0.00005	<0.00005	<0.00005	<0.00005	<0.0001
Nickel (Filtered)	mg/L	0.001	0.007				0.007	**0.02**		0.006	0.016	0.012	0.011	0.014
Zinc (Filtered)	mg/L	0.001	0.015				0.015			0.016	0.017	0.051	0.044	0.052
TRH														
C10-C16	mg/L	0.05								<0.05	<0.05	<0.05	<0.05	<0.1
C16-C34	mg/L	0.1								<0.1	<0.1	<0.1	<0.1	<0.1
C34-C40	mg/L	0.1								<0.1	<0.1	<0.1	<0.1	<0.1
F2-NAPHTHALENE	mg/L	0.05		1	1	1				<0.05	<0.05	<0.05	<0.05	<0.1
C6 - C9	mg/L	0.01								<0.01	<0.01	<0.01	<0.1	<0.02
C10 - C14	mg/L	0.05								<0.05	<0.05	<0.05	<0.05	<0.05
C15 - C28	mg/L	0.1								<0.1	<0.1	<0.1	<0.1	<0.1
C29-C36	mg/L	0.05								<0.1	<0.1	<0.1	<0.1	<0.05
C6-C10 less BTEX (F1)	mg/L	0.01		1	1	1				<0.01	<0.01	<0.01	<0.01	<0.02
C6-C10	mg/L	0.01								<0.01	<0.01	<0.01	<0.1	<0.02
BTEX														
Benzene	mg/L	0.001	0.5	0.8	0.8	0.9	0.5	**0.001**		<0.001	<0.001	<0.001	<0.01	<0.001
Ethylbenzene	mg/L	0.001	0.005	NL	NL	NL		**0.3**		<0.001	<0.001	<0.001	<0.01	<0.002
Toluene	mg/L	0.001	0.18	NL	NL	NL		**0.8**		<0.001	<0.001	<0.001	<0.01	<0.002
Xylene (m & p)	mg/L	0.002								<0.002	<0.002	<0.002	<0.02	<0.002
Xylene (o)	mg/L	0.001	0.35							<0.001	<0.001	<0.001	<0.01	<0.002
Xylene Total	mg/L		0.625	NL	NL	NL		**0.6**		<0.003	<0.003	<0.003	<0.003	<0.002
MAH														
1,2,4-trimethylbenzene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,3,5-trimethylbenzene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Isopropylbenzene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
n-butylbenzene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
n-propylbenzene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
p-isopropyltoluene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
sec-butylbenzene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Styrene	mg/L	0.001						**0.03**		<0.001	<0.001	<0.001	<0.01	<0.005
tert-butylbenzene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Chlorinated Hydrocarbons														
1,1,1,2-tetrachloroethane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,1,1-trichloroethane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,1,2,2-tetrachloroethane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,1,2-trichloroethane	mg/L	0.001	1.9				1.9			<0.001	<0.001	<0.001	<0.01	<0.005
1,1-dichloroethane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,1-dichloroethene	mg/L	0.001						**0.03**		<0.001	<0.001	<0.001	<0.01	<0.005
1,1-dichloropropene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,2,3-trichloropropane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,2-dibromo-3-chloropropane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,2-dichloroethane	mg/L	0.001						**0.003**		<0.001	<0.001	<0.001	<0.01	<0.005
1,2-dichloropropane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,3-dichloropropane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
2,2-dichloropropane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Bromochloromethane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	-
Bromodichloromethane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Bromoform	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Carbon tetrachloride	mg/L	0.001						**0.003**		<0.001	<0.001	<0.001	<0.01	<0.005
Chlorodibromomethane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Chloroethane	mg/L	0.01								<0.01	<0.01	<0.01	<0.1	<0.05
Chloroform	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Chloromethane	mg/L	0.01								<0.01	<0.01	<0.01	<0.1	<0.05
cis-1,2-dichloroethene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
cis-1,3-dichloropropene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Dibromomethane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Hexachlorobutadiene	mg/L	0.001	0.00003					**0.0007**		<0.001	<0.001	<0.001	<0.01	<0.005
Trichloroethene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Tetrachloroethene	mg/L	0.001						**0.05**		<0.001	<0.001	<0.001	<0.01	<0.005
trans-1,2-dichloroethene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
trans-1,3-dichloropropene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Vinyl chloride	mg/L	0.01						**0.0003**		<0.01	<0.01	<0.01	<0.1	<0.05
Halogenated Hydrocarbons														
1,2-dibromoethane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Bromomethane	mg/L	0.01						**0.001**		<0.01	<0.01	<0.01	<0.1	<0.05
Dichlorodifluoromethane	mg/L	0.01								<0.01	<0.01	<0.01	<0.1	<0.05
Trichlorofluoromethane	mg/L	0.01								<0.01	<0.01	<0.01	<0.1	<0.05
Halogenated Benzenes														
1,2,3-trichlorobenzene	mg/L	0.001						**0.03**		<0.001	<0.001	<0.001	<0.01	<0.005
1,2,4-trichlorobenzene	mg/L	0.001	0.02				0.02	**0.03**		<0.001	<0.001	<0.001	<0.01	<0.005
1,2-dichlorobenzene	mg/L	0.001						**1.5**		<0.001	<0.001	<0.001	<0.01	<0.005
1,3-dichlorobenzene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
1,4-dichlorobenzene	mg/L	0.001						**0.04**		<0.001	<0.001	<0.001	<0.01	<0.005
2-chlorotoluene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
4-chlorotoluene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Bromobenzene	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	<0.005
Chlorobenzene	mg/L	0.001						**0.3**		<0.001	<0.001	<0.001	<0.01	<0.005
Solvents														
Cyclohexane	mg/L	0.001								<0.001	<0.001	<0.001	<0.01	-
PAH/Phenols														
Total Positive PAHs	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.00005
Acenaphthene	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Acenaphthylene	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Anthracene	mg/L	0.0001	0.00001							<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Benz(a)anthracene	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Benzo(a) pyrene	mg/L	0.00005	0.0001					**0.00001**		<0.0001	<0.0001	<0.0001	<0.0001	<0.00005
Benzo(g,h,i)perylene	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Benzo(b,j,k)fluoranthene	mg/L									<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Chrysene	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dibenz(a,h)anthracene	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Fluoranthene	mg/L	0.0001	0.001							<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Fluorene	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Indeno(1,2,3-c,d)pyrene	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Naphthalene	mg/L	0.0001	0.05	NL	NL	NL	0.05			<0.0002	<0.0002	<0.0002	<0.0002	<0.0001
Phenanthrene	mg/L	0.0001	0.0006							<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Phenolics Total	mg/L	0.05	0.4				0.4			<0.05	<0.05	<0.05	<0.05	<0.001
Pyrene	mg/L	0.0001								<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Notes to Table:
DW1 - Replicate of Sample 203
TW1 - Triplicate of Sample 203
ANZECC 2000 guidelines used in the absence of ANZG (2018) criteria where applicable

Appendix C

QA/QC

Quality Assurance and Quality Control Review –Report on Detailed Site Investigation - Proposed Nihon University, 9 Church St, Newcastle, April 2020

Item	Addressed (Y / N / NA)	Comments
Quality Assurance Program		
Statement of pre-determined DQOs for field and laboratory procedures, including quantitative DQOs.	Y	Section 11.1 Also DSI carried out in accordance with SAQP prepared by DP in Dec 2019
DQOs state the problem, identify goals of the study, identify information inputs, define the boundaries of the study, develop an analytical approach, specify performance or acceptance criteria and outline the plan for obtaining data.	Y	
Quality plan designed to achieve DQOs assessing accuracy, precision, comparability, representativeness and completeness of data.	Y	Table 9
Procedures for assessing chemical data to determine if DQOs are met, including quantitative DQOs (eg sd, % recovery, RPDs).	Y	
Procedures that describe the actions if DQOs not met.	Y	Not specifically, however, report states “further investigation or remedial action is required …” if criteria is exceeded (Step 5)
Sampling and Analytical Program		
Site investigation objectives and a brief background provided	Y	
Summary of CSM provided.	Y	Addressed in s.8 and s.17.2 of Report
Data gap analysis provided that reviews existing information.	Y	Data gaps initially identified in Cardno (2019), cRAP, reviewed in SAQP and DSI.
Preparation of a site-specific health and safety plan and other necessary pre-mobilisation tasks.	Y	Developed prior to commencement of work (s.12.1)
Assessment includes all relevant environmental media (e.g. soil, dust, surface water, groundwater, air, sediments and biota).	Y	
Sampling is representative of the site, based on selection of appropriate sampling points stated in sampling plan. Included are details of analytes to be monitored, sampling pattern/frequency, number of samples, location and depth of sampling points.	Y	As per SAQP, any deviations noted in DSI.
Acceptability of sample collection, handling and transportation in accordance with written procedures.	Y	
Sample analyses use appropriate methodologies in NATA (or equivalent) accredited laboratories for each analyte & matrix.	Y	
Appropriate sampling methods & procedures, field	Y	

Item	Addressed (Y / N / NA)	Comments
screening methods and analysis methods are outlined.		
Detection limits for each chemical of potential concern are appropriate for use in assessment of risk.	Y	Refer to Tables 10 – 13
For dynamic/reactive sampling, methods for analysing and interpreting field data are outlined.	N/A	
QA/QC Documentation		
QA/QC narrative describing all information relevant to the site assessment. Should include following items.		
◗ **Field QA/QC**		
– Sampling team	Y	Stated experienced engineers (s.9.2), not named in report but identified on field documentation
– Sampling methods including type of container used, labelling process, order and degree of filling, preservation, labelling, logging, custody	Y	Addressed in s.9.2
– Decontamination procedures between sampling	Y	Addressed in s.9.2
– Logs for each sample, including time, date, location, sampler, duplicate location & type, chemical analyses to be performed, sample preservation method, site observations & weather	Y	Addressed in s.9.2 Logs included in Appendix A
– CoC for each sample, including sampler, sample nature, collection date, analyses to be performed, preservation method, dispatch time, condition of samples at dispatch and courier(s)	Y	Addressed in s.9.2 Included in Appendix D
– Sample duplication/splitting techniques	N	Not specifically stated
– Details and frequency of QC samples	Y	
– Background sample results	N/A	N/A – site/area developed
– Results of QC samples eg field blanks, background, rinsates, trip blanks	Y	
– Laboratory prepared trip spikes for volatile analytes and accompanying results	Y	
– Field instrument calibrations (when used)	Y	Appendix D
◗ **Laboratory QA/QC**		
– Copy of completed Chain-of-Custody including acknowledgment of receipt, conditions of samples on receipt and identity of samples included in shipments	Y	Appendix D
– Record of holding times and compliance with methods	Y	Appendix D
– Analytical Methods Used	Y	Appendix A and B
- Laboratory Accreditation for methods used	Y	
- Performance in interlaboratory trials for methods used, where available	N	

Item	Addressed (Y / N / NA)	Comments
– Description & % recovery of surrogates & spikes	Y	
– Instrument detection limits and MDLs	N	Assumed to be accounted for in PQLs
– Matrix or PQLs and limit of reporting for each analyte in each media	Y	
– Results for: Standard solutions, Reference samples, Reference check samples, Daily check samples	Y	In lab reports Appendix C
- Laboratory duplicate and blank results	Y	
– Laboratory standard charts	N	Not considered required for this assessment
◗ **QA/QC Data Evaluation**		
– Evaluation of QA/QC with DQOs including: documentation completeness, data completeness, data comparability (see below), data representativeness	Y	s.12 and Appendix D
– Precision & accuracy of sampling & analysis for each analyte in each matrix, advising reliability, unreliability or qualitative value of data	Y	statement in Appendix D
– Data comparability including bias assessment, e.g. different personnel, methodologies, times, spatial and temporal changes etc.	Y	QA/QC evaluation in Appendix D – consistent procedures used
– Results of intra and interlaboratory QC checks	Y	
◗ Names of laboratories and details of their accreditation	Y	
◗ Discussion of appropriateness of non-standard test methods (incl. sample prep; method source and validation)	N	No non-standard test methods used
◗ PQLs and MDLs for all relevant matrices	Y	
◗ Acceptance limit(s) for each QC test (eg RPDs, recoveries) included	Y	Table 9 and Appendix D
◗ Acceptance limits for each calibration standard	N/A	
◗ Results for all data tabulated according to each type of soil, fill, groundwaters, surface water and sediments, with appropriate statistical analysis.	Y	
◗ Where used, origin of certified reference material (CRM), batch number and the concentrations of the chemicals of potential concern	N	
◗ QC results relevant to the sample analyses.	Y	
◗ Highest and all measurement results for each sample	Y	Tables 10 & 13 S.15 Assessment of Contamination
QA/QC ANALYTICAL METHODS		
Field Methods		
◗ Applicability and appropriateness of field screening methods discussed.	Y	Limited to PID and landfill gas screening

Item	Addressed (Y / N / NA)	Comments
◗ Adequacy of calibration of field monitoring equipment and validation of field measurements	Y	QA/QC report in Appendix D
Laboratory screening methods		
◗ Applicability and limitations of analytical screening techniques appropriately discussed.	N/A	
◗ Analytical screening method performance expressed, and based on acceptable false negative rate.	N/A	
Methods specific for contaminants		
◗ Sensitivity of analytical methods appropriate for assessment of risk	Y	Steps 3, 6 & 7 – only NATA accredited labs using NATA endorsed methods are used …
◗ Precision and accuracy criteria in quality plan meet performance of 95% of laboratories in recognised inter-laboratory trials.	N/A	
◗ Conclusion as to the quality of the data and if meets laboratory's DQO for at least 95% of test results	Y	Appendix D – D3 concludes "… field and lab test data … are reliable and useable for this assessment".

Appendix D

Auditor Correspondence

12 November 2019

Katherine Daunt
Design Director
dwp Australia Pty Ltd
16 Telford Street
Newcastle NSW 2300

Our ref: 12519246
Your ref: SSD-9787

c.c. Paul McMurray (City of Newcastle), Gary Fielding (City Plan)

Dear Katherine

Newcastle Courthouse Redevelopment - Nihon University - Site Audit Interim Advice #1 - Review of Concept RAP

1 Introduction

Ian Gregson of GHD has been engaged to undertake a site audit under the provisions of the Contaminated Land Management Act (CLM Act) 1997 in relation to assessment and remediation of contamination at the proposed Nihon University site (former Newcastle Courthouse), located at 9 Church Street Newcastle (the site) and identified as Lot 1 DP 1199904.

The purpose of this Interim Advice is to provide the Auditor's opinion of the appropriateness of the proposed remediation strategy for the site, based on the information available at this time. These comments are provided on the basis of a brief site inspection undertaken by the Auditor on 8 November 2019 and from review of the following reports relating to the subject property:

- Cardno 2019, *Conceptual Remediation Action Plan, 9 Church Street, Newcastle NSW*, Cardo (NSW/ACT) Pty Ltd, 28 May 2019
- Coffey 2012, *Phase 1 Environmental Site Assessment Newcastle Courthouse and Former Newcastle East Public School*, Coffey Environments, 25 July 2012
- Prensa 2016, *Detailed Site Investigation, 9 Church St, Newcastle, NSW 2300*, Prensa Pty Ltd, October 2016

As part of developing an understanding of the site, the proposed development and the remediation strategy, the Auditor has also referred to the following documents, although these are more peripheral to potential contamination issues at the site, and hence detailed review or comment on these documents has not been provided as part of the audit review:

- Napier & Blakely 2008, *The Newcastle Courthouse, Church Street, Newcastle NSW, Asbestos Materials Report*, Napier & Blakely Pty Ltd, August 2008
- Cardno 2018, *Report on Geotechnical Investigation, Newcastle Courthouse Redevelopment*, Cardo (NSW/ACT) Pty Ltd, 20 December 2018

Please note that this communication has been provided as Interim Advice only, as part of the audit process. The advice does not constitute a site audit report or site audit statement under the provisions of the CLM Act, and does not pre-empt the conclusions, which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

This Interim Advice relates solely to the contamination at the site, and is not intended to provide any opinions regarding the compliance or status of other aspects of the proposed site redevelopment.

The opinions and recommendations offered in this Interim Advice are subject to the attached Limitations.

2 Background

I understand a State Significant Development Application (SSD-9787) has been submitted to develop the former Newcastle Courthouse site, being Lot 1 DP 1199904, into a new university campus. The proposed development will involve the demolition of two buildings on the site, changing the original courthouse building to an educational establishment, and construction of two new 4-storey buildings.

Limited contamination investigations have been undertaken at the site (restricted to date due to the presence of buildings and hardstand over most of the site), and a conceptual Remedial Action Plan (cRAP) has been prepared. A hazardous materials investigation has also been carried out, which may be relevant to site contamination issues. These comprise the documents listed in Section 1 above.

Comments in relation to the proposed development were provided by the EPA (letter dated 19 June 2019) and City of Newcastle (letter dated 6 June 2019). A response to comments on contamination issues was provided by Cardno, dated 9 July 2019, with further response to the Department of Planning, Industry & Environment (DPIE) provided by City Plan dated 19 September 2019.

The City of Newcastle (Council) provided further comment on the proposed development by letter dated 10 October 2019. In relation to contamination, Council advised that the 9 July 2019 response from Cardno does not fully address Council's concerns regarding site contamination. Key issues identified by Council in this letter included the following:

- A detailed contamination assessment (in accordance with relevant guidelines) has not been completed, and there is no detailed RAP which outlines a specific remediation strategy.
- It is not known if the proposed future RAP to be developed after further detailed assessment would be Category 1 or Category 2 remediation. On-site containment would be Category 1 remediation.
- Council acknowledged the available information indicates contamination risk is low, and the involvement of a site auditor would help ensure appropriate standards are complied with; however this does not absolve a determining authority from the need to properly consider contamination, and planning complexities may arise if onsite capping of contamination is required.

Based on these concerns, Council considered it appropriate for the applicant to be required, prior to determination of the application, to provide interim site auditor advice confirming the adequacy of the submitted contaminated land information and confirming land use suitability. Council also recommended that consideration be made in respect to the option of a staged approval process to provide the consent authority an opportunity to assess further detailed contaminated land information and a specific remedial action plan once this can be developed by the applicant.

A Schedule of Recommended Conditions was attached to Council's letter of 10 October 2019, however none of these conditions related to site contamination.

Subsequent to the above letter, DPIE issued a letter to Nihon Daigaku Australia Newcastle Pty Ltd dated 15/10/2019, with a request to submit additional information, including the following in relation to site contamination:

- *Provide interim site auditor advice to confirm that the proposed approach regarding contamination is appropriate for the site, and to confirm that the site can be made suitable for the proposed use*.

This Interim Advice is intended to meet the above requirement.

3 Review methodology

I have reviewed the available contamination assessment and management reports in the context of guidelines made or approved by the NSW EPA under the provisions of the CLM Act, including the following:

- NEPC 2013, *National Environment Management (Assessment of Site Contamination) Measure 1999*
- NSW EPA 1995, *Sampling Design Guidelines*
- NSW EPA 2017, *Guidelines for the NSW Site Auditor Scheme*
- NSW OEH 2011, *Guidelines for Consultants Reporting on Contaminated Sites*

My opinion on whether the proposed approach regarding contamination is appropriate for the site, and whether the site can be made suitable for the proposed use is based on the above guidelines with consideration of the following factors primarily influencing these opinions:

- What is the scope of investigations that has been carried out to date?
- Is the information considered reliable and consistent with relevant guidelines?
- Is the information sufficient to predict the likely remediation requirements?
- Does the cRAP demonstrate an appropriate remediation approach based on the contamination issues likely to be present at the site?
- Does the cRAP incorporate sufficient methodology to address current uncertainties and data gaps?

4 Review comments

Table 1 (**Attachment A**) provides a summary of the information reviewed, which is the primary basis for the Auditor's opinions. Review and comment on the adequacy of the cRAP is presented in Table 2 and Table 3 in **Attachment B**. Key comments from review, and recommendations for issues that need to be further addressed are listed below.

1. The combined assessments are relatively comprehensive as far as desktop based review, although a dangerous goods search has not been undertaken, nor have Council historical records been obtained relating to fuel / oil storage and use at the police station adjoining the site to the east.
2. Field investigations have been limited to date, based on buildings occupying most of the site. Investigations which have been carried out are considered reliable and consistent with relevant guidelines. The Cardno 2018 Geotechnical Assessment contained some useful information that was not documented in the cRAP.
3. Cardno 2019 notes the cRAP was prepared due to a requirement for lodgement with the DA prior to completion of a detailed site assessment, and hence details the sampling and investigation requirements of the DSI in addition to potential remedial options and procedures to be implemented based on the findings of the DSI when available.
4. Potential contamination sources described in the cRAP (as a basis for further investigations and potential remediation requirements) have not taken into account possible on-site (a potential breather point observed in the northeast portion of the site in driveway pavement) or off-site (police station to the east) fuel storage activities, and consequently a potential for impact to groundwater or vapour intrusion risks. The potential impacts from building demolition have not been fully considered, although the cRAP includes relatively comprehensive procedures for management of asbestos contamination.

5. The cRAP generally meets the requirements of OEH 2011 *Guidelines for Consultants Reporting on Contaminated Sites*, and the proposed remediation strategies are considered reasonable to address currently identified contamination, but further detail will be required to address all relevant aspects of EPA guidelines and policy, potential Council requirements and contingencies if there is groundwater impact or vapour risk. The Auditor considers it reasonably that these deficiencies be addressed in a detailed RAP, to be prepared on the basis of the proposed further investigations (when completed).
6. An updated conceptual site model (CSM) and detailed sampling, analysis and quality plan (SAQP) should be prepared prior to undertaking the proposed detailed investigations, taking into account the issues that have not been adequately addressed to date.

5 Conclusions and recommendations

5.1 Conclusions

DPIE request: *Provide interim site auditor advice to confirm that the proposed approach regarding contamination is appropriate for the site*

The Auditor considers the proposed approach regarding contamination documented in the conceptual RAP (cRAP) (Cardno 2019) is appropriate for the site, on the basis of the following considerations:

- The Auditor considers the proposed approach of undertaking further investigations and preparing a detailed RAP on the basis of those investigations is appropriate, given current constraints to comprehensive investigation of the site (due to buildings occupying most of the site), and Development Application requirements to have remediation plans and contingencies in place at the time of application. The Cardno cRAP is consistent with the recommendations of previous investigations, and is generally considered appropriate to address contamination identified to date. While it does not fully consider all potential contamination issues, it acknowledges unexpected issues may arise. The approach (a detailed RAP to be prepared on the basis of the proposed further investigations) allows for these deficiencies to be addressed.

DPIE request: *confirm that the site can be made suitable for the proposed use*

The Auditor considers the site can be made suitable for the proposed use by implementation of the cRAP (including the proposed detailed investigations and subsequent detailed RAP), on the following basis:

- Investigations to date have been limited due to site access constraints, primarily the presence of buildings over most of the site. The Auditor considers the potential for significant contamination on the site is low, based on historical review and site investigations to date, although the potential for impacts from fuel storage either on site or on adjacent land (the police station) has not been adequately considered. Proposed geotechnical investigations offer the opportunity to further investigate this potential, as well as the investigations that are proposed in the cRAP. While required remediation details are not yet fully known (pending the completion of detailed investigations), the approach described above provides for developing an appropriate detailed RAP, including update of the recommendations in the cRAP that are based on currently available data. The Auditor considers remediation methodology is readily available to address fuel impacts (if present) without compromising suitability of the site for the proposed development, including engineering design if necessary to address vapour intrusion risks (if any). These details can be provided in a detailed RAP following the proposed additional investigations.

5.2 Recommendations

The Auditor considers demolition works have the potential to impact the site condition, and investigations and validation following demolition should further consider any such impacts. Demolition (including any prior hazardous materials removal) should be managed to minimise the potential impacts to site contamination.

The Auditor suggests conditions of consent requiring the following could address Council's concerns (discussed in Section 2 above):

- A detailed site investigation (DSI) to be carried out following demolition works, to be reviewed by an accredited site auditor. (The Auditor recommends an updated CSM and detailed SAQP be prepared for the additional investigations, which should be reviewed by the site auditor; however the Auditor does not consider it necessary to make this a condition of consent. The CSM and SAQP should address the comments and recommendations provided in this Interim Advice).
- If the DSI concludes remediation is required, a detailed RAP to be prepared on the basis of the DSI, reviewed by an accredited site auditor and certified by way of Interim Advice that the detailed RAP is appropriate and the site can be made suitable for the proposed development by implementation of the detailed RAP. Such Interim Advice to be provided before issue of a Construction Certificate for the proposed development. (This could be staged, if eastern and western portions of the site are not demolished, investigated and developed at the same time).
- Any remediation works required are to be carried out in accordance with the detailed RAP and with a construction environmental management plan (CEMP), to be prepared in accordance with Council guidelines.
- A validation report to be prepared following completion of remediation, and reviewed by an accredited site auditor. A site audit report and site audit statement certifying the site is suitable for the proposed development to be issued prior to occupancy. (This could be staged, as above).
- Any requirements for long term management be incorporated in a LTEMP to be reviewed by an accredited site auditor, and the approved LTEMP to be implemented during operation of the development. (If this is included as a condition of consent, it offers a reasonably mechanism for legal enforcement of the LTEMP, as required by EPA 2017).

I trust these comments are sufficient for your current purposes. Please contact me if you wish to discuss anything further.

Sincerely
GHD

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Attachments A: Table 1 - Summary of Site Information
B: Review of Remedial Action Plan
C: Limitations to Interim Advice

6 Attachment A – Summary of site information

Table 1 Summary of site information from previous investigations and cRAP

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
Objectives and Scope of Work	Stated objectives were to: • Identify current and past potentially contaminated activities on the site • Assess Areas of Environmental Concern (AECs) and Chemicals of Concern (COCs) for the site • Provide recommendations for further assessment, if required The scope of work comprised a desktop study and historical review of past activities at the site with the potential to cause contamination, including: • Review of historical ownership (title search) • Aerial photograph review for 1959, 1965, 1974, 1983, 1993 and 2004 • S.149 Planning Certificate review • Review of OEH notices for the site and nearby properties • Assessment of site topography, geology and hydrogeology including site drainage and regional groundwater usage • Site walkover and visual assessment of activities, potential contaminant sources, property boundaries, surrounding land uses, topography, drainage and nearby sensitive environments.	The stated objective was to assess the contamination status of soil associated with previously identified AEC [as per Coffey 2012]. The scope of work comprised the following: • Excavation of ten boreholes (BH1 – BH10) using a hand auger, in accessible areas of the site • Logging of ground conditions at each borehole • Field screening of soil samples using a photo-ionisation detector (PID) • Analysis of selected samples for contaminants of potential concern (COPC)	Stated objectives are to define potential remediation and validation requirements, provide a sampling plan for DSI to fill data gaps following demolition, evaluate remedial options, recommend the most appropriate remedial strategy, establish validation criteria, outline the remedial process and remediation management requirements. To meet the objectives, Cardno undertook the following scope of work: • Defined site features, history, areas of environmental concern (AEC) and developed a CSM • Defined need and scope of further investigations to address data gaps • Identified suitable remediation options for identified COPCs • Evaluated options and identified the preferred strategy • Outlined implementation of the preferred strategy • Developed a construction environmental management plan (CEMP) outlining environmental controls, and unexpected finds protocol and contingency plan • Identified WHS and community consultation requirements.
Comments from review: Objectives and scope were considered appropriate for each stage of work, given constraints applying at the time. Cardno notes the cRAP was prepared due to a requirement for lodgement with the DA prior to completion of a detailed site assessment, and hence detailed the sampling and investigation requirements of the DSI in addition to potential remedial options and procedures to be implemented based on the findings of the DSI when available. Remediation objectives, remediation options review and remediation implementation sections from Cardno 2019 are discussed in **Attachment B** below.			

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
Site identification and description	Site identified as 9 Church Street, identified as a portion of Lot 7002 DP 1077042. Site area 4,750 m^2 Site plans show the locality and site boundaries, with site features including original court house building (1890), building extension to the west (1982) and building extension to the east (1949). Adjoining land uses identified as: • Mixed commercial and residential to north • James Fletcher Hospital to south • Police Station to the east • Newcastle Grammar to the west	Site identified as Part of Lot 1 in DP 1199904 [current lot identifier, confirmed by the Auditor with reference to SIX Maps NSW] Site area 5,241 m^2 , Zoning B4 Mixed Use The western portion of Lot 1 in DP 1199904 was noted as part of the adjacent property, with a Figure showing the property and investigation site boundaries. Surrounding land use included the police station to east, a hotel/pub across Church Street, and high density residential properties on the southern and western borders and on the northern side of Church Street.	Site identified as 9 Church Street, Lot 1 DP 1199904, site area approximately 0.52 ha (5,194 m^2). Site plans show current layout, buildings to be demolished. Summary of proposed development provided. Immediately adjoining development includes the Grand Hotel and residential apartments and townhouses to the north, the Newcastle Police Station to the east, and James Fletcher Hospital to the south and west.
Comments from review: The Auditor understands a small portion of Lot 1 DP 1199904 comprises an easement within the adjoining James Fletcher Hospital to the east, and is not part of the subject site. The exact site area and boundaries should be confirmed by survey plan. During site inspection, the contractor (Built) advised the James Fletcher Hospital borders the site both to the south and to the west, consistent with Cardno 2019. The Auditor considers it unlikely that adjoining land uses would affect site contamination conditions, except potentially from the police station to the east.			
Site history	Historical titles were searched dating back to 1883. Indicated the site was Crown Land until 1985, and the State of NSW is current owner. Historical aerial photos from 1959 and 1965 show the central Court House building, a building to the east (apparently different in 1965) and vacant to the west where a building now stands. Buildings to the north east of the site appeared similar to current configuration, buildings to the east and south appeared different, and land to the west was vacant. In 1974 the eastern wing had changed configuration. The property to the east changed configuration by 1974, with the police station developed by 1983.	A summary of Coffey 2012 was provided. Prensa noted the s.149 certificate revealed engine works and fuel / oil storage may have been carried out on the site. An email from Newcastle Council in Appendix H indicates a review of historical information revealed the use of 1 Church Street for engine works and fuel / oil storage, and therefore the property at 9 Church Street is not subject to any known contamination issue by Council.	Cardno identified Coffey 2012 and Prensa 2016 as available previous environmental reports, and provided brief summaries. Site history summary limited, stating the site has been in use as a court house since 1890, with little change in landform except the addition of the eastern and western wings in the 1940s and 1960s. Cardno noted that Prensa and Coffey identified several sources of surface and subsurface impact, indicating a low to moderate contamination potential associated with fill materials and degradation of hazardous building materials which will require further assessment, remediation or management under the proposed land use.

