Site Audit Report

Parts of Proposed Lots 6, 7, and 12
Moorebank Intermodal and Logistics Park
Moorebank Avenue
Moorebank, NSW 2170

Prepared for

Moorebank Intermodal Company Ltd

James Davis
NSW EPA Accredited Contaminated Land Site Auditor
Accreditation Number: 0301

Final Report

February 2022 **Report Reference: 600099_0301-2020-1**

Report Title

Site Audit Report
Parts of Proposed Lots 6, 7, and 12
Moorebank Intermodal and Logistics Park
Moorebank Avenue
Moorebank, NSW 2170

Report Reference: 600099_0301-2020-1

Site Audit Details:

Enviroview Project Reference: 600099
Site Auditor: James Davis
Site Auditor Accreditation Number: 0301

Site Audit Statements that this report relates to:

0301-2020-1

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Executive Summary

This Site Audit Report and subsequent Site Audit Statement have been produced to document the findings of a Site Audit, conducted by James Davis of Enviroview Pty Ltd, a New South Wales Environmental Protection Authority (NSW EPA) Contaminated Land Accredited Site Auditor on the subject site identified as parts of proposed Lots 6, 7, and 12 within the Moorebank Intermodal and Logistics Park (MLP) Moorebank Avenue, Moorebank, NSW. The Site Audit was commissioned by the Moorebank Intermodal Company Ltd (MIC).

The Site Audit is a specific requirement of the Development Consent for the State Significant Development (SSD) 7709 dated 11 November 2019 (NSW DPE, Nov 2019) for the Stage 2 development at Moorebank Precinct West (MPW) that will involve the construction and operation of the intermodal terminal facility, freight village, warehousing, and associated infrastructure. This Site Audit is to specifically meet condition B171 and is provided at the completion of importation and placement of fill and prior to construction of permanent built surface works. The current Site Audit has also considered Condition C37 of SSD 10431 (the Stage 3 development consent). The Site Audit was conducted to meet also meet that development consent.

As the SSD 7709 Development Consent required that an EPA accredited Site Auditor be engaged to conduct an Site Audit in accordance with the Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd edition) (NSW EPA, 2017) the Site Audit has been conducted as a Statutory Site Audit as defined by s 47(c) of the *Contaminated Land Management Act 1997*.

To achieve the Site Audit requirement the objective and scope of the Site Audit was developed to independently review the site assessment, remedial planning, risk assessment, remediation and validation, management planning, and site redevelopment works as reported by the environmental consultants and determine whether the site is suitable for the proposed land use defined as commercial/industrial.

To achieve the objective, the Site Auditor has reviewed the work undertaken as reported by the various consultants and assessed whether the consultant's work complied with relevant procedures and guidelines and provides a robust basis for determining whether the land is suitable for the proposed land use.

The outcome of the Site Audit is this Site Audit Report and subsequent Site Audit Statement, (number 0301-2020-1) a copy of which is attached to the back of this report.

The Site Auditor has inspected the site and reviewed the relevant documents prepared relating to the works conducted at the site.

The site assessment, remedial planning, risk assessment, remediation, and validation works reported and reviewed are considered to have met the requirements of the *Contaminated Sites:* Guidelines for the NSW Site Auditor Scheme (3rd edition), (NSW EPA, 2017) and other guidelines endorsed under s.105 of the *Contaminated Land Management Act 1997*, and therefore the objectives of the Site Audit.

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The current Site Audit focused on the minor remediation works that were conducted in the Site Audit Area site following the completion of Stage 2 supplementary remediation works in 2020. These works also included the placement of engineered fill across the Site Audit Area site. The works addressed contamination resulting as a legacy of the former use of the land for Defence related purposes.

Remediation works across the broader MPW site have been previously reviewed by the Site Auditor and documented in Site Audit Reports as discussed in **Section 1.6** and **1.10**.

In the Site Auditor's opinion, the works conducted to remediate the site were considered robust and detailed. The consultant demonstrated the Site Audit Area site remediation works were appropriately implemented with satisfactory documentation provided in the Woolworths Audit Area Validation Summary (JBS&G, Feb 2021).

Limited per- and poly-fluoroalkyl substances (PFAS) contamination (AEC-3) remains at depth within the Site Audit Area site. The *Lot 6, 7, and 12 Long-Term Environmental Management Plan (LTEMP)* (Site Audit Area LTEMP) (EP Risk, Dec 2021) details the management procedures required to be implemented to preclude human or environmental impacts during future works. It is the auditor's opinion that the Site Audit Area LTEMP in place for the site is appropriate for the ongoing site management to address contamination issues.

The Contaminated Sites: *Guidelines for the NSW Site Auditor Scheme* (3rd edition) (NSW EPA, 2017) prescribe that during an assessment of the suitability of a site for an existing or proposed land use in an urban context, Site Auditors must follow the decision process and checklist for assessing urban redevelopment sites.

With reference to the decision process for assessing urban redevelopment sites, the works that have been conducted are considered to have met the requirements of guidelines (NSW EPA, 2017) and the decision-making process prescribed, and therefore subject to implementation of the LTEMP, the site is suitable for the proposed land use.

In conclusion, a Site Audit Statement will be issued certifying that, in the opinion of the Site Auditor that the site is suitable for the proposed commercial/industrial land use subject to implementation of the *Lot 6, 7, and 12 LTEMP* (Site Audit Area LTEMP) (EP Risk, Dec 2021). The implementation of the LTEMP – for the duration of construction and operation of the development – is a condition of the Stage 3 MPW development consent (NSW DPIE, May 2021). It is considered that the LTEMP can reasonably be made to be legally enforceable by this consent condition. Appropriate public notification of the LTEMP will be provided be the recording of the Site Audit Statement as is required under the *Contaminated Land Management Act 1997*.

The Site Audit Statement, number 0301-2020-1, will be attached to the back of this Site Audit Report following the appendices when issued.

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Acronyms and Abbreviations

ACM	Asbestos Containing Material
ADF	Australian Defence Force
AEC	Area of Environmental Concern
AFFF	Aqueous Film-Forming Foam
AHD	Australian Height Datum
AMP	Asbestos Management Plan
ANZECC	Australian and New Zealand Environment and Conservation Council
ASTs	Above ground storage tanks
BTEX	benzene, toluene, ethylbenzene, and xylenes
Bgl	Below Ground Level
CEMP	Construction Environmental Management Plan
CMP	Contamination Management Plan
COC	Chain of custody (can also be contaminants of concern)
DA	Development Application
DEC	Department of Environment and Conservation (NSW)
DECC	Department of Environment and Climate Change (NSW)
DECCW	Department of Environment, Climate Change and Water (NSW)
DNSDC	Defence National Supply & Distribution Centre
DP	Deposited Plan
EEC	Endangered Ecological Community
EILs	Ecological Investigation Levels
EO	Exploded Ordnance
EOW	Exploded Ordnance Waste
ERA	Ecological Risk Assessment
FFTA	Former Fire Training Area
HILs	Health-based Investigation Levels
IA	Interim Advice
LTEMP	Long-Term Environmental Management Plan
LOR	Limit of Reporting
M	Metre
MIC	Moorebank Intermodal Company
MLP	Moorebank Intermodal and Logistic Park (The 'Moorebank Precinct' – MPW and MPE)
MPW	Moorebank Precinct West
MPE	Moorebank Precinct East
MW	Monitoring Well
NATA	National Association of Testing Authorities
NEHF	National Environmental Health Forum
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure

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NHMRC	National Health and Medical Research Council
NRMMC	Natural Resource Management Ministerial Council
NSW	New South Wales
OCPs	Organochlorine pesticides
OEH	The NSW Office of Environment and Heritage
OPPs	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCoC	Potential contaminants of concern
PFAS	Per- and Poly-fluoroalkyl Substances
PID	Photoionisation Detector
PQL	Practical Quantification Limit
QA/QC	Quality Assurance/Quality Control
RAP	Remediation Action Plan
RPD	Relative Per cent Difference
SAQP	Sampling Analysis and Quality Plan
SSD	State Significant Development
SEPP 55	State Environmental Planning Policy No. 55 – Remediation of Land
SIMTA	Sydney Intermodal Terminal Alliance
SMP	Site Management Plan
SSFL	Southern Sydney Freight Line
TCE	Trichloroethene
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
USTs	Underground storage tanks
UXO	Unexploded Ordnance
VENM	Virgin Excavated Natural Material
VOCs	Volatile organic compounds

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1 Introduction

1.1 Overview

This Site Audit Report and subsequent Site Audit Statement have been produced to document the findings of a Site Audit, conducted by James Davis of Enviroview Pty Ltd, a New South Wales Environment Protection Authority[1] (NSW EPA) Contaminated Land Accredited Site Auditor accredited under Part 4 of the *Contaminated Land Management Act 1997* as a Site Auditor.

The Site Audit has been conducted in accordance with the requirements of the *Contaminated Land Management Act 1997* (the 'Act'). The Act defines the Site Audit as follows:

> "site audit" means a review:
>
> (a) that relates to management (whether under this Act or otherwise) of the actual or possible contamination of land, and
>
> (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.

Furthermore, the Act provides the following definitions:

> "Site Audit Report" means a site audit report prepared by a site auditor in accordance with Part 4 [of the Act].
>
> "site audit statement" means a site audit statement prepared by a site auditor in accordance with Part 4 [of the Act].

The *Contaminated Sites: Guidelines for the NSW Auditor Scheme (3rd edition)* (NSW EPA, 2017), describes that the services of a site auditor can be used by anyone who needs an independent and authoritative review of information relating to possible or actual contamination of a site and that the review may involve independent expert technical advice or 'sign-off' of contaminated site assessment, remediation or validation work conducted by a contaminated site consultant. The obligation on the Site Auditor conveyed by those guidelines is that that

[1] *The NSW EPA has undergone several name changes; however certain statutory functions and powers have always and continue to be exercised in the name of the Environmental Protection Authority (NSW EPA). The NSW EPA is responsible for environmental regulation and associated activities throughout NSW including those activities regulated under the Contaminated Land Management Act 1997. The use of the names NSW Department of Environment and Conservation (NSW DEC), NSW Department of Environment and Climate Change (NSW DECC), NSW Department of Environment, Climate Change and Water (NSW DECCW), NSW Office of Environment and Heritage (NSW OEH) and NSW EPA in this report are used with regard to the name relevant at the time and context of the reference but are considered generally interchangeable and can be interpreted as one and the same.*

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Site Auditors owe a primary duty of care to the environment and the health, safety, and welfare of the people of New South Wales.

The guidelines describe the site assessment and Site Audit process where the contaminated land consultant designs and undertakes the site assessments and if necessary, all remediation and validation activities to achieve specified objectives. The Site Auditor independently reviews the consultant's work and prepares the material outcome of the Site Audit – the Site Audit Report and Site Audit Statement.

1.2 Guideline Documents

Guidelines made or approved by the NSW EPA under s.105 of the Act at the time of the Site Audit include the following documents.

Guidelines Made by the EPA

- Contaminated Sites: Guidelines for the vertical mixing of soil on former broad-acre agricultural land, NSW EPA, 1995 (NSW EPA, 1995)
- Contaminated Sites: Sampling Design Guidelines, NSW EPA, 1995 (NSW EPA, 1995)
- Contaminated Sites: Guidelines for Assessing Banana Plantation Sites, NSW EPA, 1997 (NSW EPA, 1997)
- Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens, NSW DEC 2005 (NSW DEC, 2005)
- Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination, NSW DEC, 2007 (NSW DEC, 2007)
- Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, NSW DECC, 2015 (NSW EPA, 2015)
- Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd edition), NSW EPA, 2017 (NSW EPA, 2017)
- Contaminated Land Guidelines: Assessment and Management of Hazardous Ground Gases, NSW EPA, 2019 (NSW EPA, 2019)
- Contaminated Land Guidelines: Consultants Reporting on Contaminated Land, NSW EPA ,2020 (NSW EPA, 2020)

Guidelines Approved by the EPA

- Guidelines for the Assessment and Clean Up of Cattle Tick Dip Sites for Residential Purposes, NSW Agriculture and CMPS&F Environmental, February 1996 (NSW Agr., 1996)
- Composite Sampling. Lock, W. H., National Environmental Health Forum Monographs, Soil Series No.3, 1996, SA Health Commission, Adelaide (NEHF, 1996)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource

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Management Council of Australia and New Zealand, Paper No 4, 2000 (ANZECC/ARMCANZ, 2000) (primary industries only)

- Australian Drinking Water Guidelines. National Health and Medical Research Council and Natural Resource Management Ministerial Council, 2011 (NHRMC/NRMMC, 2011)
- Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards. Department of Health and Ageing and EnHealth Council, Commonwealth of Australia, 2012 (EnHealth, 2012)
- National Environment Protection (Assessment of Site Contamination) Measure, National Environment Protection Council, 1999 (Amended May 2013) (NEPC, 1999, Amended 2013)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, August 2018), (ANZG, 2018) (except for the water quality for primary industries component, which still refer to the ANZECC & ARMCANZ 2000 guidelines)

From time to time the NSW EPA may amend the guidelines made or approved under s.105 of the Act. Recently the Australian and New Zealand Guidelines for Fresh and Marine Water Quality were revised and updated and have been replaced (except for primary industries) with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018). Several additional technical notes and guidance is also provided by the NSW EPA that may not be made or approved under the *Contaminated Land Management Act 1997* that may be relevant to the site contamination management, where relevant these have been considered and include the following:

- Guidelines for Implementing the *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019*. NSW DECCW, 2009. (NSW DECCW, 2009)
- Technical Note: Investigation of Service Station Sites (NSW EPA, 2014a).
- Waste Classification Guidelines Parts 1-4 (Classifying Waste, Immobilisation of Waste, Waste Containing Radioactive Material, and Acid Sulfate Soils). NSW Environment Protection Authority, 2014 (NSW EPA, 2014b).

In addition to those listed above the following document has also been considered regarding the assessment and management of per- and poly-fluoroalkyl substances (PFAS):

- PFAS National Environment Management Plan Version 2.0. Heads of EPA Australia and New Zealand. 2020. (Heads of EPA Australia and New Zealand, 2020)

1.3 Site Auditor

James Davis of Enviroview Pty Ltd, is a NSW EPA Contaminated Land Accredited Site Auditor (NSW EPA Accreditation Number 0301) and conducted the Site Audit.

The Site Audit was initiated by a request from representatives of Moorebank Intermodal Company Ltd (MIC) who engaged the Site Auditor in December 2020 following the completion of previous Site Audits across the project site.

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1.4 Type of Site Audit

The Site Audit is a specific requirement of the Development Consent for the State Significant Development (SSD) 7709 dated 11 November 2019 (NSW DPE, Nov 2019) for the 'Stage 2 Works' at the MPW site that involves construction and operation of an intermodal terminal facility and warehousing estate together with broad site preparation, filling, and infrastructure works across the site, and is provided at the completion of importation and placement of fill and prior to construction of permanent built surface works.

As the SSD 7709 Development Consent (NSW DPE, Nov 2019) required that an EPA accredited Site Auditor be engaged to conduct a Site Audit in accordance with the Contaminated Sites: *Guidelines for the NSW Site Auditor Scheme* (3rd edition) (NSW EPA, 2017), it has been conducted as a Statutory Site Audit as defined by Section 47(c) of the *Contaminated Land Management Act 1997*.

1.5 Objective and Scope of the Site Audit

This Site Audit Area site refers to parts of proposed Lots 6, 7, and 12 of the proposed subdivision (see **Section 2.1**). The Site Audit Area is a portion of the Moorebank Precinct West (MPW) developable area – and is the first stage within the MPW site to proceed to the final Site Audit required under the SSD 7709 Development Consent – that is, the Condition B171 Site Audit. The current Site Audit has also considered Condition C37 of SSD 10431 (the Stage 3 development consent). The Site Audit was conducted to meet also meet that development consent.

Previous Site Audits have been completed across the entire MPW in accordance with other conditions of the consent relevant to the entire MPW site, namely:

- SAS # 0301-1613-7 (Enviroview [James Davis Site Auditor], Sept 2020)
- SAS # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020)

The objective and scope of the Site Audit was to independently review the site assessment, remediation, validation, and redevelopment works as reported by the environmental consultants and determine whether the site is suitable for the proposed land use.

The proposed land use for the Site Audit Area site is defined as commercial/industrial.

To achieve these objectives, the Site Auditor has reviewed the work undertaken as reported by the consultants and assessed whether the consultant's work complied with relevant procedures and guidelines and provides a robust basis for determining whether the land is suitable for the proposed land use.

The outcome of the Site Audit is this Site Audit Report and subsequent Site Audit Statement, (number 0301-2020-1) a copy of which is attached to the back of this report.

1.6 Site Setting – Planning and Development Consent

This section discusses the planning instruments that are in place for the MPW site and how they relate to the ongoing Site Audits.

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1.6.1 Stage 1 Early Works/SSD 5066 – Site Audit Statement 0301-1613-7

The Stage 1 Early Works development consent – SSD 5066 (NSW DPE, June 2016) for the MPW was first approved in 2016 and allowed for site preparation and initial remediation works to proceed within selected portions of the MPW site.

Site Audit Statement (SAS # 0301-1613-7 (Enviroview [James Davis Site Auditor], Sept 2020)) was completed in 2020 for the whole of the MPW site and considered the works conducted under the development consent (NSW DPE, June 2016), known as the Stage 1 Early Works development.

1.6.2 Stage 2 Works – SSD 7709

The development consent for the MPW Stage 2 development, SSD 7709, (NSW DPE, Nov 2019) was approved in November 2019 and provides the conditions for the next stage of development at the site. The MPW Stage 2 development will involve the construction and operation of the intermodal terminal facility, freight village, warehousing, and associated infrastructure.

Subsequent to the SSD 5066 (Stage 1 Early Works) Site Audit, the MPW site has been subject to the conditions as stated in SSD 7709 (NSW DPE, Nov 2019) for the Stage 2 works as defined in the development consent and in alignment with the Moorebank Intermodal and Logistics Park (MLP) concept plan.

The conditions of the Stage 2 approval require two further Site Audits:

- as detailed in Condition B169 (prior to the commencement of construction and following completion of remediation works), and
- Condition B171 (following the completion of importation and placement of fill and prior to the construction of permanent built surface works).

Condition B169 Audit (Completion of Remediation Pre-Construction) – Site Audit Statement 0301-2014

The Stage 2 development consent – SSD 7709, Condition B169 stated that "*upon completion of the remediation required in relation to Stage 1 (SSD 5066) and this development (i.e., Stage 2 SSD 7709), and prior to the commencement of construction (other than the vegetation clearing required for remediation)*" that a contaminated land Site Auditor is to review the works conducted and in order to conduct a Site Audit concluding in the issuance of a Site Audit Statement. The Site Audit should demonstrate that the site is suitable for its intended land uses under the Stage 2 SSD 7709 consent including for the:

(a) importation and placement of fill
(b) construction of a warehouse estate including warehouse buildings
(c) development of an intermodal terminal
(d) protection of the conservation area including riparian corridor and biodiversity offset sites.

Condition B170, SSD 7709, stated that the Site Audit required under Condition B169 could not be staged. Therefore, the Condition B169 Site Audit, as for the Stage 1 Early Works/SSD 5066

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Site Audit, was conducted for the whole of the MPW Site as defined within the development consent.

The Condition B169 Site Audit – SAS # 0301-2014 – was completed in November 2020 (Enviroview [James Davis Site Auditor], Nov 2020).

Condition B171 Audit (completion of importation and placement of fill) – Site Audit Statement 0301-2020-1

Current Site Audit

The Stage 2 development consent – SSD 7709, Condition B171 stated that "*upon completion of importation and placement of fill, and prior to construction of permanent built surface works, the Applicant must submit to the Planning Secretary, a Site Audit Report and a Site Audit Statement A … which demonstrates the site is suitable for its intended uses under MPW Stage 2 SSD 7709.*"

The development consent does not preclude the staging of the B171 Site Audits. Therefore, the developer has elected to stage the B171 Site Audits across the MPW site as and when each development site or area is completed.

This Site Audit – SAS # 0301-2020-1 – considers the Site Audit Area site which refers to parts of proposed Lots 6, 7, and 12 of the proposed subdivision (see **Section 2.1**). This Site Audit Area site is the first stage within the MPW site to proceed to the Condition B171 Site Audit under the SSD 7709 Development Consent.

1.6.3 Stage 3 Works – SSD 10431

The development consent for the MPW Stage 3 development, SSD 10431, (NSW DPIE, May 2021) was approved in May 2021 and provides the conditions for the next stage of development at the site. The Stage 3 works discuss the subdivision of the MPW site into nine allotments and the proposed use for each lot. Further requirements related to the construction and development of the site are also discussed in the Stage 3 consent.

With regards to contamination and Site Audits – the Stage 3 development consent, SSD 10431, reiterates the conditions that are required under the Stage 2 consent as follows:

- Condition C36 requires that the Site Audit Report and Site Audit Statement prepared under Condition B169 SSD 7709 are implemented for the duration of construction and operation of the development.
- Condition C37 and C38 requires the submittal of a Section A Site Audit Statement following the completion of importation and placement of fill (in accordance with Condition B171 of SSD7709).
- Condition C39 requires than the Long-Term Environmental Management Plan(s) (LTEMP) prepared under condition B172 of the Stage 2 development consent (SSD 7709) are implemented for the duration of construction and operation of the development.
- Condition C40 requires that any updated to the LTEMP must be prepared in consultation with, and endorsed by, the appointed site auditor.

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Therefore, the current Site Audit – SAS # 0301-2020-1 – has considered both the requirements of Condition B171 of SSD 7709 and Condition C37 of SSD 10431.

1.6.4 Other Moorebank Development Areas

Works on the adjacent Moorebank Precinct East (MPE) and rail corridor have been conducted under separate development consents for those works (SSD 7628 and SSD 6766) (NSW DPE, Dec 2016) (NSW DPE, Jan 2018). A portion of those works related to the upgrade of Moorebank Avenue is adjacent to the eastern boundary of the Site Audit site.

1.7 Documents Reviewed

The following documents were reviewed as part of this Site Audit and relate to or incorporate a portion of the Site Audit site.

1.7.1 Regulatory Instruments MPW

The following documents were provided to the Site Auditor for reference during the Site Audit and include the regulatory instruments for MPW Stage 1 and Stage 2:

NSW Government, Department of Planning and Environment (NSW DPE). *Development Consent for State Significant Development (SSD) 5066, for the Moorebank Intermodal Company (Applicant) for the Intermodal Site (Lot 1 DP 1197707, Lot 101 DP 1049508, Lot 100 DP 1049508, and Lot 2 DP 1197707) and the Rail Corridor (Lot 5 DP 833516, Lot 51 DP 515696, Lot 102, 103, and 104 DP 1143827, and Lot 4 DP 1186349), – Stage 1 Early Works.* (Report Ref.: SSD 5066/Stage 1 Early Works). 3 June 2016. (NSW DPE, June 2016) **[The MPW Stage 1 Instrument.]**

NSW Government, Department of Planning and Environment (NSW DPE). *Modification 1 of the Development Consent for State Significant Development (SSD) 5066, for the Moorebank Intermodal Company (Applicant) for the Intermodal Site (Lot 1 DP 1197707, Lot 101 DP 1049508, Lot 100 DP 1049508, and Lot 2 DP 1197707) and the Rail Corridor (Lot 5 DP 833516, Lot 51 DP 515696, Lot 102, 103, and 104 DP 1143827, and Lot 4 DP 1186349), – Stage 1 Early Works.* (Report Ref.: SSD 5066/Stage 1 Mod 1). 30 October 2019. (NSW DPE, Oct 2019) **[The MPW Stage 1 Instrument, Modification 1.]**

NSW Government, Department of Planning and Environment (NSW DPE). *Development Consent for State Significant Development (SSD) 7709, for the Sydney Intermodal Terminal Alliance (SIMTA) (Applicant) for the Moorebank Precinct West (MPW) (Lot 1 DP 1197707, Lot 100 and 101 DP 1049508, Lot 2 DP 1197707, Part Lot 3 DP 1197707, and Part Anzac Road and Moorebank Avenue public road reserves), – Stage 2.* (Report Ref.: SSD 7709/Stage 2). 30 October 2019. (NSW DPE, Nov 2019) **[The MPW Stage 2 Instrument.]**

NSW EPA. *Environmental Protection Licence No. 21054, under Section 58(5) of the POEO Act 1997, for the Moorebank Precinct, Moorebank, NSW 2170.* (Report Ref.: Lic. # 21054). Licence first issued on 4 June 2018 with two variations (modifications) approved on 18 April 2019 and 1 August 2019. (NSW EPA, June 2018) **[The POEO Licence].**

NSW Government, Department of Planning, Industry, and Environment (NSW DPIE). *Development Consent for State Significant Development (SSD) 10431, for the Sydney Intermodal Terminal Alliance (SIMTA) as Qube Holdings (Applicant) for the Moorebank Precinct West Stage 3 (MPW Stage 3) (Lot 1 DP 1197707 and Lot 100 DP 1048508).* (Report Ref.: SSD 10431/Stage 3.) 11 May 2021. (NSW DPIE, May 2021) **[The MPW Stage 3 Instrument.]**

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1.7.2 Regulatory Instruments MPE

The following documents were provided to the Site Auditor and are cited for reference only regarding the ongoing works in the adjacent MPE that comprises another portion of the MLP.

NSW Government, Department of Planning and Environment (NSW DPE). *Development Consent for State Significant Development (SSD) 7628, Lot 1 DP 1048263, Part Lots 1, 2, and 4 DP 1197707, Moorebank Avenue.* (Report Ref.: SSD 7628). 31 January 2018. (NSW DPE, Jan 2018) [The MPE Stage 2 Instrument.]

NSW Government, Department of Planning and Environment (NSW DPE). *Development Consent for State Significant Development (SSD) 6766 (Terminal Site and Rail Corridor), Sydney Intermodal Terminal Alliance (SIMTA).* (Report Ref.: SSD 6766, Court Decision Appeal No.: 2017/81889). 12 December 2016. (NSW DPE, Dec 2016) [The MPE Stage 1 Instrument.]

1.7.3 Documents Provided and Reviewed – MPW Site

The following documents were provided to the Site Auditor as part of this Site Audit and relate to or incorporate a portion of the Site Audit site (i.e., MPW). The most significant of these documents are cited throughout this Site Audit Report, as appropriate, and discussed. The documents in blue text are those that were specifically reviewed as a part of this or the prior Site Audits (Enviroview [James Davis Site Auditor], Sept 2020) and (Enviroview [James Davis Site Auditor], Nov 2020) for the MPW site.

Dames & Moore. *Environmental Management Plan for Liverpool Base Administrative Support Centre and School of Military Engineering.* (Report Ref.: 12343-032-363). 24 May 1996. (Dames & Moore, May 1996)

Egis Consulting Australia (Egis). *Stage 1 Preliminary Site Investigation at the Defence National Supply & Distribution Centre (DNSDC), Moorebank Defence Lands.* (Report Ref.: VA0334/940). 13 September 2000. (Egis, Sept 2000)

URS Australia Pty Ltd (URS). *Investigation of Potential Sources of TCE, North Western Precinct of Moorebank Defence Land.* (Report Ref.: 12343/213/558). 11 August 2003. (URS, Aug 2003)

GHD Pty Ltd (GHD). *Groundwater Investigation of the North Western Portion of the Moorebank Defence Land.* (Report Ref.: PDTF 10/03 12764). 30 July 2004. (GHD, July 2004)

HLA-Envirosciences Pty Ltd (HLA). *Aboveground and Underground Storage Tank Management Plan, Volume 10, Sydney West Defence Region, Department of Defence*. (Report Ref.: D1020210_RPTFinalVolume10_SW_02Dec05.) 2 December 2005. (HLA, Dec 2005)

Earth Tech Engineering Pty Ltd (Earth Tech). *Stage 2 Environmental Investigation, Moorebank, Sydney, NSW.* May 2006. (Earth Tech, May 2006)

G-tek Australia Pty Ltd (G-tek). *Post Activity Report, Explosive Ordnance Assessment and Safeguarding, Moorebank Intermodal Terminal, Moorebank, NSW.* (Report Ref.: 10056KPMG). 18 May 2011. (G-tek, May 2011)

Parsons Brinckerhoff (PB). *Geotechnical Investigation Report, Moorebank Intermodal Terminal.* (Report Ref.: 2103829A_PR_036). 29 June 2011. (PB, June 2011)

AECOM Australia Pty Ltd [Frank Mohen Site Auditor]. *Site Audit Report and Site Audit Statement [No. FM105], Moorebank Intermodal Terminal, Moorebank, NSW*. (Report ref.: 60191616). 4 May 2012. (AECOM [Frank Mohen Site Auditor], May 2012)

Parsons Brinckerhoff (PB). *School of Military Engineering 'Dust Bowl' – Steele Barracks (Asbestos Management Plan).* (Report Ref.: 2189207D_SME_SteeleBarracks_AMP). 4 December 2013. (PB, Dec 2013)

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Parsons Brinckerhoff (PB). *Phase 2 Environmental Site Assessment, Moorebank Intermodal Terminal*. (Report ref.: 2103829A-CLM-RPT-1 Rev B). 28 May 2014. (PB, May 2014a)

Parsons Brinckerhoff (PB). *Moorebank Intermodal Terminal, Preliminary Remediation Action Plan*. (Report ref.: 2189293C-CLM-REP-2 RevC). 30 May 2014. (PB, May 2014b)

Parsons Brinckerhoff (PB). *Phase 1 Environmental Site Assessment, Moorebank Intermodal Terminal*. (Report ref.: 2103829A-CLM-RPT-3321 Rev C). 9 July 2014. (PB, July 2014)

AECOM Australia Pty Ltd [Frank Mohen Site Auditor]. *Site Audit Report and Site Audit Statement [No. FM106], Moorebank Intermodal Terminal, Moorebank, NSW*. (Report ref.: 60327260). 10 July 2014. (AECOM [Frank Mohen Site Auditor], July 2014)

Golder Associates Pty Ltd (Golder). *Post Phase 2 Environmental Site Assessment, Moorebank Intermodal Terminal*. (Report Ref.: 147623070-019-R-Rev0.) 21 July 2015. (Golder, July 2015)

Golder Associates Pty Ltd (Golder). *Site Validation Plan – Principles, Moorebank Intermodal Terminal*. (Report Ref.: 147623070-022-R-Rev1.) 7 August 2015. (Golder, Aug 2015a)

Golder Associates Pty Ltd (Golder). *On Site Quantitative Human Health Risk Assessment, Moorebank Intermodal Terminal*. (Report Ref.: 147623070-043-R-Rev1.) 21 October 2015. (Golder, Oct 2015a)

Golder Associates Pty Ltd (Golder). *Preliminary Aqueous Film Forming Foam Investigation, Moorebank Intermodal Terminal.* (Report Ref.: 147623070-035-R-Rev0). 28 October 2015. (Golder, Oct 2015b)

Golder Associates Pty Ltd (Golder). *Site Contamination Summary Report – Stage 2 State Significant Development, Moorebank Intermodal Terminal, draft.* (Report Ref.: 1651776-001- RevA). February 2016. (Golder, Feb 2016)

Golder Associates Pty Ltd (Golder). *Perfluoroalkyl Substances Surface Water and Sediment Investigation Georges River, Moorebank Intermodal Terminal.* (Report Ref.: 147623070-047-R-Rev0). 22 March 2016. (Golder, Mar 2016)

Golder Associates Pty Ltd (Golder). *PFAS Investigation Summary Report, Moorebank Intermodal Terminal.* (Report Ref.: 147623070-062-R-RevA). 28 June 2016. (Golder, June 2016)

G-tek Australia Pty Ltd (G-tek). *Unexploded Ordnance (UXO) Risk Review and Management Plan MIC Site, Moorebank, NSW.* (Report Ref.: 14037GOLD, V1_03). 21 July 2016. (G-tek, July 2016)

Golder Associates Pty Ltd (Golder). *Earthworks Specification – MIC Stage 2, Moorebank Intermodal Terminal*. (Report Ref.: 1416224-034-R-Rev0.) 25 July 2016. (Golder, July 2016)

Golder Associates Pty Ltd (Golder). *Remediation Action Plan – Land Preparation Works Stage 1 and Stage 2, Moorebank Intermodal Terminal Company Property West*. (Report Ref.: 1651776-005-R-Rev0.) 9 August 2016. (Golder, Aug 2016b) [The RAP].

Golder Associates Pty Ltd (Golder). *Asbestos in Soils Management Plan, Moorebank Intermodal Terminal*. (Report Ref.: 1416224-035-R-Rev1). 16 August 2016. (Golder, Aug 2016c)

Golder Associates Pty Ltd (Golder). *Technical Specification – Demolition and Site Remediation, Early Works, Moorebank Intermodal Terminal.* (Report Ref.: 1651776-003-R-Rev1). 16 August 2016. (Golder, Aug 2016d)

Golder Associates Pty Ltd (Golder). *Preliminary PFAS in Groundwater Remedial Options Appraisal, Moorebank Intermodal Terminal, Moorebank, NSW.* (Report Ref.: 147623070-065-R-RevA). 22 August 2016. (Golder, Aug 2016e)

GHD Pty Ltd (GHD). *"Hour Glass", Casula, NSW – Environmental Management Plan.* (Report Ref.: 2561000\WP\217646). 9 September 2016. (GHD, Sept 2016)

Environmental Risk Sciences Pty Ltd (EnRiskS). *Review of PFAS Risk Issues, Moorebank Intermodal Terminal.* 19 September 2016. (EnRiskS, Sept 2016)

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Golder Associates Pty Ltd (Golder). *Per- and Poly-fluoroalkyl Substances Investigations: Stage 1, Onsite Screening Assessment, Moorebank Intermodal Terminal.* (Report Ref.: 147623070-059-R-Rev0). 29 October 2016. (Golder, Oct 2016a)

Golder Associates Pty Ltd (Golder). *Per- and Poly-fluoroalkyl Substances Investigations: Stage 2 Onsite Delineation, Moorebank Intermodal Terminal.* (Report Ref.: 147623070-064-R-Rev1). 29 October 2016. (Golder, Oct 2016b)

Golder Associates Pty Ltd (Golder). *Per- Poly- fluoroalkyl Substances: Georges River Monitoring Report, July 2016, Moorebank Intermodal Terminal.* (Report Ref.: 147623070-065-R-Rev0). 29 October 2016. (Golder, Oct 2016c)

Golder Associates Pty Ltd (Golder). *Problem Identification to Inform Ecological and Human Health Risk Assessment, Moorebank Intermodal Terminal.* (Report Ref.: 147623070-061-R-Rev0). 4 November 2016. (Golder, Nov 2016)

EP Risk. *PFAS Preliminary Review # 1, Moorebank Intermodal Terminal Development*. (Report Ref.: EP0317). 25 November 2016. (EP Risk, Nov 2016)

Biosis Pty Ltd (Biosis). *Environmental Review – Soil Remediation Sites and Interaction with Mapped EEC Vegetation.* (Report Ref.: 22789). 24 February 2017. (Biosis, Feb 2017)

Construction and Remediation Advisory Services (CARAS). *Moorebank Precinct Waste Management Strategy*. (Report Ref.: C1043-R-03, RevB). 6 March 2017. (CARAS, Mar 2017)

JBS&G Australia Pty Ltd (JBS&G). *Letter Report: Soil Remediation Sites and Interaction with Mapped ECC Vegetation – MIT, Moorebank Road, Moorebank, NSW*. (Report ref.: 51997-107729 L003 (EEC Overlap) Rev 0). 16 March 2017. (JBS&G, Mar 2017)

Liberty Industrial Pty Ltd (Liberty). *Imported Material Management Plan for Moorebank Intermodal Terminal LPWDR.* (Report Ref.: RevE). 23 June 2017. (Liberty, June 2017)

EP Risk. *Per- and Polyfluoroalkyl Substances (PFAS) Nested Well Investigation, Moorebank Intermodal Terminal Development.* (Report Ref.: EP00561.002). 10 July 2017. (EP Risk, July 2017)

JBS&G Australia Pty Ltd (JBS&G). *Assessment of Lake Sisinyak Asbestos Stockpiles, Draft.* (Report Ref.: 51997-111458 L058 RevA). 6 September 2017. (JBS&G, Sept 2017)

EP Risk. *Literature Review, Criteria for Assessment of PFAS, and Risk Assessment, Moorebank Intermodal Terminal Development*. (Report Ref.: EP0448.001_v3). 3 October 2017. (EP Risk, Oct 2017a)

EP Risk. *Bench-Scale Trial, Moorebank Intermodal Terminal Development.* (Report Ref.: EP0499.001.v.2). 20 October 2017. (EP Risk, Oct 2017b) This document was not further developed.

EP Risk. *Per- and Polyfluoroalkyl Substances (PFAS) Remediation Action Plan, Moorebank Intermodal Terminal Development.* (Report Ref.: EP0500.001.v.3). 3 November 2017. (EP Risk, Nov 2017a) This document was not further developed.

EP Risk. *Per- and Polyfluoroalkyl Substances (PFAS) Data Gap Investigation, Moorebank Intermodal Terminal Development.* (Report Ref.: EP00464.002.v2). 20 November 2017. (EP Risk, Nov 2017b)

JBS&G Australia Pty Ltd (JBS&G). *Assessment of High Risk Services.* (Report Ref.: 51997-110297 L022 Rev1). 20 November 2017. (JBS&G, Nov 2017a)

JBS&G Australia Pty Ltd (JBS&G). *Interim Management of ACM Stockpiles.* (Report Ref.: 51997-112848 L100 Revb). 12 December 2017. (JBS&G, Dec 2017a)

JBS&G Australia Pty Ltd (JBS&G). *Groundwater Assessment Scope to Satisfy RAP Requirements, Moorebank Precinct West.* (Report Ref.: 51997-113060 L110 RevA). 22 December 2017. (JBS&G, Dec 2017b)

Arcadis Australia Pacific Pty Ltd (Arcadis). *Data Gap Summary – Per & Polyfluoroalkyl Substances, Moorebank Intermodal Terminal Development.* (Report Ref.: 7.14.17093). 24 January 2018. (Arcadis, Jan 2018)

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JBS&G Australia Pty Ltd (JBS&G). *Groundwater Assessment for Off-Site Sources, Moorebank Precinct West.* (Report Ref.: 51997-113060 L126 RevA). 5 February 2018. (JBS&G, Feb 2018)

Construction and Remediation Advisory Services (CARAS). *Per & Poly-Fluoroalkyl Substances (PFAS), Management Plan, Moorebank Precinct West – Early Works.* (Report Ref.: MPW_PFASMP-01_RevG). 27 February 2018. (CARAS, Feb 2018)

JBS&G Australia Pty Ltd (JBS&G). *PFAS Soils Management Advice, Draft.* (Report Ref.: 51997-114231 L137 RevA). 5 March 2018. (JBS&G, Mar 2018a)

JBS&G Australia Pty Ltd (JBS&G). *Strategy to Close-Out Remaining Remediation Areas, Draft.* (Report Ref.: 51997-113850 L130 RevC). 8 March 2018. (JBS&G, Mar 2018b)

JBS&G Australia Pty Ltd (JBS&G). *PFAS Soil Assessment in Swale Lines and Sediment Basins, Moorebank LPWDR, (Appendix of the Remediation Validation Report LPWDR MPW).* (Report Ref.: 51997-114909 L144 Rev0). 18 April 2018. (JBS&G, Apr 2018a)

JBS&G Australia Pty Ltd (JBS&G). *Qualitative Assessment for PFAS – Stormwater Discharge at Moorebank Intermodal Terminal, LPWDR, Moorebank, NSW, Draft.* (Report Ref.: 51997-114957 L145 RevA). 18 April 2018. (JBS&G, Apr 2018b)

Golder Associates Pty Ltd (Golder). *Technical Memorandum: Results from Additional Soil and Soil Vapour Investigation of TCE Contamination.* (Report Ref.: 147623070-078-M-Rev0). 5 June 2018. (Golder, June 2018)

Rare Environmental. *LPWR – Stockpile 112 Supplementary Waste Classification Information.* 25 June 2018. (Rare Environmental, June 2018a)

Rare Environmental. *LPWR – Stockpile 114 Supplementary Waste Classification Information.* 25 June 2018. (Rare Environmental, June 2018b)

Queensland Department of Environment and Science (QLD DES). *Notice of Decision to Grant a Soil Disposal Permit with Conditions*. (Report Ref.: 101/0027272) 27 June 2018. (QLD DES, June 2018)

Cleanaway Solid Waste Pty Ltd (Cleanaway). *Letter from Cleanaway Queensland re: waste from Moorebank Intermodal Terminal.* 27 June 2018. (Cleanaway, June 2018)

HWL Ebsworth Lawyers. *Email to Liberty Industrial re: Advice – Proximity Principal.* 28 June 2018. (HWL Ebsworth Lawyers, June 2018)

Enviroview [Site Auditor James Davis]. *Email to Waste Operations at NSW EPA: Site Auditor notification where not satisfied the waste has been taken to a lawful facility.* 20 July 2018. (Enviroview [Site Auditor James Davis], July 2018)

JBS&G Australia Pty Ltd (JBS&G). *Groundwater Assessment Moorebank Precinct West.* (Report Ref.: 51997-117308 L163 RevA). 22 August 2018. (JBS&G, Aug 2018)

EP Risk. *Site-Wide PFAS Assessment, Moorebank Precinct West, Moorebank, NSW.* (Report Ref.: EP0745.008). 22 August 2018. (EP Risk, Aug 2018)

EP Risk. *Addendum to Qualitative Human Health Risk Assessment, Moorebank Precinct West, Moorebank, NSW.* (Report Ref.: EP0745.016). 5 September 2018. (EP Risk, Sept 2018a)

EP Risk. *Addendum # 2 to the Human Health Risk Assessment – Construction Workers Handling PFAS-Containing Stormwater, Moorebank Precinct West, Moorebank, NSW.* (Report Ref.: EP0745.019). 19 September 2018. (EP Risk, Sept 2018b)

EP Risk. *Technical Memorandum: Capping of Sediment Basin Catchments and Lining of Swales and Basins Impacted with PFAS-Containing Stormwater, Moorebank Precinct West, Moorebank, NSW.* (Report Ref.: EP0745.017). 20 September 2018. (EP Risk, Sept 2018c)

EP Risk. *Per- and Polyfluoroalkyl Substances (PFAS) Stormwater Management Strategy, Moorebank Precinct West, Moorebank, NSW.* (Report Ref.: EP0745.018). 20 September 2018. (EP Risk, Sept 2018d)

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JBS&G Australia Pty Ltd (JBS&G). *Validation of Developable Area.* (Report Ref.: 51997-119435 L262 Rev2). 27 November 2018. (JBS&G, Nov 2018)

Hydrobiology Pty Ltd (Hydrobiology). *PFAS Investigation in the Georges River adjacent to the Proposed Moorebank Intermodal Terminal, Investigation in Biota, Water, and Sediment.* (Report Ref.: MIT1801_V2-1). 11 March 2019. (Hydrobiology, Mar 2019)

JBS&G Australia Pty Ltd (JBS&G). *Environmental Management Plan, Moorebank Intermodal Company Property West, Moorebank, NSW.* (Report Ref.: 51997-121114/Rev C). 14 March 2019. (JBS&G, Mar 2019) This document was superseded by the EP Risk (2020) CMP and LTEMP.