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
	By 1993 large buildings had been added along the neighbouring southern boundary. The S.149 certificate indicated the site is within a proclaimed mine subsidence district and may be affected by land contamination. The s.149(2) certificate stated Council records indicate engine works and fuel/oil storage may have been carried out on the land. No sites with notices listed on OEH records were in proximity to the site. OEH heritage records list an extension to the court house to the east for office and court rooms around 1949, with two trial courts later added to the west. Extensive alternations and additions were carried out in 1982, with repairs following the 1989 earthquake undertaken in 1991. Data gaps identified as follows: • Refurbishment and maintenance may have contaminated the land with hazardous building material such as lead paint and asbestos • Type and amounts of fill are unknown • Makeup and condition of underground services was unknown • Not known if pesticides or insecticides were used to maintain gardens		
Comments from review: Pesticide treatment to buildings may also have occurred, as well as in maintenance of gardens (as indicated by Coffey). Coffey did not comment on the s.149(2) information regarding engine works and fuel/oil storage on the land. Subsequent enquiries by Prensa indicated this was a mistake in the records, and applied to the adjacent site to the east (1 Church Street – the police station). No reports have considered this as a potential source of contamination that may affect the site. Historical records have not been obtained from Council. No Dangerous Goods search appears to have been undertaken (either for the site or adjacent police station). The Auditor recommends available records be obtained as part of additional investigations.			
Site condition	Site inspection in 2012 observed the central court house constructed of timer and sandstone, in good condition with the rear of the courthouse unpaved and overgrown with	The northern half of the site was taken up by 3 conjoined buildings, vacant during site works. The southeast portion was a driveway and car park predominantly covered in bitumen. A thin	States the site is currently unused, and currently accommodates the 1892-constructed former Newcastle Courthouse and two non-original 3-storey buildings, comprising the

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
	grass and several large trees. The eastern wing was a brick building in good condition, founded approx. 0.5 m below the Church Street footpath. The western wing was cut into the slope up to 1.8 m and constructed of concrete. The rear of the site may contain fill.	nature strip paralleled the southern boundary, widening into a garden area with soft cover landscaping including bare soil and grass. The western third of the southern side of the building had a concrete walkway which wrapped around the western side of the building. The north side of the site was mainly bitumen hardstand and brick paving with some garden beds. A driveway entrance located in the northwest corner of the site provided access to the buildings underground parking via Church Street.	former Administration Building constructed in 1949 (the eastern building) and the former Supreme Court building constructed in 1966 (the western building). Site features consist of the main central court building, and the eastern and western wings abutting joined by atria. The remainder of the site is either planted, grassed or hardstand covered. Vegetation described. Refers to Napier and Blakeley Asbestos Materials Report indicating asbestos containing materials (ACM) are present within the buildings onsite. Notes a potential breather point observed in the northeast portion of the site in driveway pavement.
Comments from review: Cardno 2018 Geotechnical report provided a more detailed description of site features, including fill structures acting as buttresses to retaining walls on the south western corner of the site, and also noted the possible underground storage tank refill point or breather noted in the northeast portion of the site in the driveway. While this is also mentioned in Cardno 2019, it has not been further investigated nor identified in the CSM as a potential contaminant source.			
Topography and hydrology	Located on a spur on the lower slopes of 'The Hill'. Relatively level site, modified by historical development. Surface water collected into onsite stormwater pits and drained to municipal underground drainage system,	The site was predominantly flat but sloped gradually from west to east in the western portion. The surrounding area sloped south to north and east to west indicating cut and fill activities likely occurred in the past.	The site is situated within elevated, undulating hilly terrain, on generally east to north east facing slopes. Site surfaces ranged from flat to slightly north east and east sloping, a result of cutting into the natural slopes predominantly in the western (uphill) portion during development. The floor level of the western building was in the order of up to 2 m below the adjacent footpath and Church Street road formation level.
Comments from review: Topography and hydrology have been adequately considered, although there is no mention of the stormwater easement through the site.			
Geology and hydrogeology	Newcastle 1:50,000 Geological Sheet indicates the site is underlain by the Newcastle Coal Measures – sandstone, siltstone, claystone, coal and tuff. Search of registered bores in 2009 indicated two registered bores within 1 km radius.	No further assessment of geology or hydrogeology was included (except by way of site observations – noted in the Results section below).	Geology as per Coffey 2012. CSM summarised site geology as Fill material consisting of Gravelly, Clayey and Silty SAND, underlain by Silty Clayey and Sandy CLAY and Silty CLAY followed by sandstone bedrock.

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
	Registered for "Irrigation" purposes, more than 700 m to north of the site, most likely in Hunter River alluvial deposits. Water bearing zones 1.2 – 4.1 m in sand. Based on observations of surrounding topography, groundwater at the site is expected to be located within the underlying bedrock at a depth between about 10 m to 15 m, expected to flow to north and east discharging to the Hunter River of Newcastle Beach.		Based on acid sulfate soils mapping, there are no known occurrences of acid sulfate soils in the immediate area of the proposed development. No details of hydrogeology except in CSM, which states groundwater is present as a shallow rock aquifer approximately 8 to 12 m bgl.
Comments from review: No groundwater information relevant to the site was sourced, and there is no apparent basis for the expected depth of groundwater stated in Coffey, Prensa and Cardno cRAP. Shallow (perched) groundwater may be present on the fill (or soil) / bedrock interface. Coffey 2018 Geotechnical report encountered groundwater inflow during drilling of BH01 (southeast corner of site) at a depth of 8 m bgl, and seepage during drilling at BH3 (to the north of north-western corner of the site) at about 12 m bgl, both in extremely weathered bedrock (silty CLAY).			
Potential contaminants	Potential chemicals of concern (COCs) identified as TPH, PAH, BTEX, OCPs, OPPs, Metals and Asbestos	Potential areas and contaminants targeted comprised asbestos, BTEX, OCP/OPP, PCB, TRH, PAH and heavy metals, particularly lead.	COPCs identified above adopted Tier 1 screening criteria comprised TRH C_{16}-C_{34}, benzo(a)pyrene, BaP TEQ and lead.
Comments from review: Potential contaminants associated with fuel storage have not been considered in the cRAP. The cRAP did not include asbestos in the identified COPCs, although proposed remediation management procedures do cover asbestos contamination. Further consideration should be given to the potential for contamination associated with the existing buildings, including potential sub-slab pesticide treatment, and contamination by hazardous building materials as a result of the proposed demolition works. The Auditor notes that the Napier & Blakely Asbestos Materials Report identified a range of asbestos building products within structures on the site. This included visible asbestos cement debris (small scattered fragments) to the rear of buildings B and C, and asbestos cement water piping and electrical conduit should be presumed present in underground locations across the site. There is a high potential for asbestos contamination to soils to occur from demolition activities, and assessment following demolition should specifically consider this. While unlikely to be present, the Auditor notes that the EPA 2017 *Guidelines for the NSW Auditor Scheme* impose a requirement to specifically consider whether PFAS are a potential contamination issue.			
Conceptual site model (CSM)	CSMs not required at the time of this report. Potential contaminating activities identified as: • Weathering and/or maintenance / demolition of hazardous building materials • Infiltration of potential contaminants through poorly maintained pavements • Potential use of fill on site	No CSM per se was included. Potential sources of contamination targeted during the DSI were limited to uncontrolled historical fill, potential historical use of pesticides and insecticides, and degradation / demolition of hazardous building materials. Potential receptors and exposure pathways were considered to comprise:	Provisional CSM presented, including sources of contamination, COPCs (as above), distribution of COPCs, site specific lithological information (as above) and actual and potential receptors. The provisional CSM is to be updated pending the results of further testing. Potential contaminant sources include: • Uncontrolled placement of fill material

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
	• Potential use of pesticides and insecticides Noted that the site has been developed over time, and the only accessible soil on site is limited to an approximately 10 m x 30 m area at the rear of the site.	• Future site occupants, from direct contact and inhalation (dermal contact and ingestion) with contaminated soil, dust and fibres; and vapour intrusion and inhalation from volatile contaminants. • Shallow and intrusive maintenance and excavation workers (including construction) with pathways as above. • Groundwater.	• Uncontrolled demolition, weathering and maintenance of buildings containing hazardous building materials • Potential pesticide and insecticide use and storage Given the depth to groundwater and COPCs identified for soil, site sourced groundwater impacts are not expected. Should additional investigation reveal a risk to groundwater, these will be incorporated into the CSM. Receptors include current and future site users and construction and maintenance workers, with complete pathways including direct contact and ingestion pathways to contaminated soil. Ecological receptors identified by considered to be low significance. Further investigation required to assess statistical significant of findings.
Comments from review: Prensa did not expand potential contaminant sources from those identified by Coffey. Vapour intrusion was considered as a potential exposure pathway by Prensa, but not in Cardno's CSM. As noted above, the potential on-site UST and fuel/oil storage on the adjacent police station have not been included as potential contamination sources. Potential contaminant impacts from proposed demolition works should also be given further consideration.			
Sampling plan and methodology	No sampling undertaken.	A DQO process was included in Appendix A. The "Problem" was based on contamination sources identified by Coffey. Decisions related to identifying CoPC associated with potential soil contamination, what risks the CoPC present, and whether remediation or management was required prior to divestment. Methodology was described, noting boreholes were progressive using a hand auger in accessible areas, with sampling density in general accordance with the minimum described in AS4482.2 for a site of this size. The hand auger was decontaminated between boreholes. Soil samples were collected directly from the hand auger, and a PID was used to screen the soil profile for potential volatile	DQOs for further investigations provided. The "Problem" was identified as COPCs exceeding Tier 1 criteria, however Cardno noted that complete assessment of the site is yet to be undertaken. Decisions align with cRAP objectives summarised above. Inputs include previous investigations and those to be undertaken. The vertical extent of excavations was defined as the depth of fill or depth of proposed excavations. Decision rules, DQIs and an outline sampling plan provided. Specific investigation locations not defined, but number of sampling points to be based on NEPM guidance and NSW EPA

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
		organic compounds (VOC) and evidence of hydrocarbon contamination. Subsurface conditions were logged and borehole logs provided in Appendix D.	Waste Classification guidelines. s.8.1.1 indicates a minimum of 10 samples for a site of 0.32 ha, but will be further assessed prior to investigations. Detailed methodology not provided, but reference to guidelines.
Comments from review: Previous investigations have been limited by site accessibility (buildings occupying most of the site). A detailed sampling and analytical quality plan should be prepared for the further investigations, taking into account the potential contamination sources and exposure pathways (notably potential hydrocarbons storage and use on site or on adjacent land; potential groundwater impact and vapour intrusion, and impacts from proposed demolition works). The preliminary CSM should be updated, incorporating these factors, as a basis for planning investigations.			
QA/QC	Not discussed (no investigations undertaken)	Data quality indicators (DQIs) were established as part of the DQO process. Samples were analysed by NATA accredited labs, Envirolab and Eurofins MGT for the COPC listed above. Two samples were also analysed for leachable benzo(a)pyrene using ASLP. Prensa reviewed QA/QC in Appendix F. Sampling procedures and sample handling documented and considered acceptable. A blind and split duplicate sample were analysed for the CoPC (excluding asbestos). RPDs were acceptable in accordance with DQI thresholds except for benzo(a)pyrene TEQ calculation (PQL) in one sample, with results close to the laboratory PQL and attributed to soil heterogeneity. Rinsate and trip blanks were analysed with acceptable results (one spike attributed to plastic containers). Laboratory QA/QC was reviewed and considered acceptable. Prensa considered the data could be relied upon for the purposes of the assessment.	Relatively comprehensive DQIs outlined as part of DQO process.
Comments from review: QA/QC has been adequate in the investigations undertaken to date, and appropriate QA/QC procedures are outlined for the proposed future investigations.			

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
Basis of assessment criteria	Not discussed (no investigations undertaken)	Criteria adopted from NEPC 2013 Schedule B1, for current commercial / industrial and potential future high density residential land use. Appendix C discussed HILs, HSLs (including CRC CARE 2011 HSLs). Sandy soil type selected as a conservative approach. Petroleum hydrocarbon management limits were included, with EILs and ESLs. An asbestos criterion of 0.1 g/kg for asbestos identification in soil and non-detection for trace analysis was adopted. Criteria were shown in results tables.	HILs, HSLs, EILs and ESLs for residential sites without accessible soils adopted for additional investigation stage and as validation Remediation Goals (RGs) for any remedial works. As the Site will operate as an educational facility, the NEPM 1999 HILs for Residential B (HIL B), HSLs for Residential B (HSL B), and the EILs and ESLs for Urban Residential areas and Public Open Space have been adopted. HSLs for Sand textures have been applied. Aesthetic criteria will also apply. Criteria presented in Table 5-1.
Comments from review: Assessment criteria are generally considered appropriate.			
Results of investigations	None undertaken.	Fill material was encountered across the site to depths generally ranging from surface to 1.2 m bgl, except for BH10 where fill was encountered to 3.3 m bgl. Fill was underlain by weathered sandstone and clay encountered at depths between 0.55 m and 0.8 m bgl in BH5-BH7 and BH9. Groundwater was not encountered, and no visual or olfactory evidence of soil contamination, including suspected asbestos-containing materials (ACM) was noted during sampling. The highest PID reading was 5.1 ppm, indicating VOCs were unlikely to be present. Asbestos was not detected, and COPC were less than adopted assessment criteria for commercial / industrial or high-density residential land use except the following: • Benzo(a)pyrene (BaP) in 3 samples greater than commercial / industrial and high density residential ecological screening level (ESL) [3.6 mg/kg to 5	CSM summary and risk assessment section noted the following: • Identified lead and BaP TEQ in fill indicate potential health risk via ingestion and direct contact. Further investigation, remediation, management or risk assessment required to determine or mitigate the risk and render the site suitable for the proposed land use. Remediation prior to completion of development, potential impact considered to be the depth of fill, pending further investigations. • BaP and TRH $C1_6$-C_{34} require further assessment to determine whether concentrations are statistically significant and to compare against current guidelines. As the majority of the site is likely to remain as hardstand, potential risks to ecological receptors are considered to be low. [Cardno noted the ESL for BaP used by Prensa was the NEPM low reliability ISL, and CRC CARE

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
		mg/kg vs ESLs of 1.4 mg/kg and 0.7 mg/kg respectively] • BaP Toxicity Equivalent Quotient (TEQ) in 3 samples greater than the high density residential health investigation level (HIL) [5.2 mg/kg to 7.3 mg/kg vs HIL of 4 mg/kg] • TRH (C_{16}-C_{34}) in one sample greater than the high density residential ESL [340 mg/kg vs ESL of 300 mg/kg] • Lead in one sample greater than the high density residential HIL and EIL [1,400 mg/kg vs EIL of 1129 mg/kg and HIL of 1200 mg/kg] Leachable concentrations of benzo(a)pyrene were less than the laboratory PQL.	has since published a high reliability ecological guideline of 33 mg/kg]. • Data gaps exist due to the inability to conduct complete investigations beneath the building and hardstand footprints. • There is likely to be variability in the quality and type of fill at the site. Should unidentified areas of soil impacts be discovered in further phases of site work, additional investigations and addition to the cRAP will be required. • An Unexpected Finds Protocol is to be developed dictating actions and responses.
Comments from review: Contamination identified to date is relatively minor, and if contamination found by further investigations is consistent with this, it may not be statistically significant. If that is the case, remediation per se may not be required, and contamination issues would be limited to appropriate classification and disposal of waste.			
Site characterisation / discussion		Included discussion of results as above. Discussion noted selected soil samples collected from fill across the site (excluding the garden beds) were analysed for COPC. Based on the analytical results and field observations Prensa considered the presence of benzo(a)pyrene was likely associated with the presence of bitumen fragments in the fill, with the potential for leaching being low. Ecological criteria were exceeded for TRH and lead, but based on the urban setting of the site and soil conditions encountered, Prensa considered it unlikely that soil processes or biota would be materially affected, given the current zoning of the site, and as such the potential risk to significant ecological receptors was considered low. The lead exceeding the HIL for high density residential use was considered a statistical	Discussion mentioned in other points above.

Aspect	Coffey 2012 Phase 1 ESA	Prensa 2016 DSI	Cardno 2019 cRAP
		outlier. The sample was collected at shallow depth in proximity to the northern façade of the old court house, and could be attributed to lead based paint in surface soils rather than being representative of fill across the site.	
Comments from review: Site characterisation discussions adequately addressed in at least some sections of the respective reports.			
Conclusions	The site was assessed as having a low to medium likelihood of soil contamination. Potential contamination relates to: • Weathering and or maintenance / demolition of hazardous building materials • Potential use of fill • Potential use of pesticides and insecticides Given buildings and pavements cover the majority of the site, exposure to and/or offsite migration of potential soil contamination is limited. If the buildings and pavements remain in their current configuration then further investigation is not required at this time.	The concentrations of TRH, benzo(a)pyrene and lead would not preclude an ongoing commercial use of the site. Based on the fieldwork undertaken and analytical results, Prensa concludes that the potential risk to human health and the environment, in light of the proposed divestment of the site under current land zoning, is low-moderate given the potential for future high density residential land use at the site.	No conclusions presented.
Comments from review: Coffey and Prensa conclusions considered appropriate for the respective stages of assessment. Absence of conclusions in cRAP is contrary to reporting guidelines, but doesn't affect overall content of the cRAP or the Auditor's opinions regarding it's appropriateness.			
Recommend-ations	Should redevelopment be proposed, including demolition of non-heritage listed buildings and pavements, Coffey recommends a Phase 2 ESA be carried out targeting the identified AECs that are likely to impact on the proposed development. The assessment should include, but not necessarily be limited to, the collection of surface soil samples from fill, around the buildings and gardens and laboratory analysis of samples for the identified COCs.	Should the site be redeveloped for a more sensitive land use such as high density residential, further assessment, management and/or remediation of fill across the site is recommended in open areas and beneath slabs following any proposed demolition.	No summary of recommendations. Various recommendations contained throughout the cRAP as discussed above.
Comments from review: Coffey and Prensa recommendations are considered appropriate, and the cRAP is consistent with following these recommendations.			

7 Attachment B: Review of Cardno 2019 cRAP

Aspects of the Cardno cRAP relating to site characteristics, summary of previous investigations and the proposed additional investigations are reviewed / discussed in Table 1 above.

For the remediation and management aspects of the RAP, the Auditor has referred to the specific reporting requirements for RAPs from the *Guidelines for Consultants Reporting on Contaminated Sites* (OEH 2011). The compliance of the RAP with these requirements is illustrated in Table 2.

Table 2 cRAP compliance with Reporting Guidelines (OEH 2011)

Reporting requirement	cRAP compliance
Remediation goals	Section 5.1 - purpose of proposed remedial works is to complete site characterisation, and manage and/or remediate identified impacts such a way that potential risks to human health and the environment are minimised or eliminated. Primary objectives for the remedial works are to: • Complete the characterisation of the Site through additional soil investigations • Remediate or manage identified benzo(a)pyrene, lead and TRH impacted soils and any impacts identified during further investigation in such a manner that the potential risk to human health or the environment is minimised; and • Remediate or manage impacted soils in such a manner that the Site is made suitable for the proposed land use as an educational and student accommodation facility. Remediation goals are discussed in Table 1 above, in relation to Assessment Criteria.
Auditor's opinion: Remediation objectives and goals are considered appropriate for contamination identified to date. Further goals will be required if there is impact to groundwater or vapour intrusion risk.	
Discussion of extent of remediation required	Not specifically discussed, pending additional investigations. Limited to areas of site where demolition and redevelopment will occur. DQOs (s.6.1 Step 4) indicate vertical study boundaries are limited to depth of fill or depth of proposed excavation for waste classification purposes. s.5.4 – notes further investigation or remediation may be required during the construction phase of the proposed works. Triggers may include: • Unexpected finds including impacted (visually stained and/or odorous) soils during earthworks • Presence of previously unidentified asbestos • Identification of buried waste.
Auditor's opinion: The Auditor agrees that contamination beneath the heritage court house building is unlikely. The potential extent of remediation has not considered potential impacts from fuel storage and handling, either on-site or from adjacent site to the east (police station), which could involve remediation other than that limited to the depth of existing fill. This could be provided in a detailed RAP following the proposed additional investigations.	

Reporting requirement	cRAP compliance
Discussion of possible remedial options and how risk can be reduced	s.7.2 - Remediation hierarchy outline based on recommended NSW EPA screening process. (See further comment in **Table 3** below). s.7.3 – outlines remedial options and discussed advantages and disadvantages. General characteristics of proposed development (excavation works required, buildings or hardstand proposed) considered in preferred options.
Auditor's opinion: Discussion of options is considered generally appropriate, although not all factors (eg. timing, transport risks, sustainability) have been considered in the evaluation, and potential fuel impacts have not been considered in remediation requirements, as noted in **Table 1**.	
Rationale for the selection of recommended remedial option	s.7.3 - selection of preferred option pending further investigation results, finalised design and business case for implementing each option. As such, two scenarios provided incorporating the preferred options. s.8.2 – Remediation strategy (RS) 1 involves off-site disposal of soils impacted with COPCs above adopted Tier 1 criteria. Takes advantage of excavation and removal of soil required for the development, to remedy identified impacts. Outlines sequence of works and validation requirements. Formal RAP to be developed detailing proposed works and site specific control measures. s.8.3 – RS 2 involves a combination of off-site disposal as required for construction, and on-site containment using hardstand paving, basements, behind retaining walls or within lift shafts. Subject to geotechnical requirements. Outlines sequence of works and validation requirements, including inspections and survey of capping measures. Capping to meet requirements of ANZECC 1999 *Guidelines for the On-site Containment of Contaminated Soil*. Nominal requirements include marker layer, buffer layer and impervious hardstand.
Auditor's opinion: Rationale is reasonable for contamination identified to date, although potential fuel impacts not considered. Required cut/fill balance not specified, which may influence preferred option (i.e. if there is a net requirement to remove material from the site and volumes are relatively small, containment may not be warranted). Lift shafts likely to be generators of excess spoil rather than potential containment volume.	
Data gaps	s.8.1.1 – outlines data gap investigations. See also **Table 1** above. Additional sampling and inspection to refine the lateral extent of impact for previously and any new identified AECs. Waste classification to characterise fill material and any natural soils requiring excavation and disposal.
Auditor's opinion: Data gaps are acknowledged in cRAP. As noted in **Table 1**, a detailed SAQP should be developed, taking into account the potential contamination sources and exposure pathways.	
Validation plan	s.11 – requirements for validating remaining soils, re-use or imported soils, and implementation of any on-site containment measures. Outlines requirements for visual inspection and survey, validation of excavations, soil for re-use, excavated natural material and imported fill.
Auditor's opinion: Combined with DQO sections in the cRAP, the validation plan is considered adequate at a concept level, but would require further detail once site characteristics and remediation requirements are fully established. This could be provided in a detailed RAP following the proposed additional investigations.	

Reporting requirement	cRAP compliance
Contingency plan if the selected remedial strategy fails	s.12 – outlines measures to address previously unidentified contamination (further assessment), greater soil volumes (strategies are scalable), unintended release of stockpiled soil or water (stockpile management and weather forecasts) and water ingress to excavations (removal, dewatering or barrier).
Auditor's opinion: Two remediation strategies have been presented, however neither takes potential impacts from fuel storage into account. Reasonably foreseeable contingencies are summarised, and measures are considered feasible but are presented in little detail. Further detail could be provided in a detailed RAP. Contingencies are less likely to be required if and when the site is further characterised.	
Adopted remediation criteria	s.5.2 – see **Table 1** above.
Interim site management plan (before remediation)	Not stated. Site is vacant and fenced, further site management is not considered to be required.
Site management plan (operational phase)	s.9 – outlines a Construction Environmental and Waste Management Plan to minimise potential impacts of [remediation] works on the local environment, site workers and third parties. Requirements outlined for management of stockpiles, waste tracking, excavation water, air quality and dust, asbestos waste, unexpected finds, stormwater, noise, excavation and transport, site management, and stakeholder roles and responsibilities. s.10 – outlines requirements for work health and safety (WHS), including requirement for the Principal Contractor to develop specific WHS documents. An incident management plan is provided, and requirements for incident reporting and community consultation outlined.
Auditor's opinion: The outline provided is generally appropriate. There should be a requirement for the remediation contractor or site developer to prepare a detailed CEMP.	
Remediation schedule	Not stated. (Not likely to be known at this time).
Hours of operation	Not stated.
Contingency plans to respond to site incidents	Provided in s.10.2, for medical emergencies, fire and environmental incidents. Could be covered in more specific detail in a CEMP.
Identification of regulatory compliance requirements	s.13 – identifies waste management and environmental protection requirements (asbestos waste management further discussed in s.9.4). Notes that under SEPP 55, works are considered to be Category 2 remediation work not needing consent, but prior notification and provision of a Site Validation Report would be required.
Auditor's opinion: The cRAP does not acknowledge that on-site containment would make the remediation Category 1, under Council's *Newcastle Development Control Plan 2012* and the associated *Technical Manual, Contaminated Land Management*. (Although the Auditor notes that Cardno Technical Note dated 29 April 2019 notes that DPE stated if the site requires remediation works, it must form part of the development as it would be Category 1 remediation).	

Reporting requirement	cRAP compliance
Names and phone numbers of appropriate personnel to contact during remediation	Not stated. (Not likely to be known at this time).
Community relations plans	s.10.4 – requirement mentioned. s.9.9.6 identifies Client / Owner as responsible for liaison with neighbours and other stakeholders.
Staged progress reporting, where appropriate	Mentioned in s.8.1.1 in relation to assessment, but not further discussed in relation to remediation and validation.
Auditor's opinion: The Auditor recommends review by an accredited site auditor of the proposed DSI report and proposed detailed RAP prior to commencement of remediation. If development is staged, associated reporting could be carried out independently for each stage (subject to development consent allowing for this).	
Long term site management plan	s.8.3.3 – if on-site containment is adopted, a Long Term Environmental Management Plan (LTEMP) would be required to detail the location and nature of the emplaced soils, and the ongoing responsibilities and management requirements for the material. The LTEMP would include strategies to avoid the likelihood of breaching the capping layer, and procedures to be following in the event a breach occurs.
Auditor's opinion: The cRAP does not provide a draft LTEMP, nor propose how implementation of a LTEMP would be enforced. The Auditor suggests a condition of consent could be included as a contingency, requiring implementation of any LTEMP as part of operation of the development. (EPA guidelines have specific requirements for a LTEMP, as discussed in **Table 3** below). If a detailed RAP is prepared following detailed investigations which requires long term management as part of the preferred remediation strategy, a draft LTEMP should be provided as part of the RAP.	

The *Guidelines for the NSW Site Auditor Scheme* (EPA 2017) also provides specific guidance in relation to remediation policy and issues. Compliance of the RAP with relevant issues from this guidance is illustrated in **Table 3**.

Table 3 Compliance with remediation policy (from EPA 2017)

Aspect	cRAP compliance
Remediation hierarchy	Discussed in s.7.2 of cRAP. The Auditor notes the remediation hierarchy presented is not consistent with current guidelines, as it puts "do nothing" first rather than last (eg. may be acceptable if remediation has no net environmental benefit); and the lower options of off-site disposal and on-site containment have been reversed in NEPC 2013 which is referenced by NSW EPA 2017.
On-site containment and capping	On-site containment and/or capping is one of two options put forward in the cRAP. EPA 2017 includes specific requirements (long term stability, no erection of structures that may result in a risk of harm, notification

Aspect	cRAP compliance
	mechanism) which have not been specifically discussed in the cRAP, but which are likely able to be addressed, with engineering design if necessary to address vapour intrusion risks (if any). The Auditor notes that Council's *Newcastle Development Control Plan 2012* and the associated *Technical Manual, Contaminated Land Management* also have specific requirements relating to capping / containment of contaminated soil, including that this would be category 1 remediation.
EMPs	EPA 2017 (s.3.4.6) has specific requirements for long term management plans, including review of the EMP by an auditor, that the EMP can reasonably be made legally enforceable, public notification of any restrictions applying to the land, and no off-site migration of contamination from the land. The cRAP does not specifically discuss any of these issues.
Contamination at depth	The cRAP does not currently propose to leave any contamination at depth (currently identified contamination assumed to be confined to fill material). Should deeper contamination be identified as a result of additional investigations but proposed to be left at depth, the specific requirements of EPA 2017 s.4.3.4 would need to be addressed.
Vertical mixing	Vertical mixing is not proposed.
Bioremediation	Bioremediation of contaminated soils is mentioned in discussion of options but is not proposed.
Waste management	Waste management requirements are discussed briefly in Sections 9.1.1 and 9.4 of the cRAP. Further details are required to ensure the requirements of EPA 2017 s.4.3.7 are met, if the remediation works are subject to site audit.
Chemical Control Orders / asbestos waste	No contaminants subject to chemical control orders have been identified on the site. Requirements relating to asbestos waste management are discussed in s.9.4 of the cRAP.
Groundwater remediation and management	Groundwater contamination has not been assess, and has not been considered in data gaps discussed in the cRAP.
Hazardous ground gas remediation and management	Hazardous ground gas has not been considered as a potential contamination issue in the cRAP. This could include methane from shallow coal workings (which the Auditor understands are subject to further geotechnical investigation) as well as potential vapour intrusion if fuel impacts are present to soil or groundwater.
Auditor's opinion: While the cRAP is not contrary to remediation policy, it does require additional detail in a number of areas to address EPA 2017 remediation policy and guideline requirements. This could be provided in a detailed RAP following the proposed additional investigations.	

Attachment C: Limitations to Interim Advice

This Interim Advice has been prepared as part of a site audit undertaken in accordance with relevant provisions of Part 4 of the Contaminated Land Management (CLM) Act 1997.

This Interim Advice:

1. has been prepared by Ian Gregson and members of his support team as indicated in the appropriate sections of this Interim Advice ("GHD") for dwp and Azusa Sekkei;
2. may be used and relied on by dwp and Azusa Sekkei;
3. may be used by and provided to the EPA and the relevant planning authorities for the purpose of meeting statutory obligations in accordance with the relevant sections of the CLM Act 1997 or the Environment Planning and Assessment (EP&A) Act 1979;
4. may be provided to other third parties but such third parties' use of or reliance on the Interim Advice is at their sole risk, as this Interim Advice must not be relied on by any person other than those listed in 1-3 above without the prior written consent of GHD; and
5. may only be used for the purpose as stated in **Section 1** of the Interim Advice (and must not be used for any other purpose).

GHD and its servants, employees and officers (including the Auditor) otherwise expressly disclaim responsibility to any person other than dwp and Azusa Sekkei arising from or in connection with this Interim Advice.

Whereas these current opinions and recommendations have been provided as interim guidance to assist in the assessment and management of contamination issues at the site, this guidance should not be regarded as "approval" of any proposed investigations or remedial activities, as such approval is beyond the scope of an independent review. The NSW EPA *Guidelines for the NSW Site Auditor Scheme* (2017) contains a description of the site assessment and audit process, which includes the following:

- A site audit is the second in two tiers of work in the site assessment and remediation process.
- The **'first tier' is the work of a contaminated site consultant**, generally engaged by the site owner or developer. The contaminated site consultant designs and conducts a site assessment and any necessary remediation and validation, and documents the processes and information in reports; and
- The **'second tier' is the site audit** which involves a site auditor independently and at arm's length reviewing, for one of the audit purposes stated in the CLM Act, the consultant's assessment, remediation and validation plans or reports. The material outcomes of a site audit are a site audit report and site audit statement.

The purpose of the auditor's review is to assess whether the works undertaken (or proposed to be undertaken) comply with current regulations, standards and guidelines, and that the site has been assessed, remediated and validated to a standard appropriate for the proposed land use. In the first instance, the contaminated land consultant should be satisfied that the work to be conducted conforms to all appropriate regulations, standards and guidelines; and is appropriate, based on the site's historical land use, physical characteristics and proposed land use.