GHD Pty Ltd (GHD). *Report Summarising PFAS Investigations to February 2019, Moorebank Precinct West, draft.* (Report Ref.: 2128111_draftPFAS_summaryrpt). 17 April 2019. (GHD, Apr 2019)

Environmental Risk Sciences Pty Ltd (EnRiskS). *Land Human Health and Ecological Risk Assessment (Land HHERA), Moorebank Intermodal Company.* (Report Ref.: MICL/19/BIOR001.RevC). 10 May 2019. (EnRiskS, May 2019a)

Environmental Risk Sciences Pty Ltd (EnRiskS). *Waterway Human Health and Ecological Risk Assessment (Waterway HHERA), Moorebank Intermodal Company.* (Report Ref.: MICL/18/GRR001.RevE). 10 May 2019. (EnRiskS, May 2019b)

GHD Pty Ltd (GHD). *PFAS Management Plan, Moorebank Precinct West, draft.* (Report Ref.: 2128111_R_EP_ROR). 12 June 2019. (GHD, June 2019)

GHD Pty Ltd (GHD). *Interim PFAS Remedial Action Plan – Drainage Channels, Moorebank Precinct West, draft.* (Report Ref.: 2128111/draft). 18 June 2019. (GHD, June 2019) (GHD, June 2019)

Arcadis Australia Pacific Pty Ltd (Arcadis). *Biodiversity Management Implementation Plan, Moorebank Precinct.* (Report Ref.: Final 13 RevQ). 1 July 2019. (Arcadis, July 2019)

JBS&G Australia Pty Ltd (JBS&G). *Technical Memo: PFAS Assessment and Management of Surface Water in Sediment Basins, Moorebank Precinct West, Moorebank Intermodal Terminal, NSW.* (Report Ref.: 51997-123243). 23 July 2019. (JBS&G, July 2019)

G-tek Australia Pty Ltd (G-tek). *Unexploded Ordnance (UXO) Risk Review and Management Plan Moorebank Precinct West Stage 2 (MPW2) incorporating Moorebank Avenue Upgrade Works (MAUW), Moorebank, NSW.* (Report Ref.: 17114EPRI, MPW2, MAUW, V1_01). 9 October 2019. (G-tek, Oct 2019)

JBS&G Australia Pty Ltd (JBS&G). *Letter Report: CPB Compound Stockpile Assessment, Moorebank Precinct West, Moorebank Intermodal Terminal, NSW.* (Report Ref.: 51997-125480_L341.RevA). 1 November 2019. (JBS&G, Nov 2019)

G-tek Australia Pty Ltd (G-tek). *Remediation Action Plan – Unexploded Ordnance, Moorebank Precinct West and Moorebank Avenue Upgrade Works.* (Report Ref.: 17114_EPRI_v1_02). 8 November 2019. (G-tek, Nov 2019)

EP Risk. *Contamination Management Plan Moorebank Avenue Upgrade Works 400 Moorebank Avenue, Moorebank NSW* (Report Ref.: EP1280.002_MAUW_CMP01 v4). 8 November 2019. (EP Risk, Nov 2019)

GHD Pty Ltd (GHD). *Moorebank Precinct West, Long-Term Management Plan – Non-Developable Area, draft.* (Report Ref.: 2128222_R_LTMP). 19 November 2019. (GHD, Nov 2019)

SIMTA. *Construction Environmental Management Plan (CEMP), Moorebank Precinct West Stage 2.* (Report Ref.: MIC2-QPMSEN-APP-00001). 14 January 2020. (SIMTA, Jan 2020)

JBS&G Australia Pty Ltd (JBS&G). *Remediation Validation Report, Land Preparation Work – Demolition and Remediation, Moorebank Intermodal Company Property West, Moorebank, NSW.* (Report ref.: 51997-120265 Rev1). 22 July 2020. (JBS&G, July 2020a)

JBS&G Australia Pty Ltd (JBS&G). *Site Wide Groundwater Assessment Report, Land Preparation Work – Demolition and Remediation, Moorebank Intermodal Company Property West, Moorebank, NSW.* (Report ref.: 51997-120679 Rev1). 22 July 2020. (JBS&G, July 2020b)

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EP Risk. *Contamination Management Plan, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: EP1489.002_MPW_CMP.v11). 30 July 2020. (EP Risk, July 2020)

EP Risk. *Long-Term Environmental Management Plan, Moorebank Precinct West (MPW).* (Report Ref.: EP1489.001.v8). 2 September 2020. (EP Risk, Sept 2020) [Note: this version of the LTEMP was attached to the prior Site Audit (Enviroview [James Davis Site Auditor], Sept 2020).]

JBS&G Australia Pty Ltd (JBS&G). *MPW Supplementary Validation Report, Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 58753/132401 Rev 0). 25 September 2020. (JBS&G, Sept 2020)

Environmental Risk Sciences Pty Ltd (EnRiskS). *Moorebank Intermodal Terminal: LTEMP Material Reuse Risk Assessment for PFAS.* 9 October 2020. (EnRiskS, Oct 2020)

EP Risk. *Long-Term Environmental Management Plan, Moorebank Precinct West (MPW).* (Report Ref.: EP1489.001.v12). 27 October 2020. (EP Risk, Oct 2020)

JBS&G Australia Pty Ltd (JBS&G). *Moorebank Precinct West (MPW): Woolworths Audit Area Validation Summary.* (Report Ref.: 51997-134422 L362_Rev-C). 19 February 2021. (JBS&G, Feb 2021) [The Woolworths Audit Area Validation Summary].

EP Risk. *Long-Term Environmental Management Plan, Lot 6, 7, and 12, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: EP1489.007.v5). 8 December 2021. (EP Risk, Dec 2021) [The Site Audit Site LTEMP].

1.7.4 Other Documents – MPE Site

The following documents were provided to the Site Auditor as part of this Site Audit and relate to a portion of the MPW site due to overlapping contamination or construction issues with the adjacent MPE site. These documents are cited in this Site Audit Report, where relevant, and discussed. The documents in blue text are those that were specifically reviewed as a part of this Site Audit or the prior MPW Site Audits (Enviroview [James Davis Site Auditor], Sept 2020), (Enviroview [James Davis Site Auditor], Nov 2020) .

GHD Pty Ltd. *DNSDC Moorebank – Refuelling Area, Remedial Action Plan.* (Report Ref.: 21/24133/211259). 27 November 2015. (GHD, Nov 2015)

JBS&G [Andrew Lau Site Auditor]. *Site Audit Report and Site Audit Statement: 0503-1615, Former Defence National Storage and Distribution Centre (DNSDC) – Licensed Area, Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 51732-105413 Rev0). 13 October 2016. (JBS&G [Andrew Lau Site Auditor], Oct 2016)

GHD Pty Ltd (GHD). *Former DNSDC Refuelling Area, Moorebank NSW, Environmental Management Plan.* (Report Ref.: 221472_EMP_Rev2). 9 October 2018. (GHD, Oct 2018)

JBS&G [Andrew Lau Site Auditor]. *Site Audit Report and Site Audit Statement: 0503-1907, Former Defence National Storage and Distribution Centre (DNSDC) – Licensed Area, Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 51732-114653 Rev0). 30 October 2018. (JBS&G [Andrew Lau Site Auditor], Oct 2018)

EP Risk. *Contamination Management Plan, Moorebank Precinct East Site, 400 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: EP1280_CMP01_v7). 30 July 2019. (EP Risk, July 2019)

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1.8 Site Audit Inspections

While undertaking the Site Audit several inspections of the site were conducted. The following table lists the details of the inspections of the site conducted by the Site Auditor.

Table 1-1 Site Inspections

Date	Purpose
24/06 2016	Site Inspection and familiarisation
13/02/2017	Site Inspection and commencement of remediation works
1/06/2017	Site Inspection AECs and high-risk service line removal
7/6/2018	Site Inspection unexpected finds and service line removal (combined with MPE)
10/8/2018	Site Inspection compound area (combined with MPE)
20/05/2020	Site Inspection and inspection of stockpiles related to Environmental Protection Licence (EPL) review
14/09/2020	Site Inspection of residual areas and Stage 2 works

1.9 Audit Correspondence

Correspondence in the form of Site Audit Interim Advice was issued regarding the Site Audit to clarify and request additional information and to provide guidance on the Site Audit requirements. Site Audit Interim Advice is provided in **Appendix A**.

1.10 Complimentary Site Audits

James Davis of Enviroview Pty Ltd has completed four Site Audits for nearby sites within the MPE, two Site Audits for the Rail Access Land Package to the south of MPW, and two Site Audits for the whole of the MPW site (MLP) under prior development consent conditions. These audits are referenced as follows:

> Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, Northwest Limited Works Stage Area, Moorebank Precinct East, Sydney Intermodal, 400 Moorebank Avenue, Moorebank.* (Report Ref.: 600099_0301-1613-1). 29 May 2019. (Enviroview [James Davis Site Auditor], May 2019) SAS # 0301-1613-1
>
> Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, IMEX Terminal Site, Moorebank Precinct East, Sydney Intermodal, 402 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 600099_0301-1613-2). 15 August 2019. (Enviroview [James Davis Site Auditor], Aug 2019a) SAS # 0301-1613-2
>
> Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, Rail Access Land Package, Sydney Intermodal, Moorebank Avenue, Moorebank.* (Report Ref.: 600099_0301-1613-3). 13 August 2019. (Enviroview [James Davis Site Auditor], Aug 2019b) SAS # 0301-1613-3
>
> Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, Proposed Lot 22, Moorebank Precinct East, Sydney Intermodal, 400 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 600099_0301-1613-4). 15 October 2019. (Enviroview [James Davis Site Auditor], Oct 2019) SAS # 0301-1613-4
>
> Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, Rail Access Land Package – Audit Stage 2, Sydney Intermodal, Moorebank Avenue, Moorebank, NSW.* (Report Ref.:

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600099_0301-1613-5). 5 April 2020. (Enviroview [James Davis Site Auditor], Apr 2020) SAS # 0301-1613-5

Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, Proposed Lot 23, Moorebank Precinct East, Sydney Intermodal, Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 600099_0301-1613-6). 21 July 2020. (Enviroview [James Davis Site Auditor], July 2020) SAS # 0301-1613-6

Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, Stage 1 Early Works (Land Preparation Works – Demolition and Remediation), Moorebank Precinct West, Moorebank Intermodal and Logistics Park (MLP), Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 600099_0301-1613-7). 18 September 2020. (Enviroview [James Davis Site Auditor], Sept 2020) SAS # 0301-1613-7

Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, Stage 2 Works – Completion of Remediation Pre-Construction (Condition B169 Audit), Moorebank Precinct West, Moorebank Intermodal and Logistics Park (MLP), Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 600099_0301-2014). 11 November 2020. (Enviroview [James Davis Site Auditor], Nov 2020) SAS # 0301-2014.

1.11 Chronology of Site Assessment and Audit Works

The process of Site Auditor review and preparation of final Site Audit Statement and Site Audit Report undertaken at the site has been summarised in the following table.

Table 1-2 Summary of Audit Works

Date	Action
2012	Site Audit for 'Moorebank Intermodal Terminal' completed by Site Auditor Frank Mohen (AECOM [Frank Mohen Site Auditor], May 2012). (see **Section 6.1**)
2014	Site Audit for 'Moorebank Intermodal Terminal' completed by Site Auditor Frank Mohen (AECOM [Frank Mohen Site Auditor], July 2014). (see **Section 6.2**)
June 2016	Engagement of NSW EPA Accredited Site Auditor Mr James Davis of Enviroview to conduct Statutory Site Audit in relation the suitability of the site for the proposed land use.
June 2016 to August 2020	Site Auditor James Davis issued Interim Audit Advice #1 to #38 (0301-1613-7) reviewing various remedial planning, remedial works/interim validation, validation, and management/further remedial works as reported by the consultants at the site.
September 2020	Preparation of a Site Audit Statement and Site Audit Report for Audit number 0301-1613-7 conducted by James Davis of Enviroview Pty Ltd regarding the Stage 1 Early Works conducted at the MPW site and its suitability for the proposed land use.
September to October 2020	Completion of Stage 2 remediation works on-site, following vegetation clearance, and reporting by the associated consultants.
September to November 2020	Site Auditor James Davis issued Interim Audit Advice #1 to #6 (0301-2014) reviewing the Supplemental Remediation Validation reporting and updates to the LTEMP as reported by the consultants at the site.
November 2020	Preparation of a Site Audit Statement and Site Audit Report for Audit number 0301-2014 conducted by James Davis of Enviroview Pty Ltd regarding the Stage 2 works (Completion of Remediation Pre-Construction) conducted at the MPW site and its suitability for the proposed land use. (The **Condition B169 Audit** for the whole of the MPW site.)

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Date	Action
December 2020 to December 2021	Site Auditor James Davis issued Interim Audit Advice #1 to #4 (0301-2020-1) reviewing the Woolworths Audit Area Validation Summary and development of the Lot 6, 7, and 12 LTEMP as reported by the consultants at the site (see **Appendix A**).
February 2022	Preparation of a Site Audit Statement and Site Audit Report for Audit number 0301-2020-1 conducted by James Davis of Enviroview Pty Ltd regarding the Stage 2 works (completion of importation and placement of fill) conducted within the Site Audit Area site (parts of proposed Lots 6, 7, and 12). **This Site Audit is for compliance with Condition B171 of SSD 7709 and Condition C37 of SSD 10431** and is the first stage/area within the MPW site where these conditions (B171/C37) and associated Site Audit have been completed.

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2 Site Description

2.1 Site Identification

A summary of the site identification details is provided in **Table 2-1**.

Table 2-1 Summary Site Details – Site Audit Area Site

Street Address:	Parts of proposed Lots 6, 7, and 12, Moorebank Intermodal and Logistics Park Moorebank Avenue, MOOREBANK, NSW 2170
Property Description:	Part Lot 1 DP 1197707 Parts of proposed Lots 6, 7, and 12 in the MPW proposed subdivision plan.
Zoning:	General Industrial (IN1) per Liverpool LEP 2008 (within the 'Developable' portion of the MPW site)
Local Government Area:	Liverpool City Council
Property Size:	Approx. 264,030 m^2 (26 Ha)

Located within **Appendix B** are figures that depict the site. **Figure 1** identifies the site location within the broader MPW site. **Figure 2** depicts the site plan and **Figure 3** details the proposed subdivision of the MPW site and site survey.

Also included in **Appendix B** – are the consultant's (JBS&G, Feb 2021) 'Figure 2 – Woolworths Audit Area Boundary' and 'Figure 3 – Site Audit Area' that further detail the Site Audit Area site.

This Site Audit (SAS # 0301-2020-1) pertains only to the Site Audit Area site – a portion of the MPW site – as defined in Table 1 and as depicted on **Figures 2 and 3** (**Appendix B**).

Works across the MPW site are being conducted in stages in alignment with the development consents / planning instruments – see **Section 1.6**. The proposed development scope is discussed in **Section 9.1.2**. The site Master Plan is included in **Appendix C** (updated 2 February 2021).

Note that the MPW site is generally discussed in the planning and reporting works as two areas:

- The 'Developable' portion of MPW that may also be referred to as the 'Construction Area'; and
- The 'Non-Developable' portion of MPW, that may also be referred to as the 'biobanking' area or 'conservation' area and is located along the western boundary of the site – aligns with the portion of the site that is zoned Environmental Management (E3).

The Site Audit Area site is located entirely within the 'Developable' portion of MPW.

The Site Audit Area site is approximately 585 m wide (east to west at its widest point) and 612 m long (north to south at its longest point) and is an irregular shape. The site covers an area of approximately 26 Ha.

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Works discussed in this Site Audit Report were conducted in alignment with the Stage 2 works to satisfy the requirement for the Condition B171 Site Audit (completion of importation and placement of fill) – see **Section 1.6**.

Historical and background works, together with details of the MPW site as a whole and the preceding Site Audits (see **Section 1.6** and **1.10**) are summarised as pertinent for context.

The MPW site was utilised historically by the Australian Defence Force (ADF) as a training base, primarily as the School of Military Engineering (SME). Adjacent property to the east was the location of the former Defence National Storage and Distribution Centre (DNSDC) and is now undergoing development as MPE. Both properties and other surrounding land comprise the overall MLP development. Portions of the MLP development outside of the MPW area are not discussed within this Site Audit Report unless relevant to the works within the Site Audit site.

The Site Audit site is located approximately 28 km southwest of the Sydney central business district within the Liverpool City Council local government area.

2.2 Site Condition and Surrounding Environment

The MPW site is part of the MLP development that also includes MPE to the east.

Formerly, the site was the location of an Army training base and as such the site was the location of numerous industrial-type buildings.

The MPW site, prior to the demolition works conducted during Stage 1 of redevelopment, consisted of numerous buildings/warehouses, barracks, training areas, roads, and hardstand, with some vegetation/landscaping in between.

The surrounding land uses to the MPW site are depicted on **Figure 1** included in **Appendix B** and are described (Golder, Aug 2016b) as:

- **North** – Commercial / industrial land use, including ABB Australia Pty Limited and park land including Rifle Range Park
- **South** – East Hills Railway Line followed by Defence land
- **East** – Moorebank Avenue followed by the MPE portion of MLP
- **West** – Georges River followed by a variety of land uses including park land (Leacock Regional Park), Casula Powerhouse, Casula train station, a railway line, and Glenfield Landfill.

2.3 Topography and Hydrology

The consultant (PB, May 2014a) described the site as generally flat to gently undulating with some localised steep topography adjacent to the Georges River in the north-west of the site.

A review of topographical data showed the site lies at between approximately 4 and 18 m Australian Height Datum (m AHD) with the lowest elevations associated with terraces of the Georges River. Most of the site lies at an approximate elevation of 12 to 14 m AHD.

The dominant water feature of the area is the Georges River which is adjacent to the western boundary of the MPW site.

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Within the southern portion of MPW a small creek (Anzac Creek) is present that runs through the golf course to the north-east away from the Georges River and to the south of MPE. As part of the proposed development, it is planned for Anzac Creek to be filled in within the MPW site boundaries (EP Risk, Sept 2020).

There are (Golder, July 2015) some small dams in the northern part of MPW including Lake Sisinyak and dams which form part of the golf course in the southern part of the site – these will be filled as part of the Stage 2 site development. An existing dam/wetland in the far north-west corner of the site (north of Bapaume Road) will be retained as part of the site development works.

The western boundary of the site is below the 100-year flood level that extends through the conservation or Offset Area along the west of MPW site. This indicates the conservation area of the site has the potential to flood with the adjacent Georges River.

2.4 Geology

The consultants (PB, May 2014a) (Golder, July 2015) reported the regional geology consists of the site comprised Quaternary and Tertiary alluvium consisting of silt, sand, and gravels from quaternary fluvial deposition.

The soil landscape consists of Quaternary and Tertiary terraces of the Nepean River and the Georges River. The soils comprise poorly structured orange to red clay loams, clays, and sands with the potential for ironstone nodules to be present.

The consultant reported that dark grey to black Ashfield Shale of the Wianamatta Group, underlain by Triassic Hawkesbury Sandstone in the north-western area of the site were noted based on a review of the relevant Geological Map.

2.5 Hydrogeology

The consultants (PB, May 2014a) (Golder, July 2015) reported that within groundwater at the site two main groundwater units were observed: a shallow, unconfined (perched) aquifer was present in the alluvium present across the MPW site, and a deeper regional groundwater unit was present within the bedrock of the regional Ashfield shale.

Groundwater levels (Golder, July 2015) as reported by Golder within the shallow aquifer were historically between approximately 2 m Australian Height Datum (mAHD) nearest to the Georges River and 6 mAHD on the eastern portion of the site. EP Risk reported (EP Risk, Sept 2020) groundwater flow was towards the west and the nearest surface water body, the Georges River with levels ranging between 1.7 and 14.0 mAHD.

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2.6 Auditor Discussion of Site Description

The information provided by the consultants on the site condition and surrounding environment has been checked against, and meets the requirements of NSW EPA Guidelines (NSW OEH, 2011).

The consultant has provided the required information regarding the topography, hydrology, geology, and hydrogeology.

The consultant (JBS&G, Feb 2021) (EP Risk, Dec 2021) did include the full title details, describing the site as part Lot 1 DP 1197707 (and part of proposed Lots 6, 7, and 12).

A review of the deposited plans confirms that the site plan, site location and documentation provided by the consultant are consistent with the deposited plans for the site. The requirements of the Site Audit in relation to site identification have been met.

The information provided in the consultant's reports is generally consistent with the observations made by the Site Auditor during the site inspections.

Overall, the information provided by the consultant in relation to site condition and the surrounding environment is considered adequate for the purpose of assessing the nature and extent of contamination at the site, and to determine the land use suitability for the site.

As such, in the Site Auditor's opinion the information provided meets the requirements of the Site Audit.

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3 Site History

Due to the extensive site history and investigation works conducted at the site, a limited presentation of the site history is discussed in this section. The site history is discussed for the MPW site as a whole – the 'Woolworths Audit Area' is located within the central-southern portion of MPW.

3.1 Historical Land Records

Historical land use records were reviewed as part of the early Environmental Site Assessment works (PB, May 2014a) and indicated that much of the Moorebank site was owned by the Commonwealth of Australia from 1913 to recently.

The site was utilised by Defence since the 1940s, with various construction, demolition and excavation events occurring across the site over time. In the surrounding locality, residential and industrial development has gradually increased since the 1970s with expansion and development of transport infrastructure including the M5 Motorway, the East Hills railway line, the Liverpool to Holsworthy railway and the Southern Sydney Freight Line (SSFL). The DNSDC facility located to the east of the site was present since the early 1950s.

3.2 Historical Activities

The consultant (PB, May 2014a) explained that Defence uses of the site generally included the SME and other Moorebank units including:

- **Northern portion of the site** – 'Moorebank Barracks', comprising areas of open space interspersed with heavy vegetation
- **Southern portion of the site** – 'Steele Barracks', comprising the Royal Australian Engineers (RAE) SME, the RAE Museum and RAE Golf Club

Land uses within Moorebank Barracks were generally limited to administration and older accommodation buildings, a warehouse structure for the vehicle storage and maintenance of vehicles and a concrete lined surface water drainage culvert, which runs east to west towards the Georges River.

The land uses within Steele Barracks comprised accommodation, administration offices, engineering workshops, sports ovals and military training areas including a parade ground, bomb detection and disposal compounds, a small arms range, firefighting training areas, a large bulk earth movement training area (known as the 'dustbowl'), a dog kennels and dog training compound, and a bridging yard.

3.3 Aerial Photographs

As discussed by Golder, (Golder, July 2015), the earliest available aerial photographs for the site are from 1930 and these show the land to be cleared bushland and fields. There are small tracks and paths across the site area and meandering streams. The area appears to have been cleared of trees and bush up to the edge of the Georges River with sand banks and bars are visible within the river. Moorebank Avenue is present in the photograph.

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By 1956, the military facility had been developed on the site, comprising Steele Barracks. The DNSDC is present on the eastern side of Moorebank Avenue. A road bridge is evident, which crossed the Georges River immediately to the south of the former Casula Power Station.

The 1965 aerial photograph shows additional development of the site with the bridge adjacent to the power station is no longer present and there is a sand quarry on the site of the current day Glenfield Waste Facility. From the aerial photographs it is apparent that from the 1970's dredging took place on the Glenfield site, evidenced by flooding. The golf course is present on the site in the 1978 aerial photograph.

By 1986 the road bridge on the current M5 alignment had been constructed to the north of the site. The overall site arrangement was like that observed prior to the start of site demolition works. The Glenfield Waste site did not include flooded areas, and possible shale and sandstone outcrops are visible in the base of some excavations.

As of 2014, the consultant discussed that aerial photographs showed the site in its pre-demolition configuration. Military units on the site were progressively relocating to new facilities at Holsworthy and the DNSDC was being gradually relocated in preparation for the proposed change in land use from a military facility to the proposed intermodal terminal. The site was vacated by Defence by 2015.

Regarding the history of firefighting training areas, the consultant (EP Risk, Sept 2020) summarised that a former fire training area approximately 50 m wide and 100 m long was identified close to the Georges River in the southern portion of the Site opposite Jacquinot Road. Fire training involved pouring diesel and other flammable materials into shallow drains, in pans, in above ground storage tanks and car bodies, igniting the fuel and then extinguishing the fire using foam extinguishers. Based upon a review of aerial photographs, it was inferred that fire training activities in this area ceased somewhere between 1991 and 1994.

Another fire training area approximately 60 m wide by 160 m long was in the southern portion of the Dust Bowl. It was understood that fire activities in this area included igniting oil in trays and extinguishing them with foam including AFFF and there was no information available on when fire training activities ceased in this area. Historical excavator training within the Dust Bowl resulted in routine excavation up to depths of 4 m.

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3.4 Site Auditor Discussion of Site History

The information required by NSW EPA 1997, regarding the documentation of the site history has been provided and meets the requirements of the Site Audit.

While recent reporting by the consultants is lacking in the typical site assessment reporting requirements of site history, the site history information has been previously compiled and utilised to guide the numerous assessment works, and prior Site Audits completed, at the site since approximately 2012. The Stage 1 works have included demolition of prior buildings and infrastructure across the site.

As such, it is considered that the information provided by the consultants has been checked against and meets the requirements of the guidelines made or approved by the NSW EPA.

The extent of site history information presented by the consultant is considered adequate for the purposes of identifying potential contamination issues at the site.

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4 Potential Contaminants of Concern

The consultant (Golder, Aug 2016b) discussed in the RAP, that the contaminants of potential concern that have been investigated during works at the site include:

- Total Petroleum Hydrocarbons (TPH) and light non-aqueous phase liquids (LNAPLs)
- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX)
- Metals, including arsenic, cadmium, chromium, copper, mercury, nickel, zinc, and lead
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)
- Volatile Organic Compounds (VOCs) and Semi-Volatile Organic Compounds (SVOCs)
- Formaldehyde
- Per- and poly-fluoroalkyl substances (PFAS)
- Organophosphate pesticides (OPPs) and organochlorine pesticides (OCPs)
- Explosives including residues and unexploded ordnance (UXO)
- Asbestos

The consultant considered that the contaminants of potential concern could occur in soils, sediment, groundwater, soil vapour, or surface water at the site.

Key contamination issues, as summarised in the RAP, are presented in **Section 7.1.2**.

4.1 Site Audit Discussion of Potential Contaminants of Concern

The identified potential contamination at the site was based on the findings of the numerous site assessments undertaken at the site. The list of potential contaminants is considered to have been suitably comprehensive noting the site location and history.

Therefore, the Site Auditor is satisfied that the potential contaminants of concern identified were appropriate for the assessment of the site and for carrying forward into the remediation, redevelopment, validation, and ongoing assessment or management works. The potential contaminants of concern were considered acceptable to enable assessing the suitability of the site for the intended land use and have met the objectives of the Site Audit.

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5 Data Quality Objectives

The Data Quality Objectives (DQO) process is used to define the type, quantity and quality of data needed to support decisions relating to the environmental condition of a site. It provides a systematic approach for defining the criteria that a data collection design should satisfy. The USEPA developed the DQO process as a seven-step iterative planning approach, to be undertaken prior to investigative work.

NSW DEC (2006) states that Site Auditors must check that the consultant has properly addressed and adopted DQOs for the investigation or validation program and that the consultant's report includes the following:

- A statement of predetermined DQOs for the field and laboratory procedures, including quantitative DQOs (in this instance these DQO are related to the implementation of adequate field and laboratory QA/QC and are referred to as Data Quality Indicators for the quantitative assessment of data quality).
- A plan to achieve predetermined DQOs.
- Procedures to be undertaken if the data does not meet the expected DQOs.

5.1 Site Audit Discussion on Data Quality Objectives

Data Quality Objectives are a planning tool that is an independent process from the Quality Assurance/Quality Control processes that are standard in both investigation and validation reports. The DQOs are specific to each investigation and should be completed prior to any fieldwork to assist in development of an optimal sampling analytical and quality plan to reach the projects objectives most effectively.

DQOs were developed and followed throughout the investigation and contained an evaluation of QA/QC parameters. The details of the DQOs for the investigation and remedial planning works conducted are deemed sufficient and meet the objectives of this Site Audit.

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6 Site Assessment and Prior Auditor Site Audits

This section summarises the findings of the early Site Audits conducted by Frank Mohen (AECOM [Frank Mohen Site Auditor], May 2012) (AECOM [Frank Mohen Site Auditor], July 2014) and the site assessment works that were considered as a part of those audits. The auditor was engaged by MIC to conduct two non-statutory Site Audits in relation to the MPW site.

This section discusses the site history of the MPW site – of which the Woolworths Site Audit area is one part. See figures in **Appendix B** for context.

Please review Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020) for a more comprehensive discussion of the site history.

The first Site Audit (AECOM [Frank Mohen Site Auditor], May 2012) completed in 2012 was conducted to provide advice with respect to whether the site could be made suitable for the intended commercial/industrial use. The second Site Audit (AECOM [Frank Mohen Site Auditor], July 2014) completed in 2014 evaluated the proposed remediation strategy and discussed whether the site could be made suitable for the proposed land use.

Further documentation on the site history and earlier site assessment works were provided to the Site Auditor with all documentation cited in **Documents Reviewed** (see **Section 1.6**).

6.1 2012 Site Audit

The first Site Audit for the MPW site was completed by Frank Mohen of AECOM in 2012 (Site Audit Statement No. FM105). The findings of the audit are summarised in this section. The full citation of this Site Audit is provided below.

> AECOM Australia Pty Ltd [Frank Mohen Site Auditor]. *Site Audit Report and Site Audit Statement [No. FM105], Moorebank Intermodal Terminal, Moorebank, NSW*. (Report ref.: 60191616). 4 May 2012. (AECOM [Frank Mohen Site Auditor], May 2012)

The current auditor has reviewed the prior auditor's findings – and where relevant included outstanding issues in the evaluation of the subsequent works. However, it is noted, the volume of works that have been completed for the MPW site after 2012 (and 2014) have rendered these early works superseded.

6.1.1 Site Background and Assessment Works

The works primarily reviewed by the Site Auditor during the 2012 audit included a Phase 2 Environmental Site Assessment (ESA) and its addendum and an outline of a remedial approach.

At the time of the Site Audit, the site was described as Commonwealth land currently utilised by Defence and encompassed the Moorebank Barracks and Steele Barracks within the Army base.

The Phase 2 ESA report was discussed as having identified 28 key areas of potential concern across the site based on the former land uses and the potential for contamination.

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The Phase 2 works were reportedly conducted by the consultant PB as summarised by the auditor (AECOM [Frank Mohen Site Auditor], May 2012) and included soil, groundwater, sediment, and surface water sampling from across the MPW site. The auditor discussed the overall investigation approach and reporting and found that while minor deficiencies were noted they were unlikely to impact the overall conclusions of the works.

6.1.2 Consultant's Phase 2 ESA Conclusions

The report (AECOM [Frank Mohen Site Auditor], May 2012) presented the following findings, as summarised from the Phase 2 ESA based on the 2006 (Earth Tech, May 2006) and 2011 (PB) datasets.

The conclusions of the reporting were summarised as follows:

- Surficial geology encountered comprised localised fill with variable alluvial deposits. Saturated horizons were present between 7 and 15 m bgl, within the alluvium.
- Shallow soil impacts were identified, generally comprising relatively minor and localised detections of TPH, heavy metals, PAHs, BTEX, DDD, DDE, chlordane, bis(2-ethylhexyl)phthalate, di-n-butyl phthalate, PFOA, and PFOS. Soil contamination was generally limited to TPH and heavy metals, associated with areas of operational plant and machinery, vehicle storage and maintenance and the FFTA where USTs were known to be present. Identified contamination has generally been vertically delineated, with underlying natural soil confirmed to not be impacted.
- Identified soil impacts do not pose a health risk to future site users based on the proposed development design. Potential health risks to excavation/construction workers can be adequately managed through a Construction Environmental Management Plan (CEMP) to be implemented during development works.
- Asbestos cement fragments were identified in localised surface soils and waste fill at the site and should be managed appropriately during development works.
- There is no evidence to indicate that contamination identified in soil and groundwater at the site has affected established riparian vegetation, therefore the concentrations reported were not considered to pose a significant risk to on-site ecological receptors.
- Analytical results indicate that most soils excavated from the site during development works would likely be classified as General Solid Waste (GSW). Excavated soils containing asbestos containing materials (ACM) would need to be managed as waste containing asbestos. Waste classification should be conducted or all excavated materials prior to disposal off-site.
- Soils with acid generating potential (acid sulfate soils) were present at some locations. This issue would need to be addressed with implementation of an appropriate management plan prior to and during site redevelopment.
- Groundwater levels ranged from 5.2 to 12.4 m bgl (1.7 to 9.1 m AHD), with the inferred groundwater flow direction towards the Georges River. Groundwater was found to be impacted by dissolved heavy metals, chlorinated hydrocarbons (TCE and cis-1,2 DCE) and TPH, with localised detections of formaldehyde, chloroform, PFOA and PFOS.

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Dissolved cadmium, copper, lead, nickel, and zinc were reported at concentrations greater than the adopted criteria.

- A potentially complete exposure pathway was identified for the chlorinated hydrocarbon contamination identified in the northwest portion of the site (Area 1). If migration is occurring off the site, then the Commonwealth may need to consider whether there is duty to report this to the NSW OEH under Section 60 of the *Contaminated Land Management Act 1997*. The Commonwealth may also need to consider discussions with the adjacent property owner or the NSW OEH (EPA) to seek further advice on this matter.
- Potential health risks associated with the groundwater impacts identified may be mitigated by restricting groundwater abstraction and use on the site.
- Based on the current preferred development design (no buildings within Area 1), potential vapour risks associated with the TCE groundwater plume have not been considered. Further assessment may be required should the final design incorporate building in this area.
- Soil and groundwater contamination identified at the site do not contribute significant additional impacts to the water quality within the Georges River. The indicative risk assessment indicated that impacts to the Georges River due to migration of impacted groundwater from the site are considered to be low. The section of the river adjacent to the site is considered to be highly modified, with the river health consistently rated as poor by the Community River Health Program.
- No burial pits were identified during intrusive works or the seismic refraction survey. Areas of buried fill may exist in other areas of the site not yet identified, however, as no grossly contaminated fill was identified in the areas already assessed, it was considered that likely fill materials encountered during development works can be managed via an appropriate CEMP to be implemented during redevelopment works.
- Ordnance related wastes (UXO and EOW) exist at the site, however, specialist advice (G-tek report dated 2011) indicated that the site has a very low potential to contain remnant UXO/EO containing high explosive or other energetic material.
- Items of military origin which have the appearance of UXO/EO may cause concern if encountered during redevelopment works, however, the health and safety risk of such items is considered to be perceptual rather than actual. The perceived risk can be managed via an appropriate management plan to be implemented during redevelopment works.

The Phase 2 ESA report concluded that the available data indicated that the results do not preclude a commercial/industrial site use, however, the site would require some level of remediation and ongoing site management to mitigate the potential risks identified during the investigations. The Phase 2 Addendum further concluded that the "the site is considered suitable for industrial commercial use subject to implementation of the RAP measures and management controls during the site development".

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The Phase 2 ESA report acknowledged that there may be areas of the site where unidentified contamination is present. However, PB considered that the 2011 investigation, combined with the data from the Earth Tech (2006) investigation "provides sufficient information on which to base recommendations for remediation and management measures required and to calculate broad scale cost estimates for the necessary works in respect of contaminated land management at the feasibility concept stage".

6.1.3 Conclusions by Site Auditor (2012)

The auditor (AECOM [Frank Mohen Site Auditor], May 2012) concluded his report by stating he generally concurred with the conclusions and recommendations presented by the consultant, PB. And ":

- The Phase 2 ESA works substantially complied with the requirements of the relevant NSW OEH made or endorsed guidelines as well as project documentation such as SAQP prepared for the site and other relevant correspondence.
- The Auditor considered that the minor non-conformances identified are unlikely to impact on the conclusions of the Phase 2 ESA report or this Site Audit. In addition, the Auditor considers that further works are required for completion of the indicative risk assessment, however, the conclusions are unlikely to impact on the conclusions of the Phase 2 ESA report.
- The Auditor agrees that the site can be made suitable for the proposed commercial/industrial land use based on implementation of a suitable RAP and CEMP.

Remediation options were discussed but these were superseded by the subsequent Site Audit (see **Section 6.2**)

6.2 2014 Site Audit

The second Site Audit for the MPW site was completed by Frank Mohen of AECOM in 2014 (Site Audit Statement No. FM106). The findings of the Site Audit are summarised in this section. The full citation for this report is as follows.

> AECOM Australia Pty Ltd [Frank Mohen Site Auditor]. *Site Audit Report and Site Audit Statement [No. FM106], Moorebank Intermodal Terminal, Moorebank, NSW*. (Report ref.: 60327260). 10 July 2014. (AECOM [Frank Mohen Site Auditor], July 2014)

The Site Audit was conducted to evaluate the proposed remediation strategy and discussed whether the site could be made suitable for the proposed land use.

It is noted that in the 2014 Site Audit, three 'options' for the rail access to the site were reviewed – including a north, central, and southern rail access link across the Georges River to the terminal site. The details of these rail access options are not discussed herein. The southern rail link was selected and is evaluated in depth in other projects and Site Audits covering that specific land area (see **Section 1.9**).

6.2.1 Assessment Works

The works primarily reviewed by the auditor during the course of the 2014 audit included a Phase 1 ESA (PB, July 2014), Phase 2 ESA (PB, May 2014a), and the review of a Preliminary RAP

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(PB, May 2014b). These works by Parsons Brinckerhoff built upon the earlier investigation works by Earth Tech (Earth Tech, May 2006) and the earlier PB documents.

Works completed for the Phase 2 ESA (PB, May 2014a) included the advancement of 22 boreholes, 40 test pits, 10 hand auger locations, the sampling of seven sediments and eight surface waters, installation of 21 groundwater monitoring wells and groundwater monitoring and sampling of new and selected existing wells. Representative soil, groundwater, surface water and sediment samples were collected and tested for an extensive suite of contaminants of interest. However, it is inferred (though unable to be confirmed due to the lack of source documents) that the data primarily discussed in the 2014 reports by PB is the same as the earlier dataset collected by the consultant for the 2011/2012 reports. The summary of the earlier ESA and its findings are provided in **Section 6.1.3**.

6.2.2 Remediation Planning

The auditor presented (AECOM [Frank Mohen Site Auditor], July 2014) remedial planning works as developed by the consultant (PB) and included remediation criteria, a preferred remedial strategy, remedial works methodology, and a validation approach.

The remedial strategy as presented in the consultant's Preliminary RAP was summarised as:

- Removal of all UXO/EOW and items of military origin and ongoing management of the risks under a UXO management plan.
- A tank inventory survey to confirm the exact locations of USTs and decommissioning and removal of all UPSS infrastructure.
- Excavation and disposal off the site of fill materials known to be impacted by contamination based on previous investigation data, such as stockpiles with ACM and surficial soils impacted by contamination 'hotspots' (elevated TRH and lead) with the aim of immediately removing impacted known material within these areas.
- Additional investigations to address the data gaps and augment the existing data relating to:
    - PASS (particularly in low-lying areas identified to have a high probability of ASS and where dewatering is likely to be required to facilitate Moorebank IMT construction)
    - Surface water quality and sediment (to gather data to inform management of dewatering/discharges etc.)
    - Groundwater beneath the north-western area of the proposed Moorebank IMT site (adjacent to ABB) to inform if any additional control, management, or remediation measures for groundwater in this area.
- Continued site risk management and assessment of remediation options to maximise reuse of resources and minimise importation of materials.

The consultant concluded that based on the available data and implementation of the Preliminary RAP the site could be made suitable for the proposed commercial/industrial land use.

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6.2.3 Conclusions by Site Auditor (2014)

The auditor (AECOM [Frank Mohen Site Auditor], July 2014) concluded his report by stating he generally concurred with the conclusions and recommendations presented by the consultant, PB but noted that additional works were required to address data gaps and augment the existing data for the site.

He further noted that an EMP would be required for any residual contamination remaining on the site as documented in the Preliminary RAP.

6.3 Site Auditor Discussion of Prior Site Audits

The Site Auditor has not re-evaluated the site assessment and remedial planning works undertaken in 2014 and earlier, which were the subject of the previous audits (2012 and 2014) (AECOM [Frank Mohen Site Auditor], May 2012) (AECOM [Frank Mohen Site Auditor], July 2014), except in the context of whether the former works are considered sufficient with regard to current guidance. However, the findings of the prior audits have been reviewed and the conclusions and outcome of the audits are considered appropriate for the site status and guidance available in 2014.

With regards the PFAS investigation works that were undertaken during the PB works and reviewed by Frank Mohen for his audits – the works are considered insufficient in relation to current guidelines. The PFAS analytical suite utilised at the time was limited and guidance regarding PFAS investigation and investigation levels changed substantially in years since 2014. Further work to evaluate PFAS at the site is discussed holistically in **Section 10**.

Further assessment works and development of an alternative remedial approach were subsequently developed by Golder Associates. These works are discussed in **Section 7** and supersede the prior audits and works by PB.

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7 Remediation Planning (2017 to 2020)

This section provides a summary of the remediation and validation works that were conducted across the whole of the MPW site following the conclusion of the prior Site Audits (see **Section 6**) and prior to the commencement of the Stage 1 works (see **Section 8**).

This section **summarises** the remediation and validation works, for the whole of the MPW site – of which the Site Audit Area is one part. See figures in **Appendix B** for context.

Please review Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020) for a more comprehensive discussion of these works. Within this Site Audit report specific criteria, data summary tables, and figures depicting the remediation and validation works are included (attached) and discussed in greater detail.

The remedial works presented in **Section 8** and **Section 9** detail the implemented remediation and validation works across the MPW site during the Stage 1 Early Works and Stage 2 works respectively.

The composite of all investigation and risk assessment works concerning PFAS are presented in **Section 10**.

Selected remediation and site management works that remain ongoing across the MPW site during Stage 2, and specifically within the Site Audit Area site, are discussed in **Section 11**.

The works that were conducted following the conclusion of the prior Site Audits (see **Section 6**) and prior to the commencement of the Stage 1 works (see **Section 8**) predominantly consisted of remediation planning works and some further site assessment. These works were completed by Golder and superseded the prior remedial planning works completed by PB as discussed in **Section 6**.

Due to the sequencing of the reporting conducted, the concurrent development of the development instruments (see **Section 1.6**), and the additional investigation work that was conducted to feed into the remedial planning works, the remedial planning comprised several documents. These included:

- The RAP (Golder, Aug 2016b) (see **Section 7.1**).
- The Site Validation Plan (Golder, Aug 2015a) (see **Section 7.2**).
- Site-wide Asbestos in Soils Management Plan (AMP) (see **Section 7.3**) (Golder, Aug 2016c).
- Site-wide EOW and UXO Management Plan (see **Section 7.4**).
- Technical Specification – Demolition and Site Remediation, Early Works (see **Section 7.5**) (Golder, Aug 2016d).
- Earthworks Specification (see **Section 7.6**) (Golder, July 2016).

Additional investigative works also were progressed on a similar timeframe to the RAP to assist in further defining the required remedial works. Significant further assessment works are discussed in **Section 7.7, 7.8,** and **7.9**.

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7.1 Remediation Action Plan

Golder Associates (Golder) prepared a RAP for the Tactical Group for the Moorebank Intermodal Terminal Project.

> Golder Associates Pty Ltd (Golder). *Remediation Action Plan - Land Preparation Works Stage 1 and Stage 2, Moorebank Intermodal Terminal Company Property West*. (Report Ref.: 1651776-005-R-Rev0.) 9 August 2016. (Golder, Aug 2016b)

The RAP (Golder, Aug 2016b) stated the objectives of the remediation works was to remediate and/or manage contamination risks at the site such that it would be made suitable for the proposed commercial/industrial or conservation/open space land use.

7.1.1 Key Contamination Issues

Based on the review of site history and the further assessment works conducted by Golder, the consultant (Golder, Aug 2016b) summarised the key contamination issues for the site as described in the following.

- **Buildings** - A limited number of the samples were taken beneath the site buildings or associated underground services, and it is considered that the identified contamination may be an underestimate. Pits, pipes, and soil associated with buildings used for higher risk activities (i.e., workshops, hazardous goods stores etc.) is potentially contaminated and additional soil investigation or remediation / management with associated validation is warranted following demolition.
- **Underground Services** - Limited information is available on underground services including drains, historic water pipes and electrical cables which have potential to be constructed with hazardous materials or were used to convey contaminated substances. Services may comprise asbestos, asbestos conduit or include contaminated substances or hazardous materials (i.e., PCB cable fluid, or hydrocarbon impacted water). Therefore, additional soil investigation is warranted and proposed following demolition of the infrastructure.
- **Anthropogenic fill materials** - The proposed land use is predominantly commercial and industrial, and the validation of the site involves soil sampling and the assessment of the chemical concentrations against guidelines appropriate for the intended use of the site. However, buried waste materials have been identified (referred to as anthropogenic fill materials, and are identifiable through the presence of waste materials, odour, and discolouration), and these materials may be physically/structurally unsuitable to remain in their current location (i.e., geotechnically unsuitable), although they may represent a low, acceptable contamination risk. This may result in a large volume of materials requiring on-site management and possible geotechnical rectification. Nevertheless, due to the heterogeneous nature of the waste materials, additional contaminated materials may be identified during the management and geotechnical rectification process.
- **Asbestos in or on Soil** – Asbestos has been identified in the soil on the site, however, its' distribution does not appear to be related to particular areas, or particular activities on the site. The asbestos identified is predominately ACM and was detected in the

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shallow soils. Management of potential asbestos finds needs to address worker health and safety and provide practical materials handling protocols. The potential for encountering previously identified asbestos in wastes and soil will be managed through the AMP (see **Section 7.3**). Remediation of asbestos in soils was excluded from the RAP.

- **Per- and poly-fluoroalkyl substances (PFAS)** – PFAS have been identified in the groundwater. The consultant noted that there is growing public and regulator awareness of the issues associated with PFAS at the time of the RAP development and that the regulatory approach to PFAS remained in development. The impacts may require future management and further assessment and it was recommended that PFAS issues were addressed separately to the RAP. Refer to **Section 10** for further discussion of PFAS.
- **VOCs - Trichloroethylene (TCE)** and cis-1,2-dichloroethene (cis-DCE) were identified in soil and groundwater in the north-western portion of the site. Refer to **Section 7.9** for discussion of the further assessment of this area.
- **Light Non-Aqueous Phase Liquids (LNAPL)** – The investigations have determined that LNAPL is present beneath Moorebank Avenue and the eastern portion of the site. Refer to **Section 7.10** for discussion of the assessment and remediation works completed in this area.

7.1.2 Remediation Options

In consideration of the key contamination areas, the RAP identified the remediation areas at the site as including fuel infrastructure, hotspots (of identified contamination), and asbestos in soils.

Following an assessment of the remediation options, the remedial approach can be summarised as following:

- excavation and on-site treatment – preferred option for hydrocarbon impacted soils
- excavation and off-site treatment – preferred option for soils impacted with heavy metals
- the asbestos approach was detailed in the AMP (see **Section 7.3**)

In addition, data gaps were identified as areas beneath buildings where validation was required after demolition and the assessment of underground utilities following removal or demolition.

7.1.3 Remediation and Validation Works

The RAP (Golder, Aug 2016b) detailed the strategy for the remediation of key contamination issues identified.

The key areas of anthropogenic fill, hotspots, stockpiles, and USTs/fuel infrastructure – as known at the time of the RAP development were defined in tables and figures (see Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020) for further detail).

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7.2 Site Validation Plan

The *Site Validation Plan* (Golder, Aug 2015a) was an MPW site-wide plan that was initially developed prior to the RAP to augment the earlier works by PB (see **Section 6**).

> Golder Associates Pty Ltd (Golder). *Site Validation Plan – Principles, Moorebank Intermodal Terminal*. (Report Ref.: 147623070-022-R-Rev1.) 7 August 2015. (Golder, Aug 2015a)

However, after its development further assessment works (see **Section 7.8**) were conducted by Golder and the RAP (see **Section 7.1**) was developed, along with other associated plans. Therefore, the much of the content of the Site Validation Plan regarding the development of the contamination status and areas requiring remediation were superseded by the RAP.

The Site Validation Plan (Golder, Aug 2015a) did contain the detailed approach to the site validation to be utilised during the remediation and redevelopment works. The frequencies of sampling and required analysis for various components of the works were defined.

7.3 Asbestos in Soils Management Plan

The AMP was an MPW site-wide plan that was developed to ensure a safe working environment was established during the remediation and development earth works in relation to asbestos and ACM.

> Golder Associates Pty Ltd (Golder). *Asbestos in Soils Management Plan, Moorebank Intermodal Terminal*. (Report Ref.: 1416224-035-R-Rev1). 16 August 2016. (Golder, Aug 2016c)

The consultant noted in the RAP (Golder, Aug 2016b) that despite the AMP being a separate document to the RAP – the works detailed in the AMP were considered to be remediation tasks and therefore required to be completed and validated.

The AMP (Golder, Aug 2016c) detailed the results of further site assessment (inspections and test pits) with respect to asbestos contamination. Based on the data obtained, the consultant refined the asbestos remedial approach – as defined in the AMP.

The consultant detailed areas of the site as 'direct management areas' where ACM were considered to warrant remediation or management – these generally included stockpiles that included ACM or anthropogenic buried waste areas. Other portions of the site were nominated as having a higher potential for asbestos contamination though the consultant noted that due to the site history unexpected finds of asbestos could be encountered during works across the site and as such an unexpected find procedure was developed.

The AMP detailed the approach to asbestos related remediation, treatment works – including emu-picking, tilling, and excavation and screening, and validation of asbestos areas.

The AMP included consultation requirements, roles and responsibilities associated with the asbestos works, licensing requirements, health monitoring and air monitoring requirements. The AMP also includes protocols for unexpected finds of asbestos during future development earth works.

7.4 UXO, EO, and EOW Management and Remediation

A site-wide management approach was adopted for the management of unexploded ordnance (UXO), Exploded Ordnance (EO) and Exploded Ordnance Waste (EOW) and risks. The *UXO Risk*

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Review and Management Plan (G-tek, July 2016) was developed to address these risks, including 'dummy' ordinance, and was utilised in conjunction with the RAP.

The UXO Management Plan (G-tek, July 2016) concluded that based on their review of the available information, no additional UXO, EO, or EOW site assessment surveys were required at the MPW site prior to earthworks. However, the consultant developed protocols for unexpected finds of UXO, EO, or EOW if encountered during the remediation and development earthworks and to ensure a safe working environment is established.

7.5 Technical Specification – Demolition and Site Remediation

The *Technical Specification – Demolition and Site Remediation Early Works* (Golder, Aug 2016d) was an MPW site-wide plan that was developed to form the design documents for the land preparation works and form a part of the contract for the remediation contractor. The document was issued concurrently with the RAP (Golder, Aug 2016b) and provided additional detail on the requirements of the remedial works.

> Golder Associates Pty Ltd (Golder). *Technical Specification – Demolition and Site Remediation, Early Works, Moorebank Intermodal Terminal.* (Report Ref.: 1651776-003-R-Rev1). 16 August 2016. (Golder, Aug 2016d)

Specifically, the *Technical Specification* (Golder, Aug 2016d) document included the detail for the:

- demolition of existing buildings and structures
- service utility termination and diversions/relocations
- removal of existing hardstand / roads/ pavements associated with existing buildings
- remediation of contaminated land and hotspots, including areas known to contain asbestos, and removal of:
  - underground storage tanks (USTs)
  - UXO and EOW, if found
  - asbestos contaminated buildings.

The summary of key contamination issues mirrored the issues identified in the RAP.

7.6 Earthworks Specification

The *Earthworks Specification* (Golder, July 2016) was an MPW site-wide plan that was developed by Golder to define the geotechnical requirements of any earthworks on the site.

> Golder Associates Pty Ltd (Golder). *Earthworks Specification – MIC Stage 2, Moorebank Intermodal Terminal*. (Report Ref.: 1416224-034-R-Rev0.) 25 July 2016. (Golder, July 2016)

The consultant (Golder, July 2016) explained that an imported fill platform ('the earthworks platform') was required at the site to be established to facilitate the proposed commercial / industrial development of the MPW site. The *Earthworks Specification* contained the geotechnical requirements for the works at the site to appropriately establish this earthworks platform for as the base for development works.

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The specification included the requirements for general fill (that could be utilised below structural fill), and structural fill, and detailed 'geotechnically unsuitable material' that primarily included anthropogenic fill or silt and topsoil of high organic content. The plan detailed that the intention with geotechnically unsuitable material was to process the material until it met the requirements of general fill.

The plan included requirements for the backfilling of remediation areas (as detailed in the RAP, see **Section 7.1**) to ensure that the works were conducted in a manner to meet the geotechnical requirements of the site.

7.7 Further Assessment

Further assessment works for geotechnical and geochemical purposes were conducted by Golder at the Moorebank Precinct (MPW and MPE) in late 2014 as detailed in the *Post Phase 2 Environmental Site Assessment* report.

> Golder Associates Pty Ltd (Golder). *Post Phase 2 Environmental Site Assessment, Moorebank Intermodal Terminal*. (Report Ref.: 147623070-019-R-Rev0.) 21 July 2015. (Golder, July 2015)

The investigation works enabled further assessment of the following issues:

- acid sulfate soils
- the TCE / VOCs impacted area in the northwest corner of MPW (see **Section 7.8**)
- investigation of potential anthropogenic fill materials areas
- audit of potential and current USTs locations through review of existing information, site inspection, and ground penetrating radar survey, followed by the completion of six test pits and one hand auger
- assessment of general fill materials across the site
- assessment of anthropogenic fill materials at select locations through review of existing information, site inspection, and intrusive investigations
- assessment of 'hot spots' including sampling
- investigation of potential OCPs beneath buildings through a review of existing information, site inspection and concrete coring and collection of sub-slab soil samples at four locations
- investigation of potential PCBs in sub-stations through a review of existing information and site inspection
- assessment of potential underground services either containing or made of hazardous materials
- assessment of the volume of sediment in drainage lines and dams
- groundwater monitoring of selected groundwater wells

The objective of the further assessment works was to fill key data gaps with additional information that would be utilised to guide the development of the RAP (see **Section 7.1**) and associated plans (see **Section 7.2** to **7.6**).

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The results of the Post Phase 2 ESA (Golder, July 2015) are not substantially detailed herein as they are wrapped into further information as provided in other sections.

The consultant identified that for each issue addressed during the Post Phase 2 ESA, a remedial or management approach, as appropriate would be incorporated into the RAP and other planning documents (see **Section 7.1** to **7.6**). See **Section 7.9** for discussion of the TCE/VOCs impacted area.

The consultant also concluded that further assessment of PFAS chemicals was required to manage outstanding data gaps with respect to this constituent (see **Section 10**).

7.8 TCE / VOCs Impacted Area

The RAP (Golder, Aug 2016b) had identified that potential groundwater impacts due to solvent contamination, predominantly of the form trichloroethene (TCE), were present in the north-west portion of the site. Assessment and risk evaluation works were conducted by Golder between 2015 and 2016 to further assess the TCE area as presented predominantly in the following reports:

> Golder Associates Pty Ltd (Golder). *Post Phase 2 Environmental Site Assessment, Moorebank Intermodal Terminal*. (Report Ref.: 147623070-019-R-Rev0.) 21 July 2015. (Golder, July 2015)
>
> Golder Associates Pty Ltd (Golder). *On Site Quantitative Human Health Risk Assessment, Moorebank Intermodal Terminal*. (Report Ref.: 147623070-043-R-Rev1.) 21 October 2015. (Golder, Oct 2015a)
>
> Golder Associates Pty Ltd (Golder). *Technical Memorandum: Results from Additional Soil and Soil Vapour Investigation of TCE Contamination.* (Report Ref.: 147623070-078-M-Rev0). 5 June 2018. (Golder, June 2018) (It is noted this report contained data from sampling in 2015 utilised in the risk assessment).

The TCE area is defined as Area of Environmental Concern (AEC) -1 in the Site Audit Area LTEMP discussed in **Section 11.3** and is depicted on the consultant's Figure 3 included in the LTEMP. The LTEMP is attached in full to this Site Audit Report in **Appendix D**.

7.8.1 TCE Assessment Results

The site assessment works within the TCE area included groundwater sampling at 12 locations, soil sampling, and installation and sampling at two soil vapour well locations. The results obtained showed that TCE was present in groundwater at concentrations above the adopted criteria. The soil vapour sampling showed that TCE was present in both wells at concentrations ranging between 44 mg/m^3 and 280 mg/m^3 with less significant detections of tetrachloroethene (PCE) and cis-1,2-DCE.

The consultant noted these elevated levels of TCE were consistent with a source present within the unsaturated zone.

7.8.2 Risk Assessment

The consultant (Golder, Oct 2015a) undertook a quantitative risk evaluation to further evaluate the data collected from within the TCE area in the northwest portion of the MPW site. The risk assessment was intended to evaluate whether the chlorinated solvent impacted groundwater in the north-western portion required additional control, management, or remediation during the future redevelopment of the site.

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The consultant (Golder, Oct 2015a) concluded the following based on the results of the risk calculations:

- **Commercial workers** – the calculated risks were below the acceptable risk criteria for the scenarios evaluated and it was concluded that risks are low and acceptable.
- **Intrusive trench workers** – the calculated risks were below the acceptable risk criteria for the scenarios evaluated and it was concluded that risks are low and acceptable.

Based on the results of the risk assessment the consultant concluded that further site investigation and remediation works were not considered warranted within the TCE plume.

The TCE area (AEC-1) will be managed at the MPW site long-term in accordance with the MPW site-wide LTEMP as discussed in **Section 11.1**.

7.9 LNAPL Plume – Former DNSDC Refuelling Area

The former DNSDC was located on the south-western portion of the MPE site – and directly east of the eastern boundary of MPW. It is located south and west of the Site Audit Area site. A refuelling area was formerly located within this area, and it has been the subject of significant investigation and remediation works over the past five years.

The DNSDC Refuelling Area is outside the boundaries of MPW. However, contamination from the area has migrated off-site and extends under Moorebank Avenue and within a portion of MPW. Therefore, this section summarises the prior works at the former refuelling area and the residual contamination with respect to MPW.

The Site Auditor has previously completed a Site Audit for the MPE IMEX terminal property (Enviroview [James Davis Site Auditor], Aug 2019a) that now occupies the former DNSDC Refuelling Area. This summary is taken from the auditor's prior works and reports completed by consultants including:

> GHD Pty Ltd. *DNSDC Moorebank – Refuelling Area, Remedial Action Plan.* (Report Ref.: 21/24133/211259). 27 November 2015. (GHD, Nov 2015)
>
> JBS&G [Andrew Lau Site Auditor]. *Site Audit Report and Site Audit Statement: 0503-1615, Former Defence National Storage and Distribution Centre (DNSDC) – Licensed Area, Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 51732-105413 Rev0). 13 October 2016. (JBS&G [Andrew Lau Site Auditor], Oct 2016)
>
> GHD Pty Ltd (GHD). *Former DNSDC Refuelling Area, Moorebank NSW, Environmental Management Plan.* (Report Ref.: 221472_EMP_Rev2). 9 October 2018. (GHD, Oct 2018)
>
> JBS&G [Andrew Lau Site Auditor]. *Site Audit Report and Site Audit Statement: 0503-1907, Former Defence National Storage and Distribution Centre (DNSDC) – Licensed Area, Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 51732-114653 Rev0). 30 October 2018. (JBS&G [Andrew Lau Site Auditor], Oct 2018)

The LNAPL area is defined as AEC-2 in the Site Audit Area LTEMP discussed in **Section 11.3** and is depicted on the consultant's Figure 3 included in the LTEMP. The LTEMP is attached in full to this Site Audit Report in **Appendix D**.

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7.9.1 Assessment Works and Remediation Planning

Targeted site investigation within the refuelling area was completed in 2015 (JBS&G [Andrew Lau Site Auditor], Oct 2016) to delineate the extent of LNAPL identified in the groundwater, to assess the potential for off-site migration of contaminated groundwater; and to evaluate the potential remedial options appropriate for long-term management of LNAPL. The investigation comprised installation and sampling from 28 groundwater wells in the vicinity of the refuelling area.

The findings of the investigation work found:

- Hydrocarbon odours were reported at various locations. The UST tanks were identified and considered to likely be constructed using ACM.
- Soil concentrations of TRHs more than the management limit of 1000 mg/kg were observed at four locations.
- Depth to groundwater ranged from 5.5 to 7.8m bgs with groundwater flow reported in a northerly direction.
- Odour and sheen related to hydrocarbon contamination was observed in monitoring wells in the vicinity of the refuelling area.
- LNAPL was detected in 14 out of 37 monitoring wells investigated by GHD in 2015 with thicknesses ranging from less than 5mm to over 3m.
- Groundwater concentrations of contaminants including BTEXN were observed in exceedance of criteria at numerous locations.
- Fingerprint analysis of the LNAPL sampled revealed that at most locations at the site the product was predominantly diesel, however, the sample from one location was a mixture of weathered gasoline (petrol) and diesel products.

7.9.2 Remediation Works and Risk Assessment

Remediation planning works were conducted followed by three stages of remediation. These included:

- Phase A: Source Removal (tank and soils) –removal of USTs and fuel infrastructure (primary sources) and removal of impacted soils around the tank's pits (secondary sources)
- Phase B: Risk Assessment
- Phase C: Source Removal (groundwater) - Further removal of mobile LNAPL in the form of multiphase vapour extraction

Following the completion of the Phase A remediation works the auditor had concluded that potential contamination sources (all fuel infrastructure and any contaminated fill and soils that exceeded the site validation criteria) were removed from the site and disposed of at licensed facilities – with over 5,000 tonnes of wastes (all categories) generated during the works.

The Phase B remediation works had involved the development of a Human Health and Ecological Risk Assessment (HHERA) to assess the potential risks associated with the residual

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LNAPL and dissolved phase contamination for future commercial/industrial users at the site and neighbouring properties, and to off-site ecological receptors, prior to the further remediation works at the site (LNAPL mass reduction). Soil vapour sampling was conducted at six locations (depths between 1.5m and 3m bgl) to provide data for the risk assessment. Measured soil vapour concentrations were reported to be generally below the NEPM HSLs for commercial/industrial land use based on a sandy soil type except for benzene (86 mg/m^3) at one deep well (SV02B).

As summarised by the auditor (JBS&G [Andrew Lau Site Auditor], Oct 2018) the GHD HHERA reported the following conclusions of the human health and ecological risk evaluation.

- Based on the theoretical exposures from LNAPL (calculated) risks for commercial or industrial workers at the (MPE/IMEX) site exceeded acceptable levels with benzene being the primary contributor, risks for intrusive maintenance workers were considered to be low and acceptable.
- Based on evaluation of the measured soil vapour data the consultant concluded the concentrations were:
    - Within acceptable levels for commercial/industrial workers in a building based on slab-on-ground construction design.
    - Exceeded acceptable levels for commercial/industrial workers in a building based within a single level basement. The margin of exceedance was more than an order of magnitude indicating that there is potentially an unacceptable risk to any worker in an office or workshop with a basement carpark, and potentially to regular carpark users.
- Vapour mitigation control such as a vapour barrier is required for any building design which incorporates a basement, including a carpark.
- Groundwater fate and transport modelling was undertaken to assess the potential risks to ecological receptors, including users of groundwater extraction wells downgradient of the site and recreational users in surrounding surface water bodies, from contaminants of potential concern migrating in groundwater from the on-site source area. The results indicated that concentrations of all contaminants of potential concern had attenuated and were below the adopted screening criteria for the closest receptor to the site, Georges River. No ecological risks were positively identified in relation to the residual LNAPL source present beneath the site.

The Phase C remediation works involved eleven monthly MPVE events targeting wells where LNAPL had been identified with the extraction of vapour, liquid (LNAPL), and aqueous (groundwater) phases from the subsurface under vacuum. Each of the MPVE events lasted a duration of between 3 and 5 days and took place utilising numerous extraction wells.

The consultant reported that prior to the Phase C remediation works LNAPL had been observed at a measurable thickness of up to 4.53 m in twenty-five monitoring wells and following the works the LNAPL thicknesses were reported to reduce significantly. The consultant estimated that pre- and post-MPVE volumes were estimated at 3,000L and 800L respectively (LNAPL volume).

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Post-remediation groundwater and soil vapour monitoring was conducted and generally indicated a stable or decreasing trend in concentrations measured.

7.9.3 Environmental Management Plan

An Environmental Management Plan (EMP) (GHD, Oct 2018) was developed for the site to manage the residual contamination and ensure that no unacceptable risks were posed to identified receptors.

The EMP specifies that a minimum of 10 monitoring wells downgradient and upgradient of the site, to an approximate depth of 15m, should be installed as part of the environmental management strategy.

The EMP explains that the HHERA concluded there was a theoretical risk to users on-site based on the future commercial/industrial land use scenario from the inhalation of soil vapours associated with LNAPL if a one-storey basement was to be constructed. No risks were identified for the inhalation pathway with no basement. The EMP explains that no basements are proposed as part of the current development.

The EMP further defined management procedures, inspections, and responsibilities.

The auditor (JBS&G [Andrew Lau Site Auditor], Oct 2018) concluded the remediation and risk assessment works conducted, and EMP developed, for the former refuelling area had been appropriately implemented, had reduced the source area of contamination, and were appropriate for the long-term management and minimisation of risks relating to residual contamination.

Further works to address the LNAPL area within the MPW site were not proposed in the RAP (Golder, Aug 2016b).

The LNAPL area (AEC-2) will be managed at the MPW site long-term in accordance with the LTEMP as discussed in **Section 11.1**.

7.10 Site Auditor Discussion of Remediation Planning Works

The RAP was reviewed by the Site Auditor during the prior Site Audits conducted (see **Section 1.10**). Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020) provides a more comprehensive discussion of the Site Audit review of these works.

The consultant's remedial strategy was based on excavation and on-site treatment, or excavation and off-site disposal of wastes was considered appropriate in consideration of the identified contaminants of potential concern/AECs.

PFAS contamination at the site was not addressed in the RAP as further assessment works for this contaminant were ongoing. Residual PFAS contamination at the site will be managed as discussed in **Sections 10** and **11**. The MPW site-wide LTEMP (EP Risk, Sept 2020) discusses the remedial planning approach for PFAS at the site.

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8 Stage 1 Remediation and Validation

Remediation and validation work implemented during the Stage 1 Early Works at the MPW site are discussed in this section. The works were defined Stage 1 Early Works development consent – SSD 5066 (NSW DPE, June 2016) – see **Section 1.6**.

In general, the Stage 1 Early Works involved site demolition, remediation of areas outside of the Endangered Ecological Communities (EECs), further assessment in areas where further access was available after site demolition, and removal, remediation, and validation of underground infrastructure and services.

This section **summarises** the remediation and validation works implemented during the Stage 1 Early Works – for the whole of the MPW site – of which the Site Site Audit area is one part. See figures in **Appendix B** for context.

Please review Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020) for a more comprehensive discussion of these works. Within this Site Audit report specific criteria, data summary tables, and figures depicting the remediation and validation works are included (attached) and discussed in greater detail.

Redevelopment works at the MPW site during the Stage 1 Early Works and this Site Audit have included:

- site demolition works including demolition of buildings, infrastructure, and hardstand (see **Section 8.1** and **8.2**)
- site remediation works and subsequent validation within accessible portions of the site (not including vegetated/EEC areas) (see **Section 8.1** and **8.2**)
- importation of limited quantity of clean fill and placement within remedial excavations (see **Section 8.1**)
- ongoing site investigation and sampling in areas of the site requiring further assessment in relation to unexpected finds or other environmental issues (see **Section 7** and **8**). Further assessment works related to PFAS contaminants are discussed in **Section 10**
- site-wide groundwater assessment (see **Section 8.3**)

Selected remediation and site management works that remain ongoing across the MPW site during Stage 2, and specifically within the Site Audit Area site, are discussed in **Section 11**.

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8.1 Remediation Validation Works – Stage 1

The Remediation Validation Report for the MPW site (JBS&G, July 2020a) detailed the works completed to address the contamination identified in the RAP (Golder, Aug 2016b) (see **Section 7.1**).

> JBS&G Australia Pty Ltd (JBS&G). *Remediation Validation Report, Land Preparation Work – Demolition and Remediation, Moorebank Intermodal Company Property West, Moorebank, NSW*. (Report ref.: 51997-120265 Rev1). 22 July 2020. (JBS&G, July 2020a)

The Remediation Validation Report included the significant appendix *Site Wide Groundwater Assessment Report* that is discussed in **Section 8.3**.

> JBS&G Australia Pty Ltd (JBS&G). *Site Wide Groundwater Assessment Report, Land Preparation Work – Demolition and Remediation, Moorebank Intermodal Company Property West, Moorebank, NSW*. (Report ref.: 51997-120679 Rev1). 22 July 2020. (JBS&G, July 2020b)

Remediation works at the site during the Stage 1 Early Works were constrained by areas mapped as EECs that were unable to be disturbed under the Stage 1 development approval (NSW DPE, June 2016). The EEC areas were fenced/barricaded to prevent access and were not included in the works reported by the consultant in the Remediation Validation Report. These areas were addressed during Stage 2 works in accordance with the site Contamination Management Plan (EP Risk, July 2020) (see **Section 9**).

8.1.1 Scope of Works

The scope of works (JBS&G, July 2020a) of the remediation and validation works to address contamination at the site during the Stage 1 works included:

- assessment of contamination below buildings
- removal of fuel infrastructure identified on the site, including USTs, and fuel lines
- removal of high-risk in-ground services lines and the assessment as required for the removal of unexpected finds (principally ACM pipes and pits)
- removal of anthropogenic fill sites (predominately impacted by asbestos, as well as isolated hydrocarbon contamination impacts)
- the removal of asbestos in soils identified during site investigations, including in stockpiles
- characterisation of excavated materials from remediation areas and preparation of waste classification reports for off-site disposal. Review of off-site waste disposal dockets for all material disposed to landfill
- assessment of PFAS in site soils and groundwater to support the remediation of the site in accordance with the RAP
- removal of unexploded ordnance UXO waste and EOW encountered during remedial work

The approach to remediation and validation works were clearly detailed in the planning documents, with works guided by the RAP (**Section 7.1**) and associated plans (**Section 7.2** to **7.7**).

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The consultant (JBS&G, July 2020a) presented a discussion of guidelines to be considered for the purposes of assessing the results of analytical testing of soils at the site. The criteria adopted were initially presented in the RAP and updated as pertinent based on new guidance.

8.1.2 Contamination Below Buildings

Assessment of materials beneath former buildings in which there was a potential for contamination by PCBs or OCPs based on the site history (storage or use of these materials) was planned during the remedial works. These areas were previously inaccessible prior to site demolition.

Following the demolition of buildings and ground slabs, the consultant (JBS&G, July 2020a) reported that investigation works were completed at all buildings designated as requiring additional assessment for PCBs and OCPs.

The consultant reported that the laboratory analytical results for both PCBs and OCPs were below the site assessment criteria at all locations sampled.

Based on the investigations conducted the consultant concluded that the footprints of the former buildings were considered suitable for continued commercial/industrial land use.

8.1.3 Fuel Infrastructure and Hydrocarbon Impacts

Fuel Infrastructure

Fuel infrastructure on-site as including USTs for fuel and waste oils, fuel lines, bowsers, and other petroleum related infrastructure was planned for removal during the remediation works. The associated soil contamination was remediated.

In addition to the fuel infrastructure identified in the RAP, the consultant (JBS&G, July 2020a) identified during the site demolition works an additional four USTs.

For fuel infrastructure, the remediation and validation works were conducted as follows based on the RAP methodology:

- Emptying of USTs, pipe work and above ground infrastructure (if required), and off-site disposal for recycling to an appropriately licensed facility.
- Excavation of soils to facilitate the removal of the underground fuel infrastructure.
- Excavation of any identified contamination in soils.
- Excavated soils transported to a contamination assessment and treatment area (CATA), where soils were stockpiled to enable classification.
- Treatment via bioremediation or emu-picking (if required).
- Validation of treated soils.
- Validation of groundwater.

The consultant reported the results of the remediation and validation works. Following the completion of works conducted, the areas requiring soil remediation were satisfactorily addressed and any soils requiring treatment were landfarmed and subsequently validated. Soils were validated in accordance with the RAP at each location following removal of

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infrastructure – unless there was a complete absence of visual and olfactory contamination in which case it was not required.

Groundwater assessment of areas related to the fuel infrastructure was completed as part of the site-wide groundwater assessment as discussed in **Section 8.3**.

Hydrocarbon Impacts

During site demolition and remedial works across the site, in addition to hydrocarbon contamination associated with RAP-identified locations and the fuel infrastructure, impacts were also observed by the consultant (JBS&G, July 2020a) at further locations on-site.

The consultant reported that where evidence of hydrocarbon impact was encountered these impacts were assessed and further excavation was conducted to chase-out the extent of the identified material if required. The material was subsequently managed and validated in accordance with the requirements of the RAP.

Groundwater assessments focused on the areas of impact to 'close-out' potential data gaps as required and as agreed with the Site Auditor.

8.1.4 Underground Services

The underground services identified in the RAP located across the MPW site had the potential to comprise asbestos, asbestos conduit or include contaminated substances or hazardous materials (i.e., PCB cable fluid, or hydrocarbon impacted water).

Redevelopment works conducted across the site included the removal of underground services. 'High-risk' services were identified as:

- relating to effluents including areas/wastes such as wash down, waste oil, dangerous good storage drains, triple interceptor traps, grease traps, etc.
- stormwater drains/lines from heavy vehicle parking areas and open dangerous goods storage areas
- utilities constructed of ACM and other identified hazardous materials

Utilities that did not fit into one of the above three categories were considered 'low risk' services and were planned to remain in-ground (no requirement to remove) unless other works necessitated their removal, or they were found to be a potential transport mechanism/conduit for contamination.

The consultant further developed an approach to the remediation of high-risk utilities as detailed in *Assessment of High Risk Services L277* (JBS&G, Nov 2017a). This approach can be summarised as follows:

- The narrowest trench practical was excavated to remove the utility.
- Soils from the surface to the utility were separately stockpiled to the side of the trench for reuse.
- Any liquids encountered were pumped off and classified and disposed in accordance with established waste management protocols. Should contamination be identified,

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remediation and validation were conducted consistent with the RAP procedures for hot spots.

- Pipes with ACM were removed and disposed in accordance with the required procedures. The excavation started from where the ACM pipe was positively identified and continued along the pipe direction with any branches similarly identified and excavated.
- Materials that were in PFOS/PFOA areas were subject to further assessment (see **Section 10**).
- If the trench spoil did not contain evidence of contamination following inspection, then it was reused as backfill for the trench or as engineering fill without further classification.
- Removal of utilities was conducted through use of detailed GIS mapping with the location of each pipe recorded and surveyed.

Remediation of the high-risk services was conducted during the site demolition works and reported by the consultant in an attachment to the Remediation Validation Report.

The consultant (JBS&G, July 2020a) reported that soils were not disturbed within Area 20 – the FFTA and an area of PFAS contamination – all utilities remain in situ below ground. If soil disturbance works occur in the area in the future, this will be undertaken per the guidance of the Assessment of High Risk Services (JBS&G, Nov 2017a) and the LTEMP (EP Risk, Sept 2020) (see **Section 11.1**).

The consultant concluded (JBS&G, July 2020a) that based on the reported results, the soils beneath removed high-risk services were successfully remediated in accordance with the RAP and were considered suitable for continued commercial/industrial land use.

8.1.5 Anthropogenic Fill

The RAP (Golder, Aug 2016b) identified areas of anthropogenic fill across the MPW which were predominantly considered to pose a low, acceptable contamination risk. However, the buried waste materials (anthropogenic fill) within the site developable area were considered likely to be physically or structurally unsuitable on a geotechnical basis. Therefore, to rectify the geotechnical suitability of the site, anthropogenic fill materials and associated contamination were considered to require remediation.

Anthropogenic fill sites were contaminated by asbestos with some locations presenting isolated hydrocarbon and heavy metals contamination. All anthropogenic fill sites were excavated, assessed, and validated. Anthropogenic fill was also identified during site works and remediated as unexpected finds. The RAP did not propose remediation of fill areas within the proposed conservation zone (biobanking area).

Remediation works to address the anthropogenic fill areas generally consisted of the following approach (JBS&G, July 2020a):

- excavation in the area of identified anthropogenic fill
- removal of anthropogenic fill and transport to CATA for characterisation

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- treatment (if required) via hand picking, and screening (if required)
- validation of excavation and treated materials
- classification of stockpiled materials
- on-site reuse of materials meeting the adopted site criteria
- off-site disposal of materials which did not meet the adopted site criteria

The remedial works conducted in these areas addressed the residual contamination present at the site, excepting in areas where the contamination extended into EEC areas and could not be removed during Stage 1 works. These areas were clearly identified and were incorporated into the CMP (EP Risk, July 2020) as discussed in **Section 9.1**.

8.1.6 Hot Spots

The RAP (Golder, Aug 2016b) identified two hot spots of contamination for remediation at the MPW site because of lead or TRH contamination.

The consultant reported (JBS&G, July 2020a) that the lead contamination associated with the Grit Blast Facility was excavated and validated.

The petroleum related contamination within the anthropogenic fill located within the Dust Bowl was not remediated during the remedial works contrary to the anticipated plan detailed in the RAP. The consultant explained that the location of this hot spot was within the biobanking (conservation) area and within an area of known PFAS contamination. The consultant concluded that on the basis that the soil impacts were limited in extent and at depth, and as impacts to groundwater from petroleum hydrocarbons were not identified in 2011 or 2015, then remediation of the hotspot was not warranted.

8.1.7 Asbestos in Soils

The RAP (Golder, Aug 2016b) detailed that asbestos had been identified in the soil on the site, predominately ACM in shallow soils. With the potential for encountering previously unidentified asbestos in wastes and soil, an AMP (Golder, Aug 2016c) was developed (see **Section 7.3**). The AMP included detailed descriptions on the preferred approaches to the remediation and /or management of asbestos in soils.

Based on the previous investigation of ACM in or on soils across the site, the consultant had divided the site into three general categories:

- **Direct Management Areas** were defined as areas where the ACM warranted direct remediation or management
- **High-Risk Areas** were defined as portions of the site where it was considered there was a higher potential for asbestos contamination
- **Unexpected Finds** – of asbestos were considered a potential across the whole site during remediation works given the complex site history

Inspections of the high-risk areas were conducted and identified visual ACM fragments with analysis indicating asbestos concentrations were below the NEPM HSLs for commercial land

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use. Further areas where ACM fragments were identified during preparatory or remedial works were handled as unexpected finds.

The direct management areas were generally associated with anthropogenic fill or stockpiles of asbestos-containing waste materials. These areas were remediated/excavated in accordance with the plans and proceeded until final validation sampling met criteria.

The remaining numerous locations where asbestos was identified across the site during the remedial works are generally discussed in other sections of this report as unexpected finds, underground services, or anthropogenic fill.

8.1.8 Unexpected Finds

Unexpected finds were reported (JBS&G, July 2020a) to be encountered across the site and predominantly were associated with asbestos impacts. These unexpected finds were predominately observed during the removal of in-ground services (associated with pipes, pits, and fragments in soils), stripping of topsoils (fragments in soils) and the construction of sediment basins and associated swales (fragments in soils).

When the remediation contractor (Liberty) identified any asbestos materials during services removal or excavation works, the area was visually inspected by the consultant (JBS&G) and characterised as an unexpected find. The unexpected finds-impacted soils were excavated, and either temporarily stockpiled adjacent to the excavation or immediately removed to a CATA for characterisation. Following removal of all impacted materials the excavation was validated in accordance with the RAP. If any validation soil samples failed to meet the criteria, the area was further excavated until impacts were removed, and re-validated.

8.1.9 Volatile Organic Compounds / TCE Plume

The RAP (Golder, Aug 2016b) had identified that potential groundwater impacts due to trichloroethene (TCE) among other chlorinated VOCs was present in the north-west portion of the site. The assessment works for TCE plume area, as conducted by Golder between 2014 and 2016, are discussed in **Section 7.8**.

The TCE plume area (area of chlorinated hydrocarbon impact) is identified as AEC-1 in the site CMP and LTEMP (EP Risk, Oct 2020) (see **Section 11.1**) that are to be implemented for the throughout Stage 2 works.

The validation consultant (JBS&G, July 2020a) reviewed the previous work to investigate and assess risk in relation to the TCE plume. The consultant confirmed that redevelopment plans for the site in the vicinity of the TCE plume (AEC-1) minimise the potential for human exposures – as there are no plans for buildings or permanent structures in this portion of the site. If site development plans are modified to include intrusive works in the area, the CMP or LTEMP (as appropriate) will be updated to address the works as required.

The consultant (JBS&G, July 2020a) noted that while the construction of the OSD in the vicinity of AEC-1 may lead to intermittent mounding of groundwater in the area, the mass flux of TCE in groundwater would not be affected. The construction of the OSD was therefore not considered likely to exacerbate the potential for off-site impacts.

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The consultant therefore concluded that with respect to the TCE plume (AEC-1) in groundwater, further groundwater monitoring and/or remediation was not considered necessary to satisfy the RAP. However, as discussed in **Section 8.3**, further monitoring of this area was completed as part of the site-wide groundwater assessment.

8.1.10 LNAPL Plume

The RAP (Golder, Aug 2016b) had noted that works conducted at the former DNSDC Refuelling Area, on the adjacent MPE site, had identified that LNAPL was present beneath Moorebank Avenue and on the eastern boundary of MPW.

The assessment, remediation, and risk assessment work for the former DNSDC Refuelling Area, as conducted by GHD between 2015 and 2018, are discussed in **Section 7.9**.

The area of LNAPL impact is identified as AEC-2 as discussed in the site CMP and LTEMP (EP Risk, Oct 2020) that are to be implemented for the site throughout Stage 2 works. Management measures to protect the ongoing monitoring in the area of AEC-2 – within the boundaries of MPW – and mitigate potential risk are presented in the LTEMP. Works are primarily planned to be conducted outside of the MPW site (within the IMEX terminal) under the former DNSDC Refuelling Area EMP (GHD, Oct 2018); however, details of this work/plan are incorporated as appropriate into the MPW LTEMP.

As discussed in **Section 8.3**, further monitoring of this area was completed as part of the site-wide groundwater assessment.

8.1.11 UXO and EOW

The consultant reported that a suitably qualified UXO contractor, G-tek Australia Pty Ltd (i.e., listed on the Defence Panel of suitably qualified UXO consultants), reviewed reports and prior activities in relation to UXO, EO and EOW issues within the overall site. The *UXO Risk Review and Management Plan* (G-tek, July 2016) was developed to handle potential risk during earthworks (see **Section 7.4**).

The consultant (JBS&G, July 2020a) reported that during the Stage 1 Early Works and in alignment with the UXO Management Plan (G-tek, July 2016), the UXO contractor attended the site twice during remedial works. These occasions were each to address the finding of UXO items observed during remedial works. The UXO items observed were removed from the site by G-Tek and Defence.

No further UXO or EOW concerns were noted during the Stage 1 remedial works. The UXO Management Plan (G-tek, July 2016) will remain in place for ongoing works at the site and is an attachment to the CMP and the LTEMP (see **Section 9.1** and **11.1**).

8.1.12 Importation of Approved Fill

The consultant reported (JBS&G, July 2020a) that imported fill was required when no other suitable material existed on-site for reuse and finished surface levels were required to be above pre-remediation levels. Fill was required during the Stage 1 works to be imported to raise the level of the site and backfill new service trenches.

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Assessment of imported fill was undertaken in accordance with the requirements of the RAP (Golder, Aug 2016b). Imported materials were reported (JBS&G, July 2020a) as comprising:

- Virgin Excavated Natural Material (VENM) as defined in the *Protection of the Environment Operations Act 1997* Schedule 1.
- An engineered product derived solely from VENM (e.g., quarried material from two sources blended prior to delivery to site).
- WestConnex and Sydney Metro tunnel spoil provided under the Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the *Protection of the Environment Operations (Waste) Regulation 2014*.

Independent verification of imported fill was conducted during the redevelopment works at the site by Construction and Remediation Advisory Services (CARAS) in alignment with the RAP.

At the completion of filling works for the Stage 1 Early Works, the consultant reported that the date of 21 February 2020 was utilised as the 'completion date' with respect to fill requirements. The total amount of imported material between 10 August 2017 and 20 February 2020 was documented by CARAS as 350,294 tonnes.

8.1.13 Materials Classification and Tracking

The consultant (JBS&G, July 2020a) detailed that the remediation of the site involved the establishment of CATAs. The CATAs were bunded areas for receiving, assessing, and subsequently treating impacted soils (if required).

The consultant noted the CEMP detailed the procedures for waste tracking and records keeping procedures and was implemented during the Stage 1 works. The source and destination of all remediation material was tracked and information such as the: type of waste, date and time of disposal, disposal facility, weight/mass, transportation details, and consignment information (if applicable).

Materials classification reports, waste tracking registers, disposal records and associated documentation was included within the Validation Report (JBS&G, July 2020a).

Numerous asbestos-containing stockpiles were geotechnically unsuitable for reuse on-site and therefore were classified and disposed off-site. Emu-picking of selected stockpiles was conducted where reuse was feasible. After the CATAs were cleared of stockpiled materials, the surrounding bund walls and base of the areas were validated. Following validation of the CATA and bund material the areas were decommissioned as required.

The consultant reported (JBS&G, July 2020a) that to address the special conditions of the Environmental Protection Licence (EPL) (EPL 21054) for the Moorebank Precinct associated with on-site crushing, grinding, and separating of concrete and brick stockpiles, an assessment of PFAS in the stockpiled materials was undertaken. The consultant included the records of the assessment in their report. The assessment concluded that PFAS was not detected in concrete or brick materials at concentrations above the assessment criteria. Therefore, the materials were considered suitable for reuse on the site.

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8.1.14 Consultant's Conclusions of Stage 1 Remediation Validation Works

The consultant (JBS&G, July 2020a) discussed the results of the remediation and validation works conducted during the Stage 1 Early Works with respect to the decisions identified for evaluation during the project.

The consultant's discussion of these issues is presented in this section.

Are there any Unacceptable Risks to On-site or Off-site Receptors from any Residual Soil, Following the Remediation of Contaminated Soil?

The consultant concluded that the that based on the field data and soil validation analytical results, it was considered that impacted material identified in the RAP (Golder, Aug 2016b) had been remediated and validated. Exceptions included areas within the EECs that could not be remediated during Stage 1. The CMP (see **Section 9.1**) and LTEMP (see **Section 11.1**) were developed to address the remediation or management of those areas during Stage 2 works.

The consultant therefore considered that there were no unacceptable risks to on-site or off-site receptors from residual soils at the site for the commercial/industrial land uses, subject to implementation of the CMP and LTEMP.

Have Excavated Materials been Classified and Disposed of Off-site to a Facility Licensed to Accept the Classified Waste?

The consultant reported that all material removed and disposed off-site was appropriately characterised as per the NSW EPA (NSW EPA, 2014b) Waste Classification Guidelines. The waste classification reports, and waste disposal documentation were provided in the Remediation Validation Report.

Material was disposed off-site as special waste - asbestos mixed with GSW, with additional material removed as building and demolition waste. The consultant considered that all materials removed were disposed to landfills appropriately licensed to accept the waste.

Was Imported Material Used as Backfill Suitable for the Intended Land Use?

The consultant reported that material imported to site during remediation and validation activities was evaluated and considered suitable. The documentation of imported materials was included in the report.

Have all Remediation Works been Completed in Accordance with the Requirements of the RAP, or where Variations were Required, have these been Appropriate to meet the RAP Objectives?

The consultant reported that the remedial works including the removal of impacted soil and aesthetically unsuitable surface debris was completed in accordance with the requirements of the RAP (Golder, Aug 2016b), and the resulting excavations and excavated material were appropriately validated and characterised.

Is the Site Suitable for the Proposed Use?

The consultant reported that based on the successful remediation and validation works, they considered that subject to the implementation of the CMP and LTEMP for future works, the site was considered suitable for the proposed development.

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8.2 Environmental Protection Licence

The Moorebank Precinct (MPW and MPE) is subject to an EPL #21054) (NSW EPA, June 2018) under the *Protection of the Environment Operations Act 1997*. The licence was first issued in June 2018 and a variation was issued in April 2019 that modified select requirements.

The licence included conditions relevant to contaminated land, and excluding PFAS issues, as follows:

- Special conditions (E1 and E2) were added/updated in Modification 1 (April 2019) to include that: "
    - *Crushing, grinding or separating activities … may not commence until … confirmation has been provided from the Site Auditor that the material to be processed is suitable for processing and reuse on site (E1.3); and*
    - *Extractive activities … may not commence until … confirmation has been provided from the Site Auditor that the area to be excavated is suitable for reuse on site (E2.1).*

The remedial works conducted during the Stage 1 Early Works were substantively completed and reporting works were undergoing draft review at the timeframe when these conditions were added to the EPL.

Notwithstanding this point, the extractive activities conducted during the Stage 1 works would have been considered suitable for reuse (where applicable) in alignment with approved RAP.

An assessment of the concrete and brick stockpile was conducted and PFAS was not detected in concrete or brick materials at concentrations above the assessment criteria. Therefore, the materials were considered suitable for reuse on the site.

8.3 Site-Wide Groundwater Assessment – Stage 1

Groundwater assessment was required as part of the site validation works. These works were conducted and reported by JBS&G as part of their remedial validation works and the *Site-Wide Groundwater Assessment Report* (JBS&G, July 2020b) was an appendix to the *Remediation Validation Report* (JBS&G, July 2020a). It is detailed separately in this section for clarity.

The consultant (JBS&G, July 2020b) reported that the RAP (Golder, Aug 2016b) required groundwater assessment to be undertaken at the MPW site as part of the site validation works following the completion of the following activities:

- UST removal
- hotspot excavation
- anthropogenic fill excavations

Additionally, known groundwater impacts required further assessment in the areas as follows:

- solvent contamination (principally TCE) in north-western area of the site (also known as AEC-1 – see **Section 7.8** and **8.1.9**)

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- former DNSDC Refuelling Area (LNAPL plume area migrating onto MPW under Moorebank Avenue) (also known as AEC-2 – see **Section 7.9** and **8.1.10**)
- identified PFAS-impacted areas (principally firefighting training areas) (see **Section 10**)

The groundwater assessment was completed to verify that the groundwater at the site does not present an unacceptable risk to future site users.

The consultant (JBS&G, July 2020b) reported that the scope of the groundwater assessment works included installation of additional groundwater monitoring wells, groundwater level gauging, sampling and analysis, assessment, and reporting.

8.3.1 Fuel Infrastructure

Fuel infrastructure identified on-site was removed and any associated contaminated soil remediated during Stage 1 works and subsequently groundwater assessment conducted.

The consultant (JBS&G, July 2020b) reported that all groundwater associated with the fuel infrastructure sampling returned laboratory analytical results for TRH, BTEX, PAHs, VOCs, SVOCs, and phenols either below the laboratory LOR or below the adopted site assessment criteria. While some exceedances of metals were noted, these were not considered to be associated with the former fuel infrastructure.

PFAS data indicated that the USTs were not a potential source of PFAS contamination.

8.3.2 Anthropogenic Fill Areas

Groundwater was assessed at the anthropogenic fill areas where isolated hydrocarbon or heavy metal contamination was identified. The consultant (JBS&G, July 2020b) reported that apart from heavy metals, all results for the groundwater assessment in these areas were below the site assessment criteria.

8.3.3 Northern Dust Bowl

The Northern Dust Bowl area is located within the biobanking/conservation area of MPW. A hotspot had been identified in the area where hydrocarbon impacts were observed, and groundwater assessment was conducted. One existing well directly downgradient of this location was sampled. Except for heavy metals, all groundwater results at this location were below the site assessment criteria.

8.3.4 Unexpected Finds

Two unexpected finds encountered during the soil remediation works where hydrocarbon impacts were identified, and groundwater assessment conducted. Results of the groundwater assessment in these areas were below the site assessment criteria:

8.3.5 Volatile Organic Compounds (VOCs) – TCE-Impacted Area

Further monitoring of the TCE-impacted Area (see **Section 7.8**) was completed as part of the site-wide groundwater assessment. The consultant (JBS&G, July 2020b) presented the results of the groundwater monitoring and noted that TCE was detected above the adopted criteria at one location. TCE was also detected at two other wells sampled but at concentrations

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below the adopted criteria. The consultant noted that in comparison to prior results by Golder in 2015/2016 the concentrations of TCE detected were generally considered to be stable or decreasing. Apart from 1,2-DCE, all other VOCs were below the laboratory LOR.