This interim review and advice do not constitute an audit under the provisions of the Contaminated Land Management (CLM) Act 1997, and do not pre-empt the conclusions which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be completely known and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgement must be exercised in the collection and interpretation of the data. In the conduct of

this review, in particular, reliance has been placed on data provided in the various site investigation and assessment reports. The Auditor is unable to provide certification outside of areas over which he had some control or is reasonably able to check, and does not accept responsibility for inaccuracies in information provided for review as part of this Audit.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Interim Advice are excluded unless they are expressly stated to apply in this Interim Advice.

The services undertaken by the Auditor, his team and GHD in connection with preparing this Interim Advice were undertaken in accordance with current profession practice and by reference to relevant guidelines made or approved by the EPA under Section 105 of the CLM Act 1997.

The opinions, conclusions and any recommendations in this Interim Advice are based on assumptions made by the Auditor, his team and GHD when undertaking services and preparing the Interim Advice ("Assumptions"), as specified throughout this Interim Advice. GHD and the Auditor expressly disclaim responsibility for any error in, or omission from, this Interim Advice arising from or in connection with any of the Assumptions being incorrect.

Subject to the paragraphs in this section of the Interim Advice, the opinions, conclusions and any recommendations in this Interim Advice are based on conditions encountered and information reviewed at the time of preparation of this Interim Advice and are relevant until such times as the site conditions or relevant legislations changes, at which time, GHD expressly disclaims responsibility for any error in, or omission from, this Interim Advice arising from or in connection with those opinions, conclusions and any recommendations.

The Auditor and GHD have prepared this Interim Advice on the basis of information provided by the client, their consultants and others who provided information to GHD (including Government authorities), which the Auditor and GHD have not independently verified or checked ("Unverified Information") beyond the agreed scope of work.

The Auditor and GHD expressly disclaim responsibility in connection with the Unverified Information, including (but not limited to) errors in, or omissions from, the Interim Advice, which were caused or contributed to by errors in, or omissions from, the Unverified Information.

The opinions, conclusions and any recommendations in this Interim Advice are based on information obtained from, and testing undertaken at or in connection with, specific sampling points and may not fully represent the conditions that may be encountered across the site at other than these locations. Site conditions at other parts of the site may be different from the site conditions found at the specific sampling points.

Although reasonable care has been used to assess the extent to which the data collected from site is representative of the overall site condition and its beneficial uses, investigations undertaken in respect of this Interim Advice are constrained by the particular site conditions as discussed in this Interim Advice. As a result, not all relevant site features and conditions may have been identified in this Interim Advice.

Site conditions (including any the presence of hazardous substances and/or site contamination) may change after the date of this Interim Advice. The Auditor and GHD expressly disclaim responsibility:

- Arising from, or in connection with, any change to the site conditions;
- To update this Interim Advice if the site conditions change.

These Disclaimers should be read in conjunction with the entire Interim Advice and no excerpts are taken to be representative of the findings of this Interim Advice. This Interim Advice should not be altered, amended or abbreviated, issued in part or issued incomplete in any way without prior checking and approval by GHD.

6 December 2019

Katherine Daunt
Design Director
dwp Australia Pty Ltd
16 Telford Street
Newcastle NSW 2300

Our ref: 12519246
Your ref: SSD-9787

c.c. Sita Vasanthakumar (Built P/L)

Dear Katherine

Newcastle Courthouse Redevelopment - Nihon University - Site Audit Interim Advice #2 – Review of SAQP

1 Introduction

Ian Gregson of GHD has been engaged to undertake a site audit under the provisions of the Contaminated Land Management Act (CLM Act) 1997 in relation to assessment and remediation of contamination at the proposed Nihon University site (former Newcastle Courthouse), located at 9 Church Street Newcastle (the site) and identified as Lot 1 DP 1199904.

The purpose of this Interim Advice is to provide the Auditor's opinion of the appropriateness of the Sampling, Analysis and Quality Plan (SAQP) for supplementary detailed investigations to allow finalisation of the remediation requirements for the site. These comments are provided on the basis of site inspections and previous review of reports as listed in Attachment A to this Interim Advice. The report which is the subject of this Interim Advice is as follows:

- Douglas Partners 2019, *Sampling, Analysis and Quality Plan, Supplementary Detailed Site Investigation (Contamination), Nihon University Australia, Newcastle Campus Project, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 21 November 2019.

Please note that this communication has been provided as Interim Advice only, as part of the audit process. The advice does not constitute a site audit report or site audit statement under the provisions of the CLM Act, and does not pre-empt the conclusions, which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

This Interim Advice relates solely to the contamination at the site, and is not intended to provide any opinions regarding the compliance or status of other aspects of the proposed site redevelopment.

The opinions and recommendations offered in this Interim Advice are subject to the attached Limitations.

2 Review methodology

I have reviewed the available contamination assessment and management reports in the context of guidelines made or approved by the NSW EPA under the provisions of the CLM Act, including the following:

- NEPC 2013, *National Environment Management (Assessment of Site Contamination) Measure 1999*
- NSW EPA 1995, *Sampling Design Guidelines*

- NSW EPA 2017, *Guidelines for the NSW Site Auditor Scheme*
- NSW OEH 2011, *Guidelines for Consultants Reporting on Contaminated Sites*
- NSW EPA 2012, *Guidelines for the Assessment and Management of Sites Impacted by Hazardous Ground Gases*.

3 Review comments

As indicated in the SAQP, its objective was to identify existing data gaps in relation to site contamination issues and to document the proposed supplementary DSI scope for site characterisation. The supplementary DSI will be used to support a planning proposal to allow for the redevelopment of the site.

I consider the SAQP is relatively comprehensive and in substantial accordance with relevant guidelines, and addresses the data gaps (by way of proposed investigations and/or by information incorporated in the SAQP) identified in my Interim Advice #1 dated 12 November 2019.

The following items should be taken into consideration in implementation of the SAQP.

1. The SAQP identifies the site as Lot 1 DP 1199904, comprising a rectangular shaped area of approximately 5194 m^2. A survey drawing is provided in Appendix C. The SAQP notes there is an easement for services along the western site boundary, which (from the Auditor's observations) appears to be located beyond a fence line separating the proposed development site from the existing hospital development to the west. The SAQP notes that development is not proposed within this easement, but proposes investigations within the easement to assess baseline conditions. The previous cRAP (Cardno 2019) indicated the easement was not part of the development site.

   For lack of doubt in investigations and associated reporting, please confirm whether this easement is within the proposed development site, for the purposes of defining the site audit boundary (i.e. will the whole of Lot 1 DP 1199904 be subject to the relevant conditions of the Development Consent?).

2. Section 7 of the SAQP lists potential contaminant sources and potential chemicals of concern. As noted in Section 9 of the SAQP, the potential contaminants associated with the wash bay on the Police Station site include VOCs (eg. associated with solvents or degreasers). VOCs (including chlorinated hydrocarbons) should be added to the potential chemicals of concern in sections 7, 10.3.1 (soil sample analysis – for soils potentially impacted by this contaminant source), and 10.3.2 (groundwater sample analysis).
3. Section 9, Table 1 (CSM) – potential impacted media for the UST and wash bay sources should include soil vapour. Potential pesticide use (sources) should include under-slab / structures pesticide treatment. The CSM should include hazardous ground gases from former mine workings.
4. Section 10 – the proposed sampling strategy is considered appropriate. The Auditor notes that the sampling density may not be sufficient to detect isolated hot spots (if present), but should be sufficient to determine typical soil conditions. Further sampling and analysis may be required if results indicate significant variability. The post-demolition assessment should include a thorough inspection of the remaining soil surface, and potentially additional shallow sampling if evidence of impacts from demolition (or previous fill quality) is observed.
5. Section 10.3.1 (p.16) notes analysis of asbestos in soils will be undertaken where there is potential asbestos contamination. Details of this analysis are not provided. Where there is evidence of asbestos contamination, assessment and analysis should be undertaken in accordance with WA

DoH 2009, including field sieving / assessment of 10 L bulk samples and laboratory analysis of minimum 500 mL subsamples for asbestos identification or (if required) FA/AF.

6. Section 10.4 – Step 1 should include obtaining information for appropriate management of excess soils from the development works. Step 2 decisions should include "Is there a risk from ground gas / soil vapour?", and "What are the waste management requirements for excess soils associated with the development?". Step 3 inputs should include ground gas / vapour samples. Step 5 should include field screening for hazardous ground gases / vapour. Step 6 should also include gas / vapour. (I note the SAQP includes assessment of hazardous ground gases and vapour – it just isn't documented in the DQOs).
7. Section 10.4 Step 5 mentions DQIs, but the measures for evaluation are not stated. The cRAP (Cardno 2019) has more detailed measures of DQIs, which should be incorporated in the DSI reporting. Douglas Partners should also refer to Appendix C, Schedule 2 of NECP 2013 when documenting the assessment of data quality in the DSI report, including the information required in section 19.10 *Quality assurance and quality control checklist* (NEPC 2013).
8. Section 12 – reporting should also include (amongst other information) details of the investigations undertaken, and an updated CSM and risks to receptors. When reporting, reference should also be made to the *Guidelines for the NSW Site Auditor Scheme* (EPA 2017) to make sure all relevant issues are addressed and documented in the DSI report.

4 Conclusions and recommendations

In summary, I consider the SAQP is appropriate and generally an adequate basis to proceed with the DSI. The comments above should be taken into consideration in implementing the SAQP (including analyses undertaken, triggers for additional investigation, and assessment and reporting).

Please keep me advised of progress so I can undertake a site inspection during the post-demolition investigations.

I trust these comments are sufficient for your current purposes. Please contact me if you wish to discuss anything further.

Sincerely
GHD

Ian Gregson
Principal Environmental Consultant, NSW EPA Accredited Site Auditor, Accreditation No. 0101
+61 2 4979 9904

Attachments A: Site Inspections and Previously reviewed documents
B: Limitations to Interim Advice

Attachment A: Site inspections and previously reviewed documents

Site inspections have been undertaken by the Auditor as follows:

- Brief site inspection of the former Newcastle Courthouse site on 8 November 2019
- Inspection of the adjacent Police Station site on 14 November 2019

The following documents have previously been reviewed as part of this site audit:

- Cardno 2019, *Conceptual Remediation Action Plan, 9 Church Street, Newcastle NSW*, Cardo (NSW/ACT) Pty Ltd, 28 May 2019
- Coffey 2012, *Phase 1 Environmental Site Assessment Newcastle Courthouse and Former Newcastle East Public School*, Coffey Environments, 25 July 2012
- Prensa 2016, *Detailed Site Investigation, 9 Church St, Newcastle, NSW 2300*, Prensa Pty Ltd, October 2016
- Napier & Blakely 2008, *The Newcastle Courthouse, Church Street, Newcastle NSW, Asbestos Materials Report*, Napier & Blakely Pty Ltd, August 2008
- Cardno 2018, *Report on Geotechnical Investigation, Newcastle Courthouse Redevelopment*, Cardo (NSW/ACT) Pty Ltd, 20 December 2018

Attachment B: Limitations to Interim Advice

This Interim Advice has been prepared as part of a site audit undertaken in accordance with relevant provisions of Part 4 of the Contaminated Land Management (CLM) Act 1997.

This Interim Advice:

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2. may be used and relied on by dwp and Azusa Sekkei;
3. may be used by and provided to the EPA and the relevant planning authorities for the purpose of meeting statutory obligations in accordance with the relevant sections of the CLM Act 1997 or the Environment Planning and Assessment (EP&A) Act 1979;
4. may be provided to other third parties but such third parties' use of or reliance on the Interim Advice is at their sole risk, as this Interim Advice must not be relied on by any person other than those listed in 1-3 above without the prior written consent of GHD; and
5. may only be used for the purpose as stated in **Section 1** of the Interim Advice (and must not be used for any other purpose).

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Whereas these current opinions and recommendations have been provided as interim guidance to assist in the assessment and management of contamination issues at the site, this guidance should not be regarded as "approval" of any proposed investigations or remedial activities, as such approval is beyond the scope of an independent review. The NSW EPA *Guidelines for the NSW Site Auditor Scheme* (2017) contains a description of the site assessment and audit process, which includes the following:

- A site audit is the second in two tiers of work in the site assessment and remediation process.
- The **'first tier' is the work of a contaminated site consultant**, generally engaged by the site owner or developer. The contaminated site consultant designs and conducts a site assessment and any necessary remediation and validation, and documents the processes and information in reports; and
- The **'second tier' is the site audit** which involves a site auditor independently and at arm's length reviewing, for one of the audit purposes stated in the CLM Act, the consultant's assessment, remediation and validation plans or reports. The material outcomes of a site audit are a site audit report and site audit statement.

The purpose of the auditor's review is to assess whether the works undertaken (or proposed to be undertaken) comply with current regulations, standards and guidelines, and that the site has been assessed, remediated and validated to a standard appropriate for the proposed land use. In the first instance, the contaminated land consultant should be satisfied that the work to be conducted conforms to all appropriate regulations, standards and guidelines; and is appropriate, based on the site's historical land use, physical characteristics and proposed land use.

This interim review and advice do not constitute an audit under the provisions of the Contaminated Land Management (CLM) Act 1997, and do not pre-empt the conclusions which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be completely known and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgement must be exercised in the collection and interpretation of the data. In the conduct of

this review, in particular, reliance has been placed on data provided in the various site investigation and assessment reports. The Auditor is unable to provide certification outside of areas over which he had some control or is reasonably able to check, and does not accept responsibility for inaccuracies in information provided for review as part of this Audit.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Interim Advice are excluded unless they are expressly stated to apply in this Interim Advice.

The services undertaken by the Auditor, his team and GHD in connection with preparing this Interim Advice were undertaken in accordance with current profession practice and by reference to relevant guidelines made or approved by the EPA under Section 105 of the CLM Act 1997.

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Subject to the paragraphs in this section of the Interim Advice, the opinions, conclusions and any recommendations in this Interim Advice are based on conditions encountered and information reviewed at the time of preparation of this Interim Advice and are relevant until such times as the site conditions or relevant legislations changes, at which time, GHD expressly disclaims responsibility for any error in, or omission from, this Interim Advice arising from or in connection with those opinions, conclusions and any recommendations.

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The opinions, conclusions and any recommendations in this Interim Advice are based on information obtained from, and testing undertaken at or in connection with, specific sampling points and may not fully represent the conditions that may be encountered across the site at other than these locations. Site conditions at other parts of the site may be different from the site conditions found at the specific sampling points.

Although reasonable care has been used to assess the extent to which the data collected from site is representative of the overall site condition and its beneficial uses, investigations undertaken in respect of this Interim Advice are constrained by the particular site conditions as discussed in this Interim Advice. As a result, not all relevant site features and conditions may have been identified in this Interim Advice.

Site conditions (including any the presence of hazardous substances and/or site contamination) may change after the date of this Interim Advice. The Auditor and GHD expressly disclaim responsibility:

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- To update this Interim Advice if the site conditions change.

These Disclaimers should be read in conjunction with the entire Interim Advice and no excerpts are taken to be representative of the findings of this Interim Advice. This Interim Advice should not be altered, amended or abbreviated, issued in part or issued incomplete in any way without prior checking and approval by GHD.

22 January 2020

Katherine Daunt
Design Director
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16 Telford Street
Newcastle NSW 2300

Our ref: 12519246
Your ref: SSD-9787

c.c. Edward Clode (dwp)

Dear Katherine

Newcastle Courthouse Redevelopment - Nihon University - Site Audit Confirmation of "relevant part of site"

As you are aware, I have been engaged to undertake a site audit under the provisions of the Contaminated Land Management Act (CLM Act) 1997 in relation to assessment and remediation of contamination at the proposed Nihon University site (former Newcastle Courthouse), located at 9 Church Street Newcastle (the site) and identified as Lot 1 DP 1199904.

Development Consent for the proposed development was issued by the Department of Planning, Industry and Environment (DPIE) on 11 December 2019. Of particular relevance to my role as Site Auditor is condition E31 of the Consent, which states the following:

Site Audit Statement

E31. Prior to issue of an Occupation Certificate, the Applicant must submit a Site Audit Report and Section A Site Audit Statement for the relevant part of the site prepared by a NSW EPA accredited Site Auditor. The Site Audit Report and Section A Site Audit Statement must verify the relevant part of the site is suitable for the educational establishment land use and be provided for the information of the Planning Secretary and the Certifier.

While "the site" is defined in the Consent as "Lot 1 DP 1199904, 9 Church Street Newcastle", there is no definition of "the relevant part of the site".

It is my understanding that an easement in favour of adjoining properties exists at the eastern side of the site, which is used as a corridor for underground services. I understand this easement (shown on the attached Douglas Partners Drawing No. 1, Project 91667.02 dated 20 December 2019) will not be disturbed by the proposed Development, and will not be part of "the educational establishment land use" at the completion of the Development.

On this basis I consider "the relevant part of the site" referred to in Condition E31 can reasonably be assumed to comprise the part of Lot 1 DP 1199904 which excludes this easement on the eastern boundary, and which is encompassed by the "Site Boundary" shown on the attached Douglas Partners Drawing No. 1. Accordingly, my site audit and the investigations on which it will be based would be limited to the land within the "Site Boundary" as so defined.

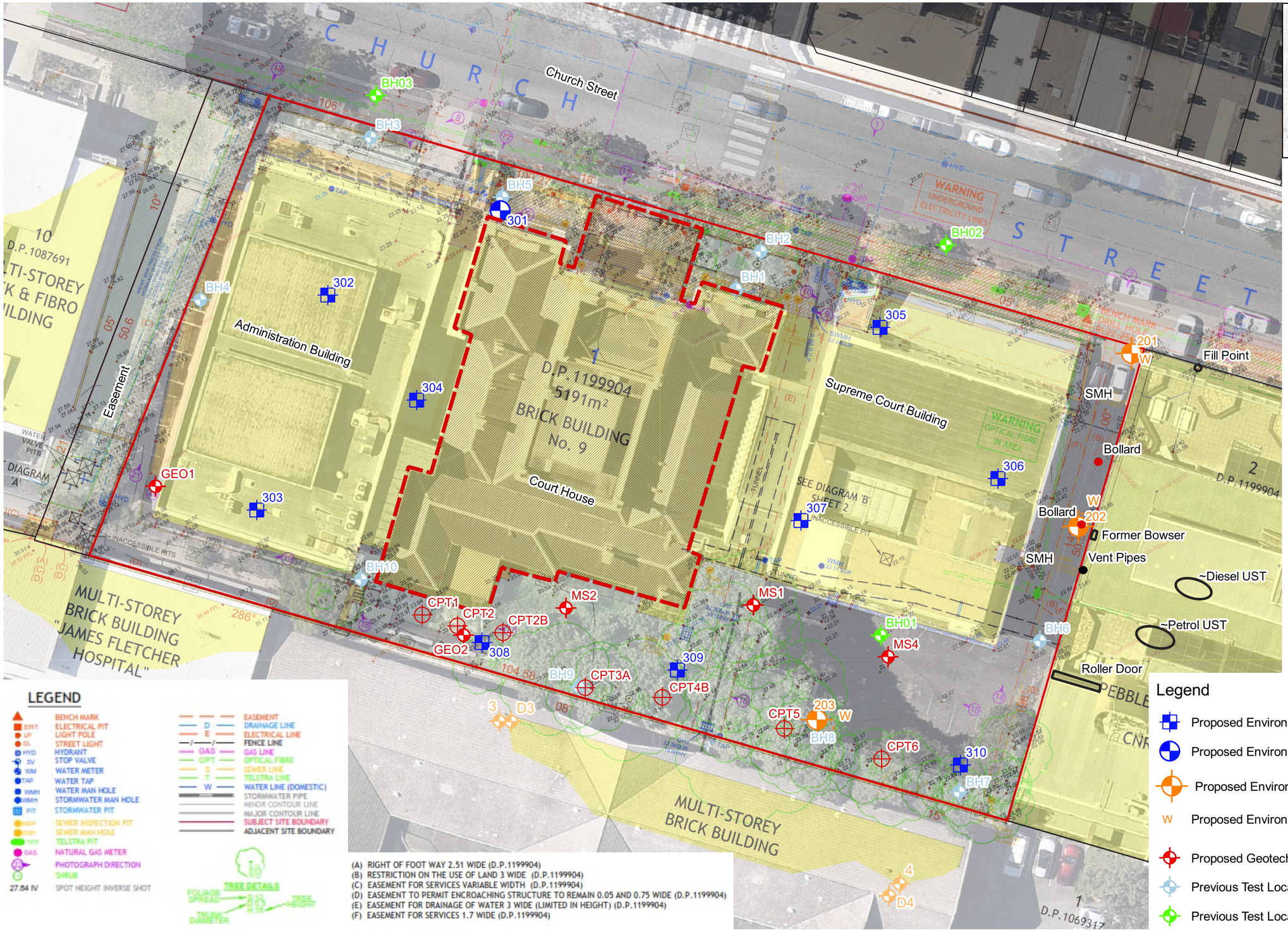
I would like confirmation from DPIE, if possible, that they agree with this interpretation. In the absence of advice to the contrary by 31 January 2020, I propose to proceed on this basis.

I trust this interpretation is consistent with the intent of the Development Consent. I am happy to discuss this further if required.

Sincerely
GHD

Ian Gregson
Principal Environmental Consultant, NSW EPA Accredited Site Auditor, Accreditation No. 0101
+61 2 4979 9904

Attachments Douglas Partners Drawing No. 1, Project 91667.02 dated 20 December 2019



Site Location

LEGEND

BENCH MARK
EPT ELECTRICAL PIT
LP LIGHT POLE
SL STREET LIGHT
HYD HYDRANT
SV STOP VALVE
WM WATER METER
TAP WATER TAP
WMH WATER MAN HOLE
SWMH STORMWATER MAN HOLE
PIT STORMWATER PIT
SEWER INSPECTION PIT
SEWER MAN HOLE
TPIT TELSTRA PIT
GAS NATURAL GAS METER
PHOTOGRAPH DIRECTION
SHRUB
27.84 IV SPOT HEIGHT INVERSE SHOT

EASEMENT
D DRAINAGE LINE
E ELECTRICAL LINE
FENCE LINE
GAS GAS LINE
OPT OPTICAL FIBRE
S SEWER LINE
T TELSTRA LINE
W WATER LINE (DOMESTIC)
STORMWATER PIPE
MINOR CONTOUR LINE
MAJOR CONTOUR LINE
SUBJECT SITE BOUNDARY
ADJACENT SITE BOUNDARY

TREE DETAILS
FOLIAGE SPREAD
TRUNK DIAMETER
TREE HEIGHT

(A) RIGHT OF FOOT WAY 2.51 WIDE (D.P.1199904)
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(C) EASEMENT FOR SERVICES VARIABLE WIDTH (D.P.1199904)
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Legend

- Proposed Environmental Pit Location Post-Demolition (DP)
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Drawing adapted from Nearmap Image dated 22.10.2019, plan by ADW Johnson ref 239815-DET-001-A dated 10.09.2018, and plan by Prensa ref 55499 Figures, Figure 2, Rev 1 dated 07.10.2016.

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: BUILT Pty Limited		
OFFICE: Newcastle	DRAWN BY: PLH	
SCALE: 1:400 @ A3	DATE: 20.December.2019	

TITLE: **Test Location Plan**
Proposed Nihon University
9 Church Street, Newcastle

N

PROJECT No:	91667.02
DRAWING No:	1
REVISION:	1

dwp

design worldwide partnership

23rd January 2020

The Planning Secretary
Department of Planning, Industry & Environment
320 Pitt Street
Sydney, NSW 2000

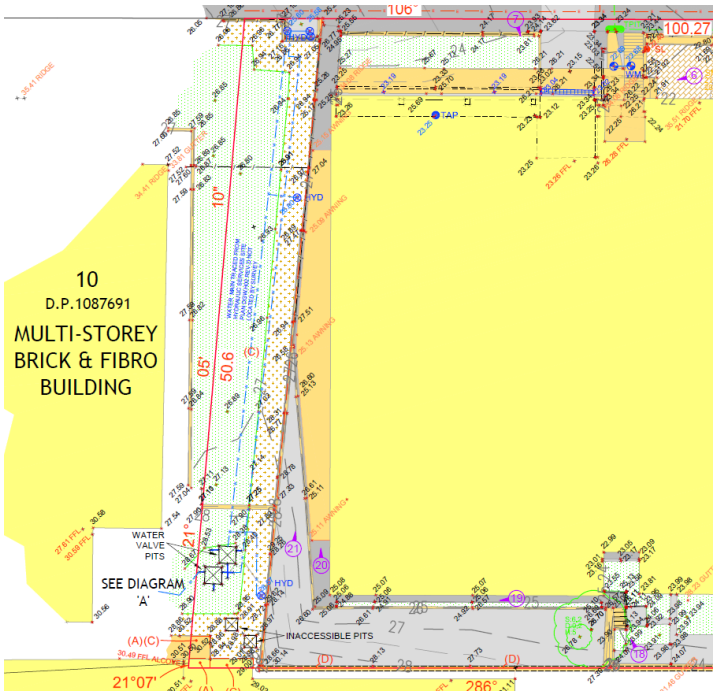
Attention: Megan Fu
Project: Nihon University Newcastle Campus - SSD 9787
Re: Conditions of Consent E31

Dear Megan,

Reference is made to SSD 9787 Conditions of Consent E31 in relation to the Site Audit Statement requirements for the development.

Further to the discussions with the Department [Megan Fu | Katherine Daunt] on the definition of the relevant part of the site to be addressed by the validation report we advise the following:

- we have reviewed the definition of the relevant part of the site with the nominated accredited site auditor,
- the site is defined as Lot DP 1199904, 9 Church Street Newcastle,
- a section of the site along the western boundary contains an easement identified as Easement [C] on the title survey [refer below],



- Easement [C] is in favour of Hunter New England Local Health District and contains significant underground services for the James Fletcher Hospital site while the ground plane is a landscaped courtyard utilised by the hospital building,
- the eastern edge of Easement [C] is bounded by a heritage retaining wall that is to be conserved as part of the Nihon University Newcastle Campus development,

- the existing heritage retaining wall to the easement is the alignment for the western edge of the Nihon University Newcastle Campus development area,
- in the design processes, Easement [C] was excluded from the Nihon University Newcastle Campus development area due to the complexities of existing heritage retaining wall structure, the major underground services contained within it and the hospital use of the land over it,
- Easement [C] does not form part of the educational land use for the Nihon University Newcastle Campus and is considered to be outside of the relevant part of the site in relation to the site audit statement.

Please find attached correspondence for the nominated accredited site auditor in relation to the definition of the relevant part of the site for the site audit statement. It is the intention to exclude Easement [C] from the site audit statement, if there is a disagreement with this approach please advise as soon as possible.

Should you require further information on this matter please feel free to contact either Katherine Daunt or Edward Clode at dwp Australia Pty.

Yours sincerely,

Edward Clode
Design Director
Registered Architect – NSW ARBN 4100
Email: edward.c@dwp.com
File: 17-0347_A-d01-20_let
Encl.: GHD correspondence 22.01.2020

Copy: Ian Gregson GHD

22 January 2020

Katherine Daunt
Design Director
dwp Australia Pty Ltd
16 Telford Street
Newcastle NSW 2300

Our ref: 12519246
Your ref: SSD-9787

c.c. Edward Clode (dwp)

Dear Katherine

Newcastle Courthouse Redevelopment - Nihon University - Site Audit Confirmation of "relevant part of site"

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Sincerely
GHD

Ian Gregson
Principal Environmental Consultant, NSW EPA Accredited Site Auditor, Accreditation No. 0101
+61 2 4979 9904

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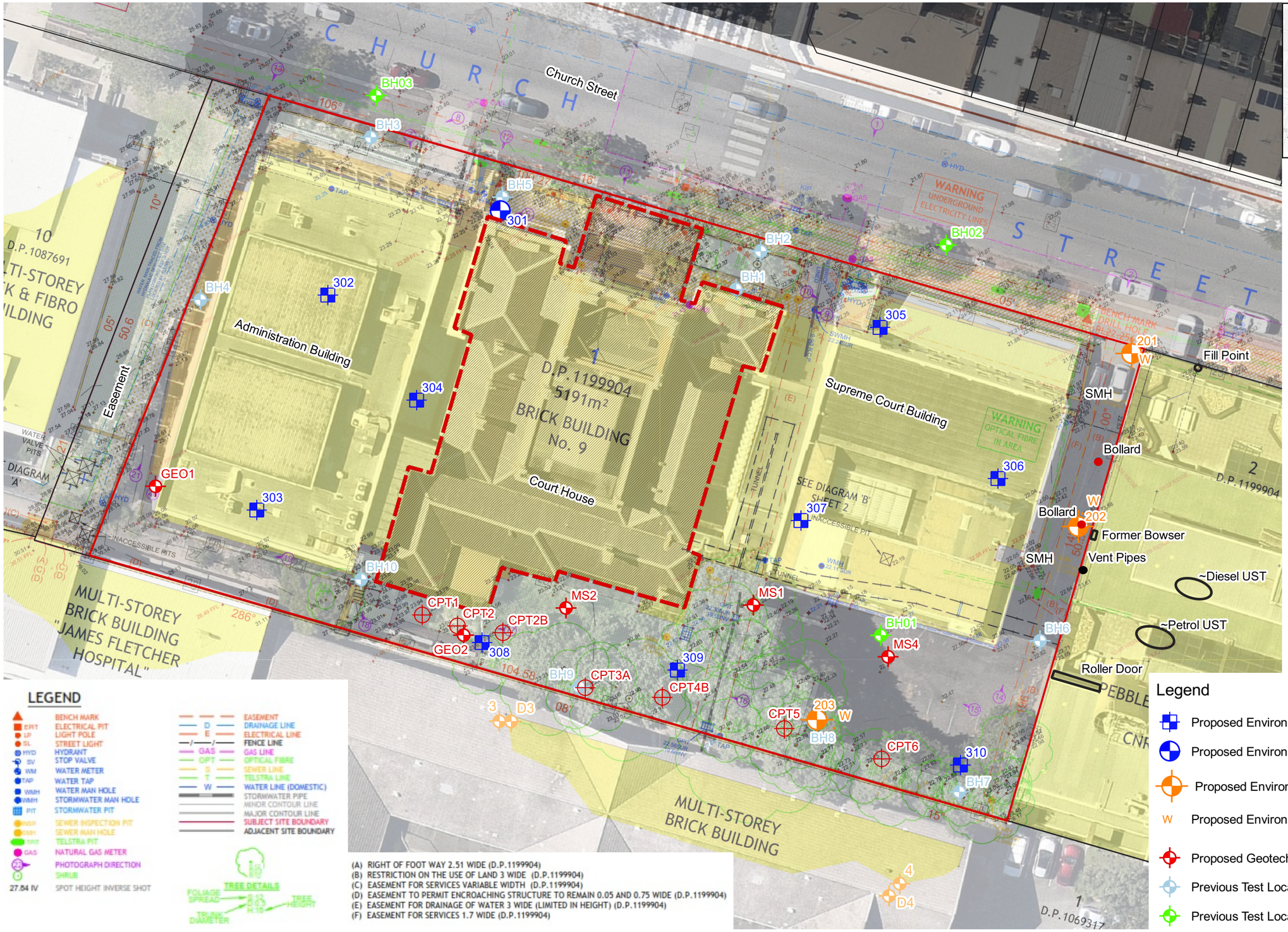

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Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: BUILT Pty Limited		
OFFICE: Newcastle	DRAWN BY: PLH	
SCALE: 1:400 @ A3	DATE: 20.December.2019	

TITLE: **Test Location Plan**
Proposed Nihon University
9 Church Street, Newcastle

N

PROJECT No:	91667.02
DRAWING No:	1
REVISION:	1

From:	Ian Gregson
To:	Chris Bozinovski (InTouch); Matthew Blackert
Cc:	Katherine Daunt; Sita Vasanthakumar (sita@built.com.au); Robert McLaughlin
Subject:	Nihon university site audit - site inspection
Date:	Wednesday, 18 March 2020 12:00:11 PM
Attachments:	image001.png image002.png image003.png image004.png

---

Thanks for the site inspection this morning. Key points as follows:

- Concrete that was inspected and cleared for asbestos by the demolition contractor's consultant has been crushed for re-use on site. I understand this has also been tested for asbestos. Please arrange for methodology and results to be provided to Douglas Partners (DP).
- As discussed, documentation of material movements, and particularly any disposal and import is critical to the audit. Please progressively provide information to DP so they can compile and check it as work proceeds.
- Below ground concrete (being removed) and associated fill is being disposed of off-site as GSW- Special Waste, Asbestos.
- I understand DP has characterised stockpiles of soil, which will assist in understanding general fill characteristics on site.
- Remaining contamination will be managed on site. The west wing will generally be excavated to natural ground, but validation may be difficult so it is likely to be subject to the same site management plan.
- The tunnel structure and parts of the courthouse building have asbestos-cement sheet attached to the concrete. As some of this will remain, an asbestos management plan and register will be required in accordance with WHS regulations, regardless of whether any asbestos is left in soil on the site.
- The stormwater easement (and replacement stormwater main) will be constructed in "clean" fill with a geofabric marker layer delineating the easement, so that Council is not subject to any contamination management requirements in the case of future maintenance work in the easement.

In regard to upcoming documentation and activities, I understand these are likely to be as follows:

- Update to pre-demolition DSI, to include current post-demolition investigations.
- Updated RAP based on pre- and post-demolition investigations and current remediation / management strategy (combination of off-site disposal and on-site management?)
- Validate east wing and provide validation report and LTEMP
- Interim Advice for east wing
- Proceed with construction of east wing
- Demolition of west wing / remaining investigations / site inspection with auditor
- Validate west wing and provide validation report for remaining area of site and update LTEMP
- Site Audit Report and Site Audit Statement on the basis of the above
- Construction of west wing

Please confirm the above or advise otherwise, thanks. Please also indicate approximate timing of the above, to the extent possible.

Regards,

Ian Gregson | A GHD Principal
BAppSc, MTech, CPEng, FIEAust
Technical Director – Contamination Assessment and Management
NSW, Vic & Qld EPA Accredited Site Auditor, Certified Environmental Practitioner Site Contamination (CEnvP SC)

GHD
Proudly employee owned
T: +61 2 4979 9904 | M: +61 418 685 838 | E: ian.gregson@ghd.com
Level 3, GHD Tower, 24 Honeysuckle Drive, Newcastle NSW 2300 Australia | www.ghd.com
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Please consider our environment before printing this email

7 April 2020

Katherine Daunt
Design Director
dwp Australia Pty Ltd
16 Telford Street
Newcastle NSW 2300

Our ref: 12519246
Your ref: SSD-9787

c.c. Sita Vasanthakumar, Robert McLaughlin, Ben Moss, Olivia Ryan, Jack Garland (Built P/L)

Dear Katherine

Newcastle Courthouse Redevelopment - Nihon University - Site Audit
SSD Consent Matrix Items A18 and A19 Site Contamination
Interim Advice #3 – Review of additional investigations and revised RAP

1 Introduction

Ian Gregson (the undersigned) of GHD has been engaged to undertake a site audit under the provisions of the Contaminated Land Management Act (CLM Act) 1997 in relation to assessment and remediation of contamination at the proposed Nihon University site (former Newcastle Courthouse), located at 9 Church Street Newcastle (the site) and identified as Lot 1 DP 1199904.

The purpose of this Interim Advice is to provide the Auditor's opinion on whether the additional investigations and revision of the Remediation Action Plan (RAP) have adequately addressed the recommendations of previous Interim Advice, and are appropriate to make the site suitable for the proposed land use. The reports which are the subject of this Interim Advice are as follows:

- Douglas Partners 2020a, *Report on Detailed Site Investigation – Pre-Demolition, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 3 March 2020. [Pre-Demolition DSI]
- Douglas Partners 2020b, *Report on Detailed Site Investigation, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 20 March 2020. [DSI]
- Douglas Partners 2020c, *Remediation Action Plan, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 24 March 2020. [RAP]
- Douglas Partners 2020d, *Long-term Site Management Plan, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 26 March 2020. [LTSMP]

Site inspections and reports that have previously been reviewed as part of this site audit (and which were the basis of previous Interim Advice) are listed in **Attachment A** to this Interim Advice.

Please note that this communication has been provided as Interim Advice only, as part of the audit process. The advice does not constitute a site audit report or site audit statement under the provisions of the CLM Act, and does not pre-empt the conclusions, which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

This Interim Advice relates solely to the contamination at the site, and is not intended to provide any opinions regarding the compliance or status of other aspects of the proposed site redevelopment.

The opinions and recommendations offered in this Interim Advice are subject to the attached Limitations.

2 Statutory requirements

SSD 9787 consent conditions which this Interim Advice is intended to address are as follows:

A18 Following the completion of demolition works and prior to the commencement of all other construction, additional site investigations of previously untested or inaccessible areas of the site must be undertaken in accordance with:

(a) interim advice dated 12 November 2019 and prepared by NSW EPA Accredited Site Auditor Ian Gregson, Principal Environmental Consultant, GHD;

(b) the recommendations provided in the Phase 1 Environmental Site Assessment – Technical Note dated 29 April 2019 and prepared by Cardno;

(c) NSW EPA Sampling Design Guidelines;

(d) Guidelines for the NSW Site Auditor Scheme (3rd edition) 2017;

(e) Guidelines for Consultants Reporting on Contaminated Sites, 2011;

(f) The National Environment Protection (assessment of contamination) Measures 2013 as amended; and

(g) testing must include assessment of both the soil and groundwater profile.

A19 The additional site investigations report must be reviewed by a NSW EPA Accredited Site Auditor and the Conceptual Remediation Action Plan dated 28 May 2019, prepared by Cardno must be updated to reflect the findings of the additional site investigations required by condition A18. The updated remediation action plan must be approved by a NSW EPA Accredited Site Auditor and submitted to the Planning Secretary prior to the commencement of remediation works.

In addition to the above, the draft LTSMP has been reviewed against the requirements of condition E32 (which applies prior to issue of an occupation certificate or commencement of operation), as follows:

E32 The Applicant must prepare a Long Term Environmental Management Plan (LTEMP), where identified as required by the remediation action plan approved by a NSW EPA Accredited Site Auditor pursuant to condition A19, and submit a copy to the Planning Secretary. The plan must:

(a) be prepared by a certified Contaminated Land Consultant;

(b) be submitted to the Planning Secretary within one month of the completion of remediation works, unless otherwise agreed by the Planning Secretary; and

(c) include, but not be limited to:

(i) a description of the nature and location of any contamination remaining on site;

(ii) provisions to manage and monitor any remaining contamination, including details of any restrictions placed on the land to prevent development over the containment cell;

(iii) a description of the procedures for managing any leachate generated from the containment cell, including any requirements for testing, pumping, treatment and/or disposal;

(iv) a description of the procedures for monitoring the integrity of the containment cell;

(v) a surface and groundwater monitoring program;

(vi) mechanisms to report results to relevant agencies;

(vii) triggers that would indicate if further remediation is required; and

(viii) details of any contingency measures that the Applicant is to carry out to address any ongoing contamination.

3 Review methodology

I have reviewed the available contamination assessment and management reports in the context of guidelines made or approved by the NSW EPA under the provisions of the CLM Act, including the following:

- NEPC 2013, *National Environment Management (Assessment of Site Contamination) Measure 1999*
- NSW EPA 1995, *Sampling Design Guidelines*
- NSW EPA 2017, *Guidelines for the NSW Site Auditor Scheme*
- NSW OEH 2011, *Guidelines for Consultants Reporting on Contaminated Sites*[1]
- NSW EPA 2019, *Assessment and management of hazardous ground gases*

My opinion on whether the proposed approach regarding contamination is appropriate for the site, and whether the site can be made suitable for the proposed use is based on the above guidelines with consideration of the following factors primarily influencing these opinions:

- What is the scope of investigations that has been carried out to date?
- Is the information considered reliable and consistent with relevant guidelines?
- Is the information sufficient to predict the likely remediation requirements?
- Does the RAP demonstrate an appropriate remediation approach based on the contamination issues likely to be present at the site?
- Does the RAP incorporate sufficient methodology to address current uncertainties and data gaps?

4 Review comments

Generally the documents are well presented and in accordance with relevant guidelines. I consider the findings and management approach are generally appropriate and the additional investigations have addressed the requirements of my previous Interim Advice. However, based on my 18 March 2020 site inspection and subsequent discussions with Douglas Partners, I consider some further documentation of site conditions, particularly with regard to the presence of asbestos, and some further assessment of contaminant concentrations is required in the DSI. This will flow on to the RAP and (ultimately, after completion of remediation) to the LTSMP. Specific comments are provided below, which should be taken into account in updating the reports. Notwithstanding, I do not consider these comments will materially change the remediation approach, and I consider the RAP as reviewed is sufficient to meet the requirements of Condition A19 provided the recommendations in this Interim Advice are taken into account during implementation of the RAP.

[1] The Auditor notes that the *Contaminated land guidelines: Consultants reporting on contaminated land* (NSW EPA 2020) has recently been gazetted and is now in force; however the EPA has advised that reports that are substantially complete at this time are not required to be updated based on the new guidelines.

4.1 DSI

As noted in the DSI (Douglas Partners 2020b), this report supersedes (and incorporates the findings of) the Pre-Demolition DSI (Douglas Partners 2020a). Comments on the DSI are as follows:

1. s.7 Site Condition – further details of observations and site conditions post demolition should be provided, particularly regarding the incidence, nature and frequency of ACM encountered on the site, and what actions were undertaken by the contractor in relation to any ACM encountered. This should include discussion of ACM remaining on structures, and whether any clearances were issued for areas where ACM was removed as part of the demolition or from subsurface structures. Discussion should also consider whether (and to what extent) ACM contamination was pre-existing or due to demolition.
2. s.7 Site Condition p.18 – the DSI notes that further inspections of the Supreme Court building footprint are proposed following demolition. I consider this can be documented in the validation report
3. s.8 Conceptual Site Model – I consider this a Preliminary CSM, which should be further presented as an updated CSM after presentation of the DSI results and assessment of contamination (eg. in / after s.15), including a column for actual risk to receptors, based on the DSI findings (eg. if a potential source does not present any unacceptable risk, based on the DSI findings). This would then provide a basis for a reduced CSM in the RAP, indicating which sources / contaminants require management or remediation.
4. s.9.1.2 states the frequency of testing was adopted to meet NSW EPA sampling guideline requirements for characterisation of the site. (See also s.11.1 Steps 3 and 7). Discussion is required as to whether systematic coverage has been achieved, or what the likely variability is in areas that have not been sampled, and how this will be addressed. (eg. by further inspections, and/or by the remediation strategy including unexpected finds protocol).
5. S.9.2, 7th bullet point – clarify whether the two material samples were the only ones encountered, whether one was from a test pit and one was from the ground surface etc. Please also provide details of soil sampling for asbestos (eg. separate containers? Sample size?).
6. s.10 – please provide further detail on the frequency, abundance and nature of ACM encountered. s10.1 notes that abundant fibre cement sheeting fragments were encountered in Pit 307 –was this subsequently removed for disposal? The report also notes (in Table 4) that Pit 302 beneath building had ACM at 0.09 – 0.8 m deep. A clear discussion of occurrence of ACM is required as a basis for qualitative assessment of risk and management requirements. Supporting photographs would be useful if available.
7. s.10 / s.15 – please also include discussion of the stockpile tested, and whether results were consistent with investigations across the rest of the site.
8. s10.3 first line – Table 4 shows more than Bores 201 to 203.
9. s.10.4 – there is a note (^{2}) missing from Table 7.
10. s.14 / s.15 / s.17 – Assessment criteria should include consideration of aesthetics, as per NEPC (2013), and discussion of findings in that regard.
11. s.14.1.3 – consideration should be given to CRC CARE Technical Report 39 for ESLs for Benzo(a)pyrene.

12. s14.1.5 para 2 – the post-demolition component of the DSI is now complete. At least a qualitative assessment of asbestos should be included, as noted above. A conservative management approach (eg. as per section 4.9 of NEPC 2013 Schedule B1) may be adopted to address uncertainties.
13. s.14.3 – the current guidelines are EPA 2019. Paragraph 4 and Table 19 refer to EPA 2012.
14. s.15 – more detailed assessment of contaminants exceeding investigation or screening levels should be undertaken, as indicated in the DQOs. A statistical summary of these contaminants should be presented (eg. range, exceedences, average, 95% UCLav, standard deviation). Brief review of the soil results suggests there are no "hot spots" for lead or BaP TEQ, and the 95% UCLav concentrations are below the HIL B. Some discussion of the occurrence of BaP TEQ exceedences in natural soil is warranted. Reference may be made to Schedule B7, Appendix A2 of NEPC 2013 if a further line of evidence is required in relation to aged vs freshly spiked soils (eg. if the standard deviation exceeds 50% of the HIL B, a higher investigation level may be justifiable for aged PAHs). Pending presentation and assessment of this information, chemical contaminants may not actually require remediation or management at the site, for it to be suitable for the proposed land use.
15. s.15 – specific comment should be made on the results of asbestos in soils analysis (eg. number of samples, whether any asbestos was detected). Please include discussion of whether (on this basis) assessment can be based on ACM (eg. as per WA DoH guidelines and section 4.10 of NEPC 2013 Schedule B1).
16. s.15 / s.17 - comment should be provided on the sampling pattern that was able to be achieved, whether soils across the rest of the site are expected to be similar, and how any uncertainties will be addressed.
17. s.17 – please update where relevant, taking above comments into account.
18. An executive summary should be provided, to be in accordance with OEH 2011 reporting guidelines.

4.2 RAP

As noted in s.1, this RAP supersedes the cRAP prepared by Cardno (Cardno 2019), and should therefore be a stand-alone document. Review and comments on the adequacy of the RAP are presented in Table 1 and Table 2 in **Attachment B**. Key comments from review, and recommendations for issues that need to be further addressed are listed below.

19. s.3.2 p.3 refers to "figures below", but none are apparent. The RAP should reflect comments on the DSI relating to post-demolition description, including incidence of asbestos, whether it is being removed etc.
20. s.3.3 – cross sections should be provided illustrating capping details (including landscaping), stormwater easement marker layer and backfill etc.
21. s.4 p.8 – first paragraph notes that the proposed development will reduce the risk of infiltration and migration (which is valid); however I would expect the DSI to find (and the RAP to reflect) that this risk is already low.
22. s.4.8 p.8 – second paragraph – may need updating based on statistical assessment of chemical contaminants as per DSI comments, subject also to qualitative assessment of ACM.
23. s.5 – the CSM should be updated as per comments on the DSI, and paragraph 2 may need updating as above.

24. The RAP should specifically discuss the extent of remediation required. (This is implied, but not specifically discussed). See also comment below, for considerations regarding the basis of this extent.
25. s.6 – the RAP adopts a conservative approach, which is considered appropriate, particularly as the nature of the proposed development lends itself to capping of site soils. Given comments above on the DSI, I consider it likely that more detailed assessment of chemical contaminants will indicate (on a statistical basis in accordance with NEPC 2013) they do not actually exceed HIL B investigation/screening levels; potentially including qualitative assessment of asbestos (although this will also depend on whether asbestos encountered will be removed and adequate asbestos clearance provided). If this is the case a conservative approach can still applied, but serves to further reduce risk, rather than being necessary for suitability. An asbestos management plan (AMP) and register will likely still be required by WHS legislation.
26. s.6 para 3 – I suggest the central Court House building may be unlikely to have contamination beneath it, based on the date of its construction (but at any rate soils beneath will be effectively capped, as noted in the RAP).
27. Sections 6 and 10 should give further consideration to NEPC 2013 Schedule B1 recommendations in relation to asbestos, in particular:
    - Section 4.3 (last paragraph) of Schedule B1, that if visible asbestos is present and may be disturbed during work activities, it must be removed.
    - Section 4.11 of Schedule B1, that either a Tier 2 analysis should be carried out or a conservative management response implemented; and remediation options which minimise soil disturbance and therefore public risk are preferred, with management of asbestos in situ being encouraged.
28. s.6 para 6 notes that on-site treatment and re-use of materials could be considered a contingency – this seems unlikely given time constraints to the development.
29. Sections 7.1, 10 – 0.3 m of soil for capping may not be sufficient to provide for landscaping – this should be confirmed with the landscape architect (as noted in s.10 of the RAP), and sufficient soil allowed for the required rooting depth or alternatively the landscaped areas being validated as suitable without capping.
30. Sections 7.2, 10.5, 11.5 - I recommend confirmatory samples of imported material be collected and analysed unless the supplier can provide analytical results directly representative of the material in question. Material should be inspected on import to confirm it is consistent with the expected properties.
31. s.7.2 – CRC CARE technical report 39 should be considered in relation to EILs for benzo(a)pyrene. Criteria for OCPs should also be included in Table 2. Site specific soil parameters may allow less conservative EILs to be applied for some metals.
32. s.9 – p18 para 2 – there is already a development consent for the project, which should be referred to, with conditions relevant to remediation and management of site contamination. Para 3, last point – why is dewatering expected for the development? Para 4, last point – regulatory requirements in relation to asbestos management should be discussed.
33. s.10 – p.20 item 13 and p.21 item 3 – high visibility geofabric should be orange.
34. s.12.4 – reporting should also be with reference to EPA 2017 *Guidelines for the NSW Site Auditor Scheme*, including specific requirements for documentation of disposal and imported materials.

4.3 Draft LTSMP

I consider the draft LTSMP is appropriate at this time and can remain draft until completion of the site validation works. The following comments should be taken into account when updating the LTSMP following validation. As noted in Attachment C, any updated guidelines in place at the time of finalising the LTSMP should also be taken into account.

35. The final LTSMP should be reviewed and agreed to by Nihon University, as they will be responsible for its implementation.
36. For usability, the LTSMP should have a document status page and table of contents.
37. The introduction should include the consent requirement for implementation of the LTSMP, as well as other regulatory requirements (such as under WHS regulations).
38. Where actions are required to prevent risk to health or the environment, the LTSMP should be more prescriptive – i.e. use "must" instead of "should" where appropriate, throughout the LTSMP.
39. Discussion of contamination remaining on site (currently mentioned in sections 1, 2 and 3) will need to be updated, based on comments on the DSI (eg. statistical assessment of chemical contamination) and validation following implementation of the RAP. The LTSMP would benefit from a single section clearly describing remaining contamination, including relative risk (with and without appropriate management), and discussing any potential for migration.
40. I suggest that the objective of the LTSMP is first to provide awareness of the contamination, and to prevent and manage breaching of the cap. The LTSMP may also serve to fulfil WHS regulation requirements for an AMP and register for asbestos remaining on the site.
41. The depth of cover in landscaped areas will need to be confirmed, as per comments above in relation to the RAP. Figures and photographs illustrating capping should be included when available.
42. Section 4 would benefit from sub-headings (eg. for responsibilities, notification / implementation requirements, review of LTSMP, record keeping etc).
43. Table 1 – site-specific maintenance procedures should be included as part of the LTSMP. Routine checks should refer to Table 3. Responsibilities for maintenance staff, subcontractors and workers include both reading and compliance with the LTSMP.
44. Section 4 – as well as notation on the Section 10.7 certificate, the consent condition for implementation of the LTSMP should be noted, and any WHS regulatory requirements (eg. for an AMP and asbestos register).
45. As mentioned above, review of the LTSMP should be under a subheading. Timing for review should be stated (eg. at least annually, and if any incidents occur which indicate the SMP needs updating) with more specific guidance on updating the LTSMP (eg. non-compliance and corrective action forms, input from appropriately qualified environmental professional). Protocols for reporting and record keeping should be included.
46. Table 3 could be made into a 'record' form, eg. by including "Date" and "Inspected by" fields, as well as a place for "Corrective actions" and "Update to SMP required?"

5 Conclusions and recommendations

5.1 Conclusions

I consider the additional investigations have addressed the requirements of my previous Interim Advice and are in substantial compliance with relevant guidelines. The DSI findings are generally appropriate, although further discussion of post-demolition site conditions and more detailed statistical assessment of chemical contaminants is recommended. These recommendations are not likely to change the proposed management approach, and if anything, are likely to indicate that chemical contaminants do not govern remediation requirements. Findings in relation to management of asbestos in soils contamination are likely to remain unchanged, however the updated DSI will provide a more comprehensive basis for the forthcoming validation report (following implementation of the RAP) and for eventual finalisation of the LTEMP.

The RAP has been updated to reflect the findings of the DSI. The management approach described in the RAP is considered appropriate, and as noted above, unlikely to change as a result of the recommendations for the DSI. I consider the RAP as reviewed is sufficient to meet the requirements of Condition A19, provided the recommendations in this Interim Advice are taken into account during implementation of the RAP.

5.2 Recommendations

The DSI report should be updated to address the comments in Section 4.1 above. If timing constraints require, I consider this can be undertaken in parallel with implementation of the RAP.

Implementation of the RAP should address the comments provided in Section 4.2 above. If timing allows, the RAP should preferably be updated prior to implementation.

As noted above, I consider the draft LTSMP is appropriate at this time and can remain draft until completion of the site validation works. The comments in Section 4.3 and Attachment C of this Interim Advice should be taken into account when updating the LTSMP following implantation of the RAP and validation of the site.

I trust this Interim Advice is sufficient for your current purposes. Please contact me if you wish to discuss anything further.

Sincerely
GHD

Ian Gregson
Principal Environmental Consultant, NSW EPA Accredited Site Auditor, Accreditation No. 0101
+61 2 4979 9904

Attachments A: Site inspections and previously reviewed documents
B: Review of RAP
C: Review of LTSMP
D: Limitations to Interim Advice

6 Attachment A – Site inspections and previously reviewed documents

Site inspections have been undertaken by the Auditor as follows:

- Brief site inspection of the former Newcastle Courthouse site on 8 November 2019
- Inspection of the adjacent Police Station site on 14 November 2019
- Inspection of the site following demolition of the east wing, on 18 March 2020.

The following documents have previously been reviewed as part of this site audit:

- Douglas Partners 2019, *Sampling, Analysis and Quality Plan, Supplementary Detailed Site Investigation (Contamination), Nihon University Australia, Newcastle Campus Project, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 21 November 2019.
- Cardno 2019, *Conceptual Remediation Action Plan, 9 Church Street, Newcastle NSW*, Cardo (NSW/ACT) Pty Ltd, 28 May 2019
- Coffey 2012, *Phase 1 Environmental Site Assessment Newcastle Courthouse and Former Newcastle East Public School*, Coffey Environments, 25 July 2012
- Prensa 2016, *Detailed Site Investigation, 9 Church St, Newcastle, NSW 2300*, Prensa Pty Ltd, October 2016
- Napier & Blakely 2008, *The Newcastle Courthouse, Church Street, Newcastle NSW, Asbestos Materials Report*, Napier & Blakely Pty Ltd, August 2008
- Cardno 2018, *Report on Geotechnical Investigation, Newcastle Courthouse Redevelopment*, Cardo (NSW/ACT) Pty Ltd, 20 December 2018

7 Attachment B: Review of RAP (Douglas Partners 2020c)

For the remediation and management aspects of the RAP, the Auditor has referred to the specific reporting requirements for RAPs from the *Guidelines for Consultants Reporting on Contaminated Sites* (OEH 2011). The compliance of the RAP with these requirements is illustrated in Table 1.

Table 1 RAP compliance with Reporting Guidelines (OEH 2011)

Reporting requirement	RAP compliance
Remediation goals	Discussed in Sections 7.1 and 7.2. Considered appropriate subject to comments in s.4.2 of this Interim Advice.
Discussion of extent of remediation required	Not specifically discussed, however s.6 states the results of the DSI indicate the impacted soils are situated broadly across the site within filling and natural soils (some at depth). The RAP notes that the Court House building will be retained as an 'Educational Establishment' and impacted soils likely to be present beneath the existing building will also be effectively capped by the existing building. The Auditor agrees that remediation or management applies to fill across the whole of the site, based on the findings of the DIS (with the likely exception of

Reporting requirement	RAP compliance
	soils beneath the heritage Court House building, based on the date of its construction). The adopted remediation strategy is not particularly sensitive to the extent of impact (and in fact has apparently been selected at least in part on that basis).
Discussion of possible remedial options and how risk can be reduced	s.6 refers to the remediation options review undertaken in the cRAP (Cardno 2019) and subsequently focusses on the two remediation options identified by Cardno as suitable for the identified contaminants, being excavation and off-site disposal or isolation and management on site by containment below a capping layer or hardstand. While the RAP has not reiterated the options review process presented in the cRAP, the Auditor considers it sufficient to follow on with the selected options.
Rationale for the selection of recommended remedial option	s.6 notes that remediation via excavation, stripping and off-site disposal of impacted materials is not likely to be feasible from both a practical, cost effective or time-effective perspective based on discussions with the client/developer. The adopted approach is therefore a combination of the two options mentioned above, being: • Off-site disposal of contaminated soils from the upper fill profile where required as part of earthworks construction (i.e. excess soils not able to be reused on-site); and • On-site management (capping) of remaining contaminated soils. s.6 states that on-site management of contaminated soils is 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 university development, and notes the Waste Hierarchy adopted by the NSW EPA is, in order of preference, Avoidance, Resource Recovery and Disposal. A 'Cap and Contain' approach would be consistent with a resource recovery initiative. The Auditor considers the rationale is appropriate for the contamination identified to date. Asbestos appears to be the governing contaminant, and the NEPM (NEPC 2013) Schedule B1 section 4.1.1 notes that management of asbestos in situ is encouraged, which may include covering the contamination with uncontaminated fill or other protective or warning layers. This is consistent with the recommended remedial option.
Data gaps	Data gaps are not specifically discussed in the RAP. Additional investigations have been undertaken (reported in Douglas Partners 2020b) to address previously identified data gaps, although the Auditor notes that systematic coverage of the site has not been achieved. The DSI (Dougal Partners 2020b) notes that further inspection of the Supreme Courte building area will be undertaken following demolition. Section 10.1 of the RAP indicates inspection of ground surface will be undertaken following removal of building slabs, and the Unexpected Finds Protocol in s.10.7 provides for periodic inspection by the consultant. The Auditor considers that procedures in the RAP are sufficient to address remaining data gaps, given the proposed remediation strategy.
Validation plan	Validation is described in s.11 of the RAP. The Auditor considers this is generally appropriate, subject to comments in Section 4.2 of this Interim Advice.

Reporting requirement	RAP compliance
Contingency plan if the selected remedial strategy fails	s.10.1.1 – outlines a brief contingency plan, essentially off-site disposal or further investigation for unexpected contamination. The Auditor considers the contingency plan is adequate for the site conditions and proposed remediation strategy.
Adopted remediation criteria	s.7.2 – the Auditor considers the remediation acceptance criteria are satisfactory and consistent with relevant guidelines, although conservative in some ecological criteria as noted in Section 4.2 of this Interim Advice.
Interim site management plan (before remediation)	Not stated. The site is now in control of the demolition / construction contractor and is securely fenced.
Site management plan (operational phase)	s.13 describes environmental management requirements during construction (including remediation), and refers to the contractor preparing a construction environmental management plan (CEMP). The Auditor considers the RAP adequately addresses site management requirements, given the Consent requires a CEMP, which is subject to separate environmental audit. The Auditor has not reviewed the CEMP.
Remediation schedule	s.13 – to be part of contractor's CEMP. The Auditor presumes that a schedule is in place for the demolition, remediation and construction works.
Hours of operation	s.13 – to be part of contractor's CEMP, and subject to Consent conditions.
Contingency plans to respond to site incidents	s.13 – to be part of contractor's CEMP.
Identification of regulatory compliance requirements	s.9 – discusses regulatory approvals and licences. The Auditor considers these are generally covered, except that the RAP does not refer to or discuss the current Consent for the site.
Names and phone numbers of appropriate personnel to contact during remediation	s.13 – to be part of contractor's CEMP.
Community relations plans	s.13 – to be part of contractor's CEMP.
Staged progress reporting, where appropriate	s.12.4 notes that the staged construction program may require interim validation reports for each stage. The Auditor considers this is appropriate.
Long term site management plan	s.7.3 – notes a long term Site Management Plan (SMP) is required for on-site management of contamination. A brief outline is provided. The Auditor notes a draft SMP has been provided and reviewed, as discussed in Section 4.3 and Attachment C of this Interim Advice.

The *Guidelines for the NSW Site Auditor Scheme* (EPA 2017) also provides specific guidance in relation to remediation policy and issues. Compliance of the RAP with relevant issues from this guidance is illustrated in **Table 2**.

Table 2 Compliance with remediation policy (from EPA 2017)

Aspect	RAP compliance
Remediation hierarchy	Briefly discussed in s.6 of RAP. Based on site conditions, previous review in the cRAP (Cardno 2019) and nature of development, the Auditor considers the remediation strategy is consistent with the EPA's remediation hierarchy.
On-site containment and capping	EPA 2017 includes specific requirements (long term stability, no erection of structures that may result in a risk of harm, notification mechanism). The on-site structures are proposed as the capping mechanism, as discussed in the RAP. The Auditor presumes that geotechnical requirements will be addressed to ensure long stability of the structures, as mentioned in the RAP (eg. s.10.1). No vapour intrusion risks have been identified by the DSI. The RAP acknowledges Council's specific requirements relating to capping / containment of contaminated soil, including that this would be category 1 remediation. Notification by way of notation on the Section 10.7 Planning Certificate is stated in the RAP.
EMPs	EPA 2017 (s.3.4.6) has specific requirements for long term management plans, including review of the EMP by an auditor, that the EMP can reasonably be made legally enforceable, public notification of any restrictions applying to the land, and no off-site migration of contamination from the land. These aspects are reviewed by the Auditor in Table 4 below.
Contamination at depth	No contamination requiring remediation has been identified at depth (identified contamination is confined to fill material, although some elevated PAHs were identified in natural material – the Auditor considers these may be attributable to coal or potentially cross contamination from fill during sampling).
Vertical mixing	Vertical mixing is not proposed.
Bioremediation	Bioremediation of contaminated soils is not proposed.
Waste management	Waste management requirements are discussed in sections 7.1, 8, 9 and 10 of the RAP and are considered appropriate.
Chemical Control Orders / asbestos waste	No contaminants subject to chemical control orders have been identified on the site. Requirements relating to asbestos waste management are discussed in the RAP.
Groundwater remediation and management	No groundwater remediation or management is required, based on the findings of the DSI (Douglas Partners 2020b).
Hazardous ground gas remediation and management	Hazardous ground gas has been assessed in the DSI and is not considered to require remediation or management.