The consultant recommended management controls in the area of the TCE plume. Management of the TCE plume area is discussed in **Section 11.1**.

8.3.6 LNAPL Plume and Further Risk Assessment

Further monitoring of the LNAPL Plume area (see **Section 7.9**) was completed as part of the site-wide groundwater assessment with gauging and sampling of accessible wells within the MPW site boundaries. The consultant (JBS&G, July 2020b) reported that the LNAPL thickness in the two existing wells gauged had increased since previously measured by GHD (2018) with apparent thicknesses of approximately 2m in each well. Two additional wells were installed to the north and west (JBS&G_MW12 and MW13) with no measurable LNAPL detected at either new well. The consultant concluded this indicated a limited LNAPL lateral extent.

The consultant further evaluated LNAPL data from the site in a risk assessment. The consultant concluded that for all constituents, the risk levels were below the acceptable criteria and were acceptable. The consultant (JBS&G, July 2020b) concluded that based on the HHRA completed and the implementation of the LTEMP, it is considered that LNAPL does not pose a potential health risk.

8.3.7 Formaldehyde

The consultant (JBS&G, July 2020b) noted that formaldehyde was discussed as a potential contaminant of concern for the site as it had been identified in groundwater associated with the former NBC Chemical Storage Area, which is located within the conservation area.

Monitoring wells in the vicinity of the NBC compound were analysed for formaldehyde, in addition to a selection of wells across the site. The results of the site-wide monitoring found that while formaldehyde was detected in a small number of wells, it was not detected in the vicinity of the former NBC compound. Concentrations were below the adopted site criteria.

8.3.8 Heavy Metals

The consultant (JBS&G, July 2020b) discussed that heavy metals had been previously detected at concentrations more than the adopted criteria for groundwater during prior monitoring across the site. Results were generally considered representative of background groundwater conditions, but further monitoring during the site-wide groundwater monitoring event was conducted.

The results of the site-wide monitoring found that heavy metals concentrations remained at elevated levels across the site, most significantly copper and zinc.

The consultant noted that following the significant earthworks that have occurred to date during site remediation, it is considered unlikely that a source of heavy metals contamination to groundwater remains on-site. Further, following site development, infiltration of surface water will be minimised due to the significant presence of hardstand or buildings.

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8.3.9 PFAS

The consultant (JBS&G, July 2020b) discussed the PFAS investigations conducted across the site. The PFAS works are summarised and discussed separately in **Section 10**.

8.3.10 Site-Wide Groundwater Assessment Conclusions

The consultant (JBS&G, July 2020b) summarised the conclusions of the groundwater assessment works as following:

- Contaminants of potential concern associated with fuel infrastructure, remediation areas and unexpected finds are below the site assessment criteria or are not considered to be associated with the assessment locations (e.g., heavy metals). No further assessment is required.
- The TCE-impacted area adjacent in the northwest corner of the site is considered stable. The impacts have been previously assessed as not affecting the proposed site land use due to restrictions on development in the impacted area.
- LNAPL apparent thickness has increased in monitoring wells associated with the Former DNSDC Refuelling Area, however, based on a detailed assessment of the potential health risk posed by vapour intrusion from the LNAPL impact to future buildings, the consultant considered this does not pose vapour intrusion risks to on- or off-site receptors.
- Formaldehyde is found at low levels across the site.
- Heavy metals have been reported consistently above site assessment criteria and are considered representative of background levels.

The consultant further discussed that there were no identified unacceptable groundwater risks to on-site users. PFAS is discussed separately (see **Section 10**). The consultant considered that remediation was not required for any of the identified groundwater contamination at the site, however, ongoing monitoring will be conducted in the vicinity of the LNAPL plume, and the management controls should be implemented for the TCE plume. These controls and monitoring are discussed in the MPW site-wide LTEMP (see **Section 11.1**).

Residual groundwater contamination is expected to exist on the site following development, and ongoing groundwater management will be implemented as part of the LTEMP.

8.4 Site Auditor Discussion of Stage 1 Remediation and Validation Works

The Stage 1 remediation and validation works, as reported in the Remediation Validation Report for the MPW Stage 1 Early Works (JBS&G, July 2020a), numerous IVRs produced prior to the final Validation Report, the Site-Wide Groundwater Assessment Report (JBS&G, July 2020b) and other supporting reports or memorandums, were reviewed by the Site Auditor during the course of the prior Site Audits conducted (see **Section 1.10**).

Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020) provides a comprehensive discussion of the Site Audit review of these works.

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The Remediation Validation Report for the Stage 1 works detailed the remediation works that were conducted across the MPW site to address the remediation as identified in the RAP (Golder, Aug 2016b). Remediation works in Stage 1 were limited to areas that were not located within EECs as the removal of vegetation was not permitted during the Stage 1 Early Works development approval. Site demolition works occurred during the Stage 1 works that enabled further assessment of areas, such as beneath building footprints, that were previously inaccessible.

Substantial remedial works were undertaken across the MPW site during Stage 1 – much of which occurred in part to address geotechnical requirements for the future development of the site. Remediation works at the site conducted in alignment with the RAP primarily addressed fuel infrastructure removal and hydrocarbon impacts, anthropogenic fill, asbestos in soils and within underground services undergoing removal. Numerous unexpected finds were observed during site demolition and remediation works – these predominantly related to asbestos.

Site-wide groundwater assessment to confirm the validation of remediation areas and the understanding of groundwater issues across the site was completed with sufficient coverage of the site and areas of interest. The assessment works did not substantially alter the nature and extent of groundwater contamination as previously defined and did not indicate any areas remediated within the Stage 1 works had led to additional groundwater issues.

In the Site Auditor's opinion, the process, and procedures to remediate the site during the Stage 1 works were considered robust and detailed. The consultant and contractors demonstrated that they followed the procedures, as identified in the RAP, and associated remedial planning documents (**Section 7**) and implemented these procedures thoroughly throughout the Stage 1 works and subsequent reporting.

The proposed redevelopment of the site (in the construction area) as commercial / industrial involves up to 3 metres of fill to be placed across the site to raise levels for the proposed development followed by the construction of buildings, infrastructure, or hardstand across much of the developable area. Therefore, any minor deficiencies in the remediation or validation works, though considered unlikely, would not alter the suitability of the site.

PFAS contamination at the site was not addressed in the RAP and therefore was not addressed during the Stage 1 Early Works. PFAS is discussed in **Section 10**.

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9 Stage 2 Remediation and Validation Works

Remediation and validation work implemented during the Stage 2 works at the MPW site are discussed in this section. The works permitted during Stage 2 were defined in the Stage 2 development consent SSD 7709 (NSW DPE, Nov 2019) – see **Section 1.6**.

The Stage 2 remediation activities across the MPW site were predominantly within areas where EECs or vegetation areas required removal under the Stage 2 development consent (as this was not a permitted activity during the Stage 1 Early Works).

Remediation and validation work implemented during the Stage 2 works at the MPW site are discussed in this section.

Stage 2 remediation and validation works were conducted in alignment with the MPW CMP (EP Risk, July 2020) that is discussed in **Section 9.1**. The CMP detailed contamination identified in the RAP (Golder, Aug 2016b) that could not be addressed during Stage 1 Early Works due to the presence of vegetation.

The Stage 2 remediation and validation works were reported in the Supplementary Validation Report (JBS&G, Sept 2020) with the works summarised in **Section 9.2**.

Remediation and validation work implemented within the Site Audit Area site specifically are discussed in **Section 9.3**.

Site management works to address residual contamination will be ongoing at the site during Stage 2 construction works. Management across the MPW site is discussed in **Section 11.1** (site-wide LTEMP), and the specific approach for the Site Audit Area site is discussed in **Section 11.3** (Site Audit Area LTEMP).

9.1 Contamination Management Plan

The consultant (EP Risk, July 2020) developed the CMP to address the remaining contamination on-site that extended into areas of EECs and that could not be addressed during Stage 1 Early Works.

> EP Risk. *Contamination Management Plan, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: EP1489.002_MPW_CMP.v11). 30 July 2020. (EP Risk, July 2020)

The contamination identified in the CMP generally represented areas that were previously identified in the RAP (Golder, Aug 2016b) and associated remedial planning documents, and that remained, or were further refined, following the conclusion of the (Stage 1) remediation validation works as discussed in **Section 8**.

The CMP only referred to vegetated areas (EEC areas) that require management within the construction area (developable area) of the site where vegetation removal was required for construction purposes. Other remaining contamination issues were to be managed through implementation of the MPW site-wide LTEMP (see **Section 11.1**) during the construction phase of Stage 2 works.

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9.1.1 CMP Scope and Purpose

The consultant (EP Risk, July 2020) discussed that the site is divided into two main areas – the Construction Area (Developable portion of the site) and the Offset Area (the biobanking or conservation area within the site) that is located on the west of the site next to the Georges River.

The CMP applied to areas where further remedial works, previously defined in the RAP (Golder, Aug 2016b), were required however, due to the presence of EECs could not be disturbed under the approval conditions for the Stage 1 Early Works (NSW DPE, June 2016).

These areas where further RAP-related remedial works were required were all located within the Construction Area. Some of the EEC areas within the construction area extend to the western perimeter of the site immediately adjacent to the Georges River. In these locations the EEC areas will require clearing to enable the construction of OSD basins and their associated drainage structures that extend to the river.

The CMP detailed the location and nature of the residual contamination areas identified in the RAP and Remediation Validation reports (Golder, Aug 2016b) (JBS&G, July 2020a) and the proposed remediation, management and validation measures to address these areas.

9.1.2 Proposed Development

The consultant (EP Risk, July 2020) presented the proposed development at the MPW site as consisting of an intermodal terminal, warehousing facilities, and supporting services and infrastructure on the western side of Moorebank Avenue, Moorebank, NSW.

The site Master Plan is included in **Appendix C** (updated 2 February 2021).

Overall, the site will be developed to form a part of the MLP under development by Qube Holdings. The MLP will consist of an import-export (IMEX) terminal (as under development on the MPE site) and an instate terminal (proposed for the MPW site) and supporting facilities and infrastructure across the whole site.

The proposed development at MPW includes:

- The intermodal terminal facility:
  - rail terminal (interstate terminal)
  - rail link connection to the SSFL located to the south of MPW
  - rail and truck container loading and unloading, and container storage areas
  - associated supporting areas such as truck waiting/storage areas, wash down facilities, refuelling areas, workshop, administration, and car parking
- The warehousing estate on the northern portion of the MPW site that services the intermodal terminal facility will include:
  - six warehouses with a total of 215,000 m^2 floor area with associated offices, amenities, hardstand, and parking
  - freight village (800 m^2) including staff and visitor amenities

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- internal roads, noise wall (if required), landscaping, lighting, and signage

- Moorebank Avenue Upgrade Works (MAUW) are to be completed under the works for the adjacent MPE site, however, associated intersection upgrades from Moorebank Avenue to internal roads on MPW are required.
- Construction and operation of OSD basins, bioretention / biofiltration systems, and stormwater infrastructure and drains across the site.
- Construction and temporary works or facilities across the site will include:
  - vegetation clearance, topsoil stripping, stockpiling, site earthworks, and temporary on-site detention
  - importation of general and engineering fill, stockpiling, and placement over the entire (developable) portion of the site to raise levels up to 3 m
  - associated works such as materials screening, crushing, installation of concrete batching plant, and utilities installation and connection

9.1.3 Contamination Issues

The consultant (EP Risk, July 2020) summarised the residual contamination at the site as consisting of four AECs defined as follows:

- **AEC 1 – Chlorinated hydrocarbon impacts** in the north-west portion of the site. Predominately groundwater, the contaminants of potential concern include Trichloroethene (TCE) and Cis-dichloroethene (Cis-DCE).
- **AEC 2 – Light non-aqueous phase liquid (LNAPL) area** located to the south, on the corner of Chatham and Moorebank Avenue. Predominantly groundwater, the contaminants of potential concern include LNAPL, total recoverable hydrocarbons (TRH), BTEX, naphthalene, lead, and PAHs.
- **AEC 3 – Former firefighting training areas** where aqueous film-forming foam (AFFF) was used and surrounding land. The contaminants of potential concern include PFAS.
- **AEC 4 – Underground services** associated with high-risk utilities and anthropogenic fill. The contaminants of potential concern include asbestos, anthropogenic materials, and potential unexploded ordnance (UXO). A number of these are remaining unexpected finds from the Stage 1 remediation works as discussed in the Remediation Validation Report (JBS&G, July 2020a).

The objective of the CMP was to manage vegetation clearing at the site and subsequent remediation of AEC 4 (in alignment with the scope discussed in **Section 9.1.1**).

Minimal soil disturbance was proposed during vegetation clearing, and localised soil disturbance was planned during the remediation works within AEC 4 following vegetation clearance.

Some vegetation clearance will also be required in AEC 3 to enable the construction of the OSDs, in particular Basin 6 and 8 located in the centre and southern portions of the eastern site. These works will be conducted at a later stage through implementation of the LTEMP (see **Section 11.1**).

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The management of AEC 1, AEC 2, and AEC 3 – post vegetation clearance will be managed through implementation of the LTEMP (see **Section 11.1**).

9.1.4 Management Activities

The primary works required to be conducted under the CMP were the remediation of remaining contamination, as previously defined, following vegetation clearance.

The CMP (EP Risk, July 2020) discussed how the remaining areas requiring remediation, within AEC-4, and within the vegetated areas would be handled during implementation of the CMP. Procedures, which were labelled with the nomenclature 'CMP', were developed to address the restrictions, management, and other activities.

These procedures included:

- CMP01– Land use restrictions
- CMP02 – Vegetation clearing
- CMP03 – Excavation/handling of potentially impacted services and soils
- CMP04 - Off-site disposal of excavated/unsuitable material
- CMP05 – Stockpile management
- CMP06 - Unexpected finds
- CMP07 - Importation of fill materials/aggregate
- CMP08 – Training
- CMP09 – Contractor and Subcontractor management
- CMP10 – Contingency plan
- CMP11 – Non-compliances with the CMP
- CMP12 – Record keeping
- CMP13 – Audit/review of CMP implementation
- CMP14 – CMP review
- CMP15 – Cessation of construction CMP application.

The consultant included in the CMP details of roles and responsibilities for the CMP implementation, and construction related tasks for access control, supervision, licences and notifications, site establishment, and air monitoring during the works.

In general, these procedures were to be implemented in alignment with the CEMP (SIMTA, Jan 2020) and the RAP (Golder, Aug 2016b) and their associated appendices/documents.

Procedures to monitor imported fill, stockpiles, wastes and classification, treatment, and tracking of materials were included in the CMP. These procedures were in alignment with the RAP and the remediation works implemented during Stage 1.

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9.1.5 UXO, EO, and EOW Management Plan

The consultant (EP Risk, July 2020) reported that there was a low risk for unexploded ordnance (UXO), Exploded Ordnance (EO) and EOW to be present at the site. However, prior to vegetation clearing an updated Management Plan for UXO (G-tek, Oct 2019) should be implemented and followed as part of the CMP.

Management works were identified for UXO within MPW that should be implemented during Stage 2 works. These works were detailed in a UXO RAP (G-tek, Nov 2019) for the area that was included in the consultant's CMP.

9.1.6 Unexpected Finds and Contingencies

The CMP (EP Risk, July 2020) included a procedure (CMP-06) to address Unexpected Finds if encountered during the works. The procedure was in accordance with the RAP (Golder, Aug 2016b) and CEMP (SIMTA, Jan 2020) methods for managing unexpected finds and included a set of decision rules for handling unexpected finds during site redevelopment works.

The decision rule developed was intended to provide a tool that posed reasonable questions relating to potential contamination that could be encountered at the site and whether further assessment was warranted. If the decision rule resulted in a 'yes' answer for any of the questions indicating a potential for contamination development of a management strategy for the potential contamination was required.

Similarly, the CMP included a procedure (CMP-10) to address contingencies if encountered. Contingencies were considered to include issues such as the unintended disturbance of contaminated material. Approaches to address unexpected issues/contingencies if encountered were developed and included isolation of the affect area to minimise exposure and subsequent implementation of other procedures as required to rectify the issue.

9.2 Supplementary Validation Works – Stage 2 – MPW Site-Wide Works

The *MPW Supplementary Validation Report* (JBS&G, Sept 2020) detailed the works completed to further address the contamination identified in the RAP (Golder, Aug 2016b) (see **Section 7.1**) or following the Stage 1 remediation validation works (see **Section 8.1**). These works were detailed in the CMP (see **Section 9.1**).

> JBS&G Australia Pty Ltd (JBS&G). *MPW Supplementary Validation Report, Moorebank Avenue, Moorebank, NSW*. (Report ref.: 58753/132401 Rev 0). 25 September 2020. (JBS&G, Sept 2020)

The supplementary remediation and validation works were conducted to 'close-out' the remaining areas of contamination that had been previously identified at the site and that were located within the EECs that could not be disturbed during the Stage 1 works.

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This section **summarises** the Stage 2 supplementary remediation and validation works implemented for the whole of the MPW site.

Please review Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020) for a more comprehensive discussion of these works. Within this Site Audit report specific criteria, data summary tables, and figures depicting the remediation and validation works are included (attached) and discussed in greater detail.

9.2.1 Objectives and Scope of Works

The consultant (JBS&G, Sept 2020) reported the purpose of the report was to supplement the Remediation Validation Report (JBS&G, July 2020a) (see **Section 8**) and document the management and close-out of remaining contamination within the EECs as identified in the CMP (EP Risk, July 2020).

The consultant's objective of the overall site validation works was to demonstrate the site is suitable for its intended land use under the Stage 2 development consent (NSW DPE, Nov 2019) (Condition B169 audit – see **Section 1.6**). Following the close-out of the CMP, the management of impacted materials encountered during construction works or long-term operation of the site were proposed to be addressed under the LTEMP (EP Risk, Oct 2020) (see **Section 11**).

The scope of works undertaken during the Stage 2 supplementary validation works included:

- management and close-out of remaining contamination within the EECs as identified in the CMP
- assessment and management of unexpected finds identified following completion of the Remediation Validation Report (JBS&G, July 2020a) up to 21 August 2020
- assessment of PFAS
- assessment of the suitability of vegetated areas for the intended land use
- review of documentation for wastes and imported fill materials

9.2.2 Close-Out of the CMP

The following sections detail the groupings of the type of contamination, type of unexpected finds, or an area of contamination as reported by the consultant (JBS&G, Sept 2020).

The consultant reported (JBS&G, Sept 2020) most residual contamination issues at the site were related to underground pipes comprising ACM that had been identified and/or damaged during the Stage 1 remediation works.

Areas such as Lake Sisinyak and the former NBC Bunker included areas of contamination that were initially identified for remediation in the RAP, but due to the identified contamination encroaching upon vegetation identified as EEC areas – the completion of remedial works in these areas was not performed in Stage 1 – and were instead completed during Stage 2 following vegetation removal as defined in the CMP (see **Section 9.1**).

Remediation works to address the anthropogenic fill and areas of ACM generally consisted of the following approach:

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- excavation in the area of identified anthropogenic fill or ACM
- stockpiling for characterisation
- treatment (if required) via hand picking, and screening (if required)
- validation of excavation and treated materials
- on-site reuse of materials meeting the adopted site criteria
- off-site disposal of materials which did not meet the adopted site criteria.

Each of these areas were remediated and validated during the Stage 2 works as reported in the Supplementary Validation Report.

9.2.3 Unexpected Finds

Further unexpected finds were encountered at the site during site preparatory works in Stage 2. These unexpected finds were associated with anthropogenic fill and/or the observation of asbestos.

Where contamination was confirmed, the soils were excavated and stockpiled and subsequently characterised. Following removal of impacted materials, validation of the excavation footprint was undertaken. If any validation samples failed, the failed area was further excavated until all impacts were removed, and re-validated.

Details of unexpected finds observed during Stage 2 construction activities through 21 August 2020 are reported by the consultant in the Supplementary Validation Report. Subsequent unexpected finds will be reported in later stages of the ongoing works at the site. Over thirty additional (not detailed in the CMP) unexpected finds were identified and remediated during the supplementary remediation and validation works.

9.2.4 Materials Classification and Tracking

The consultant (JBS&G, Sept 2020) discussed that for materials management purposes, the level of contamination (principally ACM) was classified into one of three categories:

- suitable for site reuse
- suitable for on-site treatment, and
- unsuitable for treatment and disposed off-site following waste classification.

However, for the Stage 2 remediation works conducted, no stockpiles were identified as suitable for on-site treatment. Therefore, no CATAs were established during the works.

As for Stage 1 works, (**Section 8**) the CEMP (SIMTA, Jan 2020) detailed the procedures for waste tracking and records keeping procedures. The source and destination of all remediation material was tracked and information such as the: type of waste, date and time of disposal, disposal facility, weight/mass, transportation details, and consignment information (if applicable).

The consultant included appendices in the Supplementary Validation Report (JBS&G, Sept 2020) that provided documentation of the stockpile assessments conducted and detailed

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records of the daily movements of waste materials at the site. Waste disposal documentation including volumes, classifications, and disposal dockets were also provided in the report.

Stockpile Management

The consultant (JBS&G, Sept 2020) discussed that stockpiles were managed in accordance with the CMP and CEMP and were placed at approved locations and managed to mitigate environmental impacts during material handling.

The consultant discussed that many stockpiles generated from unexpected finds were assessed as unsuitable for site use and not amenable to treatment, generally because of the presence of friable asbestos. These materials were disposed to landfill following appropriate classification.

Following the disposal or movement of stockpiles validation of the stockpile footprint was conducted. The consultant included validation records for the stockpile footprints within the report.

Waste Disposal

The consultant (JBS&G, Sept 2020) reported that between May and September 2020, a total of 269 loads of waste were disposed off-site because of ACM or friable asbestos materials in the soils/materials. The materials totalled nearly 9,000 tonnes.

Two loads of materials excavated from the NBC Bunker (SP31) and consisting of PAH-impacted soils were disposed off-site, following classification as hazardous waste. The materials totalled approximately 47 tonnes.

PFAS in Soils

During the Stage 2 remediation and validation works the consultant (JBS&G, Sept 2020) implemented the LTEMP (EP Risk, Sept 2020) in relation to potential PFAS-impacted soils.

In the management and close-out of unexpected finds, PFAS soils located within AEC-3 areas in particular were assessed for PFAS-constituents.

The consultant provided a stockpile summary table, that was included in the final LTEMP (EP Risk, Oct 2020). The summary table identifies stockpiles on-site and categorises the material – in relation to the LTEMP-defined PFAS-impacted soil reuse zones (see **Section 11.1.7**).

Concrete and Brick Stockpile Assessment

The consultant reported (JBS&G, Sept 2020) that to address the special conditions of the EPL 21054) for the Moorebank Precinct (see **Section 1.5.1**) associated with on-site crushing, grinding, and separating of concrete and brick stockpiles, an assessment of PFAS in the stockpiled materials was undertaken in 2018 as discussed in **Section 8.1.19**.

Additions to the stockpile since 2018 were reported in the Supplementary Validation Report and the consultant included four reports in Appendix H of the report that detailed the assessment.

The assessment results were found to be similar to the initial assessment with PFAS not detected in concrete or brick materials at concentrations above the assessment criteria. Therefore, the materials were considered suitable for reuse on the site.

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9.2.5 Importation of Approved Fill

The consultant reported (JBS&G, Sept 2020) that imported fill required to raise the site level was undertaken during Stage 2 works through September 2020. In addition to the sources of imported fill documented in the Validation Report (see **Section 8.1.12**) the consultant provided the documentation for further sources of fill that were utilised during this period.

Assessment of imported fill was undertaken in accordance with the requirements of the RAP (Golder, Aug 2016b). Imported materials were reported as comprising:

- VENM as defined in the *Protection of the Environment Operations Act 1997* Schedule 1.
- An engineered product derived solely from VENM (e.g., quarried material from two sources blended prior to delivery to site).
- WestConnex and Sydney Metro tunnel spoil provided under the Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014.

Independent verification of imported fill was conducted during the redevelopment works at the site by CARAS in alignment with the RAP.

The consultant reported the total amount of imported material between 21 February and 7 September 2020 was documented by CARAS as 1,028,094 tonnes (t).

9.2.6 Consultant's Conclusions of Remediation Validation Works

The consultant (JBS&G, Sept 2020) concluded that the scope of works for the supplementary remediation works were completed and the validation results demonstrated that the site has been remediated for commercial/industrial land use. The consultant considered that the site suitable for the intended intermodal terminal and designated Biobanking Offset Areas, subject to implementation of the LTEMP during the construction phase and long-term operation of the site, and Biobanking Offset Areas with restricted access.

9.3 Woolworths Audit Area – Validation Summary

The *MPW Woolworths Audit Area Validation Summary* (JBS&G, Feb 2021) detailed the works conducted within the Site Audit Area site – after the completion of the Stage 2 Supplementary Validation works (see **Section 9.2**).

> JBS&G Australia Pty Ltd (JBS&G). *Moorebank Precinct West (MPW): Woolworths Audit Area Validation Summary.* (Report Ref.: 51997-134422 L362_Rev-C). 19 February 2021. (JBS&G, Feb 2021) [The Woolworths Audit Area Validation Report.]

These works, and review of the above report, were a primary focus of the current Site Audit.

The consultant's (JBS&G, Feb 2021) figures depicting the Site Audit site are included in **Appendix B**.

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9.3.1 Unexpected Finds

The consultant (JBS&G, Feb 2021) discussed that within partial proposed Lot 12, an ACM pipe was removed during earthworks. The works were a continuation of unexpected find 55-5 (UF55-5), which was previously capped and made safe in-situ (JBS&G, Sept 2020). The unexpected find was re-labelled by the consultant as unknown pre-existing contamination 21 (UPEC21).

The consultant reported that the pipe continued to the north and west as observed during the earthworks. All sections of the pipe were excavated and removed. Two access pits to the south of the pipe were also found to contain asbestos – Pit A and Pit B. These pits were excavated and removed as asbestos waste.

Validation of the excavations was conducted in alignment with the LTEMP (see **Section 11.1**), and a validation summary prepared. The consultant reported the resultant excavation surfaces and area adjacent were free of visible asbestos and ACM. The consultant considered the validation requirements had been met.

No further unexpected finds were identified that were not previously documented in the Supplementary Validation Report (JBS&G, Sept 2020) (**Section 9.2**) were observed during earthworks within the Site Audit Area.

9.3.2 Importation of Fill

The consultant (JBS&G, Feb 2021) reported that the majority of fill imported to the Site Audit Area had been placed prior to submission of the Supplementary Validation Report (JBS&G, Sept 2020) (**Section 9.2**). Therefore, total quantities of imported fill were not duplicated in their reporting. No additional source sites for imported materials were documented by the consultant.

9.3.3 Fill Requirements

The consultant (JBS&G, Feb 2021) detailed the requirements for the placement of fill across the Site Audit Area. While these requirements were developed to meet the geotechnical and engineering requirements for the development site – they were defined in the MPW site-wide LTEMP (see **Section 11.1**) in relation to the PFAS contamination across the MPW site as a management measure.

The fill / management measures for the Site Audit Area included (JBS&G, Feb 2021):

- Engineered Fill includes sandstone fill (road header excavation, tunnel boring machine excavation, or ripped or rock hammer excavation, approved imported fill materials, or site won VENM or Excavated Natural Material (ENM)) to a minimum of 1 m thickness.
- Where thickness of the Engineered Fill is less than 1 m, the surface cover must include concrete pavement or a building slab.

The consultant confirmed that a minimum of 1 m of engineered fill was placed across the Site Audit Area site.

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9.3.4 Reuse of PFAS-Impacted Soils

The consultant (JBS&G, Feb 2021) explained that the Woolworths Audit Area is partly located within Soil Reuse Zone 3. While in alignment with the MPW site-wide LTEMP (see **Section 11.1**) reuse of PFAS-impacted soils within the Woolworths Audit Area was considered acceptable (subject to the conditions detailed in the LTEMP) – no PFAS-impacted soils were placed or reused within the site.

9.3.5 Consultant's Conclusions

The consultant (JBS&G, Feb 2021) considered that the remediation, validation, management, and importation works for the Woolworths Audit Area were completed in accordance with the LTEMP (EP Risk, Oct 2020), CMP (EP Risk, July 2020), and RAP (Golder, Aug 2016b).

The consultant considered works within the Woolworths Audit Area were completed – including the importation and placement of fill – and considered the site suitable for its intended land use subject to implementation of a site-specific LTEMP.

9.4 Site Auditor Discussion of Stage 2 (Supplementary) Remediation and Validation Works

The Stage 2 remediation planning, remediation and validation works, as reported in the CMP for MPW (EP Risk, July 2020) and the Supplementary Remediation Validation Report (JBS&G, Sept 2020) were reviewed by the Site Auditor during the course of the prior Site Audits conducted (see **Section 1.10**).

Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020) provides a comprehensive discussion of the Site Audit review of these works.

The *MPW Woolworths Audit Area Validation Summary* (JBS&G, Feb 2021) was reviewed by the Site Auditor (**Appendix A**) during the current Site Audit.

The *MPW Woolworths Audit Area Validation Summary* appropriately detailed and addressed the residual contamination issues that remained at the site following the completion of the remediation works detailed in the Supplementary Remediation Validation Report in 2020. These works involved the remediation and validation of one identified unexpected find that consisted of an asbestos-containing pipe and associated pits.

In addition, the placement of imported fill was completed, as reported, across the Site Audit Area site during the works.

The *MPW Woolworths Audit Area Validation Summary* detailed the remediation works that were conducted in alignment with the LTEMP (EP Risk, Oct 2020) to address the unexpected finds of contamination that were identified during works.

In the Site Auditor's opinion, the process, and procedures to remediate the site were considered robust and detailed. The consultant and contractors demonstrated that they followed the procedures, as identified in the LTEMP, CMP and RAP and associated remedial

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planning documents (**Section 7**) and implemented these procedures thoroughly throughout the works and subsequent reporting.

While limited PFAS contamination (AEC-3) remains at depth within the Site Audit Area site, the *Lot 6, 7, and 12 LTEMP* (Site Audit Area LTEMP – **Section 11.3**) (EP Risk, Dec 2021) details the management procedures required to be implemented to preclude human or environmental impacts during future works.

It is noted that with respect to the broader MPW site – the MPW site wide LTEMP (EP Risk, Oct 2020) and MAUW CMP (EP Risk, Nov 2019), as attached to the prior audit for the whole of the MPW site (Enviroview [James Davis Site Auditor], Nov 2020), remain in effect (see **Sections 11.1** and **11.2**). These plans enable comprehensive management of residual contamination issues at the MPW site during Stage 2 and long-term. These plans, together with the CEMP (SIMTA, Jan 2020), will continue to be utilised across the MPW site during ongoing site redevelopment works.

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10 PFAS Works and Risk Assessments

PFAS-related to the MPW site are discussed separately in this section of this Site Audit Report. As an emerging contaminant in recent years, PFAS were investigated at the site after the timeframe of the MPW RAP (Golder, Aug 2016b). In general, PFAS contamination was not addressed or remediated during the Stage 1 or Stage 2 remediation works at the site – and is being managed as discussed in **Section 11**.

Assessments to address PFAS in soils and groundwater have been undertaken at the site since approximately 2015 by numerous consultants. In addition, sampling of sediment, surface water, and biota within the adjacent Georges River to the west of MPW has been undertaken to further understand the off-site impacts of PFAS contamination at the site.

Full discussion of the PFAS site assessment, risk assessment, and management planning works are presented in Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020).

A summary of the status of PFAS contamination across the broader MPW site is presented below in **Section 10.1**. The following **Sections 10.2** and **10.3** summarise the risk assessments that have been conducted for the MPW area in relation to PFAS issues.

Within the Site Audit area and following the completion of placement of fill across the site, PFAS contamination remains at depth – covered with clean fill. A pathway between the contamination and potential receptors is only complete with the Site Audit area if the management procedures (see **Section 11.3**) are not implemented during construction, maintenance, or landscaping works.

10.1 PFAS Summary of Assessment Results

In 2019, GHD produced a report that summarised numerous consultant's work and gathered available data for PFAS-constituents into one report. The *Report Summarising PFAS Investigations* (GHD, Apr 2019) reviewed PFAS-information from 99 separate source documents, and subsequently GHD summarised eighteen reports to provide primary PFAS-related analytical data from across the MPW site. The investigations were completed by consultants including GHD, PB, Golder, EP Risk, JBS&G, Coffey, Hydrobiology, and CH2M between 2014 and 2018.

GHD (GHD, Apr 2019) compiled the analytical data for all media from these primary documents and generated comprehensive figures and analytical data summary tables in their report.

A summary of the findings reported by GHD is provided below as this work, in the auditor's opinion, represents the most comprehensive review of PFAS-related data for the broader MPW site and hence is a reasonable basis for understanding the PFAS issues.

PFAS, in relation to the Site Audit area only, is discussed in the Site Audit area LTEMP (EP Risk, Dec 2021) (see **Section 11.3**).

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GHD reported the following primary analytical data samples were available for PFAS and included in their review:

- soil data – 502 samples across 247 locations
- leachate (soil/sediment) data – 251 samples across 135 locations
- groundwater – 298 samples across 213 locations
- surface water – 238 samples across 153 locations
- sediment – 177 samples across 145 locations
- biota – 29 samples across 6 locations within Georges River

The consultant's (GHD, Apr 2019) discussion of the findings is included in the sections below.

10.1.1 Summary of PFAS Soil Results

In total, 502 soil samples were analysed in 10 investigations. The results found:

- No soil samples had PFAS concentrations more than the commercial/industrial soil guidance value protective of human health (20 mg/kg for PFOS+PFHxS).
- 160 soil samples had concentrations of PFOS more than the adopted ecological assessment level for indirect contact with soils (0.01 mg/kg). Eight soil samples had concentrations of PFOS more than the adopted ecological assessment level for direct contact with soils (1 mg/kg), four of which were within the boundary of MPW within the northern portion of the site (BH113), the southern Dust Bowl (MW2017 and TP49), and within the FFTA OSD Basin 8 (TP60).

10.1.2 Summary of PFAS Groundwater Results

In total, 298 groundwater samples were analysed in 12 investigations. The results found:

- 194 groundwater samples had concentrations of PFOS+PFHxS more than the adopted recreational guidance value protective of human health (0.7 µg/L).
- 35 samples from 15 on-site locations had PFOS+PFHxS concentrations of PFOS+PFHxS more than 100 µg/L, with six samples (four locations) having PFOS+PFHxS concentration more than 400 µg/L. The areas where these highest concentrations of contaminants were generally found either within the FFTA at the boundary of the Georges River (MW2002, MW3015) or within the southern Dust Bowl (MW3004), though elevated groundwater was also observed between the FFTA and Dust Bowl source areas.
- 37 samples from 17 discrete locations had concentrations of PFOS_PFHxS more than 100 µg/L. In general, these locations were congregated along the western boundary of MPW and the Georges River within the southern Dust Bowl and the Former Fire Training Area (FFTA).
- 190 groundwater samples had concentrations of PFOS more than the adopted ecological assessment level (0.13 µg/L).

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- Nine groundwater samples had concentrations of PFOA more than the adopted recreational guidance value protective of human health (5.6 µg/L), nine of which were within the FFTA and Dust Bowl source areas.

10.1.3 Summary of PFAS Surface Water Results

In total, 238 surface water samples were analysed in seven investigations. The results found:

- 50 surface water samples had concentrations of PFOS+PFHxS more than the adopted recreational guidance value protective of human health (0.7 µg/L), however, none of these locations were within the Georges River – they were reported in on-site drainage channels (not considered to be suitable for recreational activities).
- The maximum reported concentrations of PFOS+PFHxS in surface water was reported in a drainage channel in the southern portion of the FFTA (SW-108), at a concentration of 97.6 µg/L.
- 110 surface water samples had concentrations of PFOS more than the adopted ecological assessment level (0.13 µg/L). In most cases, these exceedances were recorded in on-site drainage channels, or along Anzac Creek.
- Concentrations in the Georges River were more than the 95% species protection level (0.13 µg/L) but below the recreational guidance value protective of human health (0.7 µg/L) adjacent to the FFTA and the former Dust Bowl. The maximum reported concentration in the Georges River was at SW02, adjacent to the FFTA, with a PFOS concentration of 0.177 µg/L.

10.1.4 Summary of PFAS Sediment Results

In total, 177 sediment samples were analysed in six investigations. The results found:

- Most sediment samples (67%) from the Georges River did not have detectable levels of PFAS. The maximum reported PFOS+PFHxS concentration of 0.414 mg/kg was reported at SD008 adjacent to the southern Dust Bowl.

The consultant noted that sediment criteria have not been developed yet in Australian guidance and that the soil criteria utilised may not be appropriate but are the best available value and in line with the screening conducted in the risk assessments.

10.1.5 Summary of Leachate / Pore Water Results

In total, 251 soil and sediment samples were subjected to ASLP testing within five investigations. The results found:

- 91 leachate samples had concentrations of PFOS+PFHxS more than the adopted recreational guidance value protective of human health (0.7 µg/L). Six samples had leachable PFOS+PFHxS concentrations more than 100 µg/L with one location on-site (BH113, west of the vehicle storage and maintenance area) at a concentration of 212 µg/L.
- 125 leachate samples had concentrations of PFOS more than the adopted ecological assessment level (0.13 µg/L). Twelve soil samples generated leachate PFOS

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concentrations above 10 µg/L, six of which were within the boundary of MPW. These six locations were:

- BH113_0.9 (200 µg/L) west of the vehicle storage and maintenance area in the northern portion of the site
- TP60_1.0 (80 µg/L) Drainage Basin 8, through the FFTA
- TP31_0.5 (43 µg/L) approximately halfway between the Dust Bowl and FFTA
- MW2017/2.0 (38.5 µg/) southern Dust Bowl
- BH3015_0.5 (27.9 µg/L) western FFTA
- TP47_0.5 (21 µg/L) Drainage Basin 6 through the Dust Bowl

The consultant noted that in two of the reports reviewed both considered leachability using neutral pH water as the leaching fluid to better represent potential PFAS leachability under likely environmental conditions.

It was further noted that upon evaluating the correlation between soil concentrations and leachate concentrations a 'good fit' was observed. The regression indicated that leachable concentrations would exceed the 95% species protection level (0.13 µg/L) when concentrations in solid media are more than 0.019 mg/kg.

10.1.6 Summary of Biota Sampling

Biota sampling was conducted in the Georges River adjacent to the site by Hydrobiology in March 2018 (Hydrobiology, Mar 2019). During this sampling event, 29 biota samples were collected of which 12 samples were human-edible species (eels, mullet, or bass) and the remainder were lower-trophic level organisms (non-edible fish and invertebrates) that are likely to be consumed by higher tropic-level organisms.

The sampling found:

- PFAS was more than the adopted guidance value protective of human health for consumption of finfish (5.2 µg/kg) within all 12 of the 'edible' samples
- 25 samples had concentrations of PFAS more than the ecological assessment level protective of mammalian receptors that may consume aquatic biota
- 23 samples had concentrations of PFAS more than the ecological assessment level protective of avian receptors that may consume aquatic biota
- biota samples exceeded the highest adopted assessment level (avian dietary value of 8.2 µg/kg) at all locations

See **Section 10.2.3** for further evaluation of the biota data in the Waterway Risk Assessment.

10.2 PFAS Risk Assessments

The risk assessments conducted for the broader MPW site and adjacent waterway (Georges River) assist in understanding the context of the PFAS data collected for the site. A summary only of the conclusions of each risk assessment are presented in the sections below.

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Full discussion of the PFAS risk assessment works is presented in Site Audit Report # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020).

10.2.1 Risk Assessment Works by EP Risk (On- and Off-Site)

A risk assessment for the MPW site was conducted by EP Risk following their PFAS investigations at the site. The risk assessment and addenda were detailed in the following reports:

> EP Risk. *Literature Review, Criteria for Assessment of PFAS, and Risk Assessment, Moorebank Intermodal Terminal Development*. (Report Ref.: EP0448.001_v3). 3 October 2017. (EP Risk, Oct 2017a)
>
> EP Risk. *Addendum to Qualitative Human Health Risk Assessment, Moorebank Precinct West, Moorebank, NSW.* (Report Ref.: EP0745.016). 5 September 2018. (EP Risk, Sept 2018a)
>
> EP Risk. *Addendum # 2 to the Human Health Risk Assessment – Construction Workers Handling PFAS-Containing Stormwater, Moorebank Precinct West, Moorebank, NSW.* (Report Ref.: EP0745.019). 19 September 2018. (EP Risk, Sept 2018b)

The EP Risk (EP Risk, Oct 2017a) risk assessment evaluated human health and environmental risk relative to impacts in soil, surface water, and groundwater associated with the two identified PFAS source areas: the former Dust Bowl Fire Training Area and FFTA located within MPW.

Human Health Risk Assessment

The Human Health Risk Assessment (HHRA) (EP Risk, Oct 2017a) evaluated data from on- and off-site for all media within the screening assessment (comparison to investigation levels) and the following points were noted:

- Soil and sediment values for on-site (across MPW) were compared to the adopted human health investigation levels with results below the levels for both the proposed commercial and open space/recreational areas of the site. Soil and sediment were therefore not considered further in the risk assessment.
- Based on the concentrations of some sediment, groundwater, and surface water samples on-site the consultant noted when these water/sediment media migrate to the river they will increase potential risk through fish consumption. This was further through the biota assessment (see **Section 10.2.3**).

The HHRA further evaluated quantitatively the MPW site-wide groundwater and surface water data. The results found that for both remediation workers and maintenance workers (in contact with groundwater in a trench) the Hazard Index was in excess of the acceptable value for both PFOS and PFOA grouped chemicals. The total HI for remediation workers was 1005.4 (more than the target HI of 1) and the total HI for maintenance workers was 223.5. For both receptors dermal contact with PFOS grouped chemicals was the most significant contributor to the unacceptable risk.

The consultant (EP Risk, Oct 2017a) discussed that while the risk assessment showed an unacceptable risk to health for workers in a trench exposed to groundwater – this work could be managed safely during site works with use of dewatering pumps and general PPE.

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The consultant also concluded that the levels of PFAS chemicals in groundwater at the site do not have any significant health concerns for the future industrial/commercial general site users.

Ecological Risk Assessment

The Ecological Risk Assessment (ERA) (EP Risk, Oct 2017a) was considered preliminary and was designed to assess the risk contaminated groundwater poses to the freshwater environment (Georges River) adjacent the site.

In evaluation of the data generated for the site relative to the ERA the consultant noted the following points:

- The maximum detected concentrations in Georges River were 0.428 µg/L for PFOS and PFOS grouped chemicals, and 0.067 µg/L for PFOA and PFOA grouped chemicals. [The maximum reported groundwater concentrations on-site were 666.6 µg/L and 68.5 µg/L.].
- The consultant recommended that to reduce the environmental concentrations in the immediate impact area below the adopted screening level of 0.001 µg/L, the maximum groundwater concentrations of PFOS and PFOS grouped chemicals should be remediated down to 0.1 µg/L before it discharges into the Georges River.
- However, the consultant noted that following the biota assessment for the Georges River further risk assessment would be required.

Human Health Risk Assessment – Addendum 1

The HHRA (EP Risk, Oct 2017a) was updated by the consultant in Addendum 1 (EP Risk, Sept 2018a). This addendum to the risk assessment reviewed newly published criteria and updated the risk assessment accordingly. The results of the risk assessment did not change substantively, and it noted that the guidance utilised have been further updated since this date – hence this addendum is not discussed further.

Human Health Risk Assessment – Addendum 2

The HHRA (EP Risk, Oct 2017a) was updated by the consultant in Addendum 2 (EP Risk, Sept 2018b). This addendum to the risk assessment further evaluated on-site risk to workers who may be involved in the handling of contaminated stormwater.

The consultant considered that the potentially complete exposure pathways for construction workers handling stormwater included incidental ingestion and dermal contact. The consultant calculated maximum allowable concentrations of PFOS and PFOA grouped chemicals for both pathways and compared these values to the reported concentrations of PFAS in stormwater observed on-site. The following points were concluded:

- Stormwater concentrations of PFOS and PFOS grouped chemicals were within an acceptable range for the ingestion pathway.
- Stormwater concentrations of PFOS and PFOS grouped chemicals were approximately an order of magnitude greater than the calculated maximum allowable concentrations for the dermal exposure pathway – indicating that the risk to workers is not acceptable. Therefore, prevention of dermal exposure through use of PPE is necessary.

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- Stormwater concentrations were significantly less that the maximum allowable concentrations for PFOA and PFOA grouped chemicals.

The consultant concluded that the precautionary principle should be applied for construction workers involved in the transport, handling and management of stormwater and the potential health risk could be effectively managed through the mandatory use of waterproof gloves and boots in accordance with the currently adopted work health and safety practices at the site.

10.2.2 Land Risk Assessment by EnRiskS

A risk assessment for the MPW site was conducted by Environmental Risk Sciences (EnRiskS) that focused on the 'land' portion of the site as detailed in the following report:

> Environmental Risk Sciences Pty Ltd (EnRiskS). *Land Human Health and Ecological Risk Assessment (Land HHERA), Moorebank Intermodal Company.* (Report Ref.: MICL/19/BIOR001.RevC). 10 May 2019. (EnRiskS, May 2019a) (the Land Risk Assessment)

It is noted that the version of the Land Risk Assessment discussed in this report, as provided to the Site Auditor, remained in 'draft' format. The Site Auditor had submitted review comments on the document, but the auditor was not provided with a revised report that incorporated auditor feedback.

This risk assessment evaluated both human health and ecological risk within two land areas – both conservation areas associated with the Moorebank Precinct – the Moorebank Offset Area (conservation/biobanking area along the western side of MPW) and the Casula (Hourglass) Offset Area on the western side of the Georges River adjacent with the middle portion of the MPW site.

The Casula Offset area is outside the boundaries of the auditor's works within MPW or MLP. The Land Risk Assessment essentially focuses on the conservation (offset) area within the MPW site.

Risks associated with the proposed OSD, and drains were not assessed. The consultant noted that risks associated with the construction and management of these features would be considered separately by the developer of the site if required.

The consultant discussed that habitat restoration works are required for the Moorebank Offset Area and works such as vegetation restoration, hollow-relocation, and nest-box installation are proposed for the area to improve the habitat for a variety of species. These works would improve the ecological amenity of the site for future receptors.

Human Health Risk Assessment

The HHRA portion of the Land Risk Assessment (EnRiskS, May 2019a) for the conservation areas can be summarised with noteworthy points as follows:

- The consultant noted the conservation area will be fenced with no public access following development, hence, the human receptors identified for the area included:
    - Workers (contractors, construction, or maintenance workers) who may need to visit the area for maintenance or conservation works.

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- Members of the public who trespass within the area. The consultant discussed that trespassers were difficult to quantify, but potential exposures would be expected to be less than for workers and hence the risk assessment focused on workers.

- Criteria for the risk assessment were adopted from the PFAS NEMP (version 1, 2018).
- Relevant and potentially significant exposure pathways were considered to include incidental ingestion of soil/sediment or groundwater/surface water, dermal contact with soil/sediment or groundwater/surface water, and inhalation of dust.
- The consultant concluded the screening HHRA by noting that no PFAS concentrations of concern, greater than the adopted human health-based criteria, were observed in either soil or sediment, or groundwater or surface water within the conservation area.

Ecological Risk Assessment

The ERA portion of the Land Risk Assessment (EnRiskS, May 2019a) for the conservation areas included:

- In relation to the assessment of ecological risk relevant to PFAS, the consultant noted that PFAS are chemically and biologically stable in the environment, are mobile (in water and can easily leach from soil to water) and are persistent and bioaccumulative. Hence, the assessment considered not only direct toxicity of PFAS but the potential for bioaccumulation and secondary poisoning (i.e., where predators are harmed through the consumption of prey or food sources that contain PFAS).

The consultant conducted a screening ERA through comparison of site concentrations in soil and sediment to the adopted screening criteria (from the 2018 NEMP). The consultant's summary of this comparison is presented in their Table 4.2 below.

Table 4.2: Summary and Review of PFAS Reported in Soil and Sediment, Ecological Health

Report Reference and Summary of Works	Maximum Reported Concentration (mg/kg)	
	PFOS	PFOA
PB (2014b) – 2 soil samples	0.42	0.006
Golder (2015b) – 18 soil samples	0.64	0.009
Golder (2016a) – 54 sediment samples[2]	0.92	0.002
Golder (2016b) – 48 soil samples	1.8	0.027
EP Risk (2017c) – 30 soil samples	0.42	0.003
EP Risk (2018) – 30 soil samples	1.3	0.02
Adopted Screening Guidelines[1]		
Direct Toxicity – Residential	**1**	**10**
Bioaccumulation – Residential	**0.01**	**--**

Notes:

1 = Ref. HEPA (2018) for a residential setting. There are no guidelines for PFAS for conservation land or for the protection of Threatened species.

2 = Sediment samples collected from drainage lines that assumed to be retained for the ongoing use of the Moorebank Offset Area.

-- = No guideline available for PFOA.

It is noted the criteria utilised have since been updated in the more recent version of the NEMP (Heads of EPA Australia and New Zealand, 2020) which states that the ecological direct and indirect exposure criteria are appropriate for all land uses. Therefore, the criteria presented in the consultant's Table 4.2 should not be considered 'residential' criteria.

The consultant discussed that PFOS concentrations in soil and sediment at the conservation area exceeded the ecological criteria for secondary poisoning (bioaccumulation) and in

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addition data from two soil samples exceeded the criteria for direct toxicity. However, at these two locations the samples were at depth and shallow soils did not present the same levels of PFOS. The consultant further reviewed the depths of contamination and noted the highest concentrations were observed at depths of 1-2m bgl, however, numerous exceedances of the indirect criteria were observed in shallow soils (<0.5m bgl).

The consultant (EnRiskS, May 2019a) discussed that the indirect soil criteria (0.01 mg/kg) was a particular concern for secondary consumers (animals that feed on herbivores including omnivores) at the site and provided the following summary:

- In surface soil (<0.5 m depth), average concentrations of PFOS were reported at five times the guideline, 95% $UCL_{average}$ concentrations were reported at 10 times the guideline and maximum concentrations were reported at close to 100 times the guideline.
- In soil at >0.5-1 m depth, average, 95% $UCL_{average}$ and maximum PFOS concentrations were 10 times, 30 times and 60 times the adopted guideline respectively.
- In deeper soil (>1 m depth), average, 95% $UCL_{average}$ and maximum PFOS concentrations were around 10 times, 40 times and 200 times the adopted guideline.

Land Risk Assessment Conclusion

The consultant (EnRiskS, May 2019a) concluded the Land Risk Assessment as follows:

- The result of the Human Health evaluation found potential risks were low and acceptable for receptors within the offset/conservation area.
- The result of the ecological evaluation found that while direct toxicity effects were low and acceptable – the potential for bioaccumulation in terrestrial receptors, and effects on higher order consumers, were unable to be excluded within the offset/conservation area (in other words a potential for unacceptable risks was found for terrestrial and higher order consumers).
- Leaching of PFAS from the Offset Area is contributing to aquatic impacts identified in the adjacent stretch of the Georges River (see **Section 10.2.3**).

10.2.3 Waterway Risk Assessment EnRiskS

A risk assessment for the MPW site was conducted by Environmental Risk Sciences (EnRiskS) that focused on the 'waterway' portion of the site as detailed in the following report:

> Environmental Risk Sciences Pty Ltd (EnRiskS). *Waterway Human Health and Ecological Risk Assessment (Waterway HHERA), Moorebank Intermodal Company.* (Report Ref.: MICL/18/GRR001.RevE). 10 May 2019. (EnRiskS, May 2019b)

It is noted that (as for the Land Risk Assessment) the version of the Waterway Risk Assessment discussed in this report, as provided to the Site Auditor, remained in 'draft' format. The Site Auditor had submitted review comments on the document, but the second set of auditor comments were not addressed and a final report of the document incorporating feedback was not provided to the auditor.

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This risk assessment evaluated both human health and ecological risk within a stretch of the Georges River adjacent to the west of the Moorebank Offset Area or MPW

The report included as an attachment the report by Hydrobiology (Hydrobiology, Mar 2019) that detailed the biota sampling in the Georges River (see **Section 10.3.6**). The results of this sampling and the risk evaluation of the data was the primary focus of the Waterway Risk Assessment.

The Hydrobiology (Hydrobiology, Mar 2019) study that included biota sampling was the most significant dataset for inclusion in the risk assessment. The consultant (EnRiskS, May 2019b) summarised this study as follows:

- Surface water, sediment, and aquatic biota data was collected from six locations in the Georges River that are upstream, adjacent to, and downstream of MPW.
- The sampling program targeted representative species for the HHRA (fish species that are typically caught and consumed during recreational fishing), and for the ERA (species targeted across 3 trophic levels).

Human Health Risk Assessment

The HHRA (EnRiskS, May 2019b) portion of the Waterway Risk Assessment of Georges River discussed the relevant exposure pathways to PFAS-impacted media. The consultant determined these could include direct contact with sediment (wading), direct contact with surface water during swimming (primary contact recreation) and incidental contact during boating and fishing (secondary contact recreation), and home consumption of biota from the waterway.

A screening level risk assessment (comparison of measured concentrations of media to relevant risk-based criteria) found that concentrations of PFAS in both surface water and sediment were below the relevant screening criteria for direct contact exposures (incidental ingestion or dermal contact). This pathway was not further evaluated.

Concentrations of PFAS in biota exceeded the relevant screening criteria for consumption of edible biota. The consultant's summary of the biota data is included in their Table 2.5 below.

Table 2.5: Summary and Review of PFAS in Biota in Georges River, Human Health

Biota Species	Reported Concentration (µg/kg wet weight)					
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
PFOS+ PFHxS						
Australian Bass	--	74	75	33	34	--
Long-finned Eel	30.2	--	55.9 – 60.4	--	--	--
Sea Mullet	--	43 - 50	39	41 - 42	54	40
Total PFAS						
Australian Bass	--	103	97.9	52.2	63.7	--
Long-finned Eel	46.5	--	84.4 – 88.7	--	--	--
Sea Mullet	--	63.7 – 72.3	59	63 – 63.6	81.2	52.4
Adopted screening guidelines for PFOS + PFHxS (FSANZ)[1]						
Finfish	**5.2**					

Notes:
Shading indicates an exceedance of the adopted guideline value.
1 = Ref. FSANZ (2017).
"--" = Indicates no data available as species was not caught at this location

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The table presents the concentration of PFAS-constituents in fish tissue of edible biota with samples from all six sampling locations, for all species sampled, exceeding the screening criteria generally by an order of magnitude.

Further assessment of this pathway was conducted through a quantitative risk evaluation utilising calculations to determine a site-specific level of risk. The consultant noted that signs had been placed by NSW DPI Fisheries along sections of the Georges River since 2016 due to high levels of industrial pollutants and that the area is advised to be 'catch and release only'. Therefore, the risk assessment assumed that someone ignores the NSW Government fishing advice and consumes two serves of fish per month from the Georges River.

The results of the risk calculations (based on the ingestion rate of two serves/month) are presented in the consultant's Table 4.2 above. As shown, at this level health risks are not elevated for adults (all calculated hazard indices are <1) but for children a potential unacceptable human health risk remains.

The auditor notes that he disagreed with the above approach to evaluating human health risks as the only approach to be detailed in the risk assessment. As the auditor discussed in Interim Advice, typically a reasonable maximum exposure (RME) would be calculated that would represent the 'worst-case risk scenario'. While the ingestion rate of two serves/month may represent a 'current' scenario (for an individual not abiding by the restrictions) – it does not represent a RME. Prior versions of the Waterway Risk Assessment (revision B) had evaluated a greater range of exposures some of which utilised higher intake of fish from the river and had revealed higher levels of risk.

Ecological Risk Assessment

The Ecological portion of the Waterway Risk Assessment (EnRiskS, May 2019b) (ERA) for Georges River evaluated potential ecological risks through comparison of measured PFAS concentrations to relevant guidelines (screening risk assessment) for the protection of aquatic ecosystems.

The consultant's Tables 5.1 and 5.2 below present the results of their comparison of the aquatic biota data and surface water data to the screening levels. (Note there is an error in

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Table 5.2 and the guideline presented is not a 'recreational' criteria – but represents a 95% species protection level ecological criterion.)

Table 5.1: Summary and Review of PFAS Reported in Aquatic Biota in Georges River: Ecological

Biota Species	Reported Concentration (µg/kg wet weight)					
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
PFOS						
Australian Bass[3]	--	74	75	33	34	--
Long-finned Eel[3]	29	--	52 – 57	--	--	--
Sea Mullet[3]	--	43 - 50	39	41 - 42	54	39
Freshwater Shrimp	2.5	--	2.8	1.9	7.3	--
Damselfly	5	34	23	14	18	--
Gastropod	4.1	--	--	9.7	--	--
Mosquitofish	28	61	61	--	51	--
Flathead Gudgeon	12	--	--	37	--	--
Total PFAS						
Australian Bass[3]	--	103	97.9	52.2	63.7	--
Long-finned Eel[3]	46.5	--	84.4 – 88.7	--	--	--
Sea Mullet[3]	--	63.7 – 72.3	59	63 – 63.6	81.2	52.4
Freshwater Shrimp	12.4	--	11	8.7	19.76	--
Damselfly	11.4	53.6	34.1	22.4	30.04	--
Gastropod	58.1	--	--	37.3	--	--
Mosquitofish	67.2	107.6	98.9	--	84.94	--
Flathead Gudgeon	41.9	--	--	86.3	--	--

Adopted screening guidelines for PFOS	
Direct toxicity (biota tissue)[2]	**8,100 to 8,300**
Birds (consumption of aquatic biota)[1]	**8.2**
Mammals (consumption of aquatic biota)[1]	**4.6**

Notes:
Shading indicates an exceedance of the adopted guideline value.
"--" = Indicates no data available as species was not caught at this location.
1 = Ref. HEPA (2018).
2 = Ref. EC (2017).
3 = Concentrations measured in fillets.

Table 5.2: Summary and Review of PFAS Reported in Surface Water in Georges River: Ecological

Surface Water Data	Reported Concentration (µg/L)	
	PFOS	PFOA
Data Collected by Golder (2015b)		
Maximum concentration reported	0.084	0.007
Data Collected by Golder (2016c)		
Maximum concentration reported	0.22	<0.01
Data Collected by Golder (2016d)		
Maximum concentration reported	0.18	0.004
Data Collected by CH2M (2018)		
Maximum concentration reported	0.04	0.02
Data collected by Hydrobiology in 2018		
SW1	<0.04	<0.02
SW2	<0.04	<0.02
SW3	<0.04	<0.02
SW4	<0.04	<0.02
SW5	<0.04	<0.02
SW6[2]	0.035	<0.02

Adopted Screening Guidelines[1]		
Recreational Water Use	**0.13**	**220**

Notes:
1 = Ref. HEPA (2018).

The consultant noted that the results indicated that significant effects due to direct toxicity are not expected with only 2 of 27 samples exceeding the 95% species protection guideline of

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0.13 µg/L for PFOS in surface water. However, based on the biota data – there is a potential for secondary poisoning to be of concern for mammals and birds that consume biota from the area of the Georges River adjacent to MPW.

Conclusions

The consultant (EnRiskS, May 2019b) concluded the Waterway Risk Assessment as follows:

- The Human Health evaluation found:
  - direct contact risks (with sediment and surface water) were low and acceptable
  - consumption of fish (at a rate of two serves/month) did not indicate adverse risk for adults at this intake level. However, for children a potentially unacceptable risk was present.
- The ERA found:
  - while some samples exceeded criteria for direct toxicity, the overall potential for adverse effects was considered to be low
  - evaluation of data for consumption of biota by higher order consumers (where bioaccumulation of PFAS is expected through these species) found that the potential for adverse effects to the environment was unable to be excluded. In other words, the risk assessment concluded that unacceptable risks were found for both mammals and birds that consume aquatic biota.
- The consultant discussed at length that other source areas for PFAS-constituents (in addition to MPW) may be present that contribute to contamination in the Georges River.
- However, based on the available data the consultant stated it is reasonable to conclude that MPW is a contributing source of PFAS to the environment, and to PFOS detected in biota within the Georges River.

10.3 Reuse of PFAS-Impacted Soils

Reuse of PFAS-impacted soils on-site was evaluated in a site-specific risk assessment conducted by EnRiskS (EnRiskS, Oct 2020). Reuse of these materials is detailed in the LTEMP for the MPW site (see **Section 11.1.7**).

> Environmental Risk Sciences Pty Ltd (EnRiskS). *Moorebank Intermodal Terminal: LTEMP Material Reuse Risk Assessment for PFAS.* 9 October 2020. (EnRiskS, Oct 2020)

No PFAS-impacted soils were reused within the Site Audit Area site (see **Section 9.3** and **Section 11.3**).

10.3.1 Existing Risks

The consultant (EnRiskS, Oct 2020) discussed that due to the risk assessments previously conducted (see **Section 10.6**) – the key receptors for MPW relate to the terrestrial environment within the Offset Area (western portion of MPW) and the aquatic environment within Georges River.

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The consultant stated that the reuse of soil in the MPW should consider the leaching of PFAS from soil and any resulting changes to the existing risk profile in terms of leaching and migration of PFAS from the MPW to off-site receptors including the offset/conservation area and the Georges River.

The consultant (EnRiskS, Oct 2020) reviewed available site-specific data, the proposed development plans, and relevant guidance including the PFAS NEMP (Heads of EPA Australia and New Zealand, 2020) that specifically addresses reuse of PFAS soils.

The consultant discussed that the NEMP decision tree and reuse discussion requires the consideration of default values of soil and soil leachate as well as other aspects such as groundwater and surface water receptors. The risk assessment included the consideration of additional management measures to manage the risk.

10.3.2 Reuse Zones

Based on the results of the reuse of PFAS-impacted soils risk assessment and feedback from the site owners concerning the commercial agreements for the area – a set of 'reuse zones' were defined in the document.

For all reuse zones soils should meet the ecological criteria for either 'all uses' (0.01 mg/kg) or commercial/industrial (intensively developed sites) (0.14 mg/kg PFOS). At these levels – there would not be expected to be any risk issues of concern for workers or visitors to the site.

Where leachate concentrations are below the NEMP criteria of 0.07 µg/L impacts to groundwater would not be expected to change the existing risk profile. In addition, dilution and mixing would occur prior to reaching the aquatic environment.

Soil reuse zones (as developed for the final MPW site-wide LTEMP – see **Section 11.1**) are depicted on the consultant's (EP Risk, Oct 2020) Figure 5 within the LTEMP (See prior Site Audit (Enviroview [James Davis Site Auditor], Nov 2020)). These reuse zones were called Zones 1 through 4.

10.3.3 Management of Reuse

Management measures to reduce the potential for leaching in reuse of soils were evaluated in the risk assessment relative to each reuse zone.

The consultant concluded that soil could be reused above the groundwater table and beneath any or all the management measures defined without consideration of leachate criteria, except for Zone 1.

The consultant (EnRiskS, Oct 2020) further defined the PFAS-reuse trigger levels for soil at the site and the required management measures for each zone/area. Specific notes and requirements for management measures were identified by the risk assessor. These requirements were incorporated in full into the revised MPW site-wide LTEMP (see **Section 11.1.7**) and are presented therein.

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10.4 Site Auditor Discussion of PFAS Works

As discussed throughout this report – within the Site Audit area – PFAS contamination remains at depth partially within the eastern and western portions of the site. Figure 3 of the Site Audit area LTEMP (the LTEMP is included in **Appendix D** of this report) depicts these areas (AEC 3) in relation to the site (part lot 6, 7, and 12, DP 1197707).

While the Site Audit area was identified as an area for potential reuse of PFAS-impacted soils (Zone 3) – no PFAS-impacted materials were placed or reused within the Site Audit area. As placement of fill at the site has been completed (final grade achieved) there is no reasonable potential for future reuse of PFAS-impacted materials. Therefore, reuse of PFAS-impacted soils is not a relevant issue for the Site Audit site.

The below discussion focuses on PFAS-related works across the MPW site in entirety.

The PFAS-related works as discussed in **Section 10** are numerous for the MPW site and have been evolving while PFAS-guidance has been evolving in recent years.

The Site Auditor has reviewed (see prior Site Audit for documentation (Enviroview [James Davis Site Auditor], Nov 2020)) a large number of the PFAS-related reports including the risk assessments discussed in **Section 10.2**.

In general, the PFAS-related works have been sufficient to depict the nature and extent of PFAS contamination across the MPW site and within the adjacent Georges River off-site. Appropriate methodology, quality control and DQOs have been adopted and checked during the works. The risk assessments utilised appropriate guidelines such as enHealth (EnHealth, 2012) and the NEPM (NEPC, 1999, Amended 2013). Relevant toxicity data, exposure scenarios, exposure assumptions and models were utilised in the assessments.

The conclusions provided by the consultants were generally considered appropriate. However, the auditor notes the two risk assessments by EnRiskS (land and waterway) were not finalised and did not incorporate all auditor review comments.

The findings of the PFAS works and risk assessments can generally be summarised as discussed by the auditor in the following paragraphs.

On-site (broader MPW site) within the commercial/industrial (developable) portion of the site – in general the PFAS contamination does not present a direct risk to either human health or ecological receptors. In some situations (such as excavation and contact with groundwater or surface water) management of risks may be required under the relevant health and safety protocols during construction and redevelopment works.

On-site within the offset/conservation area (outside of the Site Audit area) human health risks are low and acceptable. However, ecological risks to animals such as bats, amphibians, and reptiles (that are likely present in the conservation area based on ecological surveys) are present with soil concentrations more than relevant criteria. This risk will be managed as detailed in the LTEMP (see **Section 11.1**) with a clean soil cover to be placed in the area followed by revegetation works.

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Across the MPW site within portions of both the developable and conservation areas indirect risks are present - through pathways such as leaching of contamination from soil/sediment and through off-site transport of surface water and groundwater to waterways. This is not an "immediate risk" as measured in media on-site – but an indicator that a risk could be present in any impacted aquatic areas/waterways – therefore – these risks were further evaluated through assessment of biota in the Georges River.

The Waterway Risk Assessment evaluated risks posed to human and ecological receptors **within the Georges River**. It was found that with the current restrictions (per NSW DPI Fisheries) on consumption of fish from the Georges River that human health risks to adults were low and acceptable – though for children the risks could be exceeded. For ecological receptors – risk-based criteria were exceeded for nearly all samples across all trophic levels sampled – and the assessment indicated an unacceptable level of risk for fauna consuming aquatic biota – such as mammals and birds.

Thus – through all the above PFAS-related investigation works and assessment of risk – it should be concluded that the contaminated media on-site at MPW is contributing (potentially together with other sources) to unacceptable levels of risk, primarily for ecology, within the Georges River. The primary source of off-site transport of PFAS-constituents is considered to be discharge of contaminated groundwater to the river.

In general, PFAS contamination was not addressed or remediated during the Stage 1 Early Works at the site – and was planned to be addressed during Stage 2 as discussed in **Section 10**. This was in alignment with the development conditions that noted the ongoing evaluation of PFAS at the site.

Through the development of the PFAS works and risk assessments and associated regulator reviews – no requirement to remediate the groundwater discharging off-site (to the Georges River) has been established for the MPW site. While remedial discussions have been undertaken during PFAS works – it has been determined that instead of a remedial approach for groundwater at the site – a management approach during site redevelopment works for soils only (and construction related surface water) will be implemented.

The auditor is disappointed that works to address the groundwater contamination have not been required for the site, despite remedial planning works being conducted to address this off-site transport. It is the auditor's understanding that NSW EPA considers it cannot enforce implementation of relevant guidance on the site owner as they include Commonwealth government entities, and that current management of the risk is acceptable. It is beyond the scope of the Site Audit or coercion of a Site Auditor to oblige a landowner to remediate contamination regarding off-site risk if it is not under regulation by the NSW EPA or without direction to the Site Auditor from the NSW EPA.

The selected soil management approach is discussed in the MPW site-wide LTEMP (see **Section 11**) and focuses on the areas where stormwater management infrastructure to be constructed will transect contaminated soils.

Based on the risk assessment to evaluate the reuse of PFAS-impacted soils at the site (see **Section 10.3**), the auditor is satisfied that an appropriate approach has been developed that considers the commercial requirements for the site, the planned fill and cover materials for

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the site, and minimises off-site disposal of large volumes of low-level PFAS-contaminated soils – together with the potential risks to human health or the environment.

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11 Ongoing Management and Remediation Works

Following the completion of the Stage 2 remediation and validation works the CMP (see **Section 9.1**) (EP Risk, July 2020) was considered complete and closed out.

Across the broader MPW site, ongoing works to address residual contamination on-site will be required during the Stage 2 construction works (NSW DPE, Nov 2019) as significant cut and fill, infrastructure, and site development works progress – these will include the construction of the stormwater infrastructure and excavation for OSDs.

Management and remediation work to address ongoing residual contamination issues, including significantly handling of PFAS-impacted materials, are detailed within the MPW site-wide LTEMP (EP Risk, Oct 2020) discussed in **Section 11.1**.

A portion of the MPW site has become included within the Moorebank Avenue Upgrade Works project or 'MAUW'. Management of the MAUW is addressed in the CMP for the MAUW, discussed in **Section 11.2**.

The MPW site wide LTEMP (Section 11.1) and MAUW CMP (Section 11.2) – while summarised below – were reviewed as part of and attached to the prior site audit report (Enviroview [James Davis Site Auditor], Nov 2020).

Following the completion of the placement of fill within the current Site Audit Area – the Site Audit Area site (see **Section 9.3**) – a new LTEMP for this development site only has been prepared as discussed in **Section 11.3**. The 'Lot 6, 7, and 12 LTEMP' (Site Audit Area LTEMP) (EP Risk, Dec 2021) supersedes and replaces the MPW site-wide LTEMP for the Site Audit Area site.

11.1 MPW Site-Wide Long-Term Environmental Management Plan

The consultant (EP Risk, Oct 2020) developed the MPW site-wide LTEMP to provide an environmental management framework for the MPW site during short and medium-term construction works and long-term management of the site post-construction.

> EP Risk. *Long-Term Environmental Management Plan, Moorebank Precinct West (MPW).* (Report Ref.: EP1489.001.v12). 27 October 2020. (EP Risk, Oct 2020)
>
> Note: this version of the LTEMP was updated following the completion of the Supplementary Validation works for the MPW site and was attached to the prior site-wide MPW Site Audit at the conclusion of remediation works (the Condition B169 Site Audit) (Enviroview [James Davis Site Auditor], Nov 2020).

This LTEMP remains in effect for the MPW site as a whole – except for the current Site Audit site where the 'Lot 6, 7, and 12 LTEMP' (Site Audit Area LTEMP) (see **Section 11.3**) is now in effect.

The MPW site-wide LTEMP (EP Risk, Oct 2020) included significant appendices/attached reports, which are discussed as relevant below, including:

- concept plans for the proposed development (LTEMP Appendix B)

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- conceptual site model (LTEMP Appendix C)
- environmental management procedures (LTEMP Appendix D)
- unexpected finds protocol (LTEMP Appendix F)
- engineered stockpile concept design (LTEMP Appendix H) and
- stockpile summary table (LTEMP Appendix L).

11.1.1 LTEMP Objectives

The consultant (EP Risk, Oct 2020) explained the objectives of the LTEMP were to:

- Outline the nature and extent of impacted soils, sediment, surface water and groundwater requiring short to long-term management at the site.
- Develop management measures for the management of impacted materials encountered during construction works and long-term operation of the site including monitoring and reporting in satisfaction of relevant health and safety and environmental legislation.
- Assign responsibilities for the implementation of management measures.

The parties responsible for implementing the LTEMP were identified and included the site owner (Qube) and principal contractor (Georgiou – during Stage 2 construction) and management, consultants, and workers at the site as applicable.

11.1.2 LTEMP Background

The consultant (EP Risk, Oct 2020) discussed that the site is divided into two main areas – the Construction Area (Developable portion of the site) and the Offset Area (the biobanking or conservation area within the site) that is located on the west of the site next to the Georges River.

The consultant discussed the development of the site will occur only within the construction area. The proposed development works are summarised in **Section 9.1.2**. Plans depicting the proposed development are included in the LTEMP Appendix B.

The Offset Area will not be open to recreational use and access will be low frequency and limited to personnel undertaking maintenance or other requirements.

Six OSD basins will be constructed as part of the Stage 2 works across the MPW site. Of these, three OSDs are located on the western side of MPW and will include the construction of drainage structures (outlets) from each OSD and that extend (between the Offset Area) to the Georges River.

11.1.3 Residual Contamination Issues

AECs

The LTEMP (EP Risk, Oct 2020) summarised the residual contamination at the site as consisting of three primary AECs defined as follows:

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- **AEC 1 – Chlorinated Hydrocarbon Impacts** in the north-west portion of the site. Predominately groundwater, the contaminants of potential concern include Trichloroethene (TCE) and Cis-dichloroethene (Cis-DCE).
- **AEC 2 – Light Non-aqueous phase liquid (LNAPL) Area** located to the south, on the corner of Chatham and Moorebank Avenue. Predominantly groundwater, the contaminants of potential concern include LNAPL, TRH, BTEX, naphthalene, lead, and PAHs.
- **AEC 3 – Former firefighting training areas** where AFFF was used and surrounding land. The contaminants of potential concern include PFAS.

The consultant evaluated relevant pathways of exposure to the impacted media remaining on-site and concluded that:

- AEC-1 – valid source-pathway-receptor linkages included vapour intrusion into permanent structures or buildings, and worker exposure during intrusive maintenance works.
- AEC-2 – valid source-pathway-receptor linkages included vapour intrusion into permanent structure or buildings, and explosive atmospheres.
- AEC-3 – valid source-pathway-receptor linkages were considered to include:
    - Leaching and erosion of PFAS from soil to surface water and groundwater associated with soil disturbance works (primarily during construction of the OSDs and outlets).
    - Recreational fishing resulting in the consumption by children of more than two serves of fish per month.
    - Bioaccumulation and effects on higher order ecological consumers.

It is noted that in reference to the relevant pathways discussed for the PFAS contamination (AEC-3) these relate to the risk assessments conducted (see **Section 10.6** and **10.7**).

Areas Requiring Management following Completion of CMP Works

Additional areas requiring management following the completion of the CMP works (see **Section 9**) were defined in the LTEMP. These areas included:

- potential fill material in the STP area beneath stockpile 10
- fill material within area ‘Anthro-2’
- UF111 and UF230

Remediation and/or validation works in these areas could not be completed during the Stage 2 remediation works reported in Section 9 due to either flooding of the area and the need to install/advance stormwater and dewatering facilities, the requirement to move stockpiled materials, or safety issues. The LTEMP captured the residual contamination management requirements in these areas to be addressed when pertinent during later stages of Stage 2 works.

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PFAS-impacted Stockpiles

Following the completion of the Stage 1 (**Section 8**) and Stage 2/Supplementary (**Section 9**) remediation works various stockpiles of soils remain across the MPW site that will require management during ongoing construction works. The LTEMP identified PFAS-impacted soils within some of these stockpiles as residual contamination that will require ongoing management (see the consultant's table of all stockpiles on-site included in the LTEMP Appendix L. The stockpiles will be placed within reuse areas as detailed within the plan (reuse of PFAS-impacted soils is discussed in **Section 11.1.7**).

11.1.4 Activities to be Managed by LTEMP

The consultant (EP Risk, Oct 2020) explained that the scope of works to be managed under the LTEMP can be explained as sub-stages including:

- Phase 2 contamination management works
- Phase 2 site preparation works
- Phase 2 construction works
- Operational phase

The LTEMP will be implemented throughout the Stage 2 works in conjunction with the CEMP (SIMTA, Jan 2020).

The consultant detailed the activities that are planned within each of the three defined AECs – for each of the stages of works. The evaluation of these activities was provided to frame the management procedures for the LTEMP.

Activities Proposed Within AEC-1

Within AEC-1, the TCE-impacted area, the consultant noted the following activities are proposed:

- Phase 2 contamination management – validation in relation to the CMP implementation
- Phase 2 site preparation – filling to raise site levels
- Phase2 construction – construction of a roadway and pedestrian access track and installation of underground services
- Operational phase – maintenance works in sub-surface or surface/landscaping

The consultant discussed that the construction works will only extend within the level of the imported fill.

Activities Proposed Within AEC-2

Within AEC-2, the LNAPL impacted area, the consultant noted the following activities are proposed:

- Phase 2 contamination management – validation in relation to the CMP implementation, development of a CATA, and excavation of an OSD (Basin 10)

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- Phase 2 site preparation – filling to raise site levels
- Phase 2 construction – construction of a rail line, construction of OSD-10, and installation of underground services
- Operational phase – sub-surface maintenance works

The consultant explained that the depth of the proposed OSD (Basin 10) within AEC-2 will not extend to the depth where LNAPL is observed with approximately a 3-metre buffer below the base of the excavation and the highest depth of LNAPL.

Activities Proposed Within AEC-3

Within AEC-3, the PFAS-impacted area, the consultant noted the following activities are proposed:

- Phase 2 contamination management –
  - validation in relation to the CMP implementation
  - development of a CATA
  - development of a PFAS engineered stockpile area
  - excavation of OSD-5, OSD-6, OSD-8, and OSD-10
  - installation of clay liners at OSD-5, OSD-6, and OSD-8
  - implementation of erosion, sedimentation, and stormwater controls during bulk earthworks and sequencing works to minimise the potential for leaching of PFAS to groundwater and surface water
- Phase 2 Site Preparation – filling to raise site levels and bulk earthworks excavation in accordance with the site cut and fill plan
- Phase 2 Construction – construction of OSDs, rail line, roadways, warehouses, and landscaped areas, and installation of underground services
- Operational Phase – maintenance works in sub-surface or surface/landscaping

The consultant noted that the maximum excavation depth of the OSDs will be above the reported depths of groundwater in their respective areas.

Activities Proposed Within Additional Areas requiring Management

Within the additional areas requiring management following the completion of the CMP works the consultant noted the following activities are proposed:

- Phase 2 construction works –
  - Management of fill material in the STP area (SP10) and at Anthro-2
  - Management of UF111 and UF230 adjacent to live high-risk services where no capping or removal was considered safe or practical during CMP works
  - Reuse or off-site disposal of selected stockpiles of PFAS-impacted materials.

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Activities Proposed Within Offset / Conservation Area

Within the Offset Area (Biobanking or Conservation Area), the consultant noted the following activities are proposed:

- Phase 2 contamination management –
  - validation in relation to the CMP implementation
  - application of a growing medium cover layer to exposed PFAS-impacted areas
  - management of human disturbance including construction of a perimeter fence, access gates and signage
- Phase 2 site preparation – weed control and vegetation planting.
- Operational phase –
  - maintenance works for the conservation area in accordance with appropriate plans and maintenance of the cover layer
  - groundwater and surface water monitoring.

11.1.5 Management and Monitoring Procedures

To address each of the activities and relevant exposure pathways for AEC-1, AEC-2, and AEC-3 (see **Section 11.1.3** and **11.1.4**), the consultant (EP Risk, Oct 2020) developed specific procedures to address the restrictions, activity, or risk and detail required management and monitoring.

The procedures, which were labelled with the nomenclature 'EMP', are provided in the consultant's Appendix D (Environmental Management Procedures).

The consultant noted that the procedures were developed to be consistent with the RAP (Golder, Aug 2016b) and CMP (EP Risk, July 2020) and as pertinent the EMPs refer to other documents.

The procedures developed included:

- EMP01 – Land use restrictions
- EMP02 – Subsurface works – AEC1
- EMP03 – Subsurface works – AEC2
- EMP04 – Subsurface works – AEC3
- EMP05 – Materials tracking
- EMP06 – Stockpile management
- EMP07 – Soil reuse – AEC 3
- EMP08 – Lining of OSD 5, OSD 6 and OSD 8
- EMP09 – Application of cover over layer in the Offset Area
- EMP10 – Off-site disposal of excavated/unsuitable material

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- EMP11 – Importation of fill materials/aggregate
- EMP12 – Subsurface maintenance works
- EMP13 – Landscape maintenance
- EMP14 - Unexpected finds
- EMP15 – Additional validation requirements
- EMP16 – Management of groundwater
- EMP17 – Management of surface water
- EMP18 – Groundwater and surface water monitoring
- EMP19 – Training
- EMP20 – Contractor and subcontractor management
- EMP21 – Contingency plan
- EMP22 – Non-compliances with the LTEMP
- EMP23 – Record keeping
- EMP24 – Audit/review of LTEMP implementation
- EMP25 – LTEMP review
- EMP26 – Cessation of LTEMP application.

11.1.6 Management Approach to AECs

AEC-1 and AEC-2

For AEC-1 and AEC-2, restrictions were implemented (EMP-01) for the land uses to control the potential risks within these areas. Other relevant management procedures for these AECs relate to the CMP implementation works and construction related works such as the importation of fill and the excavation of OSD-10 over (not extended to the depth of) the LNAPL impacts at AEC-2. EMPs were developed to manage the sub-surface excavation works at AEC-1 (EMP02) and AEC-2 (EMP03).

AEC-3 – PFAS Impacts

Due to the broad extent of the residual PFAS contamination at the site and the required construction or earthworks through these areas, several EMPs were developed to address PFAS-related issues during the Stage 2 works. Sub-surface excavation works at AEC-3 were detailed in EMP04.

11.1.7 Reuse of PFAS-Impacted Soil

Prior to update of the LTEMP following the further remediation and validation works (**Section 9**) a site-specific risk assessment was conducted by EnRiskS (EnRiskS, Oct 2020) that evaluated PFAS-impacted soils for reuse during site development works. The risk assessment is discussed in **Section 10.7**.

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The conclusions and recommendations of the risk assessment were incorporated in the revised LTEMP in regard to reuse of PFAS-impacted soils at the MPW site. The reuse zones, criteria, and specifies management measures as presented in the LTEMP are presented below in the consultant's Table 8.

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Table 8 – PFAS Trigger Levels for Soil Reuse Within the Construction Area

Soil Reuse Zone	Analyte	Land use	Criteria	Management Measures
Soil Reuse Zone 1 (all areas)	Soil - PFOS[42]	All land uses	≤ 0.01 mg/kg	Materials must be placed at least 1 m above groundwater (seasonal maximum). These criteria relate to material that may be placed adjacent to OSD basins and overflow drainage channels that have a clay liner or equivalent geosynthetic liner[43].
	Leachate (neutral pH) - PFOS + PFHxS[44]		≤ 0.07 µg/L	
Soil Reuse Zone 2 (beneath surface cover materials as described in management measures)	Soil - PFOS	All land uses	≤ 0.01 mg/kg	Materials must be placed at least 1 m above groundwater (seasonal maximum). Materials must be placed beneath Engineered Fill[45], concrete or a clay liner or equivalent geosynthetic liner[43].
Soil Reuse Zone 3 – Soil beneath subdivided area for warehouse development / lease area.	Soil - PFOS	Intensively developed sites	≤ 0.01 mg/kg	Materials must be placed at least 1 m above groundwater (seasonal maximum). Materials must be placed beneath Engineered Fill[45], concrete, or a clay liner or equivalent geosynthetic liner[43].
Soil Reuse Zone 4 – Soil beneath the western ring road and interstate terminal/access areas	Soil - PFOS	Intensively developed sites	≤ 0.14 mg/kg	Materials must be placed at least 1 m above groundwater (seasonal maximum). Materials must be placed beneath Engineered Fill[45], concrete, or a clay liner or equivalent geosynthetic liner[43].

[42] PFOS - Perfluorooctane sulfonate.

[43] The clay liner/geosynthetic liner must comply with the following requirements:

- Install clay liners (or equivalent geosynthetic liners) through embankments and basin floors (minimum 600 mm) and under bio-retention basins (minimum 300 mm), as well as OSD overflow drainage channels to mitigate any preferential pathways for soil leachate to directly enter surface water and stormwater to migrate to groundwater. The clay/geosynthetic liner should meet a maximum permeability of 1x10-9 m/s.
- The liners should be monitored via inspection if possible (minimum yearly) or by installation and testing of monitoring well(s) and repaired if damaged or deteriorated.
- All works undertaken in the area of the OSD stormwater infrastructure should not damage these liners. If damage occurs the liners need to be repaired as soon as practicable.

[44] PFHxS – Perfluorohexane sulfonate.

[45] Engineered Fill of a minimum 1 m thickness is to conform to one of the following:

- Sandstone Fill from road header excavation, tunnel boring machine excavation or ripped or rock hammer excavation.
- Approved imported fill materials.
- Site won VENM or Excavated Natural Material (ENM).

Where the thickness of Engineered Fill is less than 1m, the surface cover must also include concrete pavement or a building slab.

Engineered Fill shall be placed in accordance with the following requirements:

- In near horizontal, laterally extensive layers of uniform material and thickness, deposited systematically across the work area as determined by the Geotechnical Inspection and Testing Authority (GITA).
- The compacted thickness of each layer shall be equal to or less than 300 mm. Engineered Fill shall only be placed on subgrade in accordance with the Moorebank Intermodal Logistics Precinct: Bulk Earthworks Specification Area A, B, D (EPSM3813-021S REV 1) and approved by the GITA.
- Engineered Fill shall be placed and compacted to a Dry or Hilf Density Ratios (Standard Compaction) of between 98% and 102%.
- The placement moisture variation or Hilf moisture variation shall be controlled to be between 2% dry of optimum and 2% wet of optimum.

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The reuse zones were defined based on the use of the site with Zones 3 and 4 located a buffer distance away from waterways and stormwater structures.

Soils at concentrations more than the PFAS trigger levels for reuse will be placed within a short- to medium-term engineered stockpile that will be constructed at the site. The stockpile is intended to provide on-site storage and containment of PFAS-impacted soils for a duration up to 2-5 years and until an appropriate treatment option for the material is available and suitable for the proposed development. The consultant nominated a location and generic design for the engineered stockpile in the LTEMP, however, this will be further designed prior to construction.

Within the Offset Area, in order to address the potential risk to terrestrial receptors due to residual PFAS contamination in soils, a cover layer of soils or appropriate growing medium will be applied as discussed in EMP09. The cover layer will be placed at a minimum of 0.5 metres thickness within the area of PFAS-impacted soils.

11.1.8 Other Management Requirements

Environmental Management Plans or Procedures (EMPs) were developed for other management issues during works at the site in the short- to long-term implementation of the LTEMP:

- EMPs were developed to address waste management, stockpiling, classification of soils, importation of fill or aggregate, and disposal of materials (EMP05, EMP06, EMP10, and EMP11).
    - Of significance in EMP06, Stockpile Management, procedures were established in alignment with the NEMP for the additional requirements relating to PFAS-impacted stockpiles. The cover, bunding, and other measures were specified to minimise the potential for generation of PFAS-impacted surface water and any off-site impacts.
    - PFAS-impacted stockpiles already present on-site (as generated during the Stage 1 or Stage 2 remediation works) were identified in the LTEMP. The stockpiles will be placed within reuse areas as detailed within the plan. Tracking of stockpiles will be updated as works progress in accordance with established protocols and the LTEMP.
- Groundwater management (EMP16) – the consultant noted that groundwater is not expected to be encountered during Stage 2 works but should construction dewatering be unavoidable a Dewatering Management Plan will be developed.
- Surface water management (EMP17) – similar to the approach implemented for PFAS-impacted surface water during Phase 1 works (see **Section 9.5.2**), the consultant discussed procedures to minimise the generation of contaminated surface water or sediment, and how to collect, test, dispose, and treat (if required) surface water generated.
- Procedures were developed to address the management of any unexpected finds (EMP14) in alignment with the approach detailed in the CEMP (SIMTA, Jan 2020), and to address any contingencies (EMP21).

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11.1.9 Monitoring Requirements

The consultant (EP Risk, Oct 2020) discussed that per the conditions of consent (NSW DPE, Nov 2019), a groundwater and surface water monitoring program must be implemented.

The consultant discussed that groundwater plumes had been identified in relation to AEC-1 (TCE impacts), AEC-2 (hydrocarbon impacts), and AEC-3 (PFAS impacts), however, the RAP (Golder, Aug 2016b) had concluded that further monitoring of the TCE plume was not necessary.

Ongoing monitoring for AEC-2 is included under the EMP for the former DNSDC Refuelling facility (GHD, Oct 2018) and includes monitoring of wells located within the MPW portion of the plume. Following completion of works at the adjacent MPE site, the consultant reported well installation and monitoring to implement the GHD EMP will be undertaken, and therefore, works to monitor AEC-2 will not be duplicated in the LTEMP. The location and access to the monitoring wells on the MPW site will be protected through implementation of the LTEMP.

Therefore, a surface water and groundwater monitoring approach was developed for the LTEMP to address PFAS contamination (AEC-3) in EMP18. The consultant defined that quarterly sampling during and at the completion of the Stage 2 works would be implemented.

Samples would be collected from 20 monitoring wells along the western side of the site (within the Offset Area) and 14 surface water locations within the Georges River (adjacent to the site). Monitoring locations are depicted in the consultant's Figure EMP18_1 (the prior Site Audit Report (Enviroview [James Davis Site Auditor], Nov 2020) includes the LTEMP). The consultant noted that existing monitoring wells would be utilised where practicable, but if wells were unavailable or destroyed, replacement wells would be installed.

Appropriate procedures for the well installation, and monitoring well and surface water sampling were included in the EMP.

To monitor surface water on-site during construction works the consultant included in EMP18 procedures to inspect capping layers, lines, basins, and swales. Sampling of stormwater from basins and swales would be undertaken following rain events and in accordance with the conditions of the EPL (see **Section 9.5.3**).

11.2 Moorebank Avenue Works

A portion of the MPW site has become included within the Moorebank Avenue Upgrade Works project or 'MAUW'. The MAUW involves the construction works to upgrade Moorebank Avenue and includes the raising of the vertical alignment of the road by 2 metres over a stretch of approximately 1.5 kilometres from the northern boundary of the MPE site to approximately 120 metres south of the MPE site. The MAUW also includes upgrades to intersections, ancillary works, and the construction of an on-site detention basin to the west of Moorebank Avenue within the MPW site.

The MAUW includes the 'LNAPL exclusion zone' or 'AEC-2' as discussed in **Section 11.1**.