8 Attachment C: Review of LTSMP (Douglas Partners 2020d)

To date, no specific guidelines for EMPs have been prepared or endorsed by the NSW EPA. However, an EMP guideline for the Preparation of Environmental Management Plans (DIPNR, 2004) is available and can be used as a guideline to ensure a minimum standard and consistent approach to EMP preparation. The guideline notes that the scope and content of an EMP will be a function of both the significance of a project's potential environmental impacts and also a project's size, however there are common elements that should be included in all EMPs. The guideline lists four main elements that should be included in an EMP, together with information and issues that may need to be addressed under each element. These are summarised in **Table 3** below, indicating where this information is presented in the Douglas Partners draft LTSMP, or issues that should be further addressed.

The Auditor notes that the NSW is currently working on guidelines for EMPs, and the following requirements may change by the time the LTSMP is finalised. Consideration should be given to guidelines in place at the time of finalising the LTSMP.

Table 3 Compliance with EMP Guideline (DIPNR, 2004)

Element	Information	Addressed in draft LTSMP
Background		
	Introduction	Section 1
	Project Description	Section 3
	EMP Context	Section 1
	EMP Objectives	Section 1
	Environmental Policy	n/a
Environmental Management		
	Environmental Management Structure and Responsibility	Section 4 (Table 1)
	Approval and Licensing Requirements	Not discussed. The LTSMP should refer to any regulatory requirements, including the Consent and WHS requirements.
	Reporting	Section 4 refers to documenting changes and/or disturbance to capping. The LTSMP should also consider reporting and maintenance of records.
	Environmental Training	Section 4 (inductions)
	Emergency Contacts and Response	Attachment Table 2 – to be completed in final LTSMP.
Implementation		
	Risk Assessment	Section 3 (last paragraph) mentions human health or environmental risk, but needs updating and should be clarified to indicate risk with and without control measures.
	Environmental Management Activities and Controls	Section 4. Considered adequate given that disturbance of capped materials is unlikely to occur during normal use of the site.

Element	Information	Addressed in draft LTSMP
	Environmental Management Plans or Maps	Figures referenced in Section 3 but not yet provided. Figures and photographs should be provided in final LTSMP.
	Environmental Schedules	Attachment Table 3 for Capping / Condition Inspection guide. Section 6 (reporting). Section 1 refers to incorporating the SMP in the Nihon University overall property management plans/ procedures. Not knowing what form these will take, consideration should be given to including forms for inductions, non-compliance and corrective action.
Monitor and Review		
	Environmental Monitoring	Section 4 and attachment Table 3 relating primarily to integrity of capping.
	Environmental Auditing	Not required except for revisions to the SMP that decrease the level of site management (end of Section 4).
	Corrective Action	Not specifically included. A corrective action form should be considered as noted above.
	EMP Review	Section 4 – regular review of SMP, update if required.

In relation to current NSW EPA requirements, Section 3.4.6 of EPA 2017 describes specific requirements for an EMP. EPA 2017 states that an EMP succinctly describes the nature and location of contamination remaining on-site and states what the objectives of the plan are, how contaminants will be managed, who will be responsible for the plan's implementation and over what time frame actions specified in the plan will take place.

EPA 2017 also states that the length and precise content of the EMP will depend on the complexity of site issues, and a short concise EMP may be adequate to address issues at a simple site. Regardless of its length, an EMP must be a stand-alone document with enough detail and clarity in the description of the site and the actions required to be readily understood.

Section 3.4.6 of DEC 2017 also notes a number of prerequisites for implementation of an EMP to be included as a condition on a site audit statement or accepted by an auditor as a means of managing contamination on a site, as shown in **Table 4.**

Table 4 EMP compliance with requirements of EPA 2017

Requirement	Compliance
The EMP has been reviewed by the auditor.	The draft LTSMP has been reviewed by the Auditor by way of this Interim Advice. The final LTSMP must be reviewed and approved by the Auditor, as required by condition E32 of the consent.
The EMP can reasonably be made enforceable… The relevant authority should be asked their view on the legality of the draft EMP.	The LTSMP (as approved by the Auditor) is legally required to be implemented under the *Environmental Planning and Assessment Act 1979*, by way of Condition F7 of the Development Consent (SSD 9787).

Requirement	Compliance
There will be appropriate public notification of any restrictions applying to the land to ensure that potential purchasers or other interested individuals are aware of the restrictions.	Sections 1 and 4 note that the SMP should be noted on the site's Section 10.7 Planning Certificate. Section 1 also refers to incorporating the SMP in the Nihon University overall property management plans/ procedures, and notation on title information for the site.
There is no off-site migration of contamination, or where there is off-site migration or its potential, that contamination is managed or monitored so that it does not present an unacceptable risk to either the on-site or off-site environments.	Based on investigations to date, the Auditor considers the potential for offsite migration of contamination is low and does not present an unacceptable risk to the offsite environment. This should be further clarified in the validation report and in the final LTSMP.

As noted in Section 2 of this Interim Advice, the draft LTSMP has been reviewed against the requirements of SSD 9787 Condition E32, as well as the requirements above. The LTSMP will be updated and finalised based on the findings of the validation report (to be prepared following implementation of the RAP), however the comments below should be taken into account both in validating the remediation and in finalising the LTSMP.

Table 5 EMP compliance with requirements of SSD 9787 Condition E32

Requirement (SMP must include)	Comment
(i) a description of the nature and location of any contamination remaining on site	Brief mention in sections 1, 2 and 3. The final LTSMP would benefit from a single section with a clear description, based on the DSI (including comments in this Interim Advice) and subsequent implementation of the RAP and validation of the site.
(ii) provisions to manage and monitor any remaining contamination, including details of any restrictions placed on the land to prevent development over the containment cell	Provided in Section 3. To be updated following implementation of the RAP and validation of the site. The development over contamination is an inherent part of the capping, and is considered appropriate.
(iii) a description of the procedures for managing any leachate generated from the containment cell, including any requirements for testing, pumping, treatment and/or disposal	Not considered applicable. The final LTSMP should include clarification that leachate / migration of contamination is not an issue (i.e. in description of remaining contamination, as noted above).
(iv) a description of the procedures for monitoring the integrity of the containment cell	Covered in Section 4 and Table 3.
(v) a surface and groundwater monitoring program	Not considered necessary based on results to date.
(vi) mechanisms to report results to relevant agencies	Not considered applicable, as there is no monitoring.
(vii) triggers that would indicate if further remediation is required	Not considered applicable, as there is no monitoring.

Requirement (SMP must include)	Comment
(viii) details of any contingency measures that the Applicant is to carry out to address any ongoing contamination	Provisions for review of SMP in Section 4. The final LTSMP should include more specific guidance in updating the LTSMP if required.

9 Attachment D: Limitations to Interim Advice

This Interim Advice has been prepared as part of a site audit undertaken in accordance with relevant provisions of Part 4 of the Contaminated Land Management (CLM) Act 1997.

This Interim Advice:

1. has been prepared by Ian Gregson and members of his support team as indicated in the appropriate sections of this Interim Advice ("GHD") for dwp and Azusa Sekkei;
2. may be used and relied on by dwp and Azusa Sekkei;
3. may be used by and provided to the EPA and the relevant planning authorities for the purpose of meeting statutory obligations in accordance with the relevant sections of the CLM Act 1997 or the Environment Planning and Assessment (EP&A) Act 1979;
4. may be provided to other third parties but such third parties' use of or reliance on the Interim Advice is at their sole risk, as this Interim Advice must not be relied on by any person other than those listed in 1-3 above without the prior written consent of GHD; and
5. may only be used for the purpose as stated in **Section 1** of the Interim Advice (and must not be used for any other purpose).

GHD and its servants, employees and officers (including the Auditor) otherwise expressly disclaim responsibility to any person other than dwp and Azusa Sekkei arising from or in connection with this Interim Advice.

Whereas these current opinions and recommendations have been provided as interim guidance to assist in the assessment and management of contamination issues at the site, this guidance should not be regarded as "approval" of any proposed investigations or remedial activities, as such approval is beyond the scope of an independent review. The NSW EPA *Guidelines for the NSW Site Auditor Scheme* (2017) contains a description of the site assessment and audit process, which includes the following:

- A site audit is the second in two tiers of work in the site assessment and remediation process.
- The **'first tier' is the work of a contaminated site consultant**, generally engaged by the site owner or developer. The contaminated site consultant designs and conducts a site assessment and any necessary remediation and validation, and documents the processes and information in reports; and
- The **'second tier' is the site audit** which involves a site auditor independently and at arm's length reviewing, for one of the audit purposes stated in the CLM Act, the consultant's assessment, remediation and validation plans or reports. The material outcomes of a site audit are a site audit report and site audit statement.

The purpose of the auditor's review is to assess whether the works undertaken (or proposed to be undertaken) comply with current regulations, standards and guidelines, and that the site has been assessed, remediated and validated to a standard appropriate for the proposed land use. In the first instance, the contaminated land consultant should be satisfied that the work to be conducted conforms to all appropriate regulations, standards and guidelines; and is appropriate, based on the site's historical land use, physical characteristics and proposed land use.

This interim review and advice do not constitute an audit under the provisions of the Contaminated Land Management (CLM) Act 1997, and do not pre-empt the conclusions which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be completely known and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgement must be exercised in the collection and interpretation of the data. In the conduct of

this review, in particular, reliance has been placed on data provided in the various site investigation and assessment reports. The Auditor is unable to provide certification outside of areas over which he had some control or is reasonably able to check, and does not accept responsibility for inaccuracies in information provided for review as part of this Audit.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Interim Advice are excluded unless they are expressly stated to apply in this Interim Advice.

The services undertaken by the Auditor, his team and GHD in connection with preparing this Interim Advice were undertaken in accordance with current profession practice and by reference to relevant guidelines made or approved by the EPA under Section 105 of the CLM Act 1997.

The opinions, conclusions and any recommendations in this Interim Advice are based on assumptions made by the Auditor, his team and GHD when undertaking services and preparing the Interim Advice ("Assumptions"), as specified throughout this Interim Advice. GHD and the Auditor expressly disclaim responsibility for any error in, or omission from, this Interim Advice arising from or in connection with any of the Assumptions being incorrect.

Subject to the paragraphs in this section of the Interim Advice, the opinions, conclusions and any recommendations in this Interim Advice are based on conditions encountered and information reviewed at the time of preparation of this Interim Advice and are relevant until such times as the site conditions or relevant legislations changes, at which time, GHD expressly disclaims responsibility for any error in, or omission from, this Interim Advice arising from or in connection with those opinions, conclusions and any recommendations.

The Auditor and GHD have prepared this Interim Advice on the basis of information provided by the client, their consultants and others who provided information to GHD (including Government authorities), which the Auditor and GHD have not independently verified or checked ("Unverified Information") beyond the agreed scope of work.

The Auditor and GHD expressly disclaim responsibility in connection with the Unverified Information, including (but not limited to) errors in, or omissions from, the Interim Advice, which were caused or contributed to by errors in, or omissions from, the Unverified Information.

The opinions, conclusions and any recommendations in this Interim Advice are based on information obtained from, and testing undertaken at or in connection with, specific sampling points and may not fully represent the conditions that may be encountered across the site at other than these locations. Site conditions at other parts of the site may be different from the site conditions found at the specific sampling points.

Although reasonable care has been used to assess the extent to which the data collected from site is representative of the overall site condition and its beneficial uses, investigations undertaken in respect of this Interim Advice are constrained by the particular site conditions as discussed in this Interim Advice. As a result, not all relevant site features and conditions may have been identified in this Interim Advice.

Site conditions (including any the presence of hazardous substances and/or site contamination) may change after the date of this Interim Advice. The Auditor and GHD expressly disclaim responsibility:

- Arising from, or in connection with, any change to the site conditions;
- To update this Interim Advice if the site conditions change.

These Disclaimers should be read in conjunction with the entire Interim Advice and no excerpts are taken to be representative of the findings of this Interim Advice. This Interim Advice should not be altered, amended or abbreviated, issued in part or issued incomplete in any way without prior checking and approval by GHD.

28 April 2020

Katherine Daunt
Design Director
dwp Australia Pty Ltd
16 Telford Street
Newcastle NSW 2300

Our ref: 12519246
Your ref: SSD-9787

c.c. Sita Vasanthakumar, Robert McLaughlin, Ben Moss, Olivia Ryan, Jack Garland (Built P/L)

Dear Katherine

Newcastle Courthouse Redevelopment - Nihon University - Site Audit 0088_IDG
SSD Consent Matrix Items A18 and A19 Site Contamination
Interim Advice #4 – Review of revised DSI and RAP

I refer to my previous Interim Advice #3 dated 7 April 2020, which documents my detailed review of the following reports:

- Douglas Partners 2020a, *Report on Detailed Site Investigation – Pre-Demolition, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 3 March 2020. [Pre-Demolition DSI]
- Douglas Partners 2020b, *Report on Detailed Site Investigation, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 20 March 2020. [DSI]
- Douglas Partners 2020c, *Remediation Action Plan, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 24 March 2020. [RAP]
- Douglas Partners 2020d, *Long-term Site Management Plan, Proposed Nihon University, 9 Church Street, Newcastle*, Douglas Partners Pty Ltd, 26 March 2020. [LTSMP]

The DSI (Douglas Partners 2020b) and RAP (Douglas Partners 2020c) have subsequently been revised, based on the comments and recommendations provided in my Interim Advice #3. I have now reviewed the revised documents, which are as follows:

- Douglas Partners 2020e, *Report on Detailed Site Investigation, Proposed Nihon University, 9 Church Street, Newcastle*, Revision 2, Douglas Partners Pty Ltd, 23 April 2020.
- Douglas Partners 2020f, *Remediation Action Plan, Proposed Nihon University, 9 Church Street, Newcastle*, Revision 1, Douglas Partners Pty Ltd, 23 April 2020.

I confirm that the revised documents listed above have satisfactorily addressed my comments and recommendations provided in Interim Advice #3, and thus form an appropriate basis with which to proceed with the remediation and validation of the site.

The following points are consistent with the RAP, but are noted for avoidance of doubt regarding the requirements of the RAP during its implementation:

1. The additional measures ‘recommended’ in Section 7.1 of the RAP, being a high visibility marker layer and preparation of a long term Site Management Plan (SMP) are requirements, not options.

2. The respective marker layer materials (geofabric except that plastic sheeting may be used beneath concrete slabs / pavements) nominated in the RAP are considered appropriate. As the existing Court House building will not be disturbed, and the likelihood of contaminated soil being present beneath this building is low, a marker layer is not required under this building.
3. The RAP suggests a minimum capping of 300 mm for landscape areas with general ground cover (i.e. shallow root system), with increased capping thickness where deep rooted vegetation is proposed, and states advice should be sought from the landscape designers regarding the required thickness of capping to support the root zone for vegetation within landscape areas. The Auditor considers validation of landscape areas as per Section 10.1 Step 6 of the RAP is the preferred remediation option for such areas. Where capping is used instead (in accordance with the provisions of the RAP), confirmation from the landscape designers will be required regarding the thickness necessary to support the root zone, including consideration of whether roots may penetrate the marker layer, such as in situations as shown in the 'Mass Planting – Typical' detail 5 on Moir Landscape Architecture drawing LP13 G provided in Appendix B of the RAP, as well as for larger plantings. Use of a marker layer may also require modification to the Moir Section B: Planting Specification, in particular Section 3.1 preparation of subgrades.

Please note that this communication has been provided as Interim Advice only, as part of the audit process. The advice does not constitute a site audit report or site audit statement under the provisions of the CLM Act, and does not pre-empt the conclusions, which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

This Interim Advice relates solely to the contamination at the site, and is not intended to provide any opinions regarding the compliance or status of other aspects of the proposed site redevelopment.

The opinions and recommendations offered in this Interim Advice are subject to the attached Limitations.

I trust this Interim Advice is sufficient for your current purposes. Please contact me if you wish to discuss anything further.

Sincerely
GHD

Ian Gregson
Principal Environmental Consultant, NSW EPA Accredited Site Auditor, Accreditation No. 0101
+61 2 4979 9904

Attachments Limitations to Interim Advice

Limitations to Interim Advice

This Interim Advice has been prepared as part of a site audit undertaken in accordance with relevant provisions of Part 4 of the Contaminated Land Management (CLM) Act 1997.

This Interim Advice:

1. has been prepared by Ian Gregson and members of his support team as indicated in the appropriate sections of this Interim Advice ("GHD") for dwp and Azusa Sekkei;
2. may be used and relied on by dwp and Azusa Sekkei;
3. may be used by and provided to the EPA and the relevant planning authorities for the purpose of meeting statutory obligations in accordance with the relevant sections of the CLM Act 1997 or the Environment Planning and Assessment (EP&A) Act 1979;
4. may be provided to other third parties but such third parties' use of or reliance on the Interim Advice is at their sole risk, as this Interim Advice must not be relied on by any person other than those listed in 1-3 above without the prior written consent of GHD; and
5. may only be used for the purpose as stated in **Section** Error! Reference source not found. of the Interim Advice (and must not be used for any other purpose).

GHD and its servants, employees and officers (including the Auditor) otherwise expressly disclaim responsibility to any person other than dwp and Azusa Sekkei arising from or in connection with this Interim Advice.

Whereas these current opinions and recommendations have been provided as interim guidance to assist in the assessment and management of contamination issues at the site, this guidance should not be regarded as "approval" of any proposed investigations or remedial activities, as such approval is beyond the scope of an independent review. The NSW EPA *Guidelines for the NSW Site Auditor Scheme* (2017) contains a description of the site assessment and audit process, which includes the following:

- A site audit is the second in two tiers of work in the site assessment and remediation process.
- The **'first tier' is the work of a contaminated site consultant**, generally engaged by the site owner or developer. The contaminated site consultant designs and conducts a site assessment and any necessary remediation and validation, and documents the processes and information in reports; and
- The **'second tier' is the site audit** which involves a site auditor independently and at arm's length reviewing, for one of the audit purposes stated in the CLM Act, the consultant's assessment, remediation and validation plans or reports. The material outcomes of a site audit are a site audit report and site audit statement.

The purpose of the auditor's review is to assess whether the works undertaken (or proposed to be undertaken) comply with current regulations, standards and guidelines, and that the site has been assessed, remediated and validated to a standard appropriate for the proposed land use. In the first instance, the contaminated land consultant should be satisfied that the work to be conducted conforms to all appropriate regulations, standards and guidelines; and is appropriate, based on the site's historical land use, physical characteristics and proposed land use.

This interim review and advice do not constitute an audit under the provisions of the Contaminated Land Management (CLM) Act 1997, and do not pre-empt the conclusions which will be drawn at the end of the audit process. A site audit report and site audit statement will be issued when the audit process has been completed.

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be completely known and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgement must be exercised in the collection and interpretation of the data. In the conduct of

this review, in particular, reliance has been placed on data provided in the various site investigation and assessment reports. The Auditor is unable to provide certification outside of areas over which he had some control or is reasonably able to check, and does not accept responsibility for inaccuracies in information provided for review as part of this Audit.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Interim Advice are excluded unless they are expressly stated to apply in this Interim Advice.

The services undertaken by the Auditor, his team and GHD in connection with preparing this Interim Advice were undertaken in accordance with current profession practice and by reference to relevant guidelines made or approved by the EPA under Section 105 of the CLM Act 1997.

The opinions, conclusions and any recommendations in this Interim Advice are based on assumptions made by the Auditor, his team and GHD when undertaking services and preparing the Interim Advice ("Assumptions"), as specified throughout this Interim Advice. GHD and the Auditor expressly disclaim responsibility for any error in, or omission from, this Interim Advice arising from or in connection with any of the Assumptions being incorrect.

Subject to the paragraphs in this section of the Interim Advice, the opinions, conclusions and any recommendations in this Interim Advice are based on conditions encountered and information reviewed at the time of preparation of this Interim Advice and are relevant until such times as the site conditions or relevant legislations changes, at which time, GHD expressly disclaims responsibility for any error in, or omission from, this Interim Advice arising from or in connection with those opinions, conclusions and any recommendations.

The Auditor and GHD have prepared this Interim Advice on the basis of information provided by the client, their consultants and others who provided information to GHD (including Government authorities), which the Auditor and GHD have not independently verified or checked ("Unverified Information") beyond the agreed scope of work.

The Auditor and GHD expressly disclaim responsibility in connection with the Unverified Information, including (but not limited to) errors in, or omissions from, the Interim Advice, which were caused or contributed to by errors in, or omissions from, the Unverified Information.

The opinions, conclusions and any recommendations in this Interim Advice are based on information obtained from, and testing undertaken at or in connection with, specific sampling points and may not fully represent the conditions that may be encountered across the site at other than these locations. Site conditions at other parts of the site may be different from the site conditions found at the specific sampling points.

Although reasonable care has been used to assess the extent to which the data collected from site is representative of the overall site condition and its beneficial uses, investigations undertaken in respect of this Interim Advice are constrained by the particular site conditions as discussed in this Interim Advice. As a result, not all relevant site features and conditions may have been identified in this Interim Advice.

Site conditions (including any the presence of hazardous substances and/or site contamination) may change after the date of this Interim Advice. The Auditor and GHD expressly disclaim responsibility:

- Arising from, or in connection with, any change to the site conditions;
- To update this Interim Advice if the site conditions change.

These Disclaimers should be read in conjunction with the entire Interim Advice and no excerpts are taken to be representative of the findings of this Interim Advice. This Interim Advice should not be altered, amended or abbreviated, issued in part or issued incomplete in any way without prior checking and approval by GHD.

From: Aconex Notification
To: 12519246
Subject: GHD-GCOR-000016: From: I Gregson - Re: Building A (Education Building) - Removal of Slab on Ground (Aconex Sent Items Backup)
Date: Thursday, 4 June 2020 3:51:55 PM

Your organization has sent a new **General Correspondence: GHD-GCOR-000016**

Project: Nihon University
Type: General Correspondence
Mail Number: GHD-GCOR-000016
To: Mr Benjamin Moss, Built Pty Ltd
Cc: Mr Leif Aleksic, Built Pty Ltd
Ben Bates, Built Pty Ltd
Mr Michael Louis, Built Pty Ltd
Mr Robert McLaughlin, Built Pty Ltd
Ms Sita Vasanthakumar, Built Pty Ltd
Mr Chris Bozinovski, Douglas & Partners Pty Ltd
Mr Ed Clode, dwp
Ms Katherine Daunt, dwp
From: I Gregson, GHD
Sent: 04/06/2020 3:51:46 PM AEST (GMT +10:00)
Status: N/A
Subject: **Re: Building A (Education Building) - Removal of Slab on Ground**

Hi Ben,
just confirming my site inspection was undertaken this morning, as requested. Chris Bozinovski from DP was also present at the time. Site status at time of inspection was briefly as follows:

- West side bulk excavation nearly complete. Numerous footings extending into natural soils have been removed (some still to remove), making it difficult to segregate VENM.
- Fill being loaded out from excavations. There is an excess of fill from the site, and little available storage space.
- Crushed concrete from on site stockpiled for re-use.
- East side grouting and piling complete, earthworks to sub-floor level.
- Stormwater not started.
- Landscaping plans not finalized yet.

Works appear to be proceeding well, and the site was in a tidy condition. Key points noted (while on site) for ongoing work:

- Make sure documentation is complete and kept up to date for waste management, to avoid problems later on. Documentation should be reconciled and checked for accuracy / completeness on an ongoing basis.
- I don't need to inspect the storm sewer installation, but there needs to be a good photographic record of the excavation, marker layer and clean backfill. DP noted that they have hold points for inspection.
- My next inspection will probably be when landscaped areas are ready for validation.

Regards,
Ian Gregson

From: B Moss
Sent: 03/06/2020 11:51:38 AM AEST (GMT +10:00)
To: Ian Gregson
Cc: Leif Aleksic, Ben Bates, Michael Louis, Robert McLaughlin, Sita Vasanthakumar
Mail Number: BUILT-CSIR-000009
Subject: Building A (Education Building) - Removal of Slab on Ground

Hi Ian,

Please be advised that the Building A Northern section of slab on ground has been removed and ready for your inspection as requested. Douglas Partners have been onsite yesterday and today to complete their initial assessment.
Please also note that the removal of slab on ground is staged in a similar methodology to Building C (Residential). Happy to discuss further onsite if required.
Regards,

Benjamin Moss

Project Manager

Built.

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The Aconex Team

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From: Benjamin Moss
To: Robert McLaughlin; Edward.c@dwp.com; Chris Bozinovski (InTouch); Ian Gregson; Rod O"Neill
Cc: Leif Aleksic; Robbie Clydesdale
Subject: FW: 9 Church Street, Newcastle - Nihon University - Stormwater Easement Management Report
Date: Tuesday, 7 July 2020 4:28:35 PM
Attachments: image001.png
image002.png
image003.png
image004.png
Built_Logo_131x51px_0b4fa851-4be5-4999-bcfa-f94227f8a4f4.png
FB_eSig_25pxSqr_1335db7e-f6b0-406e-8d18-7eaece09a257.png
LinkedIn_eSig_25pxSqr_a96c5c4c-9a07-4417-ba1d-9edfcf151b47.png
Twitter_eSig_25pxSqr_b4401d18-a2d8-42a1-bd5c-2f0f1357d838.png

---

Good afternoon All,

Please see correspondence below from CoN advising of their acceptance of the revised pipe embedment detail.

Thank you all again for your time today.

Regards,

Benjamin Moss
Project Manager

Built.

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From: Ben Lovell <blovell@ncc.nsw.gov.au>
Sent: Tuesday, 7 July 2020 4:19 PM
To: Benjamin Moss <benmoss@built.com.au>
Cc: Luke Jones <ljones@ncc.nsw.gov.au>; Peter R. McMurray <prmcmurray@ncc.nsw.gov.au>
Subject: FW: 9 Church Street, Newcastle - Nihon University - Stormwater Easement Management Report

[EXTERNAL EMAIL]

Hi Ben,

The revised pipe embedment detail has been accepted.

I note that the existing building was not underpinned prior to laying the pipe and therefor there is short term structural dependencies.

Please ensure the zones of influence from the existing and proposed buildings do not interact with the pipeline by piering as soon as practical.

Please ensure final pipeline CCTV defect inspections are performed at project completion.

Kind Regards,
Ben

Ben Lovell | Assets Coordinator - Stormwater
City of Newcastle | Infrastructure & Property
Assets & Projects | Asset Services
T: +61249742237 | E: blovell@ncc.nsw.gov.au

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From: Luke Jones <ljones@ncc.nsw.gov.au>
Sent: Tuesday, 7 July 2020 1:37 PM
To: Ben Lovell <blovell@ncc.nsw.gov.au>
Subject: RE: 9 Church Street, Newcastle - Nihon University - Stormwater Easement Management Report

Hi Ben,

Having visited site this morning to assess the implementation of the revised solution I recommend it is OK for approval. I also referred internally for comment from City staff with deeper experience in contamination who have stated and I agree, the risk of the current solution is lower then the risk of exposure from pulling out the pipes and redoing the geofabric.

The solution will be placed on the site register so that there is a record of it. I will also places notes within the asset register for these assets.

I raised the issue on site that the pipes have gone in prior to the pile installation along the boundary between the pipe and the existing building. This raises serious concerns regarding the structural interdependency of the pipe and the building. I was assured the buildings foundations however extend deeper then the pipe. CCTV of the pipe has already been completed, one of the site engineers resolved the pipes should be recamered on completion of the piling work.

I informed Ben on site that he would hear back from us by the end of the day with specific regard

to the contamination solution,

If you need any further information don't hesitate to give me a call.

Thanks,

Luke

Luke Jones | Asset Engineer
City of Newcastle | Infrastructure & Property
Assets & Projects | Asset Services
T: +61249746118 | E: ljones@ncc.nsw.gov.au

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From: Benjamin Moss <benmoss@built.com.au>
Sent: Monday, 6 July 2020 4:15 PM
To: Ben Lovell <blovell@ncc.nsw.gov.au>; Luke Jones <ljones@ncc.nsw.gov.au>; Daniel O'Brien <dobrien@ncc.nsw.gov.au>; Paul McMurray <pmcmurray@ncc.nsw.gov.au>
Cc: Chris Bozinovski <Chris.Bozinovski@douglaspartners.com.au>; Matthew Blackert <Matthew.Blackert@douglaspartners.com.au>; Edward.c@dwp.com; Ian Gregson <Ian.Gregson@ghd.com>; Robert McLaughlin <robertmclaughlin@built.com.au>; Leif Aleksic <LeifAleksic@built.com.au>; Robbie Clydesdale <robbieclydesdale@built.com.au>
Subject: RE: 9 Church Street, Newcastle - Nihon University - Stormwater Easement Management Report

All,

Further to my last email, please be advised that the report and strategy prepared by Douglas Partners has been reviewed and approved by the GHD Auditor, Ian Gregson.

Regards,

Benjamin Moss
Project Manager
Built.
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From: Benjamin Moss
Sent: Monday, 6 July 2020 4:04 PM
To: Ben Lovell <blovell@ncc.nsw.gov.au>; Luke Jones <ljones@ncc.nsw.gov.au>; Daniel O'Brien <dobrien@ncc.nsw.gov.au>; Paul McMurray <pmcmurray@ncc.nsw.gov.au>
Cc: Chris Bozinovski <Chris.Bozinovski@douglaspartners.com.au>; Matthew Blackert <Matthew.Blackert@douglaspartners.com.au>; Edward.c@dwp.com; Ian Gregson <Ian.Gregson@ghd.com>; Robert McLaughlin <robertmclaughlin@built.com.au>; Leif Aleksic <LeifAleksic@built.com.au>; Robbie Clydesdale <robbieclydesdale@built.com.au>
Subject: 9 Church Street, Newcastle - Nihon University - Stormwater Easement Management Report

Good afternoon,

Please see the Stormwater Easement Management Report attached for review prior to our meeting onsite tomorrow morning at 9 Church Street, Newcastle.

Regards,

_____
This e-mail has been scanned for viruses

From:	Chris Bozinovski
To:	Benjamin Moss; Robert McLaughlin; Ian Gregson
Cc:	benbates@built.com.au; Leif Aleksic; Matthew Blackert; Katrina D"Alessandro; sita@built.com.au; Slafco Gavriloski; Robbie Clydesdale; Dana Wilson
Subject:	91667.03 - 9 Church Street, Newcastle - Nihon University - Stormwater Easement Inspection (16 July 2020)
Date:	Thursday, 16 July 2020 1:01:15 PM
Attachments:	image003.png image005.png image007.png

Ian/Ben/Rob

Confirming that DP conducted an inspection this morning at the Nihon site in relation to stormwater easement construction.

The following was noted:

- **Stormwater easement construction is progressing in accordance with the agreed management strategy (91667.03.R.001.Rev1);**
- Geofab has been placed over the batters of the trench excavation (central and northern portions);
- Imported clean FCR (fine crushed rock) has been utilised as trench backfill within the easement;
- A sacrificial geofab separator (see Figure 1) and approx. 300mm of FRC material has been placed over the surface of the easement to provide temporary access for piling operations and to minimise the risk of cross-contamination of the clean trench backfill materials;

Figure 1: Sacrificial geofab placement looking north (from Built)

- Current easement conditions are shown in Figure 2 below indicating the sacrificial FCR at the surface:

Figure 2: Stormwater Easement surface – looking north (DP - 16/07/20)

- The sacrificial marker and FCR layer will be peeled back to allow completion of the easement surface as per the agreed strategy;
- Potentially impacted surface FCR will be utilised outside the easement beneath final site capping as a precautionary measure (ie not within easement backfill);
- Built were able to utilise the orange geofab for the works;
- Further details will be provided in our validation report to follow.

Please call if you have any questions.

Regards

Chris Bozinovski | Principal
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
15 Callistemon Close Warabrook NSW 2304 | Box 324 Hunter Region Mail Centre NSW 2310
P: 02 4960 9600 | M: 0412 496 093 | E: Chris.Bozinovski@douglaspartners.com.au

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09 September 2021

Benjamin Moss
Built
Level 7/343 George Street
Sydney NSW 2000

Dear Benjamin

Landscape Soil Depth Confirmation – Nihon University, Newcastle

In response to your request, I have reviewed our landscape design (Drawings LP03-LP06 Issue M) in the context of the *As Built Remediation Layers Survey Geosurv – Drawing #191196-AB-R-01 - Issue E* for the purpose of determining whether sufficient soil depth has been provided to ensure the viability of the proposed plant species.

It is my opinion that the depths indicated on the *As Built Remediation Layers Survey* are sufficient in the areas indicated to sustain the planting installed as per the landscape design.

It is also noted that a geofabric marker layer has been installed between the subsoil and the imported planting medium. It is my opinion that with the soil depths installed, the geofabric marker layer will not impede the growth of the selected species or diminish the long-term viability of the installed landscape.

Please do not hesitate to contact me if you have any further queries.

Kind Regards,

David Moir B.L.Arch RLA
Director
Moir Landscape Architecture Pty Ltd

Tokyo, Sept.9th, 2021

Att: Scott O'Donohue

A1 Acredited Certifier

Managing Director,

SureScope

Address: Suite 4C 250 Pacific Hwy Charlestown NSW 2290

E-mail: wgsxxD wgstigivx2gsq 2ey

Subject: LTSMP

Dear Mr.Donahue,

On behalf of Nihon University, and being nominated as their representative, I hereby attest that once the operation starts Nihon University would manage the site in accordance with the submitted approved LTSMP.

In the meantime, due to COVID restrictions of international travels, the site would be managed temporarily under caretaker mode by Built, whom will be managing the site in accordance with the LTSMP.

Warm regards,

Junichi YOKOBORI

Chief Project Manager

Azusa Sekkei Co., Ltd.

On behalf of Nihon University

From:	Benjamin Moss
To:	Ian Gregson
Cc:	Chris Bozinovski (InTouch); Matthew Blackert; Robert McLaughlin
Subject:	Nihon University - Removal of Materials
Date:	Wednesday, 15 September 2021 1:01:46 PM
Attachments:	Built_Logo_131x51px_0b4fa851-4be5-4999-bcfa-f94227f8a4f4.png FB_eSig_25pxSqr_1335db7e-f6b0-406e-8d18-7eaece09a257.png LinkedIn_eSig_25pxSqr_a96c5c4c-9a07-4417-ba1d-9edfcf151b47.png Twitter_eSig_25pxSqr_b4401d18-a2d8-42a1-bd5c-2f0f1357d838.png

Good morning Ian,

As discussed, Woodbury Civil completed detailed excavation works involving the removal of intermixed upper fill between the 11th May 2021 to 28th June 2021. This material generally consisted of previously imported materials (FCR, sand), gravelly sandy clay, GSW construction waste, and sandstone. No visible bonded ACM was identified by Built or Woodbury Civil personnel throughout these works.

Based on the activity, observations and material characteristics outlined above, the regulatory requirements for handling and transport of asbestos were not expected to be triggered, however these materials were removed and disposed of as GSW (non-putrescible) with trace bonded ACM as a precautionary measure and in line with previous advice.

All loads between these dates were appropriately disposed of at the Raymond Terrace Waste Management Centre as Contaminated Asbestos Soil and were reported to the NSW EPA by the facility operator, Suez Recycling & Recovery.

Regards,

Benjamin Moss
Project Manager

Built.

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Appendix E

Long Term Environmental Management Plan

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Long-term Environmental Management Plan

Nihon University
9 Church Street, Newcastle

Prepared for
Nihon Daigaku Australia Newcastle

Project 91667.03
September 2021

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	91667.03	Document No.	R003.Rev1.LTEMP
Document title	Long-term Environmental Management Plan Nihon University		
Site address	9 Church Street, Newcastle		
Report prepared for	Nihon Daigaku Australia Newcastle		
File name	91667.03.R003.Rev1.LTEMP.docx		

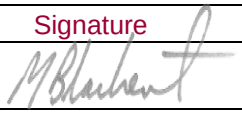
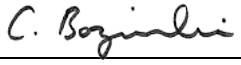
Document status and review

Status	Prepared by	Reviewed by	Date issued
Draft A	Matthew Blackert	Chris Bozinovski	24 March 2019
Draft B	Matthew Blackert	Chris Bozinovski	26 March 2019
Revision 0	Matthew Blackert	Chris Bozinovski	9 September 2021
Revision 1	Matthew Blackert	Chris Bozinovski	10 September 2021

Distribution of copies

Status	Electronic	Paper	Issued to
Draft A	1	0	Sita Vasanthakumar, Built Pty Limited
Draft B	1	0	Sita Vasanthakumar, Built Pty Limited
Revision 0	1	0	Ben Moss, Built Pty Limited
Revision 1	1	0	Ben Moss, Built Pty Limited

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		10 September 2021
Reviewer	 CEnvP – No. SC41163SC	10 September 2021

bsi. ISO 9001 Quality Management
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Appendix A: About This Report

Appendix B: Table 2: Emergency Contacts

Table 3: Capping/Condition Inspection Guide

Letter from Azusa Sekkei Co Ltd (acting on behalf of Nihon University) dated 10 September 2021

Table 10 DP(2020c) - Results of Chemical Analysis of Soil (Contamination)

Appendix C: Drawing 1 – Test Location Plan

Moir LP02 (Rev M) - General Arrangement dated 21.05.2021

Moir - LP17 (Rev M) - Remediation Action Plan dated 30.08.2021

Geosurv Asbuilt Remediation Layers Plans (191196-AB-R-01 (E) dated 6.09.2021)

Report on Long-term Environmental Management Plan
Nihon University
9 Church Street, Newcastle

1. Introduction

This Long-term Environmental Management Plan (LTEMP) provides procedures for long term management of contaminated soils, which are present within the subject site shown on Drawing 1 attached.

Contaminated soils/fill containing bonded asbestos-containing materials (ACM) are present across the site due to uncontrolled historic fill and historic demolition of structures within the site. Based on the results of previous assessments at the site, the remediation strategy for the proposed redevelopment comprised the management of bonded asbestos impacted soils under structures, pavements, or beneath 'clean' soil capping. While Polycyclic Aromatic Hydrocarbons (PAH), heavy metals and petroleum hydrocarbon (TRH) impacts were identified within fill on site exceeding the adopted Tier 1 health based and ecological investigation / screening levels (refer to DP 2020a for details), remediation for these contaminants was not warranted based on statistical analysis and consideration of the ecological setting and the proposed development.

On-site management (capping) of contaminated soils was conducted in a controlled manner with reference to regulatory requirements and the NSW EPA Auditor approved Remediation Action Plan (RAC) for the site (DP, 2020a) to render the site suitable for use as a university campus. Details of remediation and validation works are provided in the validation report for the site (DP, 2021). In summary, significant volumes of fill material were removed from site during construction, and the remaining potentially impacted soils were capped beneath existing and proposed buildings, new pavements and landscape areas, as shown on Geosurv Asbuilt Remediation Layers Plan in Appendix C. It is noted that the capped area excludes a variable width easement for services along the western boundary of Lot 1, DP1199904, which falls outside the development footprint and is not covered by the LTEMP.

The objective of the LTEMP is to provide awareness of the contamination managed on site and prevent and manage breaching of the cap. The LTEMP promotes awareness of the contamination management and the requirements to avoid disturbance (where possible) and provides an outline of maintenance requirements. It is noted that only passive management measures are required.

The preparation of this LTEMP is a requirement under Clause E32 of the final development consent conditions (SSD 9787 dated 11 December 2019) for the Nihon University development, as is the notation of this LTEMP on the Section 10.7 certificate for the site by Council. Ongoing management of the site by Nihon Daigaku Australia Newcastle Pty Ltd (Nihon) is required in accordance with this LTEMP and SSD-9787 Consent Condition E34 and F7. The draft LTEMP was reviewed by Nihon, who agreed to implement it (see letter from SureScope dated 9 September 2021 on behalf of Nihon University in Appendix B).

The LTEMP should be incorporated as part of documentation to fulfil WHS regulation requirements for an asbestos management plan (AMP) and register for asbestos remaining on the site.

This LTEMP must be incorporated into the Nihon University overall property management plans/procedures to allow implementation of the management procedures within this plan for routine maintenance and for targeted subsurface works if and when required within the site. The requirement for ongoing site management must be noted on the appropriate planning certificate. Consideration should be given to recording the requirements on the title information for the site.

Implementation and enforcement of this LTEMP must remain until such time that specific additional assessment is conducted at the site that finds that the LTEMP is no longer required. Any such additional assessment and subsequent removal of the LTEMP requirements must be subject to review and approval by an NSW EPA-accredited Auditor, or the NSW EPA.

The remediation and validation and long-term environmental management plan is subject to review by Mr Ian Gregson, a NSW EPA-accredited Auditor.

2. Site Description

The site is described as part Lot 1 DP 1199904, 9 Church Street, Newcastle, NSW and comprises a rectangular shaped area of approximately 4880 m^2. The site (for the purposes of this LTEMP) excludes a variable width easement for services along the western boundary of Lot 1 which falls outside the development footprint.

The site was formerly known as the Newcastle Courthouse and comprised three adjoining structures – the original Courthouse, the Administration Building and the Supreme Court Building with a rear carpark (south-east corner) and landscape areas.

The site is shown on Drawing 1 in Appendix C and Figure 1 below.

Figure 1: Approximate extent of development area ('the site') in red, Nihon University (Metromap Image dated 6 June 2021)

3. Site Development / Location of Capping

The university development included construction of two four-storey buildings consisting of a 108 bed 'Student Accommodation Building' (east wing) and an 'Education Building' (west wing), both connected to the central 'Public Building' (former Courthouse building that was retained) by atria. A carpark for 20 cars is contained on the lowest level of the 'Education Building'. The three buildings are surrounded by landscape areas and pavements.

The site condition as of 20 August 2021 (final inspection date) is shown in Figures 2 to 22 below.

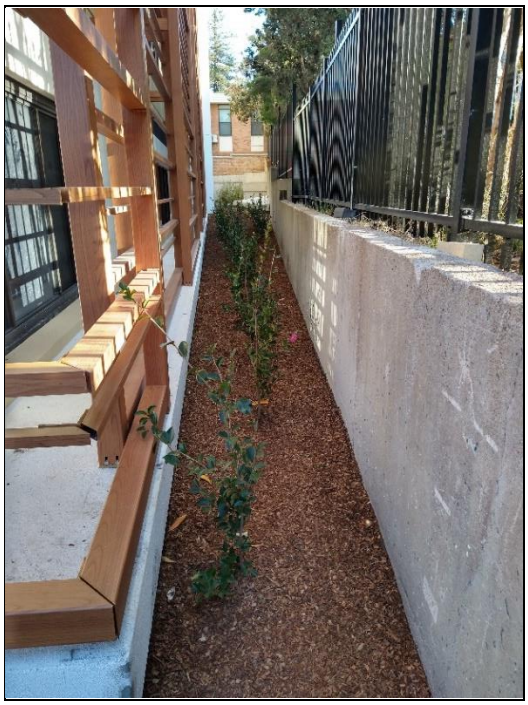


Figure 2 – Looking south at garden bed and mulch along western investigation boundary adjacent Education Building (20 August 2021)

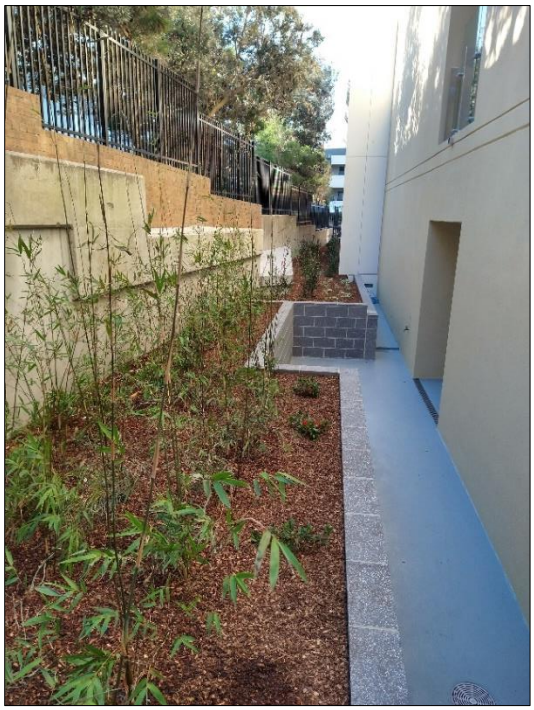


Figure 3 – Looking north at garden bed along western investigation boundary adjacent Education Building. (20 August 2021)

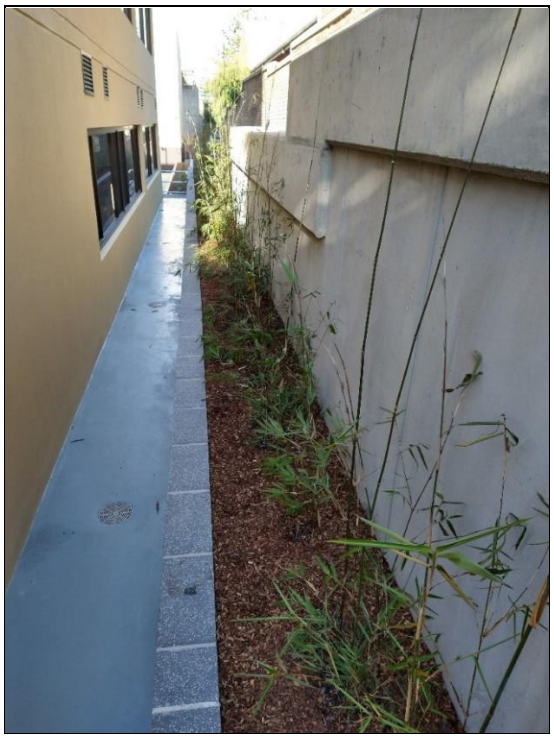


Figure 4 – Looking east at garden bed along southern site boundary adjacent Education Building.

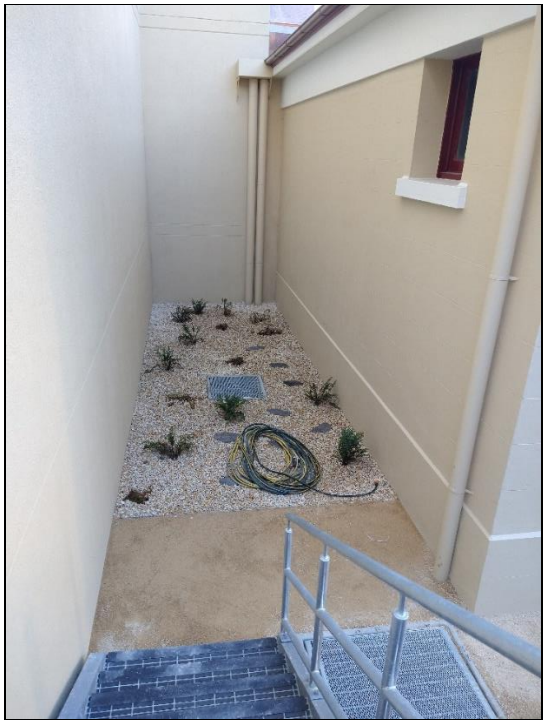


Figure 5 – Looking north at garden bed and walkway along southern side of Education Building. (20 August 2021)

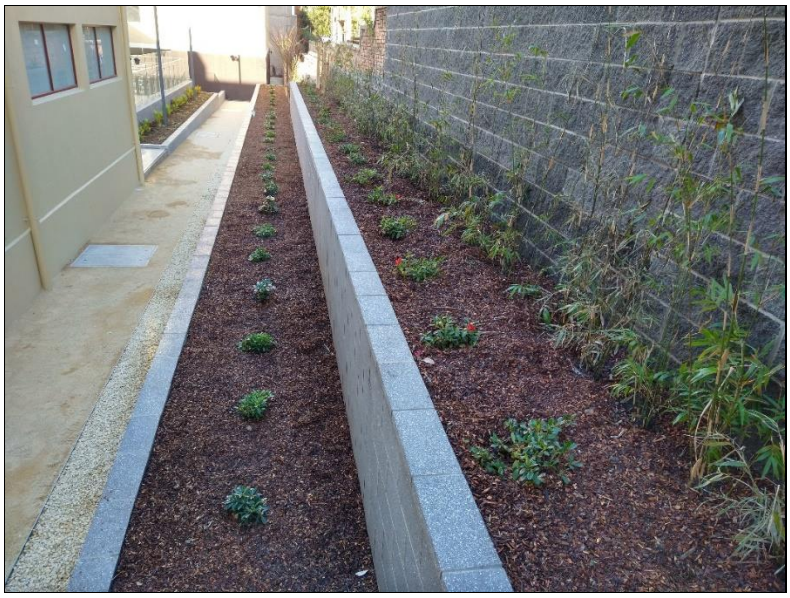


Figure 6 – Looking east at garden bed and walkway along southern side (rear) of central building (20 August 2021)

Figure 7 – Looking north at garden bed and walkway along southern side of Atrium (20 August 2021)

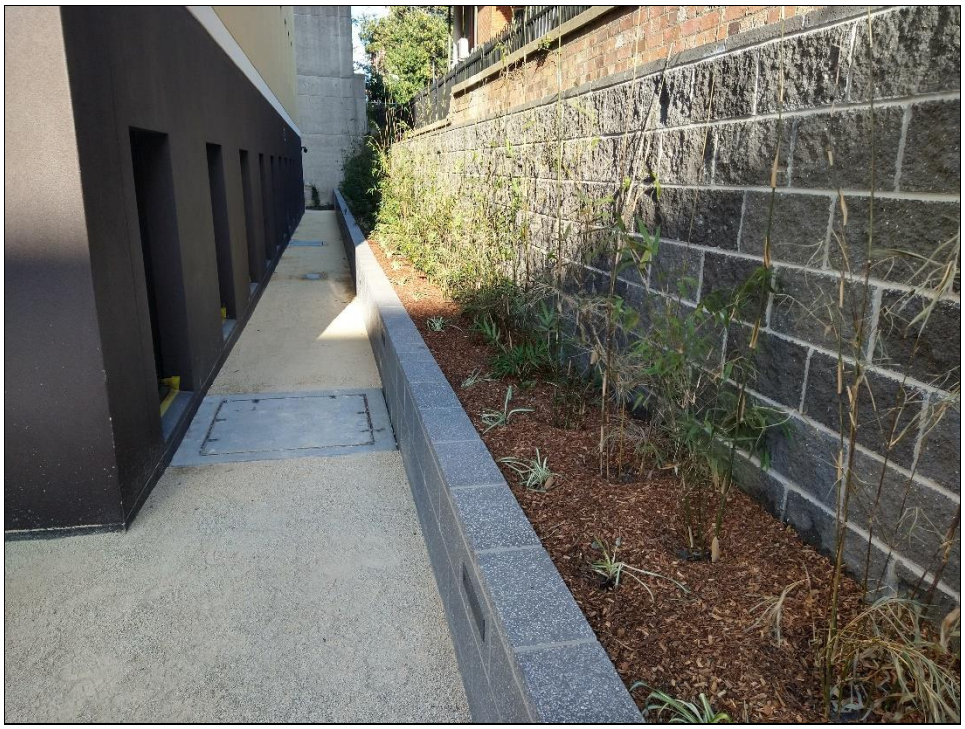


Figure 8 – Looking east at garden bed and walkway along southern side of Student Accommodation Building (20 August 2021)

Figure 9 – Looking east at garden bed and walkway in south eastern corner of site (20 August 2021)

Figure 10 – Looking north at concrete driveway and adjacent garden bed along the eastern site boundary (20 August 2021). Student Accommodation Building to the left and the Newcastle Police Station to the right.

Figure 11 – Looking southeast at concrete paved driveway and adjacent garden bed along the eastern site boundary (20 August 2021)

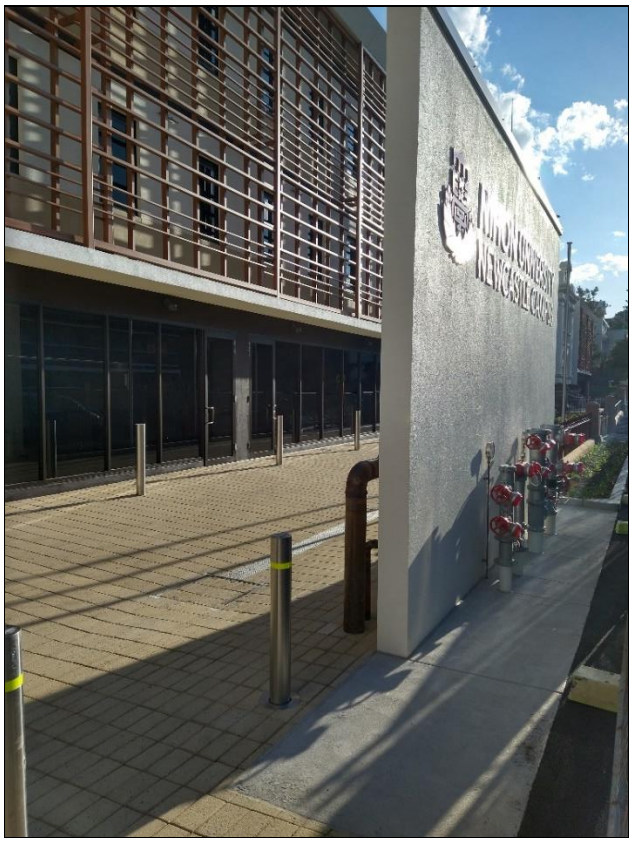


Figure 12 – Looking west at concrete paved driveway/footpath along the north side (front) of the Student Accommodation Building (20 August 2021)

Figure 13 – Looking east at concrete paved driveway/footpath and adjacent garden bed along the northern side (front) of the Student Accommodation Building (20 August 2021)

Figure 14 – Looking west at concrete paving and adjacent garden bed along the northern side (front) of the central building (20 August 2021)

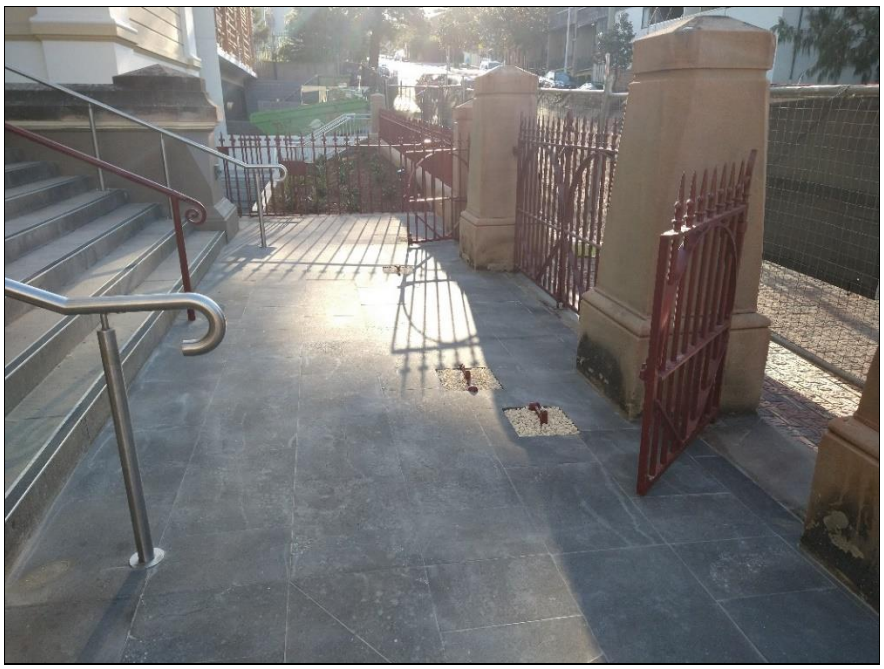


Figure 15 – Looking west at Bluestone paving and adjacent garden bed along the northern side (front) of the central building (20 August 2021)

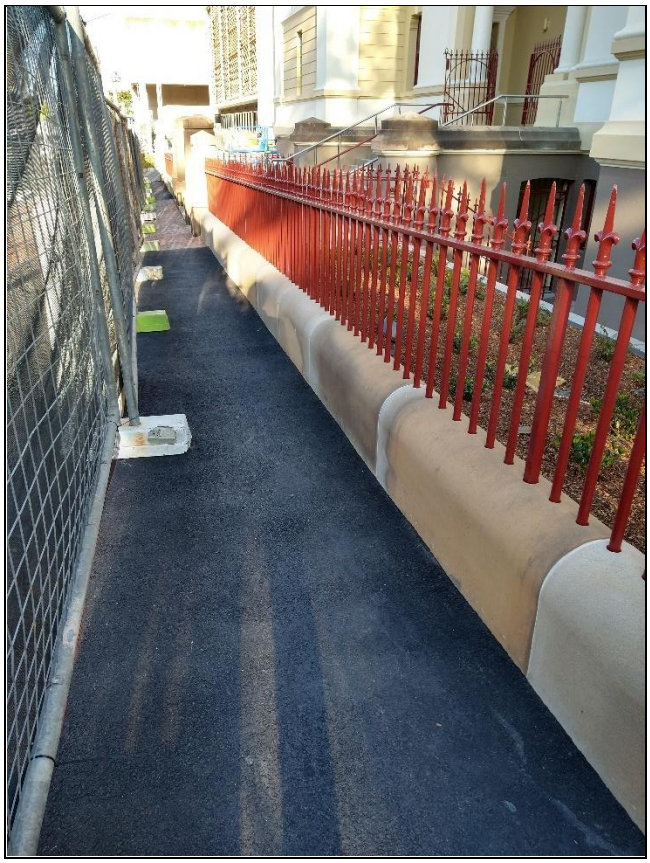


Figure 16 – Looking east at asphalt paving and adjacent garden bed along the northern side (front) of the central building (20 August 2021)

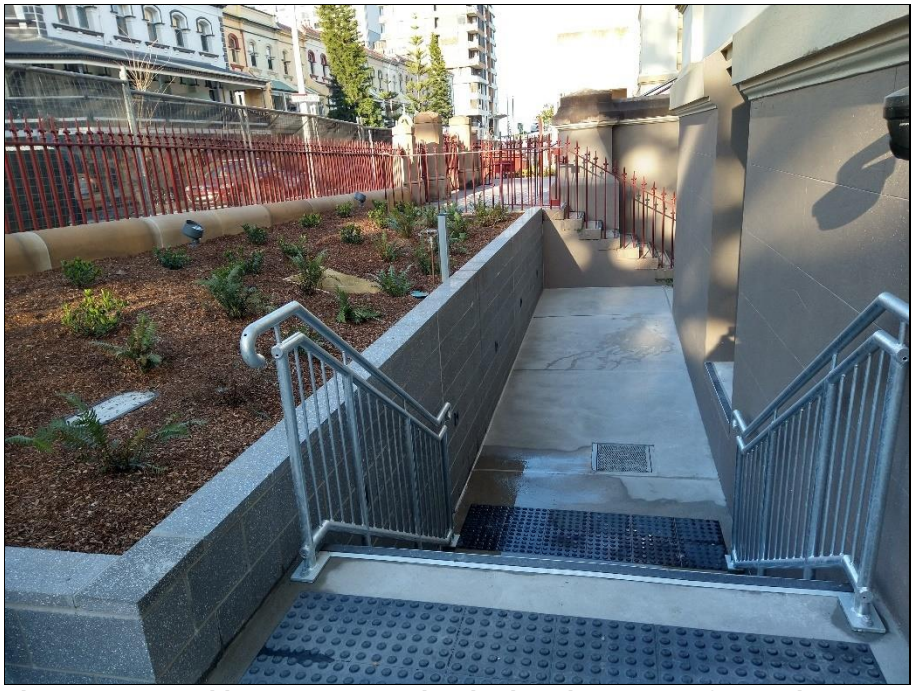


Figure 17 – Looking east at garden bed and concrete footpath pavements along the northern side (front) of the central building (20 August 2021)

Figure 18 – Looking west at electrical kiosk along the northern side (front) of the Education Building (20 August 2021)

Figure 19 – Looking east at garden beds along the northern side (front) of the Education Building (20 August 2021)

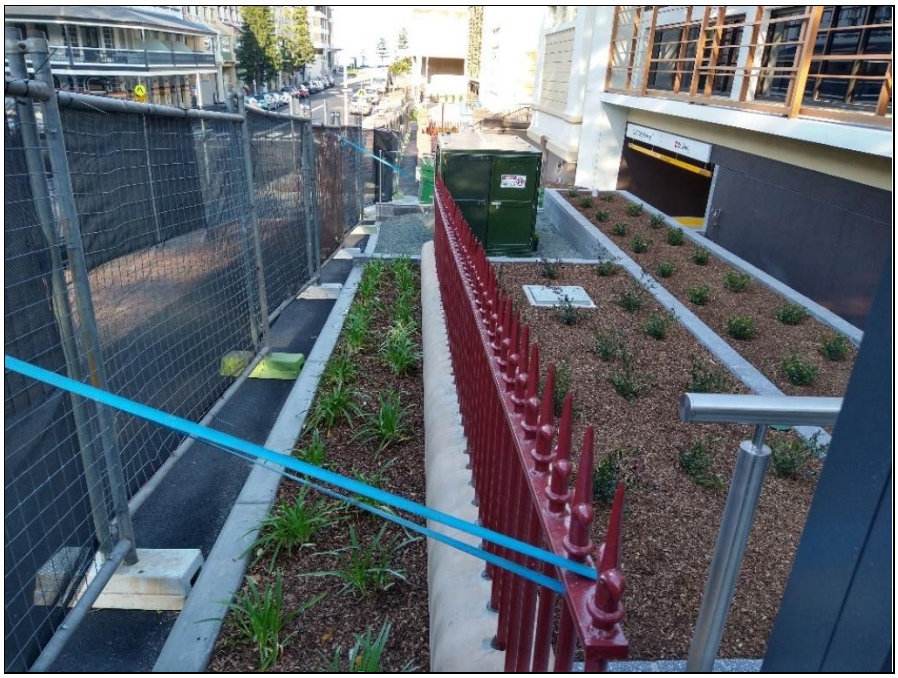


Figure20 – Looking east at asphalt pavement and garden beds along the northern (front) boundary and northern side of the Education Building (20 August 2021)

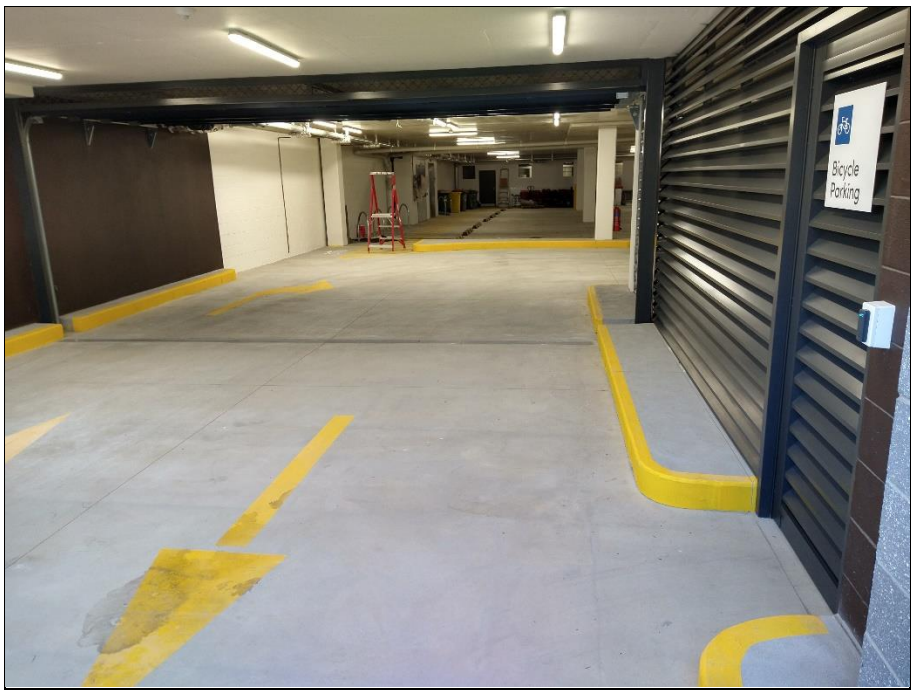


Figure 21 – Looking south at concrete pavements within the underground carpark of the Education Building (20 August 2021)

Figure 22 – Looking south east at Church Street and the Nihon University development site (20 August 2021). Newcastle Police Station to the left.