Management of the MAUW is incorporated into the CMP for the Moorebank Avenue Upgrade works:

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EP Risk. *Contamination Management Plan, Moorebank Avenue Upgrade Works, 400 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: EP1280.002_CMP01_v4). 8 November 2019. (EP Risk, Nov 2019)

The plan includes procedures to address potential contamination issues that could be encountered during remediation or construction works. While not detailed herein, the approaches detailed and reviewed elsewhere, are considered appropriate for use during the construction works within the MPW portion of the MAUW.

As discussed in **Section 9.1.6**, the CMP for MPW (EP Risk, July 2020) also included attachments that detail management works for UXO that should be implemented during Stage 2 works – including a UXO RAP (G-tek, Nov 2019) that incorporates the area of MPW and the MAUW. This G-tek RAP, and the updated *UXO Risk Review and Management Plan* (G-tek, Oct 2019), should be implemented for the MAUW during construction works.

It is further noted that as of September 2020, the Site Auditor has received a draft SAQP for the MAUW area to investigate the potential for PFAS contamination prior to construction works. These works will remain ongoing during further stages of work across the MPE and MPW sites and will be reviewed and discussed in future audits as pertinent.

11.3 Site Audit Area Long-Term Environmental Management Plan

The consultant (EP Risk, Dec 2021) developed the *Lot 6, 7, and 12 LTEMP* (also known as the Site Audit Area LTEMP) to provide the environmental management framework for the Site Audit area long-term following the completion of placement of fill during the redevelopment works.

EP Risk. *Long-Term Environmental Management Plan, Lot 6, 7, and 12, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: EP1489.007.v5). 8 December 2021. (EP Risk, Dec 2021)

This LTEMP will remain in effect for the Site Audit site both long-term and during ongoing construction works.

The *Lot 6, 7, and 12 LTEMP* (the Site Audit Area LTEMP) was prepared to manage the Site Audit site following placement of fill and informs this SAR and SAS (see **Section 1.5**) to enable Condition B171 of the Stage 2 SSD 7709 to be met.

For the broader MPW site and excluding the Site Audit area – the MPW site-wide LTEMP (EP Risk, Oct 2020) remains in effect to provide the environmental management framework over the short to long-term (see **Section 11.1**).

The Lot 6, 7, and 12 LTEMP (Site Audit Area LTEMP) (EP Risk, Dec 2021) is attached to this Site Audit Report in **Appendix D**.

The Lot 6, 7, and 12 LTEMP (EP Risk, Dec 2021) included significant appendices/attached reports (see **Appendix D**), which are discussed as relevant below, including:

- conceptual site model (LTEMP Appendix A)
- environmental management procedures (LTEMP Appendix B)

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- unexpected finds protocol (LTEMP Appendix D).

11.3.1 LTEMP Objectives

The consultant (EP Risk, Dec 2021) explained the objectives of the LTEMP were to:

- Outline the nature and extent of impacted soils, sediment, surface water and groundwater requiring short to long-term management at the site.
- Develop management measures for the management of impacted materials encountered during construction works and long-term operation of the site including monitoring and reporting in satisfaction of relevant health and safety and environmental legislation.
- Assign responsibilities for the implementation of management measures.

The parties responsible for implementing the LTEMP were identified and included the landowner and their representative (the Commonwealth and MIC), the developer (Moorebank Precinct Nominees Pty Ltd), and various parties yet to be appointed that include the principal contractor, operational managing entity, and environmental consultant.

11.3.2 Residual Contamination Issues

AECs

The MPW site-wide LTEMP (EP Risk, Oct 2020) (**Section 11.1**) discussed that residual contamination at the MPW site is defined as consisting of three primary AECs:

- **AEC 1 – Chlorinated Hydrocarbon Impacts** in the north-west portion of the site. Predominately groundwater, the contaminants of potential concern include Trichloroethene (TCE) and Cis-dichloroethene (Cis-DCE).
- **AEC 2 – Light Non-aqueous phase liquid (LNAPL) Area** located to the south, on the corner of Chatham and Moorebank Avenue. Predominantly groundwater, the contaminants of potential concern include LNAPL, TRH, BTEX, naphthalene, lead, and PAHs.
- **AEC 3 – Former firefighting training areas** where AFFF was used and surrounding land. The contaminants of potential concern include PFAS.

As presented in the Site Audit area LTEMP (EP Risk, Dec 2021), neither AEC 1 nor AEC 2 are considered relevant for the Site Audit area site – and they are located outside the boundaries of the site.

Therefore, the known sources of contamination within the Site Audit Area are associated with PFAS impacts from historical firefighting activities – AEC 3. These are identified as being partially located within the eastern and western portions of the Site Audit Area site. Figure 3 of the LTEMP (the LTEMP is included in **Appendix D** of this report) defines the site (part lot 6, 7, and 12, DP 1197707) and AEC 3.

The consultant's Figure 5 of the LTEMP depicts the soil reuse zones across the MPW site. While the Site Audit area was previously identified as an area for potential reuse of PFAS-impacted soils (Zone 3) – no PFAS-impacted materials were placed or reused within the Site Audit area.

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As placement of fill at the site has been completed (final grade achieved) there will be no potential for future reuse of PFAS-impacted materials. Therefore, reuse of PFAS-impacted soils is not a relevant issue for the Site Audit site.

Conceptual Site Model

The consultant (EP Risk, Dec 2021) explains that a minimum of 1m of engineered fill has been placed across the Site Audit area – and that the site will (post-development) also be covered substantially by warehousing or concrete/pavement. Therefore, while potential contamination remains within the Site Audit area boundaries – it is at depth and covered with clean fill and surface cover.

The consultant's Figure 4 of the LTEMP (the LTEMP is attached in **Appendix D**) depicts the Site Audit area Conceptual Site Model (CSM). As is shown, the Site Audit area is located above potential PFAS-contaminated areas (AEC 3) – but clean imported fill has built-up the site above this area.

Therefore, while construction and maintenance workers at the site have potential exposure pathways to contamination (from the MPW site) of inhalation, dermal contact, and ingestion – these are only *complete* pathways if the 'barrier' of fill between the site surface and the potential contamination is breached.

The site CSM and locations of historically defined contamination within the Site Audit area are further defined in the consultant's Appendix A of the LTEMP (the LTEMP is attached in **Appendix D**). This appendix of the LTEMP details the concentrations of contaminants observed, numbers of samples collected within the Site Audit area, and depicts the sample locations in figures.

The consultant's Appendix A also further discusses the CSM and source-pathway-receptor linkages and notes that the linkage between contamination and receptors is only complete if the management procedures (as defined in the LTEMP) are not implemented during construction, maintenance, or landscaping works.

11.3.3 Activities to be Managed by LTEMP

The consultant (EP Risk, Dec 2021) explained the scope of works to be managed under the LTEMP:

- Stage 2 construction works that include the installation of underground services and the construction of roadways, warehouses, and landscaped areas, and
- operational phase works that may include sub-surface maintenance works.

The consultant nominated that the developer, principal contractor, and operational managing entity will be responsible for implementation of the LTEMP.

LTEMP will be implemented throughout the Stage 2 works in conjunction with the CEMP (SIMTA, Jan 2020).

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11.3.4 Management and Monitoring Procedures

To address the activities and relevant exposure pathways the consultant (EP Risk, Dec 2021) developed specific procedures to address the restrictions, activity, or risk. The required management and monitoring were detailed in these procedures.

The procedures, which were labelled with the nomenclature 'EMP', are provided in the consultant's Appendix D (Environmental Management Procedures) with the LTEMP attached to this Site Audit Report in **Appendix D**.

The consultant noted that the procedures were developed to be consistent with the RAP (Golder, Aug 2016b), CMP (EP Risk, July 2020), and MPW site-wide LTEMP (EP Risk, Oct 2020) and as pertinent the EMPs refer to other documents.

The procedures developed included:

- EMP01 – Land use restrictions
- EMP02 – Subsurface works – AEC 3
- EMP03 – Materials tracking
- EMP04 – Stockpile management
- EMP05 – Minor excavation
- EMP06 – Off-site disposal of excavated/unsuitable material
- EMP07 – Subsurface maintenance works
- EMP08 - Unexpected finds
- EMP09 – Additional validation requirements
- EMP10 – Management of groundwater
- EMP11 – Management of surface water
- EMP12 – Training
- EMP13 – Contractor and subcontractor management
- EMP14 – Contingency plan
- EMP15 – Non-compliance with the LTEMP
- EMP16 – Record keeping
- EMP17 – Audit/review of LTEMP implementation
- EMP18 – LTEMP review
- EMP19 – Cessation of LTEMP application.

11.3.5 Management Approach

During the Stage 2 construction works where activities such as installation of underground utilities or construction of roadways, warehouses, or landscaped areas would be conducted –

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the consultant (EP Risk, Dec 2021) noted that the procedures including EMP 02, 03, 04, 05, 06, 07, 08, 09, 10, and 11 would require consideration.

Subsequently, during the operational phase of works at the site, where sub-surface maintenance works may be required, the EMPs 7, 8, 10, and 11 would require consideration.

The land use restrictions that are defined in EMP 01 and administrative and record keeping procedures defined in EMPs 12 through 19 would be relevant at any stage of works.

Procedures were developed to address the management of any unexpected finds (EMP8) in alignment with the approach detailed in the CEMP (SIMTA, Jan 2020), and to address any contingencies (EMP14).

11.3.6 Reuse of PFAS-Impacted Soil

The consultant (EP Risk, Dec 2021) noted that as engineered fill material has been placed across the entire footprint of the site there is limited opportunity for the future reuse of PFAS-impacted soil within the Site Audit area site.

There is a potential for disturbance of soils underlying the fill material (that are potentially PFAS-impacted) during construction works (such as utility installation or landscaping works). If excess spoil is generated during these works the consultant explained that it would be managed in accordance with the relevant guidance, and the CMP (EP Risk, July 2020) and LTEMP (EP Risk, Oct 2020) in place for the broader MPW site.

11.3.7 Monitoring and Reporting Requirements

No routine environmental sampling is required within the Site Audit area site.

The consultant (EP Risk, Dec 2021) discussed that the LTEMP should be periodically reviewed in accordance with EMP 18, and any revisions would require review and approval by the appointed NSW EPA accredited Site Auditor.

In the event of an incident or non-compliance with the LTEMP, the consultant noted that reporting would be managed in accordance with EMP 15.

11.4 Application and Enforcement of LTEMPs and CMP

11.4.1 Condition B169 LTEMP and CMP

The site-wide MPW LTEMP (EP Risk, Sept 2020) (**Section 11.1**) was developed to help inform the Site Audit Statement (SAS # 0301-2014). The LTEMP was considered able to be made legally enforceable through compliance with Condition B172 of SSD 7709 (NSW DPE, Nov 2019) that requires the preparation of an LTEMP to the satisfaction of the Site Auditor. The consultant (EP Risk, Oct 2020) noted the LTEMP must be registered on the property title in satisfaction of Condition B173 of SSD 7709.

This site-wide MPW LTEMP and the MAUW CMP (EP Risk, Nov 2019) (**Section 11.2**) were noted on, and attached to, SAS # 0301-2014 (Enviroview [James Davis Site Auditor], Nov 2020) with the SAS contingent on the appropriate implementation of these documents. This was the Statutory Site Audit conducted to meet the consent condition B169 of SSD 7709 (NSW DPE, Nov 2019).

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11.4.2 Condition B171 LTEMP

The Site Audit area LTEMP (*Lot 6, 7, and 12 LTEMP*) (EP Risk, Dec 2021) (**Section 11.3**) was developed to help inform **the current Site Audit** that has been conducted to meet consent conditions B171 and B172 of SSD 7709 (NSW DPE, Nov 2019) and Condition C37 of SSD 10431 (NSW DPIE, May 2021). Both the LTEMP and SAS are limited to the area defined in **Section 2.1** – the Site Audit Area site.

The consultant noted the LTEMP must be registered on the property title in satisfaction of Condition B173 of SSD 7709.

The implementation of the LTEMP is required for compliance with Condition C39 of the Stage 3 development consent – SSD 10431 (NSW DPIE, May 2021) that states "*the applicant must ensure that the LTEMP prepared under condition B172 of MPW Stage 2 (SSD 7709) is implemented for the duration of construction and operation of the development.*"

Further, the LTEMP will be noted on, and attached to, the Site Audit Statement to be issued as part of this Site Audit, and the SAS will be contingent on the appropriate implementation of this document. This current Site Audit is a Statutory Site Audit to meet Condition B171 of SSD 7709.

It is considered that the above is sufficient to require the implementation and enforcement of the LTEMP.

11.4.3 Both LTEMPs

Councils will record SASs on future planning certificates that may be prepared under S. 10.7 (formerly S. 149) of the Environmental Planning Act and Assessment 1979 and that supporting information (i.e., the SAS with attached LTEMP and CMPs) are supplied with the certificates. When land is bought or sold the Conveyancing Act 1919 and Conveyancing (Sale of Land) Regulation 2010 require that a Section 10.7 Planning Certificate be attached to the contract of sale for the land. This process is sufficient to meet the requirements for both notification and enforcement of the LTEMP.

11.5 Site Auditor Discussion of Management Plans

The Site Audit area LTEMP (*Lot 6, 7, and 12 LTEMP*) (EP Risk, Dec 2021) was reviewed by the Site Auditor (**Appendix A**) during the Site Audit (see **Section 11.3**).

The LTEMP appropriately details and addresses the residual contamination issues known within the Site Audit Area site that are associated with AEC 3 – residual PFAS contamination (see Section 10). Limited management considerations are necessary for the site going forward given that placement of fill across the site has been completed – and therefore a 'barrier' between any potential contamination and the site surface has been established.

The LTEMP defines activities that should be managed and procedures (EMPs) to address the valid and relevant pathways of exposure between impacted media and receptors over the course of future construction and maintenance works in the short- and long-term.

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There were no potential ecological risks identified in relation to PFAS contamination at the site. Potential human health risks at the site are only present if the minimum 1-metre-thick imported fill that has been placed across the site is breached in areas of PFAS contamination (AEC 3). The LTEMP details procedures to mitigate this risk if sub-surface construction or maintenance works are required.

The Site Audit area LTEMP (Lot 6, 7, and 12 LTEMP) (EP Risk, Dec 2021) (**Section 11.3**) was developed to help inform the current Site Audit that has been conducted to meet consent conditions B171 and B172 of SSD 7709 (NSW DPE, Nov 2019). Both the LTEMP and SAS are limited to the area defined in **Section 2.1** – the Site Audit area site.

In conclusion, the Site Auditor considers that the Site Audit area LTEMP (*Lot 6, 7, and 12 LTEMP*) – has been appropriately developed to address the residual contamination issues at the site and is sufficient and appropriate for implementation during Stage 2 or Stage 3 works.

The Site Auditor is satisfied that the mechanism to ensure the implementation of the LTEMP (see **Section 11.4**) is sufficient to meet the requirements for legal enforceability and notification of a site environmental management plan.

The Site Auditor considers that the LTEMP is sufficient and appropriate to detail the requirements of the ongoing management at the Site Audit area site during the construction works and long-term management and operation of the warehouse site. With implementation of this document (EP Risk, Dec 2021) – the Site Auditor considers that the Site Audit area (part Lots 6, 7, and 12) site is suitable for the proposed commercial/industrial land uses.

The MPW site-wide LTEMP (EP Risk, Oct 2020) and the CMP for the MAUW (EP Risk, Nov 2019) are summarised in **Sections 11.1** and **11.2** respectively. While these documents remain in effect for the broader MPW site – they have been superseded by the Site Audit Area LTEMP (**Section 11.3**) for the current Site Audit site.

The MPW site-wide LTEMP and MAUW CMP were reviewed by the Site Auditor during the prior Site Audit (Enviroview [James Davis Site Auditor], Nov 2020) and Site Audit discussion is presented in that Site Audit Report. The site-wide MPW LTEMP and the MAUW CMP were noted on, and attached to, the SAS (# 0301-2014) with the SAS contingent on the appropriate implementation of these documents. This was the Statutory Site Audit conducted to meet the consent condition B169 of SSD 7709 (NSW DPE, Nov 2019).

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12 Evaluation of Site Land Use Suitability

The NSW EPA *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd edition)* prescribe that during an assessment of the suitability of a site for an existing or proposed land use in an urban context, Site Auditors must follow the decision process and checklist for assessing urban redevelopment sites provided as an Appendix to the abovementioned Guidelines (NSW EPA, 2017).

For the purposes of this Site Audit the objective is to determine whether the site **is suitable** for **commercial/industrial land use.**

The findings of the Site Audit are presented for each requirement of the decision process:

All site assessment, remediation and validation reports follow applicable guidelines.

The documents provided by the consultants generally meet the requirements of the Site Audit in relation to the *Guidelines for consultants reporting on contaminated sites* (NSW EPA, 2020).

Any aesthetic issues relating to site soils have been adequately addressed.

Potential aesthetic issues (residual contamination and presence of ACM) have been addressed during remedial works through the implementation of the site RAP (Golder, Aug 2016b) and associated remedial planning documents (see **Section 7**) and the site demolition, remediation, and validation works as documented in the *Remediation Validation Report* (JBS&G, July 2020a), *Supplementary Validation Report* (JBS&G, Sept 2020), and *Woolworths Audit Area Validation Summary* (JBS&G, Feb 2021).

Soils have been assessed against relevant health-based investigation levels and potential for migration of contamination from soils to groundwater has been considered.

Soils were assessed against the appropriate and equivalent health-based investigation levels during assessment, remediation, and validation works.

Groundwater (where relevant) has been assessed against relevant health-based investigation levels and, if required, any potential impacts to buildings and structures from the presence of contaminants considered.

Groundwater was assessed against the appropriate and equivalent health-based investigation levels during the assessment works at the site.

Hazardous ground gases (where relevant) have been assessed against relevant health-based investigation levels and screening values.

Soil vapour contamination was not found to be a relevant concern for the Site Audit Area site.

Any issues relating to local area background soil concentrations that exceed relevant investigation levels have been adequately addressed in the site assessment report(s).

No local background soil concentrations above the appropriate criteria were identified as an issue.

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The impacts of chemical mixtures have been assessed.

No issues relating to chemical mixtures in relation to the identified contaminants of concern are expected.

Any potential ecological risks have been assessed.

Soils were assessed against the appropriate ecological-based investigation levels during assessment works. Within the Site Audit Area site due to the presence of fill across the site, placed to prepare for the construction of warehouses and pavement in alignment with the development Master Plan, there is considered to be limited opportunity for ecological receptors.

Any evidence of, or potential for, migration of contaminants from the site has been appropriately addressed, including potential risks to off-site receptors, and reported to the site owner or occupier.

Within the Site Audit Area site there is considered to be limited potential for migration of contamination from the site. As presented in **Section 10**, while PFAS contamination across the broader MPW site does contribute to contamination discharge – this is not considered by the Site Auditor to be a significant concern for the Site Audit Area site. Limited PFAS contamination (AEC-3) is located within the Site Audit Area site – it is at depth and has been covered by engineered fill reducing infiltration and leaching potential.

The site management strategy (where relevant) is appropriate including post-remediation environmental plans.

The Site Audit Area site has been remediated and validated during the Stage 1 and Stage 2 remedial works. A minimum of 1 m of engineered fill has been placed within the site – which will be predominantly covered by warehousing and/or pavement following the completion of construction works.

While limited PFAS contamination (AEC-3) remains at depth within the Site Audit Area site, the *Lot 6, 7, and 12 LTEMP* (Site Audit Area LTEMP) (EP Risk, Dec 2021) details the management procedures required to be implemented to preclude human or environmental impacts during future works.

It is the auditor's opinion that the Site Audit Area LTEMP in place for the site is appropriate for the ongoing site management to address contamination issues.

It is noted that with respect to the broader MPW site – the MPW site wide LTEMP (EP Risk, Oct 2020) and MAUW CMP (EP Risk, Nov 2019), as attached to the prior audit for the whole of the MPW site (Enviroview [James Davis Site Auditor], Nov 2020), remain in effect. These plans enable comprehensive management of residual contamination issues at the MPW site during Stage 2 and long-term. These plans, together with the CEMP (SIMTA, Jan 2020), will continue to be utilised across the MPW site during ongoing site redevelopment works.

The site assessment, remediation, and validation works conducted have been reviewed, and the decision-making process prescribed has been applied with regard to those reported works, and it is considered the Site Audit Area site is suitable for the proposed commercial/industrial land uses with implementation of the LTEMP (EP Risk, Dec 2021).

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13 Conclusions

The site assessment, remedial planning, risk assessment, remediation, and validation works reported and reviewed are considered to have met the requirements of NSW EPA (2017) *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd edition)* and other guidelines made or approved under s.105 of the *Contaminated Land Management Act 1997* and therefore the objectives of the Site Audit.

The current Site Audit focused on the minor remediation works that were conducted at the Site Audit Area site following the completion of Stage 2/supplementary remediation works in 2020. These works also included the placement of engineered fill across the Site Audit Area site.

Investigation and remediation works across the broader MPW site have been previously reviewed by the Site Auditor and documented in Site Audit Reports as discussed in **Section 1.6** and **1.10**.

The current Site Audit has considered both the requirements of Condition B171 of SSD 7709 (Stage 2 development consent) and Condition C37 of SSD 10431 (Stage 3 development consent) as discussed in **Section 1.6**. The Site Audit was conducted with consideration to these development consents.

In the Site Auditor's opinion, the works conducted to remediate the site were considered robust and detailed. The consultant demonstrated the remediation works were appropriately implemented with satisfactory documentation provided in the Woolworths Audit Area Validation Summary (JBS&G, Feb 2021).

Limited PFAS contamination (AEC-3) remains at depth within the Site Audit Area. The *Lot 6, 7, and 12 LTEMP* (Site Audit Area LTEMP) (EP Risk, Dec 2021) details the management procedures required to be implemented to preclude human or environmental impacts during future works. It is the auditor's opinion that the Site Audit Area LTEMP in place for the site is appropriate for the ongoing site management to address contamination issues. It is considered that the LTEMP can reasonably be made to be legally enforceable by this consent condition. Appropriate public notification of the LTEMP will be provided be the recording of the Site Audit Statement as is required under the *Contaminated Land Management Act 1997*.

The Contaminated Sites: *Guidelines for the NSW Site Auditor Scheme* (3rd edition) (NSW EPA, 2017) prescribe that during an assessment of the suitability of a site for an existing or proposed land use in an urban context, Site Auditors must follow the decision process and checklist for assessing urban redevelopment sites.

Regarding the decision process for assessing urban redevelopment sites, the works that have been conducted are considered to have met the requirements of guidelines (NSW EPA, 2017) and the decision-making process prescribed, and therefore subject to implementation of the LTEMP, the site is suitable for the proposed land use.

In conclusion, a Site Audit Statement will be issued certifying that, in the opinion of the Site Auditor, the site is suitable for the proposed commercial/industrial land use subject to implementation of the *Lot 6, 7, and 12 LTEMP* (Site Audit Area LTEMP) (EP Risk, Dec 2021). The implementation of the LTEMP – for the duration of construction and operation of the

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development – is a condition of the Stage 3 MPW development consent (NSW DPIE, May 2021). It is considered that the mechanisms for lawful enforcement and notification of the LTEMP exist.

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14 Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only and has been based in part on information obtained from the client and other parties. Enviroview Pty Ltd or the Site Auditor accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client or amended in any way without prior approval by the Site Auditor, and should not be relied upon by other parties, who should make their own enquires other than regulatory and planning authorities as required under the *Contaminated Land Management Act 1997* and *State Environmental Planning Policy 55*.

The data used to support the conclusions reached in this report have been obtained by other consultants and have been audited with a reasonable level of scrutiny, care, and diligence. Every reasonable effort has been made to identify and obtain all relevant data, reports and other information that provide evidence about the condition of the site, and those that were held by the client and the client's consultants, or that were readily available. No liability can be accepted for unreported omissions, alterations or errors in the data collected and presented by other consultants. Accordingly, the data and information presented by others are taken and interpreted in good faith.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations reviewed, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analyses selected are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site that was not identified in the site history, and which may not be expected at the site.

Changes to the subsurface conditions may occur after the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, Enviroview Pty Ltd and the Site Auditor reserves the right to review the report in the context of the additional information.

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Appendix A:
Site Audit Interim Advice

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Ref: IA 0301-2020-1_01

18 December 2020

Mark Howley
Tactical Group
Level 15, 124 Walker Street
NORTH SYDNEY NSW 2060

Via email/Aconex: mhowley@tacticalgroup.com.au

Dear Mr Howley,

RE: Site Audit Interim Advice 01 – Review of the Woolworths Audit Area Validation Summary – an area within Moorebank Precinct West.

James Davis of Enviroview Pty Ltd has been engaged to provide the services of a NSW EPA Contaminated Land Accredited Site Auditor, to conduct a Site Audit in relation to the land to be developed for the Moorebank Intermodal Terminal located at Moorebank Avenue, Moorebank, NSW, in accordance with the *Contaminated Land Management Act 1997* and relevant guidelines made or approved under s.105 of that Act.

The objective of the Site Audit is to provide a Site Audit Report and Site Audit Statement to certify, in relation to contaminated land, the Auditor's opinion of whether the site is suitable for the proposed commercial/industrial development.

A Site Audit Interim Advice is provided by a Site Auditor to assist in the management of contamination issues in regard to the requirements of the Site Audit at a particular stage of the Site Audit, prior to issuing the Site Audit Statement. An interim advice does not constitute a Site Audit Statement or a Site Audit Report and does not pre-empt the final Site Audit conclusions. A Site Audit Report and Site Audit Statement will be prepared at the conclusion of the Site Audit.

The purpose of this interim advice is to provide comment with regard to the review of the following revised report:

> JBS&G Australia Pty Ltd (JBS&G). *Moorebank Precinct West (MPW): Woolworths Audit Area Validation Summary.* (Report ref.: 51997-134422_L362_Rev-A). 11 December 2020.

Review Comments – Woolworths Audit Area Validation Summary

1. General Comment – Site Audit Area and Site Identification. The auditor understands that the site has been identified as "part of the proposed subdivision of Lot 1 in deposited plan (DP) 1197707 as partial Lots 6, 7, 8, and 12" and is depicted on the consultant's Figure 2.

   However – the following issues require further information in relation to the site identification. To assist in the discussion the auditor has attached three figures:

- Draft Figure 2 and Draft Figure 3 for the Site Audit report/statement – it is requested that these figures are reviewed for accuracy and feedback provided regarding the specific site identification. The site outline was defined by superimposing the JBS&G outline (from the consultant's Figure 2) onto the provided survey figure and alternate aerial photograph.
- A rough mark-up of EP Risk's Figure 5 from the LTEMP. Please review for accuracy.

Review of the auditor's draft Figure 3 (survey plan) appears to show that the boundaries of the Woolworths Audit Area extend to the western edge of the developable area – and therefore would include the Estate Road. Similarly, the eastern boundary of the site, where it incorporates a portion of Lot 12, appears (see LTEMP Figure 5 mark-up) to extend into a portion of the site that had been identified (in the LTEMP) for the Intermodal Terminal.

Review of the aerial photograph and site boundary as depicted in the auditor's draft Figure 2 (based on a NearMap aerial photograph captured on 1 October 2020), and similarly in the consultant's (JBS&G's) Figure 2 – the site appears to include on the eastern and western edges – portions of land that do not appear to have included fill placement as is clearly visible across Pad C and Pad D. Further, the consultant's documentation of UPEC21 validation works clearly demonstrate that this area had not included fill placement in mid-October 2020.

As can be seen in the LTEMP Figure 5 mark-up – these issues are significant in relation to the LTEMP and reuse of PFAS at the broader MPW site. The Estate Road and Intermodal Terminal areas have both been identified as 'Zone 4' areas in which reuse of PFAS soils within certain criteria is acceptable. If filling has been completed in these areas and there will be no potential for future reuse of PFAS soils – then the LTEMP will require update to appropriately incorporate these updated boundaries (and ensure they are no longer included within PFAS reuse zones).

However, <u>if future placement of PFAS soils and/or any remaining placement of clean fill is yet to be completed **in any portion** of the Woolworths Audit Area</u> – then the auditor would be unable to provide a condition B171 SAR/SAS in alignment with the development conditions.

<u>Therefore – in consideration of the above discussion the auditor requests the following:</u>

a. Review and feedback on the auditor's attached figures
b. The report should include detail regarding the site dimensions and area
c. Discussion of the boundaries of the Woolworths Site Audit Area – specifically whether it includes the Estate Road and any portion of the area identified (in the LTEMP) as part of the Intermodal Terminal
d. Discussion regarding whether fill placement has been completed across the entire site including all boundaries of the Woolworths Site Audit Area as discussed above. Documentation of completed fill placement of portions of the site outside of Pad C and Pad D would be beneficial
e. An provision of updated Master Plan for the MPW site with the Woolworths Site Audit Area clearly depicted.

f. It would also be beneficial if the consultant could provide the survey plans (included in Attachment 3 of the report) with additional annotation that depicts the Woolworths Site Audit Area (and therefore the auditor's Figure 3 would become irrelevant/unnecessary).

2. General Comment –Structure. On the western side of Pad C, a structure is visible (Figure 2) that appears to be a dewatering or stormwater collection pond. Is this pond still present on Pad C? Does it have any contamination issues in relation to collected waters?

3. Section 2.2.1, LTEMP.

   a. It is unclear what the statement that "*AEC3 considers the reuse and management of PFAS soils only*" means – please explain/rephrase. AEC3 was defined based on existing data across the MPW site where PFAS was identified in soils – it is a defined area of residual contamination.

   b. It is confusing why the consultant is discussing the LTEMP PFAS reuse conditions – have any residual PFAS-impacted soils been excavated/moved and placed within the Woolworths Audit Area? If the answer is no – then this should be clearly stated.

      As it is currently phrased in the report – it appears the consultant is trying to say that if PFAS-impacted soils had been reused/placed at the site it would be okay because they would have been covered by fill.

      Perhaps the consultant is trying to explain that residual PFAS-impacted soils – within AEC3 – were not disturbed and now remain at depth and covered by clean fill? Please clarify.

   c. With regards to the statement that the "*Audit Area does not overlap with long-term management areas … the LTEMP is not considered to require ongoing implementation within the Audit Area*" – the auditor is not sure that he can agree with this position. While it is agreed that monitoring and active management requirements should not be required within the audit area (pending addressing site identification in Comment # 1) – the LTEMP also includes, for example, provisions to prevent disturbance of residual contamination (i.e. the AEC-3 present across large portions of the audit area), management of PFAS-impacted soils (if required), and reinstatement of the cover material. If any excavation or disturbance of the surface clean fill material is likely to be required in the future – then the auditor would prefer that the LTEMP remains in place to cover the construction period for the Woolworths Site Audit area. Alternatively – a much simpler and separate LTEMP could be prepared that is specific for the site and only addresses the relevant issues.

4. Section 2.2.2, Unexpected Finds, and Attachment 4 – UPEC 21 Validation.

   a. Was UPEC 21 (continuation of UF55-5) the only unexpected find identified during ongoing earthworks in areas of the site surrounding Pad C and Pad D? Was the previously identified UF07 (addressed and validated during the Supplementary Validation works) located within the partial Lot 12 area?

   b. Given the excavation works that have occurred within AEC-3 as is clear from the works documenting UPEC 21 – and following the requirement to implement the

LTEMP – what further analysis of soils for PFAS has occurred? Was EMP 07 fully implemented during the works? Was only the generated stockpile sampled?

5. Section 2.2.4, Importation of Fill and Attachment 6 – MPE Sandstone Stockpile Assessment. The auditor understands that the stockpiled sandstone material located on the MPE site was surplus to (MPE) requirements and therefore were selected for reuse on the MPW site. However, the statement that "*imported fill has been tracked and documented by CARAS and was previously deemed suitable for use on-site*" applies to the MPE site and is subject to a different consent. For completeness and appropriate documentation – the consultant should provide relevant documentation or at minimum include complete references for the reports in which this documentation is provided in entirety – for all VENM imported to the site that has not been previously documented in the MPW Remediation Validation or Supplementary Validation reports.
6. Attachment 5 – Stockpile 31 Assessment. Where is Stockpile 31 located – is it within the Woolworths Audit Area? Are any stockpiles remaining within the audit area? Has the stockpile been reused/placed – and if so – has it been reused within the audit area?

Thank you for your time regarding this matter. If you require additional information or clarification, please do not hesitate to contact me.

Yours sincerely



James Davis
NSW EPA Contaminated Land Site Auditor
Enviroview Pty Ltd



ENVIROVIEW

Site Audit Plan - Site Audit Statement 0301-X UPDATE
MPW, Woolworths Site (Part Proposed Lots 6, 7, 8, and 12)
Stage 2 Works (Condition B171), MPW, MOOREBANK, NSW

Figure 2

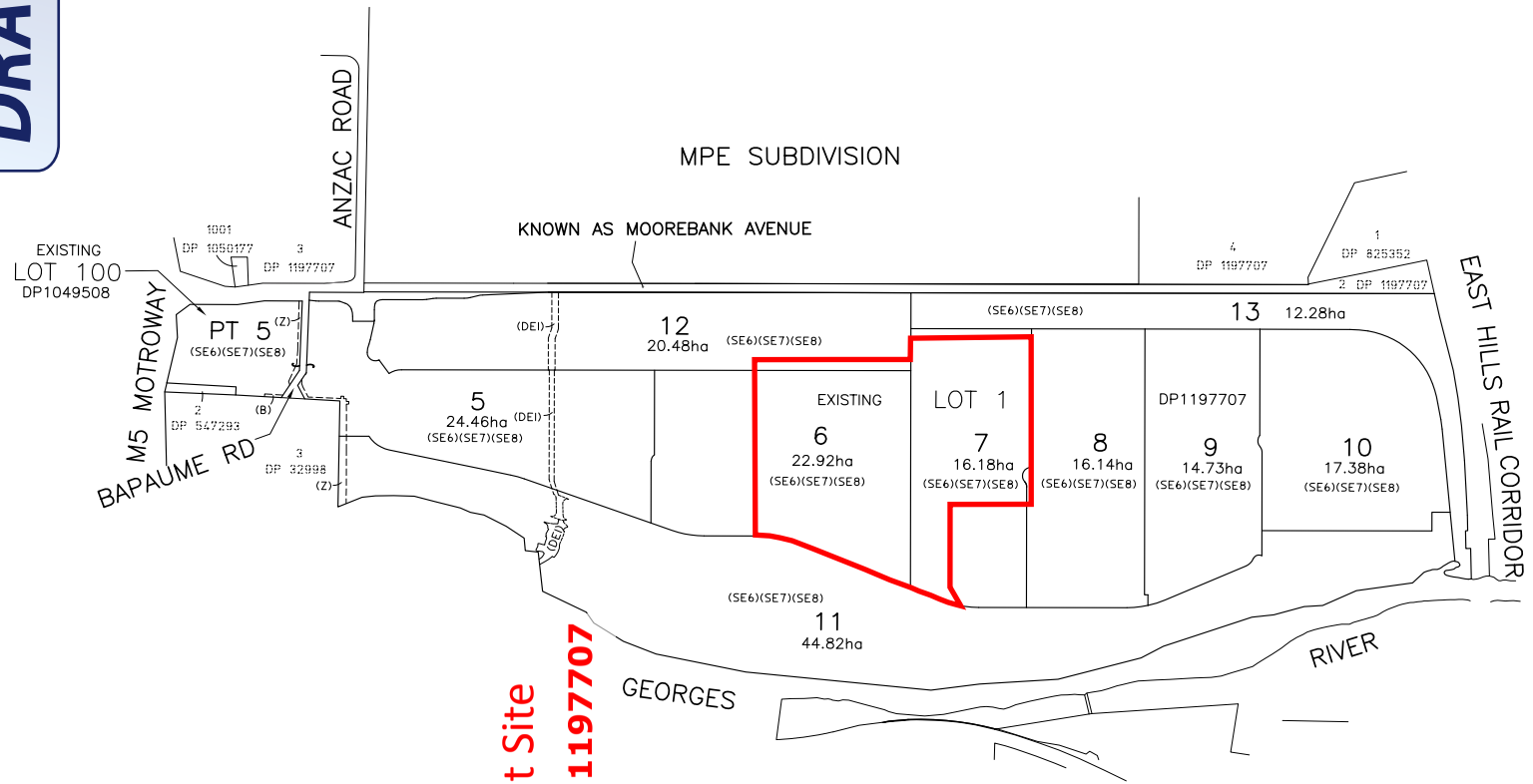
Date: 15 Dec 2020
Drawn By: CTA
Checked: JRAD
ENVIROVIEW PTY LTD

PLAN FORM 2 (A2) WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION ePlan Sheet 01 of 03 sheets

DRAFT

STAGED PLAN OF PROPOSED SUBDIVISION OF LOT 1 DP1197707 AND LOT 100 DP1049508

M.G.A. NORTH (ZONE 56) SCIMS



(B) EASEMENT FOR DRAINAGE OF WATER 6 WIDE (DP1049508)
(DEI) EASEMENT FOR DRAINAGE OF WATER
(SE6) EASEMENT FOR SERVICES (WHOLE OF LOT)
(SE7) EASEMENT FOR FUTURE SERVICES (WHOLE OF LOT)
(SE8) EASEMENT FOR ACCESS (WHOLE OF LOT)
(Z) EASEMENT FOR OVERHEAD POWERLINES VARIABLE WIDTH (DP1125932)

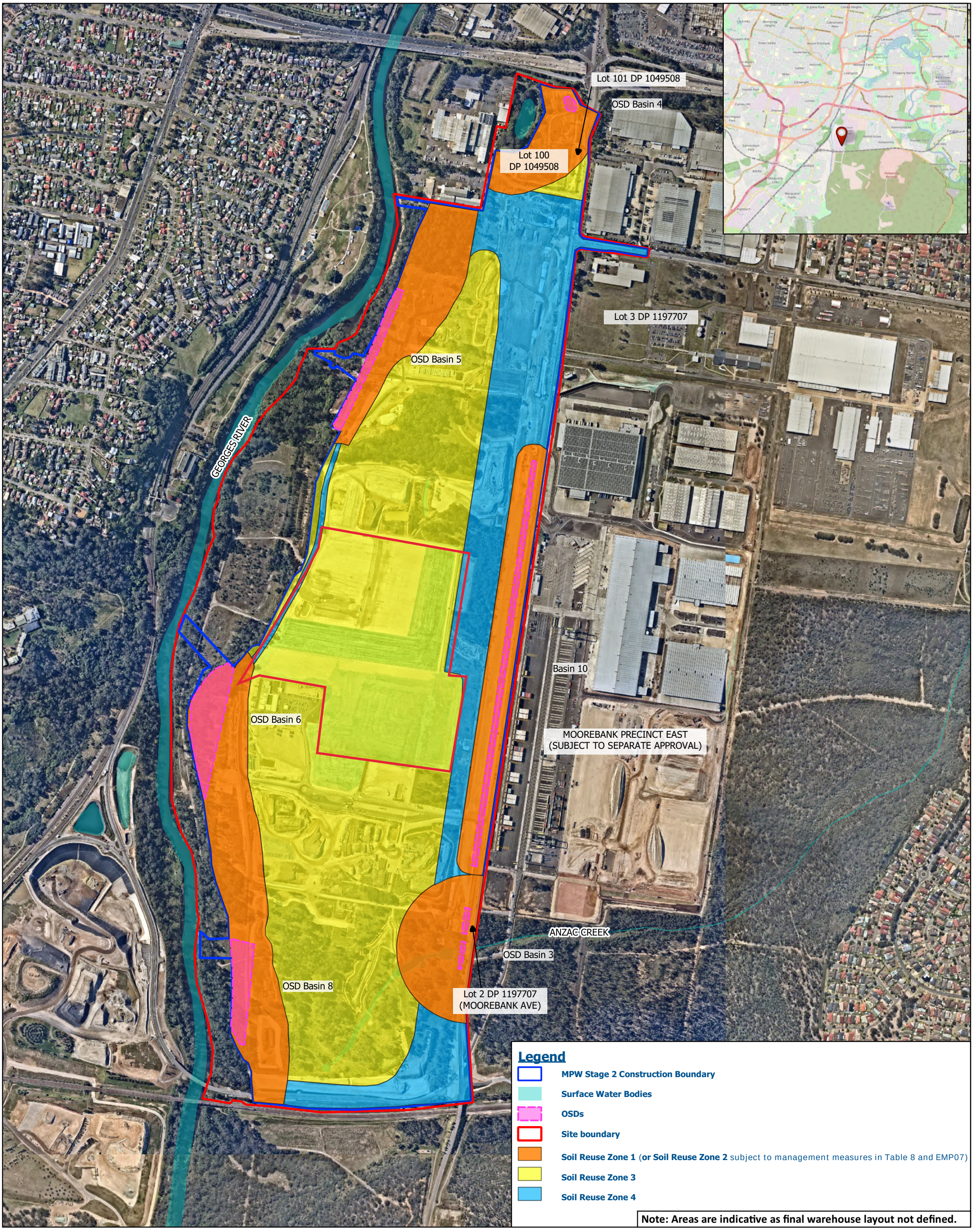
Surveyor: GREGORY K OXLEY, LandPartners PTY LTD, PO BOX 1144 DUNDAS 2117 Date of Survey: 00/00/2019 Surveyor's Ref: SY073909.013.2.1	PLAN OF SUBDIVISION OF LOT 1 IN DP1197707 AND LOT 100 DP1049508	LGA: LIVERPOOL Locality: MOOREBANK Subdivision No: XXX Lengths are in metres. Reduction Ratio 1:7500	Registered	DP

10 20 30 40 50 Table of mm 90 100 110 120 130 140

Figure 3
Date: 15 Dec 2020
Drawn By: CTA
Checked: JRAD
ENVIROVIEW PTY LTD

Site Audit Plan - Site Audit Statement 0301-XXXX UPDATE
MPW, Woolworths Site (Part Proposed Lots 6, 7, 8, and 12)
Stage 2 Works (Condition B171), MPW, MOOREBANK, NSW

ENVIROVIEW



Long Term Environmental Management Plan
Moorebank Precinct West

Figure 5 - Soil Reuse Zones

EP RISK

www.eprisk.com.au

Job No: EP1489.001
Date: 26/10/2020
Drawing Ref: Fig 5
Version No: v3

N

0 130 260 390 m

Approximate Scale Only

Coordinate System: WGS 84
Drawn by: MBO **Checked by:** PS
Scale of regional map not shown
Source: Near Maps

APPROVED COMPANY ISO 9001 Quality Management Systems QMS Certification Services

APPROVED COMPANY AS/NZS 4801 OH&S Management Systems QMS Certification Services

APPROVED COMPANY ISO 14001 Environmental Management Systems QMS Certification Services

Ref: IA 0301-2020-1_02

25 January 2021

Mark Howley
Tactical Group
Level 15, 124 Walker Street
NORTH SYDNEY NSW 2060

Via email/Aconex: mhowley@tacticalgroup.com.au

Dear Mr Howley,

RE: Site Audit Interim Advice 02 – Review of the revised Woolworths Audit Area Validation Summary report – an area within Moorebank Precinct West.

James Davis of Enviroview Pty Ltd has been engaged to provide the services of a NSW EPA Contaminated Land Accredited Site Auditor, to conduct a Site Audit in relation to the land to be developed for the Moorebank Intermodal Terminal located at Moorebank Avenue, Moorebank, NSW, in accordance with the *Contaminated Land Management Act 1997* and relevant guidelines made or approved under s.105 of that Act.

The objective of the Site Audit is to provide a Site Audit Report and Site Audit Statement to certify, in relation to contaminated land, the Auditor's opinion of whether the site is suitable for the proposed commercial/industrial development.

A Site Audit Interim Advice is provided by a Site Auditor to assist in the management of contamination issues in regard to the requirements of the Site Audit at a particular stage of the Site Audit, prior to issuing the Site Audit Statement. An interim advice does not constitute a Site Audit Statement or a Site Audit Report and does not pre-empt the final Site Audit conclusions. A Site Audit Report and Site Audit Statement will be prepared at the conclusion of the Site Audit.

The purpose of this interim advice is to provide comment with regard to the review of the following revised report:

> JBS&G Australia Pty Ltd (JBS&G). *Moorebank Precinct West (MPW): Woolworths Audit Area Validation Summary.* (Report ref.: 51997-134422_L362_Rev-B). 15 January 2021.

In addition to the revised report, the consultant provided responses to the Site Auditor's comments that were previously provided (in consideration of Rev-A of the document dated 12 December 2020) in Interim Advice # 1, dated 18 December 2020. The consultant's Response to Auditor Comments document was dated 15 January 2021 (Report Ref.: JBS&G 51997-134812_L363_Rev 0).

Review Comments – Woolworths Audit Area Validation Summary

In general, the auditor agrees with the majority of responses provided by the consultant in response to Interim Advice # 1, dated 18 December 2020 as presented in the consultant's Responses to Auditor Comments document. These comments are not discussed further.

Several outstanding comments for which further consideration is required are presented below.

1. IA # 1 Comment 1 – Site Audit Area and Site Identification. The auditor appreciates the detailed response and revised figures. However:
    a. It is unsatisfactory that the survey plan was not updated to accurately identify the site. Per the consultant's response and the provided Master Plan – it appears that the site *should* be identified as the whole of Lots 6 and 7 (and part of Lots 12 and 8? see next point). However, the survey plan (and consultant's report) indicates that the Woolworths area occupies 'part' of Lots 6 and 7 due to the '*discrepancy*' in the area of the Estate Road. When is the survey plan to be updated? Can this not be rectified to prevent inaccurate identification of the site prior to issuance of the Site Audit? In other words - given the survey plan is a 'proposed' subdivision (circa 2019) – can it not be updated to reflect the current Master Plan given that it appears the timeframe for the sale of specific lots is imminent?
    b. Further to the prior point – would it be correct to state – that if the survey plan were updated to accurately reflect the proposed Master Plan (Attachment C) – then the boundaries of Lots 6 and 12, and Lots 7 and 8, would also be adjusted so that – the Woolworths Site Audit area should be described as the entire Lots 6 and 7 and no partial lots?
    c. Please provide the revised LTEMP with all updates conducted (as indicated in the consultant's response to comments) in reference to the PFAS zones and the Woolworths Audit Area.
    d. The consultant indicates that further documentation will be provided "*once fill placement is completed to the east (part Lot 12)*". Please provide this documentation in a future revision to the Woolworths Audit Area Validation Summary report. When is the completion of fill in this area anticipated?

2. IA # 1 Comment 3 – LTEMP. The further information regarding the (lack of) placement and disturbance of PFAS soils within the audit area is understood. However, the auditor does not agree with the consultant's points presented in the responses to comments document as follows:
    a. It is irrelevant that 'no further disturbance or reuse' of soils is proposed prior to construction of the warehousing – the LTEMP is in place per the Stage 2 Development Consent (SSD 7709) to manage works during the construction phase (and thereafter). Therefore, as there is there is always the potential for disturbance to both the capping layer and underlying soils (i.e., AEC-3) during the construction works and in the future – the LTEMP should be applied.

b. Per the Development Consent – the LTEMP must include – (Condition B172b-ii) a description of the nature and extent of contamination remaining on site and (Condition B172b-viii) details of any contingency measures that the applicant is to carry out to address any ongoing contamination. Further, Condition B173 requires that the LTEMP must be registered on the title to the land – as written, this condition does not allow for exclusion of 'portions 'of the overall MPW site to not have a LTEMP. While as previously discussed, the auditor is amenable to a shorter, streamlined LTEMP for the Woolworths Audit Area only – the absence of an LTEMP does not appear feasible.

c. In the auditor's perspective and as discussed in IA #01, while the contamination remaining within the Woolworths Audit Area is minor – nevertheless the LTEMP defines this contamination and the measures that are required for it to be addressed in the future (see point (b) above).

   More specifically, the following EMPs may be applicable in future to the site: 1, 4, 5, 6, 7, 11, 12, 13, and 20-26. Most significantly the EMPs 12 (Subsurface Maintenance Works) and EMP 13 (Landscape Maintenance) should be applied to the site as they discuss the measures that are required when construction or landscaping works may be required to penetrate the capping layer.

d. It is irrelevant that the destination of the 'waste' that may be encountered during the construction will not remain within the Woolworths Audit Area. The LTEMP addresses is required to issues beyond waste handling.

e. The reinstatement of cover materials should occur in accordance with the existing approved development conditions – and in the auditor's perspective – these conditions are those as stated in part (b) above that require the implementation of an LTEMP. Further, to suggest that the residual contamination risks on site would be further assessed if significant redevelopment was proposed in the future per DA conditions does not reflect that the site has already been subject to much assessment and remediation already has been determined as being suitable for commercial/industrial redevelopment with implementation of a LTEMP.

Thank you for your time regarding this matter. If you require additional information or clarification, please do not hesitate to contact me.

Yours sincerely



James Davis
NSW EPA Contaminated Land Site Auditor
Enviroview Pty Ltd

Ref: IA 0301-2020-1_03

18 May 2021

Mark Howley
Tactical Group
Level 15, 124 Walker Street
NORTH SYDNEY NSW 2060

Via email/Aconex: mhowley@tacticalgroup.com.au

Dear Mr Howley,

RE: Site Audit Interim Advice 03 – Review of the Woolworths Audit Area Long-Term Environmental Management Plan (LTEMP) and the revised Woolworths Audit Area Validation Summary reports.

James Davis of Enviroview Pty Ltd has been engaged to provide the services of a NSW EPA Contaminated Land Accredited Site Auditor, to conduct a Site Audit in relation to the land to be developed for the Moorebank Intermodal Terminal located at Moorebank Avenue, Moorebank, NSW, in accordance with the *Contaminated Land Management Act 1997* and relevant guidelines made or approved under s.105 of that Act.

The objective of the Site Audit is to provide a Site Audit Report and Site Audit Statement to certify, in relation to contaminated land, the Auditor's opinion of whether the site is suitable for the proposed commercial/industrial development.

A Site Audit Interim Advice is provided by a Site Auditor to assist in the management of contamination issues in regard to the requirements of the Site Audit at a particular stage of the Site Audit, prior to issuing the Site Audit Statement. An interim advice does not constitute a Site Audit Statement or a Site Audit Report and does not pre-empt the final Site Audit conclusions. A Site Audit Report and Site Audit Statement will be prepared at the conclusion of the Site Audit.

The purpose of this interim advice is to provide comment regarding the review of the following reports:

> JBS&G Australia Pty Ltd (JBS&G). Moorebank Precinct West (MPW): Woolworths Audit Area Validation Summary. (Report ref.: 51997-134422_L362_Rev-C). 19 February 2021. (The Woolworths Site Validation Report)
>
> EP Risk. *Long-Term Environmental Management Plan, Woolworths Site, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW.* (Report ref.: EP1489.007_MPW LTEMP v1). 12 March 2021. (The Woolworths Site LTEMP)

The revised Woolworths Audit Area Validation Summary report (JBS&G, Feb 2021) has previously been submitted to the Site Auditor (Dec 2020 and Jan 2021) and reviewed as discussed in Interim Advice # 0301-2020-1_01 and 0301-2020-1_02 dated 18 December 2020 and 25 January 2021 respectively. Together with the revised report (Rev-C), the consultant (JBS&G) submitted a Responses to Comments document (L365 dated 19 February 2021) in relation to the most recent Interim Advice (# 02).

The LTEMP (EP Risk, March 2021) has been developed to address the long-term management requirements for the Woolworths site (separate to the broader requirements for the remainder of the MPW site) and the Site Audit Statement when issued will be subject to this LTEMP and the LTEMP will be registered on the title for the land as per condition of approved development consent B173 of State Significant Development 7709.

Review Comments – Woolworths Audit Area Validation Summary (JBS&G, Feb 2021) rev-C

The auditor has reviewed the revised report and the consultant's responses to comments and considers that the revised report (rev-C) has acceptably addressed all prior comments.

1. The consultant notes that following the 2 February 2021 revision of the MPW Master Plan (which provides the most recent lot boundaries) it is understood that the survey plan will be updated according to these lot boundaries. Is (or when will) the revised survey plan (be) available? The specific area of the 'site' needs to be confirmed as this will be reflected in the boundary of the Site Audit.

Review Comments – Woolworths Audit Area LTEMP

2. Site Audit Area and Site Identification (and Figures). The identification of the site is inconsistent throughout the report. The introduction identifies it as partial lots 6, 7, and 12 – which is consistent with the most recent *Woolworths Audit Area Validation Summary* (JBS&G, rev-C, Feb 2021). However, Section 2.1 and all figures identify the site as partial lots 6, 7, 8, and 12. Please check and correctly identify / update throughout the report. As this report will be attached to the Site Audit and registered on title it is very important that the specific site boundary is defined and consistent throughout.
3. General Comment, LTEMP Content. In the auditor's opinion – the Woolworths Area LTEMP is overly lengthy and complex and does not sufficiently address the requirements for the site going forward.
    a. The Woolworths Audit Area Validation Summary (JBS&G, Feb 2021) (Section 2.2.1) far more succinctly addresses the issues going forward for the site requiring management as follows:

    "PFAS in soils (AEC3) is partially within the Audit Area. … A minimum of 1 m of Engineered Fill has been placed within the Audit Area and is also proposed to be substantially covered by warehousing and concrete pavement. ***No residual PFAS impacted soils were placed/reused within the Audit Area****.*

    The Woolworths development is to include large-scale warehousing and paved areas, with a suitable growing medium supporting landscaped areas. During construction there is the potential for relatively minor disturbance to underlying soils. Any excess spoil generated is unlikely to be suitable as a growing medium for landscaped areas, and the spoil would be addressed appropriately under one or more of the following scenarios:

    - *Excess spoil designated for reuse elsewhere on site to be managed under the LTEMP enforced for the remaining MPW site (i.e. under the management plan for the receiving location); or*

- *Excess spoil designated for off-site disposal to be managed as per NSW EPA Waste Classification Guidance.*

An LTEMP specifically for the Woolworths Audit Area has been developed to manage any potential disturbance works during the warehouse construction phase and thereafter.

b. Due to the failure to remove portions of the (MPW-site wide) LTEMP that address activities that have either not been conducted within (and will not be) the Woolworths site or would not be applicable within the Woolworths site following the completion of filling works across the site – the LTEMP retains large amounts of information and procedures that have no relevance to the site going forward.

c. In this regard, the LTEMP does not meet the requirements of the Site Audit. Note the auditor guidelines (NSW EPA, Oct 2017) state:

"*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.*"

d. Some examples of this unnecessary complexity relate to the LTEMP retaining procedures for reuse of soils (PFAS) and much discussion of how to handle 're-use areas' – when there will be no future opportunity or plan to reuse these materials on site. Further, discussion of "reuse" is unnecessary and complicates the LTEMP as PFAS-impacted soils were not reused within the Woolworths site/audit area. Numerous EMPs (Appendix C) discuss handling of soils within 'reuse' zones – but there are none within the audit area.

e. Further example – the EMPs discuss "bulk earthworks" and provide procedures for the large-scale works that were required during the site earthworks and filling works across the MPW site – for example the stockpile management procedures and requirements for imported fill. Given that the site fill works have now been completed – and as JBS&G state there is likely only "minor disturbance to underlying soils" going forward – are these procedures required?

f. In the auditor's perspective – the LTEMP needs a thorough review and edit to remove unnecessary portions of the plan (in consideration of the above text from JBS&G).

4. Section 4, Table 4. The consultant nominates 'Woolworths' as responsible for implementation of the LTEMP. Have "Woolworths" been involved in the development of this LTEMP? Please provide confirmation from an appropriate representative of Woolworths that they accept the responsibilities contained within the LTEMP.

5. Section 4, LTEMP Enforcement and Section 1.3, How the LTEMP will be made Enforceable. As noted in Table 4, the consultant nominates that "Woolworths" are responsible for ensuring that the "*LTEMP is noted on the property title and is legally enforceable".* Please further explain this process and how 'Woolworths' are required to enforce the LTEMP. While it is noted that the Development Consent (SSD 7709, Nov 2019, NSW DPE) discusses in conditions B172 and B173 the requirements of the LTEMP – these do not include a requirement to implement the LTEMP. Section 1.3 defines the requirements for development of the LTEMP – but these do not define the requirements for enforcing the implementation of the plan. Please further discuss. The LTEMP must be reasonably legally enforceable. The specific registration on title needs to be provided for the Site Auditor to determine whether that is an enforceable registration.

6. Section 4.3, Implementation of the LTEMP.
    a. First set of bullets – are the contamination management works not complete now within the Woolworths site?
    b. The proposed development activities within the Woolworths site should be discussed – not the activities within AEC-3.
    c. Activities listed under proposed development activities within AEC-3 – these are out of date and should not include actions such as importation of fill to raise site levels or bulk earthworks etc.. Inclusion of this text demonstrates the LTEMP provided did not appropriately consider the works at the site going forward.
7. Section 4.4, LTEMP EMPs. As discussed in Comment # 3 and #11 – the EMPs and this section – should be thoughtfully edited. The source-pathway-receptor linkages provided in Table 7 are not representative of the likely works at the site going forward.
8. Section 4.5, Reuse of PFAS Impacted Soil. This section is unnecessary and confusing.
9. Figures. While the figures require update in relation to the site identification (comment #2), they are otherwise suitable for the LTEMP going forward.
10. Appendix B, Conceptual Site Model. It is noted that efforts were made to cut this section (in comparison to the site-wide MPW LTEMP) – however – it remains over 30 pages in length which is too much for a site with low-level PFAS soils at depth that have been covered completely by engineered fill. Please consider including only information and data/figures that are relevant to the Woolworths site, only relevant to the PFAS-impacts remaining within the Woolworths site, and that considers the completed fill works across the site.
11. Appendix C, EMPs. As discussed above (Comment #3), this section requires a thoughtful edit that considers the works likely/proposed for the site going forward (as shaped by JBS&G – see point 3(a).)
12. Appendix G, Soil Reuse Data. In the auditor's perspective this appendix is not required.

It is noted that this review by the Site Auditor was somewhat cursory in consideration of the rather sweeping requirement to update the LTEMP to reflect only procedures applicable to the Woolworths site going forward. Further substantive review will be required following a thorough update of the document.

Thank you for your time regarding this matter. If you require additional information or clarification, please do not hesitate to contact me.

Yours sincerely



James Davis
NSW EPA Contaminated Land Site Auditor
Enviroview Pty Ltd

Ref: IA 0301-2020-1_04R1

8 July 2021

Mark Howley
Tactical Group
Level 15, 124 Walker Street
NORTH SYDNEY NSW 2060

Via email/Aconex: mhowley@tacticalgroup.com.au

Dear Mr Howley,

RE: Site Audit Interim Advice 04R1 – Review of the revised (v2) Woolworths Audit Area Long-Term Environmental Management Plan (LTEMP).

James Davis of Enviroview Pty Ltd has been engaged to provide the services of a NSW EPA Contaminated Land Accredited Site Auditor, to conduct a Site Audit in relation to the land to be developed for the Moorebank Intermodal Terminal located at Moorebank Avenue, Moorebank, NSW, in accordance with the *Contaminated Land Management Act 1997* and relevant guidelines made or approved under s.105 of that Act.

The objective of the Site Audit is to provide a Site Audit Report and Site Audit Statement to certify, in relation to contaminated land, the Auditor's opinion of whether the site is suitable for the proposed commercial/industrial development.

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The purpose of this interim advice is to provide comment regarding the review of the following revised report:

> EP Risk. *Long-Term Environmental Management Plan, Woolworths Site, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW.* (Report ref.: EP1489.007_ v2). 18 June 2021. (The Woolworths Site LTEMP)

The LTEMP (EP Risk, March 2021) has been developed to address the long-term management requirements for the Woolworths site (separate to the broader requirements for the remainder of the MPW site) and the Site Audit Statement when issued will be subject to this LTEMP and the LTEMP will be registered on the title for the land as per condition of approved development consent B173 of State Significant Development 7709.

The March 2021 (v1) LTEMP was previously reviewed by the Site Auditor as documented in Interim Advice # 0301-2020-1_03 dated 18 May 2021. The consultant (EP Risk) submitted a response to auditor comments document together with the revised LTEMP (v2).

Review Comments – Revised Woolworths Audit Area LTEMP

The auditor appreciates the consultant's responses to comments on Interim Advice #03 and accepts the majority of responses. The Woolworths Site LTEMP (v2) has been substantially updated and 'cut-back' to address these comments and is now much more appropriately scoped for the site going forward.

1. Section 1.3, How the LTEMP will be made Enforceable. The consultant has not sufficiently addressed the comment in the prior (#03) Interim Advice.
    a. While the auditor notes the LTEMP will be recorded on title – this does not ensure enforcement.
    b. The text in the first paragraph of the section is not accurate as SSD 7709 does not include a condition that requires implementation of the LTEMP following issuance of the B171 audit. We note that the Stage 3 SSD and enforcement of any LTEMP in that approval does not apply to the Woolworths lot.
    c. In relation to the above clarification should is again sought as to who this obligation will fall on.
2. Section 4, Table 4. The consultant has altered the entity responsible for ensuring the LTEMP is legally enforceable and is implemented from Woolworths (prior draft) to 'developer/Qube'. (This is reflected within the EMPs included in Appendix B).
    a. Given the 'sale' of the intermodal terminal – please confirm this selection.
    b. What involvement will Qube have across MPW following sale of the intermodal terminal, MLP/MPW to Logos – particularly with respect to the day-to-day requirement to enforce the Woolworths area LTEMP?
    c. Implementation of MPW sub-area specific LTEMPs - such as the under-development 'Woolworths Lot/Area LTEMP. The auditor has questioned in review of the Woolworths area LTEMP how the document will be made enforceable (following the issuance of a B171 Site Audit Statement for the site). The consultant (EP Risk) has responded that Tactical noted the LTEMP will be registered on the title of the property.
    d. Is the title of the property currently commonwealth ownership, has their permission been sought to make the required registration and is this to be made? Is the LTEMP also to be record in any long-term lease agreement? Please review and reword as appropriate and provide details of the registration instrument, nominated authority if relevant and proposed wording.
    e. If the above is correct - does that mean Woolworths is a sub-lessee? Which entity retains responsibility and ownership of the site?
    f. Please provide advice regarding the entity responsible "under law" for implementation of the Woolworths area LTEMP long-term.
    g. Acceptance of Responsibilities by Woolworths. Prior version of the Woolworths LTEMP had nominated Woolworths as the entity responsible for implementation of the LTEMP. The auditor had requested confirmation/documentation that Woolworths (or a Woolworths representative) accepts the responsibilities contained within the site-LTEMP. However, the revised Woolworths LTEMP nominated the developer/Qube as the entity responsible for ensuring the LTEMP is enforceable.

Given the sale of the site and ownership - please confirm this selection. What involvement will Qube have across MPW following sale of MLP/MPW to Logos - particularly with respect to the day-to-day requirement to enforce the Woolworths area LTEMP and compliance with DA conditions?

3. Appendix B – EMPs. EMP 11 – fourth bullet – open brackets appear empty/no visible reference (is the text/link white?) to another EMP? Please correct.

Thank you for your time regarding this matter. If you require additional information or clarification, please do not hesitate to contact me.

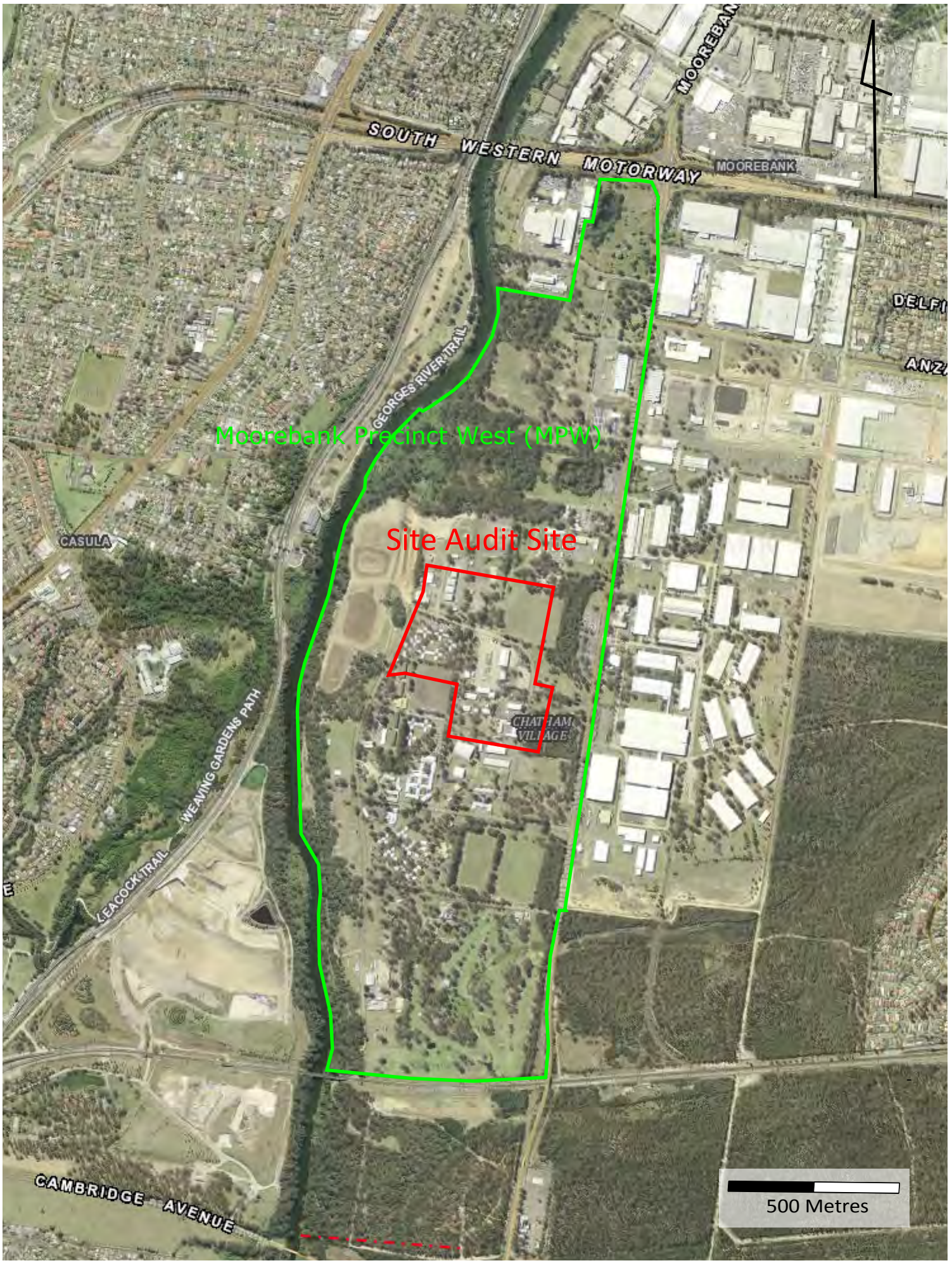
Yours sincerely



James Davis
NSW EPA Contaminated Land Site Auditor
Enviroview Pty Ltd

Appendix B:
Site Audit Area Location and Plans for Site Identification

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ENVIROVIEW

Site Audit Location - Site Audit Statement 0301-2020-1
Woolworths Site Audit Area (Part Proposed Lots 6, 7, and 12)
Stage 2 Works (Condition B171), MPW, MOOREBANK, NSW

Figure 1

Date: 3 Feb 2022
Drawn By: CTA
Checked: JRAD
ENVIROVIEW PTY LTD



ENVIROVIEW

Site Audit Plan - Site Audit Statement 0301-2020-1
Woolworths Site Audit Area (Part Proposed Lots 6, 7, and 12)
Stage 2 Works (Condition B171), MPW, MOOREBANK, NSW

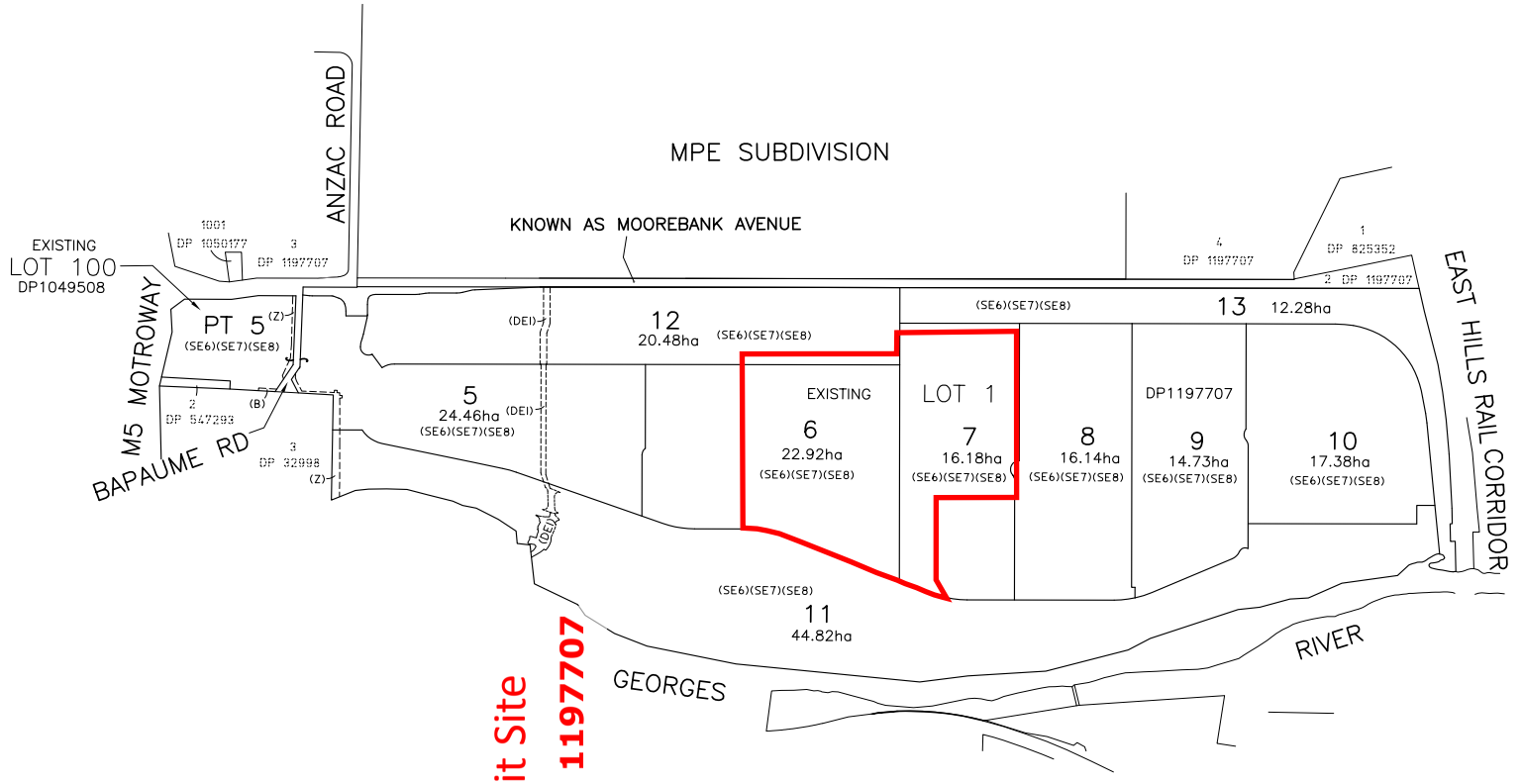
Figure 2

Date: 3 Feb 2022
Drawn By: CTA
Checked: JRAD
ENVIROVIEW PTY LTD

PLAN FORM 2 (A2) WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION ePlan Sheet 01 of 03 sheets

STAGED PLAN OF PROPOSED SUBDIVISION OF LOT 1 DP1197707 AND LOT 100 DP1049508

M.G.A. NORTH (ZONE 56) SCIMS



(B) EASEMENT FOR DRAINAGE OF WATER 6 WIDE (DP1049508)
(DEI) EASEMENT FOR DRAINAGE OF WATER
(SE6) EASEMENT FOR SERVICES (WHOLE OF LOT)
(SE7) EASEMENT FOR FUTURE SERVICES (WHOLE OF LOT)
(SE8) EASEMENT FOR ACCESS (WHOLE OF LOT)
(Z) EASEMENT FOR OVERHEAD POWERLINES VARIABLE WIDTH (DP1125932)

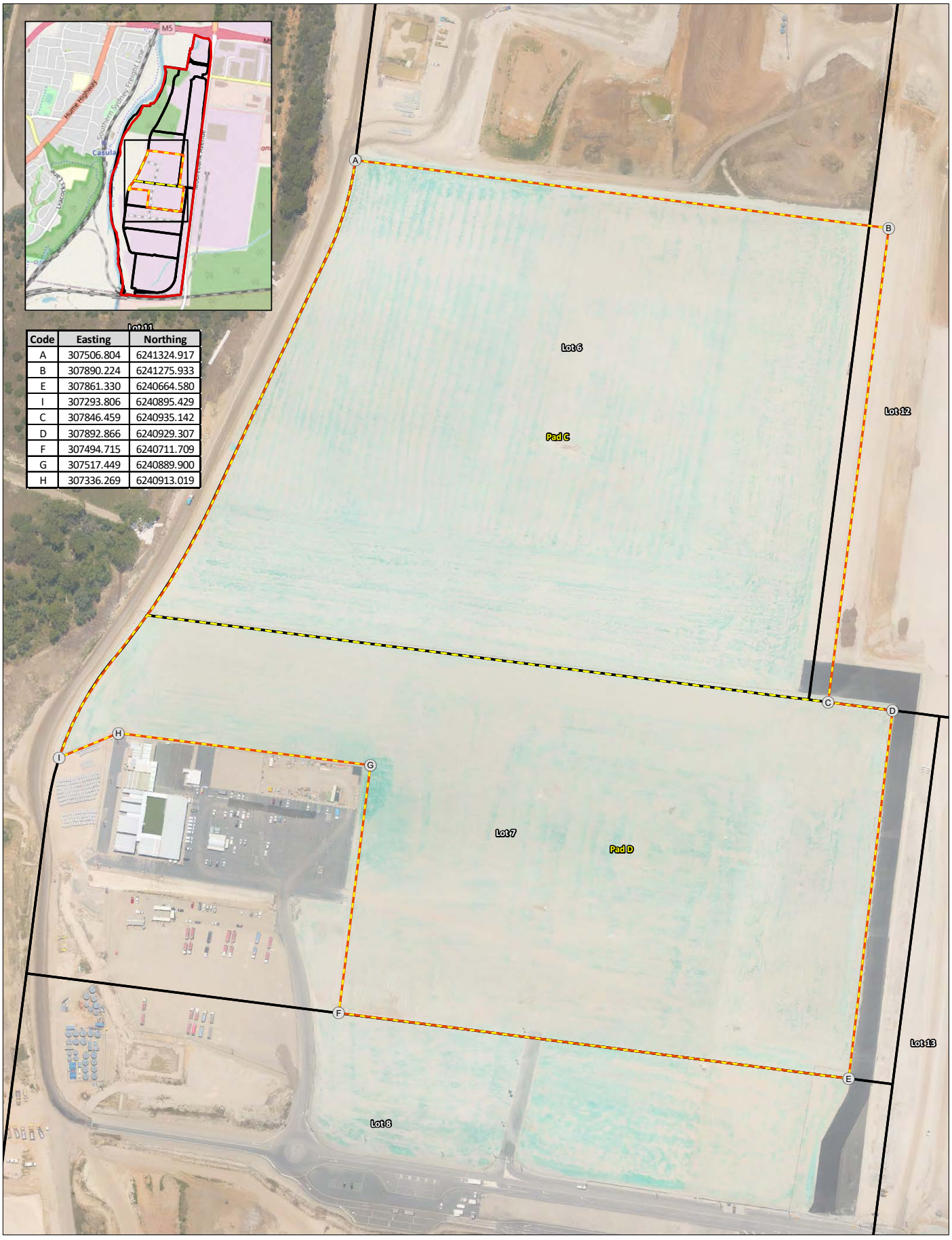
Surveyor: GREGORY K OXLEY, LandPartners PTY LTD, PO BOX 1144 DUNDAS 2117 Date of Survey: 00/00/2019 Surveyor's Ref: SY073909.013.2.1	PLAN OF SUBDIVISION OF LOT 1 IN DP1197707 AND LOT 100 DP1049508	LGA: LIVERPOOL Locality: MOOREBANK Subdivision No: XXX Lengths are in metres. Reduction Ratio 1:7500	Registered	DP

10 20 30 40 50 Table of mm 90 100 110 120 130 140

Figure 3
Date: 14 Feb 2022
Drawn By: CTA
Checked: JRAD
ENVIROVIEW PTY LTD

Site Audit Area - Site Audit Statement 0301-2020-1
Part Lot 1 DP 1197707 (Parts of Proposed Lots 6, 7, and 12)
Moorebank Intermodal and Logistics Park, MOOREBANK, NSW

ENVIROVIEW



Code	Easting	Northing
A	307506.804	6241324.917
B	307890.224	6241275.933
E	307861.330	6240664.580
I	307293.806	6240895.429
C	307846.459	6240935.142
D	307892.866	6240929.307
F	307494.715	6240711.709
G	307517.449	6240889.900
H	307336.269	6240913.019

Legend:
- Pad C and D Boundaries
- Woolworths Audit Area Boundary
- Lot Boundaries - MPW Master Plan 02/02/2021

JBS&G

0 40 80
metres

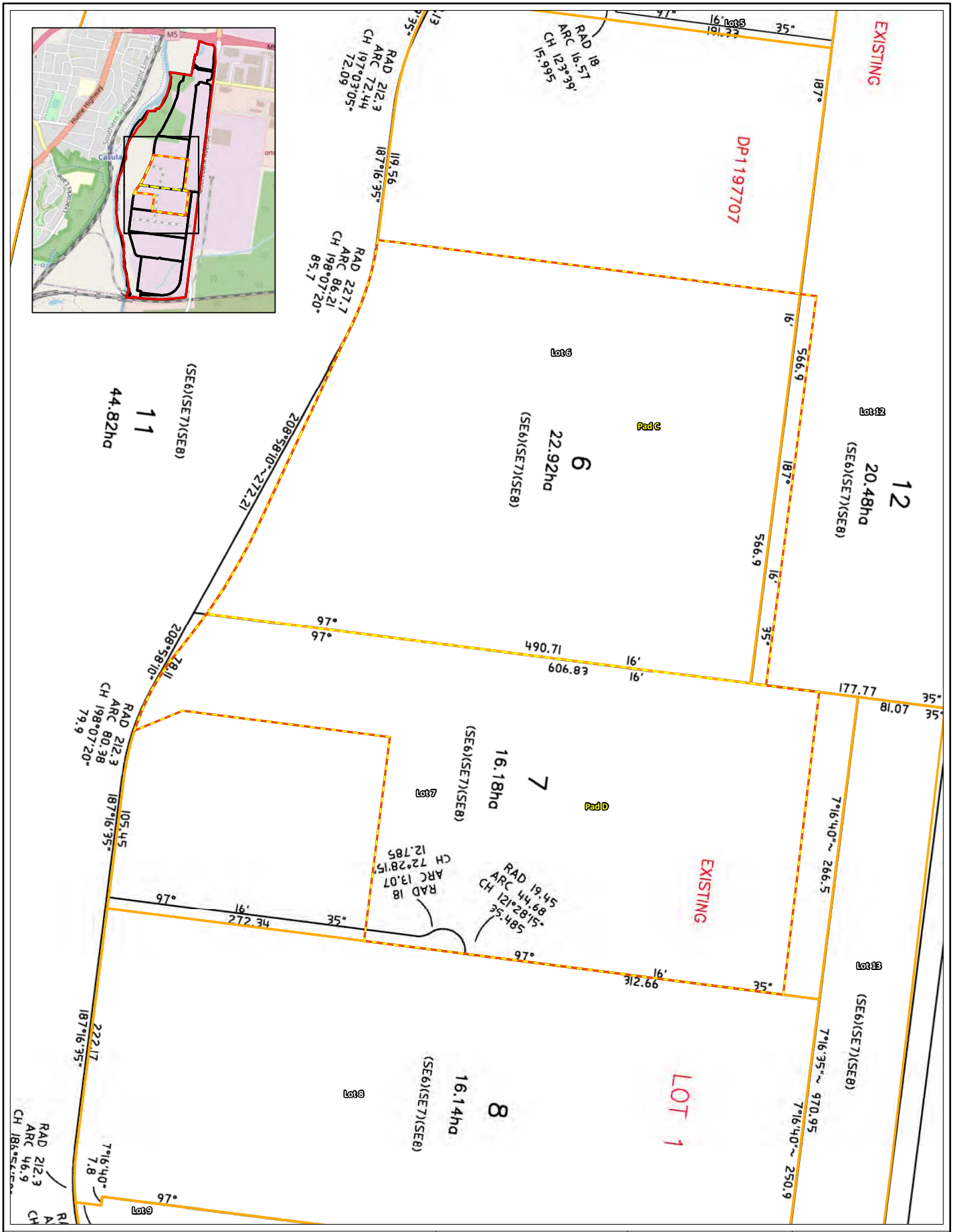
Job No: 51997
Scale: 1:2,500
Client: Tactical Group
Coord. Sys. GDA 1994 MGA Zone 56
Drawn By: AS / JA
Checked By: LL
Version: L362 Rev C
Date: 18-Feb-2021

Partial Lots 6, 7 and 12, Moorebank Avenue, Moorebank, NSW

WOOLWORTHS AUDIT AREA BOUNDARY

FIGURE 2

File Name: N:\Projects\Tactical Group\51997 Moorebank LPWDR Consulting\GIS\Maps\L362 Rev C\51997_02_WoolworthsAuditAreaBoundary.mxd
Reference: Client Supplied Drone Imagery - Captured 25-01-2021



Legend:
- Woolworths Audit Area Boundary
- Pad C and D Boundaries
- Survey Plan Lot Boundaries
- Lot Boundaries - MPW Master Plan 02/02/2021

JBS&G

0 50 100 metres

Partial Lots 6, 7 and 12, Moorebank Avenue, Moorebank, NSW

WOOLWORTHS AUDIT AREA AND SURVEY BOUNDARIES

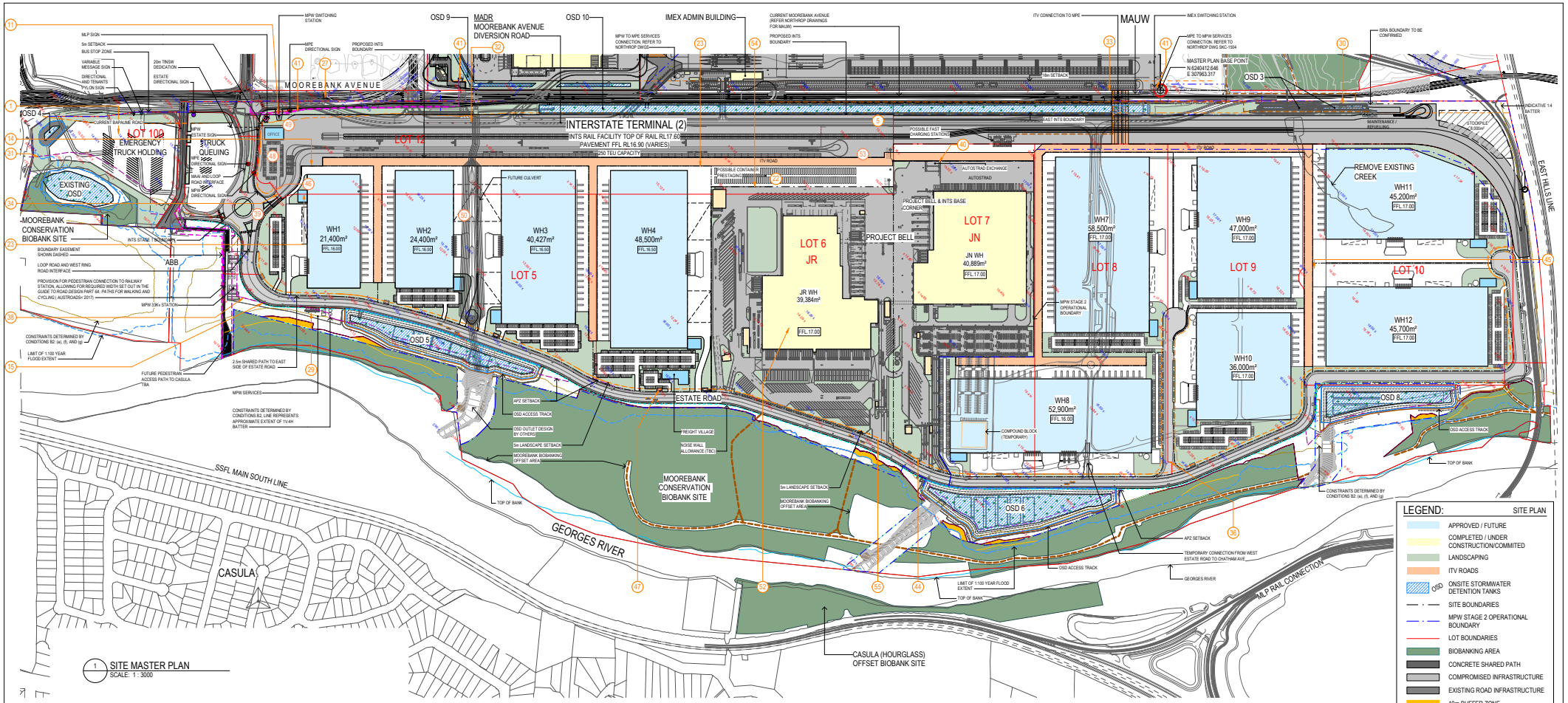
Job No: 51997		Scale: 1:3,000	
Client: Tactical Group		Coord. Sys. GDA 1994 MGA Zone 56	
Drawn By: AS / JA	Checked By: LL	Version: L362 Rev C	Date: 18-Feb-2021

FIGURE 3

File Name: N:\Projects\Tactical Group\51997 Moorebank LPWDR Consulting\GIS\Maps\L362 Rev C\51997_03_Survey.mxd
Reference: Client Supplied Survey

Appendix C:
MPW / MLP Development Master Plan (Feb 2021 Update)

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REVISION NOTES

1. DRAWING REFERENCES UPDATED
2. CO-ORDINATION NOTES UPDATED
3. MPW SERVICES PAD UPDATED
4. BIOBANKING NAMING UPDATED
5. EAST-WEST CULVERT UPDATED
6. PROJECT BELL LAYOUT UPDATED
7. FAST CHARGE STATION LOCATION & MAINTENANCE ACCESS TRACK UPDATED
8. WH5 & JR WAREHOUSE AREA UPDATED
9. MPW 33kV LAYOUT UPDATED
10. EXISTING CREEK TO BE REMOVED OUTLINE SHOWN
11. MPW STAGE 02 OPERATION BOUNDARY UPDATED

PIWW (WEST PRECINCT) WYA COMMENTS FOR COORDINATION (24)