Management of contaminated soils within the site has been achieved as follows:

- Via capping with a minimum of 125 mm of pavement thickness, comprising concrete, placed over the black plastic marker layer within the internal pavements / building slabs / footpaths / some landscape areas and raised garden beds. Some of these concrete pavements were further overlaid with landscaping materials (ie roadbase and white granite in pathways, imported soil and mulch in garden beds etc – refer to Geosurv survey plans and Moir landscape plans for details);
- Via capping within landscape areas. Capping was generally greater than 300 mm. Minor exceptions to this occurred in the landscape area immediately south of the Atrium (minimum 193 mm) and the localised landscape area immediately north of the Atrium (minimum 191 mm) (Refer to Geoserv Asbuilt Survey Plan in Appendix C). Garden beds comprised imported soil (Hills premium garden mix) and either surficial woodchips (mulch) or white scoria gravel over an orange geo-fabric marker layer which was placed over the ground surface in the landscape beds across the site. Moir Landscape Architecture (Moir, 2021) indicated that sufficient landscape depths were present to sustain the planting installed as per the landscape design;
- Via Approximately 219 mm to 382 mm (average thickness for each area) of imported roadbase and asphalt placed over an orange geofabric marker layer which was placed over the ground surface in asphalt footpaths along the northern (front) site boundary;
- Via approximately 396 mm (average thickness) of imported roadbase from Boral Seaham and 10 mm blue metal gravel from Saddingtons - Quarry Products (Newcastle) was placed over an orange geofabric marker layer over the ground surface in the vicinity of the electrical kiosk in the north western portion of the site.

The provided survey information (in Appendix C) confirms that appropriate capping has generally been achieved as required by the RAP.

The minimum thickness of capping as presented in the RAP has generally been achieved across the site with the minor exception of the two landscape areas to the north and south of the Atrium (min 191mm as shown on Geosurv Asbuilt Plan in Appendix C). The survey plan provides accurate levels indicating the depth to the geofabric marker layer. This depth should be considered during any future disturbance/maintenance of soils within the site on Geosurv Asbuilt Remediation Layers survey plan in Appendix C. Any changes to depth (eg. as a result of landscaping requirements) should be documented as part of LTEMP review and maintenance.

Typical placement of the orange geofabric marker layer beneath capping materials within landscape areas is shown in Figures 23 to 24 below.

Figure 23 – Orange geofabric marker layer in garden bed at the rear of the Atrium (16 July 2021)

Figure 24 – Orange geofabric marker layer within garden bed on northern (front) side of the Student Accommodation Building (22 July 2021 – supplied by Built)

Typical placement of black plastic marker layer beneath concrete pavements within buildings and driveways is shown in Figures 25 to 27 below.

Figure 25 - Black plastic marker layer beneath Student Accommodation Building concrete slab (30 July 2020 - supplied by Built)

Figure 26 - Black plastic marker layer beneath Atrium concrete slab (25 August 2020 - supplied by Built)

Figure 27 – Black plastic marker layer beneath concrete pavement on northern (front) side of Student Accommodation Building (26 June 2021 – supplied by Built)

It is noted that crushed demolition waste (concrete/brick) together with imported fine crushed rock was also utilised on-site during construction beneath capping in some areas.

Drawings showing the capping and landscaping undertaken for the site are as follows:

- Moir LP17 (Rev M) Remediation Action Plan in Appendix C shows the nature of various capping within the site (ie concrete capping and plastic marker layer or imported material capping over an orange geofabric marker layer);
- Moir LP02 (Rev M) – General Arrangement Plan in Appendix C shows finished materials at surface although it is noted roadbase and crushed granite was not laid over the concrete footpath in the south western corner adjacent to the Education Building as shown on this plan;
- Geosurv Asbuilt Remediation Layers Plan (191196-AB-R-01 (E) dated 6.09.2021) in Appendix C shows thickness of capping within site and marker layer present.

Geosurv Asbuilt Remediation Layers Plan and Figure 1 above indicates the location of the areas to be managed under this LTEMP. As a precautionary measure, all materials beneath the marker layers, pavements or buildings across the site as indicated in Geosurv Asbuilt Remediation Layers Plan and Figure 1 must be treated as potentially contaminated in the event that the capping is penetrated. It is noted that the stormwater pipeline trench excavated within the HWC easement located parallel to the eastern side of the former Courthouse (Now central Public Building) was backfilled with ‘clean’ materials in the event that future maintenance or replacement was required (albeit unlikely). Further details on the management of the HWC easement is provided in DP (2020b).

4. Nature of Capped Material Requiring Management

The detailed site investigation (DP, 2020c) conducted for the proposed Nihon University identified the following pertinent site conditions:

- Presence of fill within all bores / pits to depths of 0.1 m to >3.3 m;
- Presence of ash, slag and asphalt within some fill materials;
- Presence of building materials (brick, concrete, tile, metal, wood, glass) within some fill materials across the majority of the site spatially which may be an indicator of the presence of hazardous building materials (HBM) including asbestos;
- Presence of elevated lead and PAH impacts within fill / soil;
- Bonded ACM has been confirmed within filling under both buildings and within the car park and landscape areas (ie all areas of the site proposed for development);
- The groundwater table on the site is variable in height (ranging in depth from approximately 6.5 m to 11.2 m depth and present within the upper highly weathered bedrock. It should be noted that groundwater levels are affected by factors such as climatic conditions and soil permeability and will therefore vary with time;
- Groundwater testing was generally within the adopted guidelines with the exception of heavy metal concentrations (namely nickel and zinc) which were marginally above the adopted criteria (GILs for marine waters). It is noted that the groundwater concentrations in the up-gradient well (Bore 203) was typically higher or commensurate with concentrations detected in downgradient wells. It is also noted that no obvious visual or olfactory indications of impact to groundwater (ie no obvious staining, odours, slicks or free product) were detected during purging / sampling and no detectable concentrations of hydrocarbons (TRH, BTEX, PAH, VOCs) were identified within groundwater samples;
- Ground gas monitoring has indicated the general absence of mine gases or volatile hydrocarbons associated with USTs associated infrastructure and wash bay on the adjacent Police Station, within the bores and buildings / site grounds.

The results of chemical analysis undertaken on soil samples including previous soil analysis results (Prensa, 2016) were summarised in Table 10 (DP, 2020c) with comparison to the adopted site assessment criteria (SAC) for contamination. Table 10 (DP, 2020c) is provided in Appendix B for completeness.

Bonded ACM impacted fill materials were identified during the DSI (DP, 2020c) across all areas of the site (ie both the Administration Building, the Supreme Court Building, landscape areas and the car park). The bonded ACM impacts appeared to be associated with the fill materials across the site which contained extensive building wastes. ACM was also observed to have been utilised as formwork for existing footings/structures below ground. We understand that a licensed contractor was engaged by Built to validate the removal of hazardous building materials (HBM) from all the buildings including the Administration building and Supreme Court building which were demolished as part of the Nihon University development.

Bonded ACM materials, where encountered in fill, were typically observed to comprise a few to numerous fibro sheeting fragments (general in sound condition). Based on a qualitative assessment, the frequency of ACM were considered to exceed the NEPC (2013) concentration limits in the absence of a detailed asbestos assessment (ie field sieving for bonded ACM). Based on these observations and the presence of widespread building wastes within fill across the site, the presence of further bonded ACM impact was anticipated across the site as evidenced during exposure of fill materials beneath the former Administration Building. The ACM encountered was generally observed to be in sound condition. Friable asbestos (ie AF/FA) was not detected within the soil samples analysed. The identified asbestos impacts at the site were therefore associated with bonded ACM.

It is noted that the bonded ACM utilised as formwork on the external walls of the former Courthouse building and on the external walls of the tunnel extended beneath the ground surface. Given the tunnel and Courthouse are to remain in-situ, it was not considered practical to remove ACM in these areas. ACM therefore remained beneath the ground surface and was managed beneath the site capping as instructed by the client.

It is noted that significant volumes of fill material were removed from site during construction, however, no areas were stripped and validated to verify removal of potentially impacted fill materials at the client's request. All fill materials were excavated from the trench excavation for the new stormwater pipeline in the easement beneath the new Atrium. The trench was backfilled with clean imported materials (refer to DP, 2020b for further details). All soils remaining beneath the site capping (ie beneath existing and new buildings, new pavements and landscape areas, as shown on Geosurv Asbuilt Remediation Layers Plan in Appendix C) should therefore be considered as potentially ACM impacted soils unless investigation and testing confirms otherwise.

While Polycyclic Aromatic Hydrocarbons (PAH), heavy metals and petroleum hydrocarbon (TRH) impacts were identified within fill on site exceeding the adopted Tier 1 health based and ecological investigation / screening levels (refer to DP 2020a for details), remediation for these contaminants was not warranted based on statistical analysis (see below) and consideration of the ecological setting and the proposed development.

The statistical analysis of lead and B(a)P TEQ concentrations undertaken for the DSI (DP, 2020c) included consideration of the following:

- All test results across the site;
- Results of both fill and natural soils independently;
- Soil properties at different depths and spatially across the site.

The analysis (DP, 2020c) was conducted using USEPA ProUCL Version 5.1 and considered non-detects. The results of statistical analysis indicated the following:

- Maximum concentrations detected for lead (1400 mg/kg) and B(a)P TEQ (9.8 mg/kg) are less than 2.5 times the HIL-B criteria (1200 mg/kg and 4 mg/kg respectively) and are therefore not considered to represent a 'hot spot' with reference to NEPC (2013);

- The 95% UCL of the mean for B(a)P TEQ were within the HIL-B criteria (ie 4 mg/kg) as follows:
  - All fill samples (3.09mg/kg);
  - All fill samples including natural samples 203/0.5, D3 and 201/7.9 (likely to be associated with cross contamination from upper fill material) (3.54 mg/kg);
  - All fill and natural samples (3.068 mg/kg).
- The standard deviation (SD) for all B(a)P TEQ scenarios above ranged from 2.35 to 2.68 which is >50% of the HIL-B criteria (considered a possible exceedance of the HIL with reference to NEPC (2013) Schedule B1 Section3.2.1);
- While some scenarios show marginal exceedances of the SD values (ie above 50% of the HIL-B criteria), the results are not considered to be significant based on the following:
  - No 'hot spots' were detected;
  - The PAH impact is aged (ie which would allow a theoretically higher HIL with reference to the PAH HIL derivation outlined in Schedule B7, Appendix A2 of NEPC (2013)).
- The 95% UCL of the mean for Pb were within the HIL-B criteria of 1200 mg/kg as follows:
  - All fill and natural samples (303.3 mg/kg);
  - All fill samples (490.3 mg/kg);
  - All fill and natural samples within the upper 3 m (407.7 mg/kg);
- Given that no 'hot spots' were detected for lead and the 95% UCL values for all scenarios were below the conservatively derived HIL-B criteria, the elevated lead result at Bore 5/0.1 m does not constitute significant contamination requiring remediation.

Based on the above findings, remediation of the site was deemed necessary to remediate the bonded ACM impacts across the site. Risks associated with ACM impacts are subject to the condition of the materials and the manner in which they are treated. The pathway to human receptors for asbestos impacts is via the respiratory route. The impacted materials were assessed to be suitable to remain on the site subject to appropriate management/capping, on the basis of the low potential to cause environmental impact and subject to long-term management to minimise potential human health impacts (DP, 2020c).

On-site management of the bonded ACM impacts was proposed and was undertaken with reference to the RAP (DP, 2020a). On the basis of the remediation and validation works completed, the site is considered to be suitable for the proposed university campus with respect to site contamination.

The site is subject to long-term management (as shown in Figure 1 above and Geosurv Asbuilt Remediation Layers Plan in Appendix C) due to the potential presence of bonded asbestos containing materials (ACM) impacted soils beneath building slabs, pavements or landscape areas.

5. On-site Management (Capping) of Contaminated Soils

5.1 Introduction

The capping layer installed across the site provides a physical barrier between underlying potentially contaminated soils and the ground surface. The high visibility orange geofabric marker layer at the base of the capping layer in landscape areas readily identifies the base of this capping layer to minimise accidental penetration into underlying potentially contaminated soils. Under the normal use of the site (including landscaping maintenance such as plant removal/reinstatement) this capping will prevent exposure of personnel to the remaining potentially contaminated soils on site. Exposure to underlying potentially contaminated soils would only occur is soils beneath the orange marker layer if landscape areas are disturbed or if the concrete capping and underlying black plastic marker layer are penetrated in building slabs, pavements and other concrete paved landscaping areas such as may be required for maintenance or redevelopment.

The long-term management of contaminated soils located within capping across the site will be achieved by maintaining the cap. This will confirm that the site remains suitable for use as a university campus. A summary of affected parties and responsibilities is provided in Table 1 below.

5.2 Responsibilities

Table 1: Responsibilities/Actions for Personnel

Personnel	Responsibilities
Newcastle City Council	• Notification on planning certificates. • Maintain a copy of the current approved LTEMP.
Nihon University – Chancellor/Executive	• Updating property management records and procedures; • Provision of university policy for management of impacted soils; • Notification of site management in university-specific documentation, capital works programs, maintenance etc; • Informing staff of the soil management; • Create/amend university policy for maintenance staff and subcontractors; • Preparation of site-specific maintenance procedures and record keeping with university maintenance staff; • Documenting changes and/or disturbances to capping. • Providing Council will a copy of any updated versions of the LTEMP.

Table 2: Responsibilities/Actions for Personnel

Personnel	Responsibilities
Nihon University – Maintenance Staff	• Reading and compliance with LTEMP; • Preparation of site-specific maintenance procedures and record keeping; • Routine checks of managed areas to confirm cap integrity (eg quarterly or during routine maintenance inspections); • Implementation of induction procedures for new maintenance staff, subcontractors and site workers; • Reinstatement of capped areas following cap penetration; • Generation of records to confirm reinstatement of capping; • Documenting changes and/or disturbances to capping.
Subcontractors/site workers	• Reading and compliance with LTEMP; • Preparation of SWMS for site works, taking into account working in managed areas; • Reinstatement of capped areas following cap penetration; • Generation of records to confirm reinstatement of capping; • Documenting changes and/or disturbances to capping.

5.3 Notifications / Implementation Requirements

The site management (Nihon University, University Chancellor and maintenance staff) will be responsible for the implementation of the LTEMP as per Conditions E34 and F7 of the final development consent conditions (SSD 9787 dated 11 December 2019) for the Nihon University development. The Chancellor or designated representative will also be responsible for notifying all personnel whose activities may impact on managed areas under building slabs, concrete pavements or capped landscaped areas. All designated personnel must read and understand the provisions of the LTEMP.

A notation must be placed on the Section 10.7 certificate for the site by Council as required under Condition E33 of the final development consent conditions (SSD 9787 dated 11 December 2019) for the Nihon University development, indicating that the site is subject to the requirements of this LTEMP.

The LTEMP should be incorporated as part of documentation to fulfil WHS regulation requirements for an asbestos management plan (AMP) and register for asbestos remaining on the site.

Regular inspections must be conducted within the site to confirm the integrity of capping (refer to Table 3 attached). Capping must be repaired as soon as possible if damaged.

Any activities which require excavation/disturbance of greater than the thickness of capping shown on the Geosurv Asbuilt Remediation Layers Plan (191196-AB-R-01 (E) dated 6.09.2021) or which have the potential to penetrate the capping and marker layers (ie excavations, repairs or installation of additional services), must be conducted in the manner described below.

As a precaution, a contractor licensed to handle asbestos waste should be engaged. The contractor must prepare a safe work method statement (SWMS) prior to conducting the work in accordance with relevant regulatory and statutory requirements (including the Worksafe Australia Asbestos Code of Practice), which will generally include the following:

- Prepare temporary areas to receive clean and contaminated soils resulting from excavations;
- Careful excavation and segregation of overlying clean soils (ie to expose the orange geofabric marker / separation layer without damaging it) in areas managed via soil capping;
- Cut orange geofabric marker / separation layer and carefully excavate and segregate contaminated soils to minimise cross contamination with clean soils;
- All materials below concrete slabs or marker layer in the capped areas must be assumed to be contaminated;
- Conduct the works with minimal disturbance of contaminated soils;
- Remove, classify, transport and dispose any excess contaminated soils in accordance with regulatory requirements;
- Reinstate contaminated soils beneath the geofabric marker layer where practical, and reinstate the orange geofabric marker / separation layer, clean cap and/or concrete slab above the contaminated soils;
- Any imported materials must be suitable for their intended purpose and be lawfully received at the site (eg VENM, ENM, material subject to a resource recovery exemption (RRE) or compliant with an appropriate standard such as for landscaping materials);
- Provide documentation of the activities that disturb capping (ie location, depth, evidence of cap reinstatement, transport and disposal records, records of imported material and photographs of work);
- A brief unexpected finds protocol, eg in the unlikely circumstance that excavations encounter unexpected contamination that has not previously been identified at the site, as apparent from staining, odour or other observations. A suitably qualified environmental consultant should be engaged to assess the contamination and recommend appropriate management requirements in the event of an unexpected find.

All operations and activities conducted on the site must comply with the provisions of relevant NSW WHS legislation, and must include measures to minimise migration/cross contamination of contaminated soils. The SWMS must be reviewed by the principal/project manager prior to the works.

A qualified contaminated land consultant must undertake inspections during and following the completion of the works to confirm the following:

- The work was conducted in accordance with the approved SWMS;
- The work has not resulted in any adverse human health or environmental impact;
- Site capping has been appropriately reinstated;
- Site remains suitable for use as a university campus.

Any observed defects or damage to the capped area must be reported to the Chancellor and university maintenance staff.

Emergency contact details for relevant personnel including the Nihon University, Chancellor, Maintenance Manager, Council and after hours contact are to be provided in Table 3 attached.

The above LTEMP has been prepared in general accordance with current professional and industry standards for the management of land contamination.

Notwithstanding the above recommendations, any work associated with the handling or disposal of contaminated soils must be conducted in accordance with the relevant statutory and regulatory requirements.

5.4 Review of the LTEMP

This LTEMP must be regularly reviewed (at least annually and if any incidents occur which indicate the LTEMP needs updating) to confirm its suitability for continued use. The LTEMP must be revised/updated should the provisions of the LTEMP not cover site activities adequately. Any revisions to the LTEMP must be submitted to Council within one month of the update. Any revisions of the LTEMP that decrease the level of site management will require the approval of a NSW EPA-accredited site auditor or the NSW EPA.

Site management (Nihon University, University Chancellor, designated representative and maintenance staff) will be responsible for the continued implementation of the LTEMP and any revisions made as per Conditions E34 and F7 of the final development consent conditions (SSD 9787 dated 11 December 2019) for the Nihon University development.

5.5 Record Keeping

Records of implementation and review of the LTEMP and submission of revised versions to Council should be maintained together with the LTEMP, including documentation of any activities that disturb capped material (ie location, depth, evidence of cap reinstatement), routine inspection records (refer to Table 3 attached), incidents and responses and any changes to the LTEMP.

Any observed defects or damage to the capped area must be reported to the Chancellor and university maintenance staff as per Section 5.3.

6. References

DP. (2020a). *Remediation Action Plan, Proposed Nihon University, 9 Chursh Street Newcastle.* Document No. 91667.02.R.004.Rev1: Douglas Partners Pty Ltd.

DP. (2020b). *Stormwater Easement Management Strategy, Proposed Nihon University, 9 Church Street, Newcastle.* Document No. 91667.03.R.001.Rev1: Douglas Partners Pty Ltd.

DP. (2020c). *Report on Detailed Site Investigation, Proposed Nihon University, 9 Church Street Newcastle.* Document No. 91667.02.R.003.Rev2: Douglas Partners Pty Ltd.

DP. (2021). *Report on Validation of Remediation, Nihon University, 9 Church Street, Newcastle.* Document No. 91667.03.R.002.Rev0: Douglas Partners Pty Ltd.

Moir. (2021). *Landscape Soil Depth Confirmation - Nihon University, Newcastle.* Letter dated 9 September 2021: Moir Landscape Architecture Pty Ltd.

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 EPA. (2017). *Guidelines for the NSW Site Auditor Scheme (3rd Edition).* NSW Environment Protection Authority.

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

7. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 9 Church Street, Newcastle with reference to DP's proposal dated NCL190520.P.001.Rev1 dated 16 September 2019 and subsequent email budget update of 1 July 2020 and acceptance received from Sita Vasanthakumar of Built Pty Ltd dated 30 October 2019 on behalf of Nihon Daigaku Australia Newcastle Pty Ltd. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Nihon Daigaku Australia Newcastle Pty Ltd and Built Pty Limited 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 environmental 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 been detected by observation and by laboratory analysis, either on the former surface of the site, or in filling materials at the previous test locations sampled and analysed. Building demolition materials, such as concrete, brick, tile etc, were, also, located in previous below-ground filling, 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, or to vegetation preventing visual inspection and reasonable access. 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

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

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

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.

Appendix B

Table 2: Emergency Contacts
Table 3: Capping/Condition Inspection Guide
Letter from Azusa Sekkei Co Ltd (acting on behalf of Nihon University) dated 10 September 2021
Table 10 DP (2020c) - Results of Chemical Analysis of Soil (Contamination)

Table 3: Emergency Contacts

Name	Contact Phone Number
Emergency Services (Fire Brigade, Ambulance, Police)	000
Nihon University	TBC
Chancellor – Nihon University	TBC
Maintenance Manager – Nihon University	TBC
After Hours Contact	TBC
Newcastle City Council	(02) 4974 2000

This table is to be regularly updated by the site owner, managers or their representatives.

Table 3: Capping/Condition Inspection Guide / Form

Inspection Guide/Form					
Inspected by: _____		**Company: _____**		**Date of Inspection: _____**	
No.	**Visual Check**	**Pass/ Fail**	**Fault / Action Required / Comments**	**Corrective Action**	
				Corrective Action Undertaken	**Date Completed**
1	Building slabs (condition, cracking, staining, evidence of damage)				
2	Outdoor pavers condition (cracked, broken, shifted, uneven, visible bedding material)				
3	Asphaltic concrete and concrete footpaths (condition, cracking, staining, evidence of damage, visible bedding material or marker layer)				
4	Crushed granite walkways (condition, evidence of erosion, visible roadbase bedding material)				
5	Condition of garden areas (i.e. thickness of cap retained, evidence of visible marker layer at the surface, vegetation stress)				
6	Condition of stormwater/drainage infrastructure - pipes and subsurface grates/pits etc. (cracking, broken, evidence of flooding, siltation)				
7	Condition of slab penetrations (e.g. footings of outdoor structures, drainage/sewer pipes)				
8	Overall building condition				
9	Evidence of unauthorised excavation/penetration of capping and marker layer or pavements				
Update to LTEMP Required (Y/N?)					
Nihon Daigaku Australia Newcastle Pty Ltd Notification Date:					

Tokyo, Sept.10th, 2021

Att: Scott O'Donohue
A1 Acredited Certifier
Managing Director,
SureScope
Address: Suite 4C 250 Pacific Hwy Charlestown NSW 2290
E-mail: scott@scopecert.com.au

Subject: Long Term Environmental Management Plan (LTEMP)

Dear Mr.Donahue,

On behalf of Nihon University, and being nominated as their representative, I hereby attest that once the operation starts Nihon University would manage the site in accordance with the submitted approved LTEMP.
In the meantime, due to COVID restrictions of international travels, the site would be managed temporarily under caretaker mode by Built, whom will be managing the site in accordance with the LTEMP.

Warm regards,

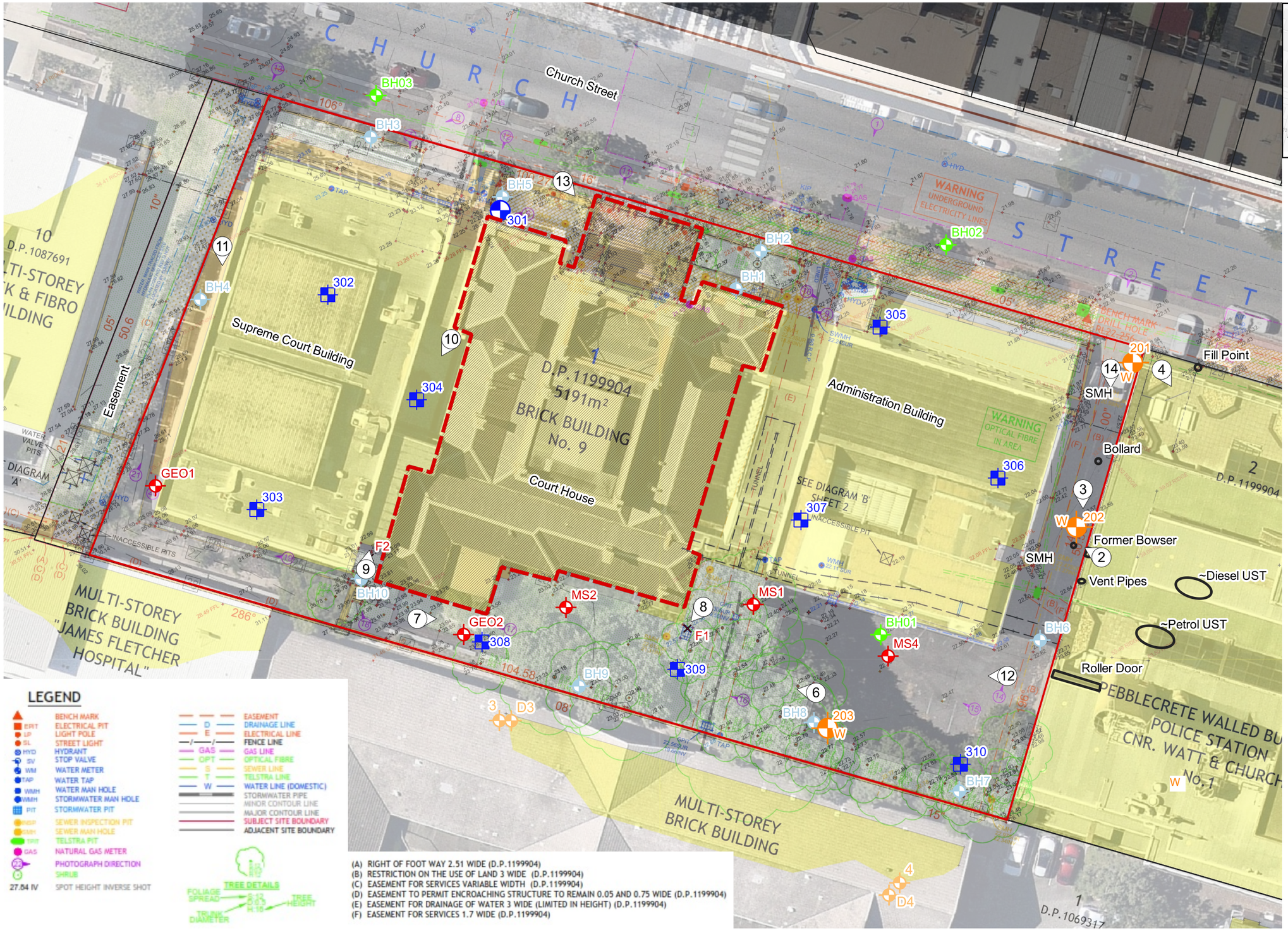
Junichi YOKOBORI
Chief Project Manager
Azusa Sekkei Co., Ltd.
On behalf of Nihon University

Table 10: Results of Chemical Analysis of Soil (Contamination)

Analyte	Units	PQL	NSW EPA 2014 - General Solid Waste CT1 (No TCLP)	NSW EPA 2014 - Restricted Solid Waste CT2 (No TCLP)	CRC Care Direct Contact HSL-B	CRC Care Direct Contact Intrusive Maintenance Worker	CRC Care Intrusive MW Soil HSL Vapour Sand 0-2m	2-4m	>4m	NEPM 2013 Table 1A(1) HILs Res B Soil	NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand 0-1m	1-2m	2-4m	>4m	NEPM 2013 ESLs Res/Open Space Aged	NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil	NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil	Field_ID	201/0.9-1.2	201/7.9	202/4.8	202/7.0	203/0-0.05	203/0.5	203/11-12/19	MS4 / 0.02	MS4 / 0.2	F1	F2	301/0.05	301/0.2	301/0.4	03 - 3-3-20	T2 -3-3-20	301/0.7	302/F1	302/0.3	303/0.2	304/0.2	306/0.5	307/F1	307/F15	307/F2	307/F25	308/0.1	309/0.3	309/15	310/F1	310/0.2	51	52	SS499_BH1	SS499_BH4	SS499_BH5	SS499_BH6	SS499_BH7	SS499_BH8	SS499_BH9	SS499_BH10
																		LocCode	201	201	202	202	203	203	203	MS4	MS4	F1	F2	301	301	301	301	301	301	302	302	303	304	304	306	307	307	307	307	308	309	309	310	310	Stockpile B	Stockpile B	BH1	BH4	BH5	BH6	BH7	BH8	BH9	BH10
																		Fill (F) / Natural (N)	F	N	N	N	Asphalt	N	N	Asphalt	F	Material	Material	F	F	F	F	F	F	N	F	F	F	F	N	F	F	F	F	F	F	N	F	N	F	F	F	F	F	F	F	F
																		Sample	0.9-1.2	7.9	4.8	7	0-0.05	0.5	0.5	0.02	0.2	Surface	Surface	0.05	0.2	0.4	0.4	0.4	0.7	0.5	0.3	0.2	0.2	0.5					0.1	0.3	0.5	0.05	0.2			0.3	0.5	0.1	0.1	0.1	0.6	0.4	
																		Depth																																							
																		Sample Date	12/12/2019	12/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	11/12/2019	19/11/2019	19/11/2019	22/11/2019	22/11/2019	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	1/03/2020	12/03/2020	12/03/2020	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016	22/09/2016
[Coal Tar Identification	-																		-	-	-	-	ND	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																																																										
Aluminium	mg/kg	10																	5000	7000	9000	8900	-	7000	6400	-	-	-	-	5000	5400	3300	2700	3320	1400	-	3400	11000	2600	18000	-	-	-	-	-	5700	5800	9500	-	9400	10000	6600	-	-	-	-	-	-	-	-
Antimony	mg/kg	7																	<7	<7	<7	<7	-	<7	<7	-	-	-	-	<7	<7	<7	<7	<5	<7	-	<7	<7	<7	<7	-	-	-	-	-	<7	<7	<7	-	<7	<7	<7	-	-	-	-	-	-	-	-
Arsenic	mg/kg	4	100	400						500					100				<4	5	10	<4	-	<4	<4	-	-	-	-	<4	<4	<4	<4	<5	<4	-	<4	5	<4	10	-	-	-	-	-	<4	7	6	-	5	8	5	5	<4	7	<4	<4	<4	4	5
Boron	mg/kg	3								40000									<5	<3	<3	<3	-	<3	<3	-	-	-	-	5	<3	<3	<3	<50	<3	-	<3	<3	<3	<3	-	-	-	-	-	4	<3	4	-	<3	<3	<3	-	-	-	-	-	-	-	-
Cadmium	mg/kg	0.4	20	80						150									<0.4	<0.4	<0.4	<0.4	-	<0.4	2	-	-	-	-	1	1	<0.4	<0.4	<1	<0.4	-	<0.4	<0.4	<0.4	<0.4	-	-	-	-	-	<0.4	<0.4	<0.4	-	<0.4	<0.4	<0.4	-	-	-	-	-	-	-	-
Chromium (III+VI)	mg/kg	1	100	400						500					190				4	9	12	11	-	7	10	-	-	-	-	21	15	7	5	7	2	-	4	12	4	23	-	-	-	-	-	11	9	12	-	15	11	7	9	9	27	10	17	18	9	22
Cobalt	mg/kg	1								600									1	4	<1	2	-	1	3	-	-	-	-	4	5	1	1	<2	<1	-	2	2	2	<1	-	-	-	-	-	3	11	15	-	<1	2	<1	-	-	-	-	-	-	-	-
Copper	mg/kg	1								30000					55				7	17	27	41	-	29	46	-	23	-	-	170	140	26	16	26	8	-	15	32	15	3	-	-	-	-	-	30	18	360	-	<1	14	7	19	17	420	10	65	20	39	9
Iron	mg/kg	10																	4900	15,000	28,000	27,000	-	11,000	11,000	-	-	-	-	8500	8700	6000	5500	6660	2700	-	8400	14000	4600	36000	-	-	-	-	-	7800	17000	19000	-	17000	23000	14000	-	-	-	-	-	-	-	-
Lead	mg/kg	1	100	400						1200					1100				6	16	9	12	-	100	240	-	4	-	-	770	670	190	54	163	14	-	75	68	44	10	-	-	-	-	-	19	50	180	-	5	44	22	58	40	1400	8	38	25	70	14
Magnesium	mg/kg	10																	1500	1700	820	1700	-	510	920	-	-	-	-	1500	1200	610	490	500	270	-	310	410	260	780	-	-	-	-	-	1800	1700	2100	-	380	1200	600	-	-	-	-	-	-	-	-
Manganese	mg/kg	1								14000									60	81	15	43	-	64	130	-	-	-	-	260	290	60	34	56	19	-	140	130	53	6	-	-	-	-	-	270	500	1100	-	3	580	210	-	-	-	-	-	-	-	-
Mercury	mg/kg	0.1	4	16						120									<0.1	<0.1	<0.1	<0.1	-	0.2	0.2	-	<0.1	-	-	0.3	0.4	1.4	0.3	0.3	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	<0.1	<0.1	0.3	-	<0.1	0.2	0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	-
Nickel	mg/kg	1	40	160						1200					9				3	9	1	8	-	5	8	-	18	-	-	10	9	5	3	5	1	-	4	5	3	2	-	-	-	-	-	6	13	11	-	<1	4	2	4	4	15	4	16	19	7	3
Selenium	mg/kg	2	20	80						1400									<3	<2	<3	<3	-	<2	<2	-	-	-	-	<2	<2	<2	<2	<5	<2	-	<2	<2	<2	<4	-	-	-	-	-	<2	<2	<2	-	<2	<2	<2	-	-	-	-	-	-	-	-
Tin	mg/kg	1																	<1	<1	<1	<1	-	6	6	-	-	-	-	3	3	1	<1	<5	<1	-	1	1	<1	<1	-	-	-	-	-	<1	<1	3	-	<1	3	1	-	-	-	-	-	-	-	-
Zinc	mg/kg	1								60000					150				15	120	12	49	-	170	500	-	34	-	-	620	470	110	39	150	14	-	89	50	46	4	-	-	-	-	-	58	85	280	-	2	58	31	48	39	1100	35	210	75	85	13
TPH																																																									
C10-C16	mg/kg	50			4200	62000												1000	<50	<50	<50	<50	-	<50	<50	-	<50	-	-	-	-	-	-	-	-	-	-	<50	<50	<50	-	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C16-C34	mg/kg	100			5800	85000										300		2500	<100	<100	<100	<100	-	<100	290	-	300	-	-	-	190	-	-	-	-	-	-	<100	<100	<100	-	-	-	-	-	<100	<100	220	-	<100	<100	<100	120	<100	240	<100	<100	340	<100	-
C34-C40	mg/kg	100			8100	120000										2800		10000	<100	<100	<100	<100	-	<100	<100	-	110	-	-	-	<100	-	-	-	-	-	-	<100	<100	150	-	-	-	-	-	<100	<100	<100	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	-
F2-NAPHTHALENE	mg/kg	50					NL	NL	NL		110	240	440	NL		120			<50	<50	<50	<50	-	<50	<50	-	-	-	-	<50	<50	<50	<50	<50	<50	-	<50	<50	<50	<50	-	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C6 - C9	mg/kg	25	650	2600															<25	<25	<25	<25	-	<25	<25	-	-	-	-	<25	<25	<25	<25	<25	<25	-	<25	<25	<25	<25	-	-	-	-	-	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
C10 - C14	mg/kg	50																	<50	<50	<50	<50	-	<50	<50	-	-	-	-	<50	<50	<50	<50	<50	<50	-	<50	<50	<50	<50	-	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28	mg/kg	100																	<100	<100	<100	<100	-	<100	210	-	240	-	-	-	120	-	-	-	-	-	-	<100	<100	<100	-	-	-	-	-	<100	<100	130	-	<100	<100	<100	<100	160	<100	<100	240	<100	<100	-
C29-C36	mg/kg	100																	<100	<100	<100	<100	-	<100	110	-	130	-	-	-	100	-	-	-	-	-	-	<100	<100	<100	-	-	-	-	-	<100	<100	130	-	<100	<100	<100	<100	120	<100	<100	130	<100	<100	-
>C10 - C36 (Sum of total)	mg/kg		10000	40000															<250	<250	<250	<250	-	<250	346	-	396	-	-	-	245	-	-	-	-	-	-	<250	<250	285	-	-	-	-	-	<250	<250	285	-	<250	<250	<250	<250	305	<250	<250	396	<250	<250	-
C10 - C40 (Sum of total)	mg/kg	50																	<50	<50	<50	<50	-	<50	290	-	410	-	-	-	190	-	-	-	-	-	-	<50	<50	360	-	-	-	-	-	<50	<50	360	-	<50	<50	<50	<50	360	<50	<50	410	<50	<50	-
C6-C10 less BTEX (F1)	mg/kg	25					NL	NL	NL		45	70	110	200		180			<25	<25	<25	<25	-	<25	<25	-	<25	-	-	-	<25	-	-	-	-	-	-	<25	<25	<25	-	-	-	-	-	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
>C10 -C16	mg/kg	25			5600	82000												700	<25	<25	<25	<25	-	<25	<25	-	<25	-	-	-	<25	-	-	-	-	-	-	<25	<25	<25	-	-	-	-	-	<25	<25	<25	-	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
BTEX																																																									
Benzene	mg/kg	0.2	10	40	140	1100	77	160	NL		0.5	0.5	0.5	0.5		50			<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	-	-	-	<0.2	-	-	-	-	-	-	<0.2	<0.2	<0.2	-	-	-	-	-	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ethylbenzene	mg/kg	1	600	2400	5900	85000	NL	NL	NL		55	NL	NL	NL		70			<1	<1	<1	<1	-	<1	<1	-	<1	-	-	-	<1	-	-	-	-	-	-	<1	<1	<1	-	-	-	-	-	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	mg/kg	0.5	288	1152	21000	120000	NL	NL	NL		160	220	310	540		85			<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	-	-	-	<0.5	-	-	-	-	-	-	<0.5	<0.5	<0.5	-	-	-	-	-	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylene (m & p)	mg/kg	2																	<2	<2	<2	<2	-	<2	<2	-	<2	-	-	-	<2	-	-	-	-	-	-	<2	<2	<2	-	-	-	-	-	<2	<2	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylene (o)	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	<1	-	-	-	<1	-	-	-	-	-	-	<1	<1	<1	-	-	-	-	-	<1	<1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Xylene Total	mg/kg	3	1000	4000	17000	130000	NL	NL	NL		40	60	95	170		105			<3	<3	<3	<3	-	<3	<3	-	<3	-	-	-	<3	-	-	-	-	-	-	<3	<3	<3	-	-	-	-	-	<3	<3	<3	-	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
MAH																																																									
1,2,4-trimethylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,3,5-trimethylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
n-butylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
n-propylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
p-isopropyltoluene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
sec-butylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Styrene	mg/kg	1	60	240															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
tert-butylbenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chlorinated Hydrocarbons																																																									
1,1,1,2-tetrachloroethane	mg/kg	1	200	800															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1,1-trichloroethane	mg/kg	1	600	2400															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1,2,2-tetrachloroethane	mg/kg	1	26	104															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1,2-trichloroethane	mg/kg	1	24	96															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloroethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloroethene	mg/kg	1	14	56															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,1-dichloropropene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2,3-trichloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dibromo-3-chloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dichloroethane	mg/kg	1	10	40															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dichloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,3-dichloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
2,2-dichloropropane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromoform	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	1	10	40															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chloroform	mg/kg	1	120	480															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
cis-1,2-dichloroethene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
cis-1,3-dichloropropene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	1	10	40															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1	14	56															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
trans-1,2-dichloroethene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
trans-1,3-dichloropropene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	1	4	16															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Halogenated Hydrocarbons																																																								
1,2-dibromoethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
Halogenated Benzenes																																																								
1,2,3-trichlorobenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2,4-trichlorobenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,2-dichlorobenzene	mg/kg	1	86	344															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,3-dichlorobenzene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
1,4-dichlorobenzene	mg/kg	1	150	600															<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	-	-	-
2-chlorotoluene	mg/kg	1																	<1	<1	<1	<1	-	<1	<1	-	-	-	-	-	-	-	-	-	-	-

Appendix C

Drawing 1 – Test Location Plan
Moir LP02 (Rev M) - General Arrangement dated 21.05.2021
Moir - LP17 (Rev M) - Remediation Action Plan dated 30.08.2021
Geosurv Asbuilt Remediation Layers Plans (191196-AB-R-01 (E) dated 6.09.2021)



Site Location

LEGEND

BENCH MARK
EPIT ELECTRICAL PIT
LP LIGHT POLE
SL STREET LIGHT
HYD HYDRANT
SV STOP VALVE
WM WATER METER
TAP WATER TAP
WMH WATER MAN HOLE
SWMH STORMWATER MAN HOLE
PIT STORMWATER PIT
SEWER INSPECTION PIT
SMH SEWER MAN HOLE
TPIT TELSTRA PIT
GAS NATURAL GAS METER
PHOTOGRAPH DIRECTION
SHRUB
27.84 IV SPOT HEIGHT INVERSE SHOT

EASEMENT
D DRAINAGE LINE
E ELECTRICAL LINE
FENCE LINE
GAS GAS LINE
OPT OPTICAL FIBRE
S SEWER LINE
T TELSTRA LINE
W WATER LINE (DOMESTIC)
STORMWATER PIPE
MINOR CONTOUR LINE
MAJOR CONTOUR LINE
SUBJECT SITE BOUNDARY
ADJACENT SITE BOUNDARY

TREE DETAILS
FOLIAGE SPREAD
TRUNK DIAMETER
TREE HEIGHT

(A) RIGHT OF FOOT WAY 2.51 WIDE (D.P.1199904)
(B) RESTRICTION ON THE USE OF LAND 3 WIDE (D.P.1199904)
(C) EASEMENT FOR SERVICES VARIABLE WIDTH (D.P.1199904)
(D) EASEMENT TO PERMIT ENCROACHING STRUCTURE TO REMAIN 0.05 AND 0.75 WIDE (D.P.1199904)
(E) EASEMENT FOR DRAINAGE OF WATER 3 WIDE (LIMITED IN HEIGHT) (D.P.1199904)
(F) EASEMENT FOR SERVICES 1.7 WIDE (D.P.1199904)

Legend

- Proposed Environmental Pit Location Post-Demolition (DP)
- Proposed Environmental Bore Location Post-Demolition (DP)
- Environmental Bore Location Pre-Demolition (DP)
- Environmental Well Location
- Geotechnical Test Location Pre-Demolition (DP)
- Previous Test Locations (Prensa 2016)
- Previous Test Locations (Cardno 2018)
- Site Boundary
- Proposed Buildings Structures to be Retained
- Approximate Location of Material Sample
- Approximate Figure &Orientation Location

0 10 20 30 40 m

Drawing adapted from Nearmap Image dated 22.10.2019, plan by ADW Johnson ref 239815-DET-001-A dated 10.09.2018, and plan by Prensa ref 55499 Figures, Figure 2, Rev 1 dated 07.10.2016.

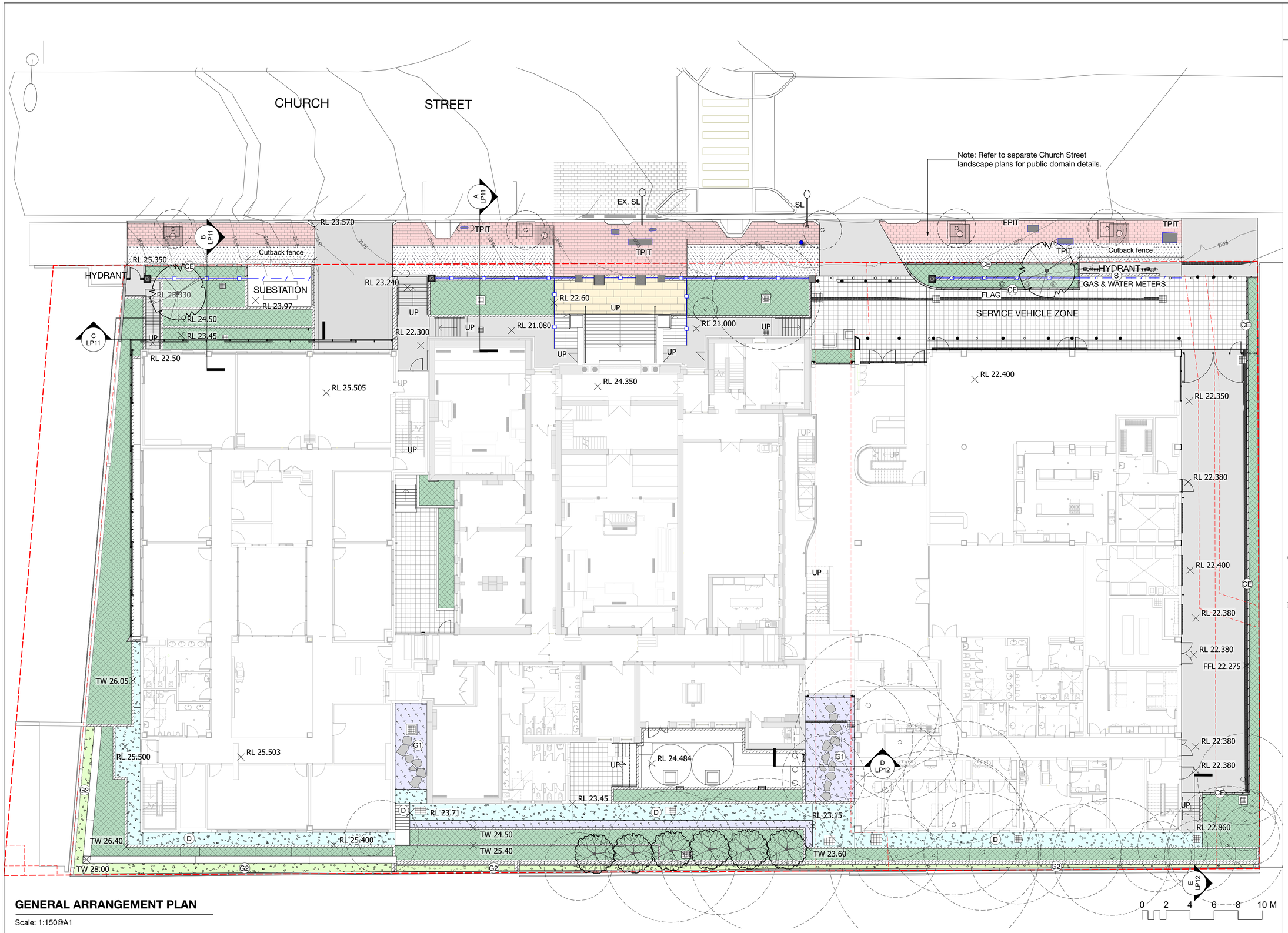
Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Nihon Daigaku Australia Newcastle Pty Ltd		
OFFICE: Newcastle	DRAWN BY: PLH	
SCALE: 1:400 @ A3	DATE: 02.March.2020	

TITLE: **Test Location Plan**
Proposed Nihon University
9 Church Street, Newcastle

N

PROJECT No:	91667.02
DRAWING No:	1
REVISION:	1



GENERAL ARRANGEMENT PLAN

Scale: 1:150@A1

LEGEND

- Lot boundary
- Easement line
- 22.25 Proposed level refer to Engineer's detail
- Existing heritage fence & sandstone footing to be retained
- Existing heritage fence & sandstone footing to be cut
- Heritage brick paving refer to 6/LP14
- Bluestone paving refer to 4/LP14
- Concrete paving refer to Engineer's detail. Colour: Natural.
- Asphalt paving refer to Engineer's detail
- Pavement refer to Architect's detail
- D Decomposed granite - refer to 3/LP14
- G1 White crushed gravel -refer to specification
- G2 Blue metal -refer to specification
- Random stepping stones -refer to 1/LP14
- CE Concrete edge refer to Engineer's detail
- S Signage wall by Architect
- Existing plinth to be retained
- Proposed removable bollards
- FLAG Proposed flag pole
- SL New street light refer to Engineer's detail
- EX. SL Existing street light to be retained
- Existing sandstone pillar to be retained & relocated
- EPIT Existing electrical pit
- TPIT Existing Telstra pit
- Tactile ground surface indicator Colour: Black
- Drainage refer to Engineers detail.
- Stormwater pit refer to Engineers detail.
- Existing trees to be removed
- Landscape planting - refer to Detail Planting Plan
- New tree pit - refer to 4/LP13

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Islington NSW 2296
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www.moirlandscapearchitecture.com.au

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NOTES:

1. DO NOT SCALE OFF DRAWINGS. FOLLOW WRITTEN DIMENSIONS. IF IN DOUBT OBTAIN WRITTEN ADVICE FROM THE SUPERINTENDENT.
2. VERIFY ALL DIMENSIONS ON SITE.
3. TO BE READ IN CONJUNCTION WITH THE SPECIFICATION.
4. READ IN CONJUNCTION WITH ALL ARCHITECTURAL, CIVIL, STRUCTURAL, HYDRAULIC, MECHANICAL AND ELECTRICAL ENGINEER'S DRAWINGS AND SPECIFICATIONS.
5. CONFIRM LOCATION OF ALL SERVICES ON SITE PRIOR TO EXCAVATION.
6. DRAWINGS TO BE PRINTED IN COLOUR ONLY

Architect: AZUSA SEKKEI Architects, Engineers & Consultants; dwp

Engineer: Cardno Shaping the Future

No.	Date	REVISION	By
M	21/5/21	FOR CONSTRUCTION	AL

North

Status: FOR CONSTRUCTION

NIHON UNIVERSITY AUSTRALIA
NEWCASTLE CAMPUS
9 CHURCH STREET, NEWCASTLE

NIHON UNIVERSITY

GENERAL ARRANGEMENT PLAN

SCALE: 1:150@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. 1691

Drawing No. LP02 Rev M

CHURCH STREET

Type 2 Civil Pavement/Asphalt detail - refer to Cardno Drawing CI-551

Note: Refer to separate Church Street landscape plans for public domain details.

Type 4 Civil Pavement detail (typical for concrete pavement) - refer to Cardno drawing CI-551.

Type 3 Civil Pavement - refer to Cardno Drawing CI-551

GAS & WATER METERS

FLAG

EX. SL

SL

EPIT

TPIT

Cutback fence

RL 25.350
RL 25.330
RL 24.50
RL 23.97
RL 23.570
RL 23.240
RL 22.60
RL 22.300
RL 21.080
RL 21.000
RL 22.50
RL 25.505
RL 24.350
RL 22.400
RL 22.350
RL 22.380
RL 22.400
RL 22.380
RL 22.380
FFL 22.275
RL 22.380
RL 22.380
RL 22.860
TW 26.05
RL 25.500
RL 25.503
RL 24.484
RL 23.45
RL 23.71
TW 24.50
TW 25.40
TW 23.60
TW 26.40
RL 25.400
TW 28.00

A LP11 · B LP11 · C LP11 · D LP11 · E LP12

1 LP14 · 2 LP13 · 3 LP14 · 4 LP14 · 5 LP13 · 7 LP14 · D LP12 · 1 LP13 · 3 LP13 · 5 LP13

0 2 4 6 8 10 M

GENERAL ARRANGEMENT PLAN

Scale: 1:150@A1

LEGEND

- Lot boundary
- Easement line
- 22.25 Proposed level refer to Engineer's detail
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- Existing sandstone pillar to be retained & relocated
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- TPIT Existing Telstra pit
- Tactile ground surface indicator Colour: Black
- Drainage refer to Engineers detail.
- Stormwater pit refer to Engineers detail.
- Existing trees to be removed
- Landscape planting - refer to Detail Planting Plan
- New tree pit - refer to 4/LP13

- Landscape and paved areas with concrete capping and plastic marker below
- Landscape and paved areas with orange geofabric marker and minimum 300mm clean fill above

M

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Architect: AZUSA SEKKEI Architects, Engineers & Consultants · dwp

Engineer: Cardno Shaping the Future

No.	Date	REVISION	By
M	21/5/21	FOR CONSTRUCTION	AL

North

Status
FOR CONSTRUCTION
NIHON UNIVERSITY AUSTRALIA
NEWCASTLE CAMPUS
9 CHURCH STREET, NEWCASTLE

NIHON UNIVERSITY

REMEDIATION ACTION PLAN

SCALE: 1:150@A1
ORIGINAL DRAWING AT A1.

Drawn By: CX
Checked By: MW

Project No. 1691

Drawing No. LP17 M Rev

Min Depth = 237mm
Max Depth = 539mm
Avg Depth = 400mm

Min Depth = 396mm
Max Depth = 396mm
Avg Depth = 396mm

Concrete Capping
200mm thick

Concrete Capping
150mm thick

Asphalt Capping Avg.
382mm Depth

Min Depth = 480mm
Max Depth = 735mm
Avg Depth = 610mm

Concrete Capping
150mm thick

Asphalt Capping
Avg. 219mm Depth

Min Depth = 414mm
Max Depth = 603mm
Avg Depth = 515mm

Concrete Capping
150mm thick

Concrete Capping
125mm thick

Min Depth = 688mm
Max Depth = 803mm
Avg Depth = 726mm

Min Depth = 1002mm
Max Depth = 1729mm
Avg Depth = 1439mm

Concrete Cap 250mm thick

Concrete Capping
125mm thick

Min Depth = 191mm
Max Depth = 317mm
Avg Depth = 274mm

Education Building
Concrete Capping 125mm
thick

Concrete Capping
300mm thick

Concrete Capping
125mm thick

Concrete Capping
300mm thick

Concrete Capping
125mm thick

Concrete Capping
125mm thick

Courthouse Terrace
Concrete Capping
200mm thick

Concrete Capping
600mm thick

Concrete Capping
500mm thick

Concrete Capping
500mm thick

Min Depth = 302mm
Max Depth = 594mm
Avg Depth = 424mm

Min Depth = 193mm
Max Depth = 325mm
Avg Depth = 275mm

ADJOINS PAGE 1
ADJOINS PAGE 2

RL 23.570
RL 23.240
RL 22.60
RL 22.330
RL 21.080
RL 21.000
RL 23.45
RL 22.50
RL 25.505
RL 24.350
RL 25.500
RL 25.503
RL 23.71
RL 25.400
RL 23.15
TW 26.05
TW 26.40
TW 28.00
TW 24.50
TW 25.40
TW 23.60

NORTH[APPROX]

LEGEND

22.000 GEOFAB

22.000 FINISHED CAPPING/SURFACE LEVEL

22.000 PLASTIC

LANDSCAPE & PAVED AREAS WITH CONCRETE CAPPING & PLASTIC MARKER BELOW

LANDSCAPE & PAVED AREAS WITH ORANGE GEOFABRIC MARKER & NOMINAL CLEAN FILL ABOVE

ASPHALT CAPPED AREA WITH GEOFABRIC MARKER LAYER

GREGORY IRETON GIBSON SURVEY ID 1101
SURVEYOR REGISTERED UNDER THE SURVEYING AND SPATIAL INFORMATION ACT,2002 (NSW)

NOTES:

1. ALL SPOT LEVEL HEIGHTS SHOWN ARE ACCURATE AT TIME OF SURVEY

2. GEOSURV TAKES NO RESPONSIBILITY FOR THE ACCURACY OF THE SPOT LEVELS POST SURVEY DATA

3. THIS SURVEY IS FOR PURPOSE OF REMEDIATION LAYERS SPOT LEVEL AS-BUILT CHECKS ONLY AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE

4. PLAN HAS BEEN PRODUCED AS A PRIORITY AS PER BUILDERS REQUEST. FOR CLARITY OF THE OFFSET MARKS SHOWN PLEASE ENLARGE SECTION OF THE PLAN WHEN PRINTING. SEEK CLARIFICATION FROM GEOSURV IF UNSURE OF THE OFFSET OR THE DIRECTION OF THE OFFSET TO THE LOCATION OF THE MARK PLACED

5.FINISHED CAPPING/SURFACE LEVELS ARE COMBINED POINTS SURVEYED ON PAVING, TILES, CONCRETE CAPPING BEAM, BITUMEN & NATURAL SURFACE AREAS.

PLANS USED:

1691_CC_20210719_AL.dwg

REV.	DATE	AMENDMENTS	INT.
E	02.09.21	HATCHING ADDED & POINT LAYERS COMBINED	GPAP
D	30.08.21	HATCHING & LEGEND UPDATED	GPAP
C	26.08.21	ADDITIONAL DATA & PAGE 2 ADDED	GPAP
B	16.08.21	ADDITIONAL DATA ADDED	GPAP
A	20.07.21	ISSUED FOR INFORMATION	BTP

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PREPARED FOR:

Built.

PLAN OF:

ASBUILT
REMEDIATION LAYERS
NIHON UNIVERSITY NEWCASTLE
9 CHURCH STREET
NEWCASTLE
NSW

ORIGINAL SIZE: A1 Page 1 of 2

SCALE:	1:100	CO-ORD:	SITE
DATUM:	SITE	ORIG DATUM:	PM 19805
SURVEY BY:	SJF	DATE:	VARIOUS
DRAWN BY:	GPAP	DATE:	20.07.21
CHECKED BY:	SJF	DATE:	20.07.21
APPROVED BY:	ADF	DATE:	20.07.21

DRAWING #:

191196-AB-R-01 [E]

Plot Date: 3 September 2021 - 12:00 PM
Cad File No: 191196-AB-R-01 (E).dwg

Asphalt Capping
Avg. 382mm Depth

Min Depth = 480mm
Max Depth = 735mm
Avg Depth = 610mm

Concrete Capping
150mm thick

Asphalt Capping
Avg. 219mm Depth

Min Depth = 414mm
Max Depth = 603mm
Avg Depth = 515mm

Concrete Capping
150mm thick

Min Depth = 249mm
Max Depth = 403mm
Avg Depth = 327mm

Min Depth = 299mm
Max Depth = 502mm
Avg Depth = 421mm

RL 22.60

RL 21.080

RL 21.000

RL 24.350

RL 22.400

RL 22.350

RL 22.380

RL 22.400

Concrete Capping
125mm thick

Concrete Capping
125mm thick

Min Depth = 191mm
Max Depth = 317mm
Avg Depth = 274mm

Concrete Capping
150mm thick

Concrete Capping
300mm thick

ADJOINS PAGE 1
ADJOINS PAGE 2

Residential Building
Concrete Capping
125mm thick

Atrium Area Concrete
Capping 125mm
thick

Concrete Capping
125mm thick

Min Depth = 277mm
Max Depth = 402mm
Avg Depth = 350mm

FFL 22.275

Courthouse Terrace
Concrete Capping
200mm thick

Concrete Capping
300mm thick

Min Depth = 302mm
Max Depth = 594mm
Avg Depth = 424mm

Min Depth = 193mm
Max Depth = 325mm
Avg Depth = 275mm

Atrium Area
Concrete Capping
600mm thick

Concrete Capping
500mm thick

Atrium Area
Concrete Capping
125mm thick

RL 23.71

TW 24.50

TW 25.40

RL 23.15

TW 23.60

Concrete Capping
600mm thick

Concrete Capping
125mm thick

Min Depth = 312mm
Max Depth = 553mm
Avg Depth = 447mm

RL 22.380

NORTH[APPROX]

LEGEND

22.000 GEOFAB

22.000 FINISHED CAPPING/SURFACE LEVEL

22.000 PLASTIC

LANDSCAPE & PAVED AREAS WITH CONCRETE CAPPING & PLASTIC MARKER BELOW

LANDSCAPE & PAVED AREAS WITH ORANGE GEOFABRIC MARKER & NOMINAL CLEAN FILL ABOVE

ASPHALT CAPPED AREA WITH GEOFABRIC MARKER LAYER

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PLAN OF:

ASBUILT
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NIHON UNIVERSITY NEWCASTLE
9 CHURCH STREET
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NSW

ORIGINAL SIZE: A1 Page 2 of 2

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DRAWN BY:	GPAP	DATE:	20.07.21
CHECKED BY:	SJF	DATE:	20.07.21
APPROVED BY:	ADF	DATE:	20.07.21

DRAWING #:

191196-AB-R-01 [E]

Plot Date: 3 September 2021 - 11:58 AM
Cad File No: 191196-AB-R-01 [E].dwg

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The Power of Commitment