(1) FUEL SERVICES AREA: BENCH RL FROM CIVIL TO BE CONFIRMED.
(2) ~~TACTICAL TO CONFIRM REQUIRED INTS MAINTENANCE BUILDING SIZE.~~
(3) MAINTENANCE BLOCK NEXT TO ITV TO BE ADVISED.
(4) ~~MAINTENANCE RL'S ON INTS A & B TBC.~~
(5) TAC/WYA TO RESOLVE INTS STAGE 2 TRUCK SWEPT PATH WITH BOUNDARY.
(6) ~~WYA TO CONFIRM ESTATE ROAD INTERSECTION WITH PROJECT BELL, COSTIN ROE TO CO-ORDINATE BOUNDARY BETWEEN PROJECT BELL NORTH WEST CORNER AND ROAD RESERVE.~~
(7) ~~WYA TO ADJUST ESTATE SETBACK REQUIREMENTS AT END OF WEST ESTATE ROAD (SH ON 2 SH).~~
(8) ~~TACTICAL/AURECON/WTP/JNP TO CO-ORDINATE INST ACCESS FROM MAIN AND ROUNDABOUT, INTS CARPARK TO SUITE NEW MPW SERVICES AREA WYA TO CHECK PROPOSED LAYOUT.~~
(9) ~~TACTICAL/AURECON/WTP/JNP TO CO-ORDINATE INST ACCESS FROM MAIN AND ROUNDABOUT, INTS CARPARK TO SUITE NEW MPW SERVICES AREA WYA TO CHECK PROPOSED LAYOUT.~~
NORTHROP AND COSTIN ROE TO CO-ORDINATE ALIGNMENT OF WESTERN ROAD AND ROUNDABOUT.
(10) ~~NNPJ/NP TO PROVIDE UPDATED MPW SERVICES TO SUIT INTS BUILDING.~~
(11) ~~EASEMENTS AND SLP SIGN LOCATION.~~
(12) ~~TACTICAL/NORTHROP TO CO-ORDINATE LATEST MAM LAYOUT WITH INTERSTATE TERMINAL 2 CONFIG WITH RMS.~~
(13) ~~JNP/LAND PLANNERS & WYA TO CO-ORDINATE SUBDIVISION WITH PROJECT BELL & INTERNAL LOT BOUNDARIES WITH ESTATE ROAD ALIGNMENT.~~
(14) TACTICAL/QUBE/WYA TO CO-ORDINATE INTERSTATE FENCE & GATE AND CO-ORDINATE LOT BOUNDARY WITH LAND PARTNERS.
(15) QUBE & JNP TO SEEK INPUT / CONFIRMATION ON NOISE WALL ALONG WEST ESTATE ROAD.
(16) ~~WYA TO PROPOSE COMPLIANT PARKING LAYOUT TO SUIT MPW SERVICES ZONE.~~
(17) ~~JNP/WSP TO SHOW PROPOSED PEDESTRIAN CROSSING FURTHE SOUTH TO AVOID PROXIMITY WITH ROUNDABOUT.~~
(18) ~~NNPJ/WP TO PROVIDE UPDATED MPW SERVICES LAYOUT NORTH OF INTS.~~
(19) ~~WYA TO PLACE SPATIAL ALLOWANCE FOR MLP SIGN, OPTION 1 ABOVE ROAD, OPTION 2 ON INTS CORNER.~~
(20) ~~TACTICAL TO CONFIRM PEDESTRIAN ACCESS IS PROVIDED TO PLAT.~~
(21) ~~GATE/FREIGHT VILLAGE FROM SIDE TERMINAL AS PER WORKPLACE TRAVEL PLAN.~~
(22) ~~TAC/WYA/QUBE/AUTOMATION TO COORDINATE CONTAINER PRE-STAGING AND FAST CHARGE REQUIREMENTS.~~
(23) ~~TAC/JNP TO CO-ORDINATE INTERFACE RL'S BETWEEN INTERSTATE AND PIWW WAREHOUSES.~~
(24) ~~WYA/QUBE TO PROPOSE ALTERNATIVE LOCATION FOR MPW COMMS @HV ROOMS.~~
(25) ~~TJP/QUBE TO PROVIDE UPDATED ROAD ALIGNMENT WITH BIODIVERSITY OFFSET AREA.~~
(26) ~~CJP/WYA/QUBE TO CO-ORDINATE WEK VL TRIATE ROAD COURT ENCROACHMENT INTO BIOBANK.~~
ESA/CASS TO PROVIDE UPDATED MAIN/ AND EXTEND WORKS TO TIE IN WITH MAM.
(27) ~~JNP/ASPECT TO CONFIRM REQUIREMENT FOR 10m BUFFER ZONES.~~
(28) ~~QQ/JNP TO PROVIDE UPDATED BATTERS ALONG MPW ESTATE ROAD.~~
(29) CC/SAURIN/TAC TO COORDINATE MAINTENANCE ACCESS REQUIREMENTS FOR OSD-3.
(30) CC/QUBE TO COORDINATE POSITIONING OF OSD-4 IN REFERENCE TO RIPARIAN CORRIDOR CONDITIONS OF MP#2 POST APPROVALS, TO BE ASSESSED WITH FINALISED POST APPROVALS DESIGN.
(31) TAC TO COORDINATE UPDATED DRAINAGE APRON OF EAST-WEST CULVERT.
TAC TO PROVIDE UPDATED REQUIREMENTS AND RELEVANT DRAWINGS FOR EAST-WEST ITV CROSSINGS (CURRENTLY UNDER DEVELOPMENT).
(32) TAC/TJP/MNP TO COORDINATE MAAL LOOP ROAD AND INTS INTERFACE AND SERVICES.
(33) ~~TAC/QUBE TO CONFIRM OSD 5 & 6 MAINTENANCE ACCESS STRATEGY.~~
(34) JMP/CDE TO CONFIRM/ADVISE FEASIBILITY OF NEW MPW SOUTH INTERNAL ROAD ARRANGEMENT.
(35) TAC/AMB TO ASSESS ENERGY AGREEMENT INTO TWIN DEVELOPMENT AREA.
(36) WYA/QUBE/TAC/JMP TO CO-ORDINATE 33KV STATION WITH EARTHWORKS, ADJACENT EASEMENT & SHARED PATH TO CASULA
(37) TACTICAL/AUR/JMP TO PROVIDE COMPLIANT DDA SHARED PATH FROM MPW TO INTS.
(38) QUBE/WYA/TAC/JMP - ITV LAYOUT TO BE COORDINATED WITH JN & JR AUTOSTRAD & INTERCHANGE ZONES.
(39) TACTICAL/BMD TO COORDINATE AND CONFIRM UTILITIES CONNECTIONS TO MPE AND MPW.
(40) JJP/COSTIN ROE TO COORDINATE BULK EARTHWORKS CLASH WITH MPW CONSTRUCTION LIMIT BOUNDARY.
(41) WYA/JWP/GROUNDINK TO CO-ORDINATE LANDSCAPE REQUIREMENTS.
(42) QUBE/WYA TO SEEK UPDATED JN DOCUMENTATION WHICH MEETS 5m LANDSCAPE SETBACK REQUIREMENT.
(43) MPW CIVIL AND SERVICES DOCUMENTATION SOUTH OF JN LOT ON HOLD SUBJECT TO FUTURE TENANTS' MASTERPLAN DESIGN
(44) TAC/WYA/QUBE TO CO-ORDINATE INTS LOT BOUNDARY
(45) NNPJ/WP MPW SERVICES ALONG ESTATE ROAD SUBJECT TO FUTURE TENANTS/ MASTERPLAN DESIGN
(46) WYA/TAC/QUBE TO COORDINATE INTS OFFICE AND CARPARK SUBJECT TO FURTHER DETAIL DESIGN
(47) TACTICAL/AURECON TO COORDINATE SWITCHING STATION ACCESS AND RL
(48) TACTICAL/JWP/COS TO COORDINATE FUTURE DRAINAGE CONNECTION
(49) TACTICAL/WYA/QUBE TO COORDINATE INTS DETAIL DESIGN FOR STAGE 1 & 2 JR SUBJECT TO QUBE APPROVAL
(50) TAC/WYA/QUBE TO COORDINATE INTS WEST BOUNDARY SUBJECT TO FURTHER DETAILED DESIGN
(51) JR-EAST BOUNDARY EXTENSION TO BE APPROVED BY QUBE
(52) QUBE/JWP/WYA/NRP/COS TO COORDINATE JR & JN INTERFACE WITH WEST ESTATE ROAD
(53) ~~TAC/AMB TO ASSESS ENERGY AGREEMENT INTO TWIN DEVELOPMENT AREA.~~
(54) ~~WYA/QUBE/TAC/JMP TO CO-ORDINATE 33KV STATION WITH EARTHWORKS, ADJACENT EASEMENT & SHARED PATH TO CASULA~~
(55) ~~TACTICAL/AUR/JMP TO PROVIDE COMPLIANT DDA SHARED PATH FROM MPW TO INTS.~~
~~QUBE/WYA/TAC/JWP - ITV LAYOUT TO BE COORDINATED WITH JN & JR AUTOSTRAD & INTERCHANGE ZONES.~~
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~~TAC/WYA/QUBE TO CO-ORDINATE INTS LOT BOUNDARY~~
~~NNPJ/WP MPW SERVICES ALONG ESTATE ROAD SUBJECT TO FUTURE TENANTS/ MASTERPLAN DESIGN~~
~~WYA/TAC/QUBE TO COORDINATE INTS OFFICE AND CARPARK SUBJECT TO FURTHER DETAIL DESIGN~~
~~TACTICAL/AURECON TO COORDINATE SWITCHING STATION ACCESS AND RL~~
~~TACTICAL/JWP/COS TO COORDINATE FUTURE DRAINAGE CONNECTION~~
~~TACTICAL/WYA/QUBE TO COORDINATE INTS DETAIL DESIGN FOR STAGE 1 & 2 JR SUBJECT TO QUBE APPROVAL~~
~~TAC/WYA/QUBE TO COORDINATE INTS WEST BOUNDARY SUBJECT TO FURTHER DETAILED DESIGN~~
~~JR-EAST BOUNDARY EXTENSION TO BE APPROVED BY QUBE~~
~~QUBE/JWP/WYA/NRP/COS TO COORDINATE JR & JN INTERFACE WITH WEST ESTATE ROAD~~

DRAWING REFERENCES:

MPW:

	DRAWING	ORGANISATION	DATE
51	PLAN OF COORDINATES OF BOUNDARIES: PREC-LPN-SU-DWG-0001-DWG rev4	LAND PARTNERS	08/04/2020
	INTS & ISRA STAGE 1 LAYOUT: 19311_SK05A_INTS & ISRA 4 rail Option A (P2)	WATSON YOUNG ARCHITECTS	09/12/2020
	MPW COMPOUND: PREC-RCG-AR-DWG-2000[H] AS PER MEETING MINUTES 04.06.2020	REID CAMPBELL	20/03/2020
	OSD-3: INTS-AUR-CIV-DWG-5101[7]	AURECON	28/01/2021
	OSD-5: LPWPW-COS-CV-DWG-0433-2	COSTIN ROE	22/09/2020
	OSD-6: LPWPW-COS-CV-DWG-0434-2	COSTIN ROE	22/09/2020
	OSD-8: LPWPW-COS-CV-DWG-0435-2	COSTIN ROE	22/09/2020
	OSD-10: MAUW-NRP-CV-DWG-1121_CA[D][8] TO MAUW-NRP-CV-DWG-1130_CA[D][8]	NORTHROP	08/07/2020
	WEST ESTATE ROAD: LPWPW-COS-CV-DWG-0511-1	COSTIN ROE	10/07/2020
	WEST LOOP ROAD & ROUNDABOUT: PIWW-NRP-CV-SKC-0003 [B]	NORTHROP	15/07/2020
	MAM STAGE 1: 180936 - MOOREBANK AVENUE (SKETCHES) 7000_RevD	NORTHROP	30/11/2020
	MADR: MADR-NRP-CV-DWG-0006_CA[D][6]	BMD/NORTHROP	29/05/2020
	JLU INTERSECTION WORKS: RIUW-NRP-CV- DWG- 1121-1122[2]	NORTHROP	23/09/2019
	SWTA BIODIVERSITY AREA & BIOBANK SITES: PREC-LPN-SU-DWG-0003 rev 3	LAND PARTNERS	14/04/2020
	PROJECT BELL SITE: BAS190054_JR-WD-A-0-1000_P1_Master_Plan	BELL ARCHITECTS	03/12/2020
	PROJECT BELL WH AREAS: Precinct Modification Plan JR-SK-A-0-9401(H)	BELL ARCHITECTS	16/10/2020
	MPE TO MPW ITV CONNECTION: MPW FastCharge location preliminary	REID CAMPBELL	UNKNOWN
	MPW SWITCHING STATION: 115804537_05 Lead-in Services Easements_LP_ELEC_ 20190417_REV_)	SURVEYOR	18/04/2019
	MAUW: MAUW-NRP-CV-DWG-1121_CA[D][8]	NORTHROP	08/07/2020
	WH1 AND WH2 INTERNAL ROAD: W3W4-COS-CV-DWG-0542-Z1	COSTIN ROE	26/05/2020
	FINISH FLOOR LEVEL MASTERPLAN: LPWPW-COS-CV-DWG-1001-B	COSTIN ROE	12/06/2020
	MPW SERVICES & KIOSKS: PIWW-NRP-CM-DWG- 1501-1527_rev F	NORTHROP	29/05/2020
	MPW STAGE 02 OPERATION BOUNDARY: PIWW-RCG-AR-DWG-0101-(L)	WATSON YOUNG	29/01/2021
	MPW 33KV STATION: 19311_MPW Services Area	WATSON YOUNG	01/02/2021
	MPW SERVICES AREA: 19311_MPW SERVICES AREA	WATSON YOUNG	01/02/2021
	EAST WEST CULVERT: LPWPW-COS-CV-DWG-0442-6_EAST WEST CULVERT STAGE 3	COSTIN ROE	15/12/2020
	BIOBANKING WARNG: BIOBANKING AGREEMENT NO.341	UNKNOWN	UNKNOWN

NOTES:

1. ALL LEVELS ARE INDICATIVE & SHOULD BE READ IN CONJUNCTION WITH CIVIL ENG. DWGS FOR FINAL LEVELS OF ALL EARTH WORKS.
2. ALL SERVICES RELOCATION TO BE CONFIRMED BY ENG.
3. ALL WAREHOUSE TEAMS TO PROVIDE WAREHOUSE GROSS LEASE AREA CALCULATIONS ON FUTURE PLANS ISSUED FOR INCLUSION.

TARGET MPW WAREHOUSE	550,000 m²
TOTAL CURRENT WAREHOUSE AREA	500,300 m²
TOTAL WAREHOUSE AREA (STAGE 2 SSD)	215,000 m²
MPW STAGE 2 OPERATIONAL AREA	961,996 m²
MPW STAGE 2 POST APPROVALS LANDSCAPE COVERAGE (SOFT / HARD) LANDSCAPE - OSD-5 AREA PER PIWW-RCG-AR-SCH-0100(G) (43)	64,135 m² (16.60%)
MPW STAGE 2 DEVELOPABLE WAREHOUSE AREA (CoC)	367,625 m²

LEGEND: SITE PLAN

- APPROVED / FUTURE
- COMPLETED / UNDER CONSTRUCTION/COMMITED
- LANDSCAPING
- ITV ROADS
- OSD ONSITE STORMWATER DETENTION TANKS
- SITE BOUNDARIES
- MPW STAGE 2 OPERATIONAL BOUNDARY
- LOT BOUNDARIES
- BIOBANKING AREA
- CONCRETE SHARED PATH
- COMPROMISED INFRASTRUCTURE
- EXISTING ROAD INFRASTRUCTURE
- 10m BUFFER ZONE
- PROPOSED ACCESS TRACK
- EXISTING ACCESS TRACK
- PART CONDITION B2 SETBACK
- SETBACK
- NOISE WALL ALLOWANCE (TBC)
- LIMIT OF 1 IN 100 YEARS FLOOD
- ASSET PROTECTION ZONE (APZ) SETBACK
- BUTCHERS KNIFE AREA
- CONSTRUCTION BOUNDARY
- SERVICES EASEMENT
- TOP OF BANK
- LOCATA POLES
- EXISTING RELATIVE LEVEL
- PROPOSED RELATIVE LEVEL
- WAE FINISHED FLOOR LEVEL

NOTE: ALL PROJECT MANAGERS AND CONTRACTORS TO CO-ORDINATE PACKAGE INTERFACES

BUILDER TO CONFIRM ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY PART OF THE WORKS.

FIGURED DIMENSIONS TAKE PRECEDENCE. DO NOT SCALE FROM THE DRAWING.

ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS, SCHEDULES AND PROJECT ENGINEERS DRAWINGS

THE MASTERPLAN ARCHITECT IS TO BE CONSULTED REGARDING ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF ANY PART OF THE WORKS.

ALL WORK IS TO CONFORM TO RELEVANT CURRENT AUSTRALIAN STANDARDS AND ALL OTHER APPLICABLE CODES ALONG WITH ANY LOCAL AUTHORITIES REQUIREMENTS & REGULATIONS

0 25 50 100
SCALE IN METERS 1:3000

PRELIMINARY
NOT FOR CONSTRUCTION

NO:	DATE:	REVISION:	BY:	CHK:
E	15.04.2020	PRELIMINARY ISSUE	AG/BMB/BH	JF
F	21.04.2020	PRELIMINARY ISSUE	AG/BMB/BH	JF
G	22.04.2020	PRELIMINARY ISSUE	AG/BMB/BH	JF
H	13.05.2020	FOR CO-ORDINATION	AG/BMB/BH	JF
J	29.05.2020	FOR CO-ORDINATION	AG/BH	JF
K	26.06.2020	FOR CO-ORDINATION	BH/AG	JF
L	31.07.2020	FOR INFORMATION	SB/SAG	JF
M	01.09.2020	END OF AUGUST UPDATES	AG/SB/S	JF
N	30.09.2020	END OF SEPTEMBER UPDATES	AG/SB/S	JF
P	06.11.2020	END OF OCTOBER UPDATES	AG	JF
Q	10.11.2020	FOR INFORMATION	AG	JF
R	03.12.2020	END OF NOVEMBER UPDATES	AG/DS	JF/AG
S	02.02.2021	END OF JANUARY UPDATES	AG/DS	JF

QUBE

MOOREBANK LOGISTICS PARK

watson young

PROJECT: MOOREBANK LOGISTICS PARK
MOOREBANK AVENUE, MOOREBANK NSW

TITLE: MPW MASTER PLAN- HYBRID

CLIENT: QUBE

DATE: NOVEMBER, 2020
DRAWN BY: AG/BM/BH/FA
SCALE: As indicated @ B1
SCALE: N.T.S @ A3
ACONEX REFERENCE: PREC-WYA-AR-DWG-2000-pdf
FILE PATH: C:\Users\alexa.g\Documents\19311_PERM_2020_Master_alexa.g.CATCH.rvt
PLOT DATE: 2/02/2021 5:19:02 PM
JOB NO: 19311
DRAWING NO: 2000
REVISION: S

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Appendix D:
Lot 6, 7, and 12 LTEMP (Site Audit Area LTEMP) (EP Risk, Dec 2021)

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Long-Term Environmental Management Plan

Lot 6, 7 and 12, Moorebank Precinct West,
400 Moorebank Avenue, Moorebank, NSW

Prepared for: Qube c/- Tactical
EP1489.007_v5 8 December 2021

APPROVED COMPANY ISO 9001 Quality Management Systems QMS Certification Services

APPROVED COMPANY AS/NZS 4801 Occupational Health & Safety Management Systems QMS Certification Services

APPROVED COMPANY ISO 14001 Environmental Management Systems QMS Certification Services

EP RISK

Long-Term Environmental Management Plan

Lot 6, 7 and 12, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW

Qube Property Management Services Pty Ltd c/o Tactical Group Pty Ltd
Via email: mhowley@tacticalgroup.com.au

8 December 2021

Our Ref: EP1489.007_v5

LIMITATIONS

This Long-Term Environmental Management Plan was conducted on the behalf of Qube Property Management Services Pty Ltd c/o Tactical Group Pty Ltd for the purpose/s stated in **Section 1**.

EP Risk has prepared this document in good faith but is unable to provide certification outside of areas over which EP Risk had some control or were reasonably able to check. The report also relies upon information provided by third parties. EP Risk has undertaken all practical steps to confirm the reliability of the information provided by third parties and do not accept any liability for false or misleading information provided by these parties.

It is not possible in a Long-Term Environmental Management Plan to present all data, which could be of interest to all readers of this report. Readers are referred to any referenced investigation reports for further data.

Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

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QUALITY CONTROL

Version	Author	Date	Reviewer	Date	Quality Review	Date
v1	A. Thomson	12.03.2021	P. Simpson	12.03.2021	P. Simpson	12.03.2021
v2	A. Thomson	18.06.2021	P. Simpson	18.06.2021	P. Simpson	18.06.2021
v3	A. Thomson	10.09.2021	P. Simpson	10.09.2021	P. Simpson	10.09.2021
v4	A. Thomson	09.11.2021	P. Simpson	09.11.2021	P. Simpson	09.11.2021
v5	A. Thomson	08.12.2021	P. Simpson	08.12.2021	P. Simpson	08.12.2021

DOCUMENT CONTROL

Version	Date	Reference	Submitted to
v1	12.03.2021	EP1489.007_Qube_MPW_WW LTEMP_v1	Qube c/- Tactical
v2	18.06.2021	EP1489.007_Qube_MPW_Lot 6, 7, 12_LTEMP_v2	Qube c/- Tactical
v3	10.09.2021	EP1489.007_Qube_MPW_Lot 6, 7, 12_LTEMP_v3	Qube c/- Tactical
v4	09.11.2021	EP1489.007_Qube_MPW_Lot 6, 7, 12_LTEMP_v4	Qube c/- Tactical
v5	08.12.2021	EP1489.007_Qube_MPW_Lot 6, 7, 12_LTEMP_v5	Qube c/- Tactical

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Abbreviations and Terminology		
Abbreviations	**Term**	**Definition**
AF	Asbestos Fines	AF includes free fibres, small fibre bundles and small fragments of bonded ACM that pass through a 7 mm x 7mm sieve. Equivalent to "friable" asbestos in SafeWork NSW *Code of Practice: How to Manage and control asbestos in the workplace* (SafeWork NSW 2019).
AHD	-	Australian Height Datum
Ammunition	Ammunition	A device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological, or chemical material for use in connection with defence or offence including demolitions. Certain ammunition can be used for training, ceremonial, or other non-operational purposes.
AMP	Asbestos Management Plan	See **(Golder 2016b).**
AOC	Area of Concern	An area identified as containing potential contamination. Can also be referred to as Quarantined Area.
As	-	Arsenic
BGS	-	Below Ground Surface
BioBanking Agreement Area	See also Offset Area	Vegetated areas which are to be conserved and no construction to occur.
Bonded ACM	Bonded Asbestos Containing Materials	Bonded ACM comprises ACM, which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin. This term is restricted to material that cannot pass a 7 mm x 7mm sieve. Equivalent to "non-friable" asbestos in SafeWork NSW *Code of Practice: How to Manage and control asbestos in the workplace* (SafeWork NSW 2019).
BTEX	-	Benzene, Toluene, Ethylbenzene and Xylenes
Cd	-	Cadmium
CLM	-	Contaminated Land Management
CMP	Contamination Management Plan	EP Risk 2020
CoC	Conditions of Consent	Conditions of Consent SSD 5066
Conservation Area	Same as BioBanking Area	See BioBanking Area
Construction Area	-	Extent of construction works, namely areas to be disturbed during the construction of the Site.
COPC	-	Contaminants of Potential Concern
Cr	-	Chromium
CSM	-	Conceptual Site Model
Cu	-	Copper
DBYD	-	Dial Before You Dig
DNAPL	-	Dense Non-Aqueous Phase Hydrocarbons
DPI&E	-	NSW Department of Planning, Industry and Environment
DQI	-	Data Quality Indicator
DQO	-	Data Quality Objective
DSI	-	Detailed Site Investigation
DUXOP	Defence Unexploded Ordnance Panel	The panel of contractors and consultants from whom the Department of Defence selects remembers for UXO related tasks

Abbreviations and Terminology		
Abbreviations	**Term**	**Definition**
EEC	Endangered Ecological Communities	Vegetated areas inaccessible during SSD 5066 development works. Located within both the Construction and Offset Areas.
EIL	-	Ecological Investigation Level
EO	-	Explosive Ordnance
EOW	-	Exploded Ordnance Waste
EPA	-	Environment Protection Authority
ESL	-	Ecological Screening Level
FA	Fibrous Asbestos	FA comprises friable asbestos material and includes severely weather cement sheet, insulation products and woven asbestos material. Defined as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. Equivalent to "friable" asbestos in SafeWork NSW *Code of Practice: How to Manage and control asbestos in the workplace* (SafeWork NSW 2019).
Ha	-	Hectares
HCB	-	Hexachlorobenzene
Hg	-	Mercury
HIL	-	Health Investigation Level
HSL	-	Health Screening Level
IMEX	-	Import-Export
IMT	-	Intermodal Terminal
Induction	Site Specific Induction	The *Work Health and Safety Act 2011* (WHS Act) main objective is to secure the health and safety of workers and workplaces. A site-specific induction is necessary for all workers on the Site to understand the site-specific risks.
LGA	-	Local Government Area
LNAPL	-	Light Non-Aqueous Phase Hydrocarbons
Metallic Debris	Metallic Debris	Debris comprising metal (ferrous) items. May include fragments of former ordnance items.
MIC	-	Moorebank Intermodal Company
MPE Project	Moorebank Precinct East Project	The MPE Intermodal Terminal Facility, including a rail link and warehouse and distribution facilities at Moorebank (eastern side of Moorebank Avenue) as approved by the Concept Plan Approval (MP10_0913) and the MPE Stage 1 Consent (14_6766).
MPE Stage 1 Site	Moorebank Precinct East Stage 1 Site	Moorebank Precinct East Stage 1 Site, including the MPE Stage 1 Site and the Rail Corridor, i.e. the area for which approval (construction and operation) was sought within the MPE Stage 1 Proposal EIS.
MPE Stage 2 Site	Moorebank Precinct East Stage 2 Site	Stage 2 of the MPE Concept Plan Approval including the construction and operation of 300,000m^2 of warehousing and distribution facilities on the MPE Site and the Moorebank Avenue upgrade within the Moorebank Precinct.
MPW Project	Moorebank Precinct West Project	The subject of this LTEMP. The MPW Intermodal Terminal Facility as approved under the MPW Concept and Early Works Consent (SSD_5066), MPW EPBC Approval (No. 2011/6086) and MPW Stage 2 Consent (SSD_7709).
MPW Site	Moorebank Precinct West Site	The site which is the subject of the MPW Concept and Early Works (Stage 1) Consent, MPW EPBC Approval and MPW

Abbreviations and Terminology		
Abbreviations	**Term**	**Definition**
		Stage 2 SSD 7709. The MPW Site does not include the rail link as referenced in the MPW Concept Consent or MPE Concept Plan Approval. For the purpose of this LTEMP, this excludes the Site (see **the Site**)
Ni	-	Nickel
OCP	-	Organochlorine Pesticides
Offset Area	BioBanking Agreement Area	Vegetated areas which are to be conserved and no construction to occur.
Ordnance	Ordnance	Any item of potential military origin. See Ammunition, Category A and B Ordnance Item and UXO.
PAH	-	Polycyclic Aromatic Hydrocarbons
Pb	-	Lead
PCB	-	Polychlorinated Biphenyls
PFAS	Per- and polyfluoroalkyl substances	Per- and polyfluoroalkyl substances are a diverse group of compounds resistant to heat, water, and oil. These chemicals are persistent, and resist degradation in the environment. They also bioaccumulate, meaning their concentration increases over time in blood and organs.
PFOS, PFOA and PFHxS	Perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS)	Man-made chemicals belonging to the group known as PFAS. See PFAS.
PSH	-	Phase Separated Hydrocarbon
PSI	-	Preliminary Site Investigation
QA/QC	-	Quality Assurance and Quality Control
QUBE	QUBE Holdings Ltd	Owners of the Moorebank Precinct
RAE	-	Royal Australian Engineers
Rail Corridor	-	Area defined as the 'Rail Corridor' within the MPE Concept Plan Approval.
Rail Link	-	The rail link from the South Sydney Freight Line to the MPE IMEX Terminal, including the area on either side to be impacted by the construction works included in MPE Stage 1.
RPD	-	Relative Percentage Difference
SAQP	-	Sampling Analysis and Quality Plan
SIMTA	-	Sydney Intermodal Terminal Alliance - a consortium comprising Qube and Aurizon Holdings.
The Site	-	Part of the proposed subdivision of Lot 1 in DP1197707 as partial Lots 6,7 and 12 (The Site).
SME	-	School of Military Engineering.
SMP	-	Site Management Plan.
SSD	-	State Significant Development.
SSFL	-	South Sydney Freight Line.
SVOC	-	Semi Volatile Organic Compounds.
Tactical	Tactical Group	Project Managers of the Moorebank Precinct for Qube.
MAUW	Moorebank Avenue Upgrade Works	The extent of construction works to facilitate the construction of the Moorebank Avenue upgrade. Raising of the vertical alignment of Moorebank Avenue for 1.5 kilometres of its length by approximately two metres, from

Abbreviations and Terminology		
Abbreviations	**Term**	**Definition**
		the northern boundary of the MPE Site to approximately 120 metres south of the MPE Site. The Moorebank Avenue upgrade also includes upgrades to intersections, ancillary works, and the construction of an on-site detention basin to the west of Moorebank Avenue within the MPW Site.
The Moorebank Precinct	-	Refers to the whole Moorebank intermodal precinct, i.e. the MPE Site and the MPW Site.
TPH	-	Total Petroleum Hydrocarbons
TRH	-	Total Recoverable Hydrocarbons
UCL	-	Upper Confidence Limit
UST	-	Underground Storage Tank
UXO	Unexploded Ordnance	Explosive ordnance that has been primed, fused, armed or otherwise prepared for action and which has been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installations, personnel or material but remains unexploded either by malfunction or design or for any cause. UXO includes items of military ammunition or explosives removed from their original resting place for any reason, including souveniring.
Vegetated Areas	EEC	Refers only to those areas inaccessible during SSD 5066 works.
VOC	-	Volatile Organic Compounds
Zn	-	Zinc

1 Introduction

Qube (Qube) Property Management Services Pty Ltd, c/o Tactical Group Pty Ltd (Tactical), engaged EP Risk Management Pty Ltd (EP Risk) to prepare a Long-Term Environmental Management Plan (LTEMP) for the proposed Development following a subdivision, within the Moorebank Precinct West site located at 400 Moorebank Avenue, Moorebank NSW, 2170 (MPW Site).

The development includes the proposed subdivision of Lot 1 in DP1197707 as partial Lots 6,7 and 12 (The Site). The location of the Site and MPW Site is provided as **Figure 1.**

It is understood the MPW Site has been owned by the Commonwealth Government since 1913, used as a Defence facility since the 1940s, and is approximately 190 hectares (ha) in area. The Site is located in the central portion of the MPW Site and is approximately 264,030 m^2 in area.

The MPW Site is currently being redeveloped into the Moorebank Intermodal Terminal Development (MITD) (Proposed Development) and comprises land within a developable area, for construction and operation of the Intermodal Terminal (IMT), and land reserved as an offset and conservation area. These areas are identified as follows:

- **Construction Area**: Encompasses the portion of the MPW Site inside the MPW Stage 2 Construction Boundary, including the Site (ref: **Figure 1**).
- **Offset Area**: Comprises the riparian area adjacent the Georges River which is located outside the MPW Stage 2 Construction Area Boundary to the west of the Site (ref: **Figure 1**).

The Site is within the construction area of the MPW Site and does not include the Offset Area of the MPW Site or areas of endangered ecological communities (EEC) present within the greater MPW Site.

Planning consent for the Proposed Development at the MPW Site included MPW Early Works (Stage 1) under State Significant Development (SSD) (SSD 5066), and the Stage 2 Development (SSD 7099).

In accordance with the conditions of planning consent SSD 5066, remediation of the MPW Site was required in accordance with the approved Remediation Action Plan (RAP) prepared by Golder (2016)[1] and Contamination Management Plan (CMP) prepared by EP Risk (2020[2]). At the completion of remediation, A Site Audit Statement A2 and Site Audit Report for the MPW Site was provided by Enviroview (2020)[3] subject to the implementation of a LTEMP for the MPW Site (EP Risk 2020b)[4]. It is understood that upon completion of placement of fill and prior to construction at the Woolworth Site, a SAR and SAS for the Site is required to demonstrate the Site is suitable for the intended land use under Condition B171, SSD 7709.

[1] Golder (2016) *Land Preparation Works Stage 1 and Stage 2 – Remediation Action Plan*.
[2] EP Risk (2020) *Contamination Management Plan, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW*, 30 July 2020 (ref: EP1489.002_v11.0).
[3] Enviroview (2020) *Stage 2 Works – Completion of Remediation Pre- Construction (Condition B169 Audit)* Moorebank Precinct West Moorebank Intermodal and Logistics Park (MLP) Moorebank Avenue, Moorebank, NSW, dated 20 November 2020 (ref: 600099_0301-2014)
[4] EP Risk (2020b) *Long-Term Environmental Management Plan*, Moorebank Precinct West (MPW), dated 27 October 2020 (ref: EP1489.001_v12).

JBS&G prepared a Woolworths Audit Area Validation Summary (JBS&G 2021)[5], intended to summarise the information available for the Site to demonstrate the area is suitable for the intended land use following importation of fill so a SAS A and SAR could be prepared to satisfy Condition B171. JBS&G (2021) concluded remediation, validation, management and importation works had been completed in accordance with EP Risk 2020, EP Risk 2020b and Golder 2016. The Site was considered suitable for its intended land use subject to the implementation of an LTEMP.

This LTEMP is a standalone document that provides environmental management framework for the Site and is focused on both short to medium-term management during construction and long-term management of the Proposed Development post construction. The LTEMP was prepared to inform a SAR and SAS for the Site following placement of fill, consistent with Stage 2 SSD 7709 (Condition B171).

1.1 Purpose

The LTEMP has been prepared in accordance with the requirements of relevant legislation, regulations, codes of practice, Australian Standards and conditions of consent to address the potential risk to human health and the environment from impacted media during construction and operation of the Proposed Site Development. The objectives of this LTEMP are to:

- Outline the nature and extent of impacted soils, sediment, surface water and groundwater requiring short to long-term management at the Site.
- Develop management measures for the management of impacted materials encountered during construction works and long-term operation of the Site including monitoring and reporting in satisfaction of relevant health and safety and environmental legislation.
- Assign responsibilities for the implementation of management measures.

[5] JBS&G (2021) *Moorebank Precinct West (MPW): Woolworths Audit Area Validation Summary*, dated 27 May 2021 (ref: 51997-134422 L362 (Rev 0)).

1.2 Parties Responsible for the Implementation and Review / Maintenance

The parties responsible for the implementation and review / maintenance of the LTEMP include:

- Land Owner.
- Land Owner Representative.
- Developer (or their representative)
- Principal Contractor (during construction).
- Operational Managing Entity (post construction).
- Environmental Consultant.
- Construction Worker.
- Operational Worker.

1.3 How the LTEMP will be complied with

The LTEMP is prepared in compliance and to satisfy Moorebank Intermodal West Stage 2 Condition B172 of SSD 7709, which specifies that: '*Where remediation outcomes for the site require long term environmental management, a suitably qualified and experienced person must prepare a Long-Term Environmental Management Plan (LTEMP), to the satisfaction of the Site Auditor'.* The LTEMP will inform a statutory SAS to be prepared by the Site Auditor.

This LTEMP will be implemented in compliance with Condition C39 of the MPW Stage 3 Consent (SSD 10431).

2 Background

2.1 Site Identification

The site identification details are presented in **Table 1**.

Table 1 – Site Identification

Item	Description
Site Address	MPW Site – 400 Moorebank Avenue, Moorebank, NSW, 2170 (see **Figure 1**) The Site – Portion of the MPW Site, as described below.
Legal Description	**The Site:** Proposed subdivision of Lot 1 in DP 1197707 to: Partial Lots 6, 7 and 12. The Site boundary is provided as **Figure 1**.
Approximate Site Area	264,030 m^2
Site Owner	Moorebank Intermodal Company
Municipality	Liverpool City Council
Site Zoning	IN1 General Industry

The Site is located approximately 27 km south-west of the Sydney Central Business District (CBD) and approximately 26 km west of Port Botany. The Site is situated within the Liverpool Local Government Area (LGA), in Sydney's South West subregion, approximately 2.5 km from the Liverpool City Centre and is located approximately 1.5 km south of the intersection of Moorebank Avenue and the M5 Motorway. The Site is entirely within the MPW Site footprint.

2.2 Current Land Use

At the time of writing, the Site had been covered with a minimum of 1 m engineered fill to design levels (JBS&G 2021).

2.3 Proposed Land Use

The development is believed to include the construction of large warehouse buildings and paving, with a suitable area for a growing medium supporting landscaped areas. There is potential for relatively minor disturbance of underlying soils during construction works. Excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be managed under one of the following scenarios (JBS&G 2021):

- Reuse on remaining portions of the MPW Site in accordance with the POEO Act 1997, Protection of the Environment Operations (Waste) Regulation 2014 (POEO Regulation), applicable Development Application (DA), Environmental Protection License (EPL), Contamination Management Plan (CMP) or LTEMP for the land.
- Off-site disposal in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014).

2.4 Surrounding Land Use

The land surrounding the Site comprises:

- **North:** MPW Site, Industrial warehouses, the M5 motorway, small pockets of remnant bushland and further industrial and residential properties beyond. The Georges River meanders to the north east.
- **South:** MPW Site, Rail corridor, Holsworthy Defence land, and residential properties to the west of the Georges River.
- **East:** MPW Site, Moorebank Avenue, MPE, general industrial properties and infrastructure (Defence), Liverpool Fire Station (north-east), Anzac Creek, low density and medium density residential properties beyond.
- **West:** MPW Site, Offset Area, The Georges River (which flows north), Glenfield Tip, rail corridor and Casula Station, Leacock Regional Park and low and medium density residential properties beyond.

2.5 Topography

With reference to the JBS&G Woolworths Validation Summary (JBS&G 2021), the Site comprising MPW Pad C and D has been filled to final design levels with a minimum of 1 m of Engineered Fill.

2.6 Hydrology

Drainage at the Site is anticipated to follow the design level contours as overland flow or via drainage channels, swales and detention basins via the MPW Site to the Georges River to the west.

The historical drainage system at the Site was replaced by temporary sediment control swales and dams during Stage 1 and Stage 2 Works which have since been backfilled during importation of Engineered Fill.

2.7 Geology

Based upon a review of the NSW Government Planning and Environment Resources and Energy Penrith 1:100,000 Geological Map (Sheet 9030, First Edition) (1991), the majority of the Site is underlain by Fluvial, clayey quartzose sand and clay from the Tertiary period. The underlying bedrock consists of interbedded Hawkesbury Sandstone and Ashfield Shale (Wianamatta) from the middle Triassic period.

The Site has been covered in a minimum of 1 m of Engineered Fill (JBS&G 2021).

2.8 Hydrogeology

EP Risk (2018) reported groundwater flow was towards the west and the nearest surface water body, the Georges River. Groundwater ranged from 3.751 m Australian Height Datum (AHD) to 8.153 m AHD.

EP Risk (2018) reported that groundwater was predominantly fresh to brackish water (relatively low electrical conductivity, EC) with the exception of three (3) groundwater monitoring wells (GMWs) which indicated an area of high salinity (> 10,000 µS/cm). Dissolved oxygen (DO) measurements

indicated generally anaerobic conditions. The oxidation-reduction potential (ORP) indicated reducing conditions and the pH measurements were generally slightly acidic.

Groundwater elevation and gauging information is provided in **Appendix F**.

2.9 Acid Sulfate Soil

A review of the Liverpool Local Environmental Plan 2008 indicates the Site is located within a Class 5 acid sulfate soil (ASS) developmental control area. The surrounding MPW Site is partially within a Class 5 and Class 1 ASS area. Development consent is required for works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

Based on the review of available information (PB 2014[6] and Golder 2015[7]) actual and potential acid sulfate soils were identified in shallow soils between 1.0 metres below ground level (mBGL) and 2.0 mBGL in the MPW Site Offset Area along the Georges River to the west of the Site. Golder 2015 concluded the acid generating potential of the soils was not caused by sulfidic material. Both Golder (2015) and PB (2014) recommended an Acid Sulfate Soil Management Plan (ASSMP) was a requirement for future earthworks.

Development consent SSD 7709 Condition B39 for MPW Stage 2, required the preparation of an ASSMP for the MPW Site, which includes the Site. EP Risk (2020b) prepared an ASSMP for inclusion as a sub-plan to the CEMP[8] for Stage 2 works at the MPW Site in satisfaction of condition C2 of SSD 7709. The purpose of the ASSMP was to deal with any unexpected discovery of actual or potential acid sulfate soil. The ASSMP included procedures for the investigation, handling, treatment and management of such soil and water seepage.

2.10 Summary of Site History

Numerous contamination assessments have been undertaken at the Woolworth Site as part of assessment of the greater MPW Site, the findings of which are summarised in **Appendix A**.

A summary of the site history is provided in **Table 2**.

[6] PB (2014) *Phase 2 Environmental Site Assessment Moorebank Intermodal Terminal*, dated 28.05.14 (ref: 2103829A-CLM_REP-1 Rev B) Parsons Brinkerhoff Pty Ltd.
[7] Golder (2015) *Post Phase 2 Environmental Site Assessment*. Golder Associates.
[8] SIMTA (2020) Construction Environmental Management Plan, Moorebank Precinct West Stage 2, dated 14 January 2020 (ref: MIC2-QPMS-EN-APP-00001).

Table 2 – Summary of Site History	
Year	**Summary**
1913	The Site, as part of the MPW Site, was purchased by the Commonwealth Government.
1930	The Site was predominantly vacant and covered in bushland/grazing land.
1940s	The Site was used by Australian Defence Force (ADF) as a training base for the Army.
Prior to 1956	The Site had had been developed as a Defence base.
1956 to circa 1995	There was no known fire training activities that occurred within the Site. The MPW Site had undergone various phases of development. A former fire training area (FFTA) approximately 50 m wide and 100 m long was identified close to the Georges River in the southern portion of the MPW Site opposite Jacquinot Road. Fire training involved pouring diesel and other flammable materials into shallow drains, in pans, in above ground storage tanks and car bodies, igniting the fuel and then extinguishing the fire using foam extinguishers. Based upon a review of aerial photographs, it was inferred that fire training activities in this area ceased somewhere between 1991 and 1994. Another fire training area approximately 60 m wide by 160 m long was located in the southern portion of the Dust Bowl. It was understood that fire activities in this area included igniting oil in trays and extinguishing them with foam including AFFF and there was no information available on when fire training activities ceased in this area. Historical excavator training within the Dust Bowl resulted in routine excavation up to depths of 4 m.
2015	The Site and MPW Site was vacated by Defence, with the relocation of military units to new facilities at the nearby Holsworthy Base.

Numerous contamination assessments have been undertaken at the MPW Site and Site, the findings of which are summarised in **Appendix A** and various stages of development are summarised by JBS&G (2021).

3 Description of Existing / Residual Contamination

3.1 Summary of Impacted Media

Based on the JBS&G (2021) summary letter, the following remaining areas of environmental concern (AEC) and contaminants of concern for the MPW Site is provided as follows:

- AEC 1 - Chlorinated hydrocarbons impact (Trichloroethylene (TCE) and Cis-1,2-dichlorothene (cis-DCE)) and total recoverable hydrocarbons (TRH) in the north west portion of the MPW Site to the south of the ABB Building.
- AEC 2 - Petroleum hydrocarbon impact including light non-aqueous phase hydrocarbons (LNAPL) in the eastern portion of the MPW Site.
- AEC 3 - PFAS impact associated with residue from historical fire-fighting activities.

The chlorinated hydrocarbon impacted area (AEC 1) is located approximately 860 m north of the Site and the petroleum hydrocarbon impact are (AEC 2) is located approximately 110 m to the south west. JBS&G (2021) considered no long-term management is required in relation to these off-site impacts within the Site, limiting the known sources of contamination to PFAS impacts associated with residue from historical fire-fighting activities (AEC 3), partially located within the eastern and western portion of the Site. The location of the AECs at the MPW Site in relation to the Site is provided as **Figure 3**. Further information relating to the AECs is provided in the Conceptual Site Model (CSM) provided as **Appendix A.** A CSM Figure is provided as **Figure 4**.

JBS&G (2021) stated *"A minimum of 1 m of Engineered Fill has been placed within the Audit Area* (the Site) *and is also proposed to be substantially covered by warehousing and concrete pavement."* Additionally, *"No residual PFAS impacted soils were placed/reused within the Audit Area* (the Site)".

3.2 Source – Pathway – Receptor Linkages Requiring Management

Based on the CSM provided in **Appendix A** for the Site, a summary of impacted media requiring management in this LTEMP is provided in **Table 3**. However, based on the placement of a minimum 1 m of Engineered Fill, it is considered unlikely underlying soils will be significantly disturbed as part of construction of a warehouse facility. Management of any unidentified contamination is to be managed in accordance with an unexpected finds protocol provided as **Appendix D**.

Table 3 – Identified Areas of Environmental Concern and Impacted Media

Area of Environmental Concern (AEC)	COPC	Impacted Media	Risk Assessment / Management	Source – pathway receptor linkages requiring management
AEC 3 - PFAS impact associated with residue from historical fire-fighting training.	PFAS	**Soil** – Exceedances of Tier 1 ecological indirect commercial / industrial criteria. **Soil leachate** – Detectable leachable PFOS + PFHxS concentrations reported up to a maximum concentration of 1.68 µg/L (<2 m BGL) and 6.1µg/L (>2 m BGL). **Sediments** - Detectable PFAS concentrations historically reported within on-site sediment. **Surface water** - Exceedances of Tier 1 criteria for samples collected within temporary detention basins during Early Works construction and from the Georges River. **Groundwater** – Exceedances of Tier 1 criteria.	• EnRiskS (2019)[9] undertook a human health risk assessment of the MPW Site and reported the risk to human health at the MPW Site was low and acceptable, but bioaccumulation and the effects on higher order ecological consumers were unable to be excluded. • EnRiskS (2019a) [10] reported a potential health risk to children who consume more than two serves of fish per month sourced from the Georges River and potential adverse effects to the aquatic environment by bioaccumulation and the effects on higher order ecological consumers.	• Leaching and erosion of PFAS from soil to surface water and groundwater associated with soil disturbance during construction. • Recreational fishing resulting in the consumption by children of more than two serves of fish per month. • Bioaccumulation and the effects on higher order ecological consumers.

[9] EnRiskS (2019) *Land Human Health and Ecological Risk Assessment (Land HERA)*, dated 6 May 2019 (ref: MICL/19/BIOR001, Revision B – Revised Draft).
[10] EnRiskS (2019a) *Waterway Human Health and Ecological Risk Assessment (Waterway HHERA)*, dated 10 May 2019 (ref: MICL/18/GRR001, Revision E – Revised Draft).

4 Management Activities

4.1 LTEMP Roles and Responsibilities

This LTEMP has been developed to provide an environmental framework for short to medium term environmental management during construction and operation of the Proposed Development at the Site. The terminology, roles and responsibilities relevant to the LTEMP are provided in **Table 4**.

Table 4 – Responsibilities for LTEMP Implementation

Position	Company/Entity	Responsibilities
Land Owner	Commonwealth	To consent to the registration of the LTEMP on title.
Land Owner Representative	Moorebank Intermodal Consortium (MIC)	To consent to the registration of the LTEMP on title.
Developer (or their representative)	Moorebank Precinct Nominees Pty Ltd	The Developer is responsible for: • The engagement of the Principal Contractor (during construction). • Management of the operation of the Site post construction or engagement of the Operational Managing Entity. • Ensuring that the Principal Contractor or Managing Operational Entity implement the LTEMP.
Principal Contractor (during construction)	To be appointed	• Responsible for the implementation of the LTEMP during construction works and has primary control of the Site (partial Lots 6,7 and 12). Responsible for inductions, training, notifying the owner, appropriate consultant or contractor in relation to unexpected finds. Also responsible for quarantining unexpected finds requiring management with suitable barricades and informing other workers of its location. • Persons and/or company appropriately qualified to undertake the required management works and has the appropriate insurances and licences. • Responsible for undertaking works in accordance with this LTEMP.
Operational Managing Entity (post construction)	To be appointed	• Responsible for the implementation of the LTEMP at the Proposed Development during long-term operation.
Environmental Consultant	To be appointed	• As defined under the NEPM (NEPC 2013) (Schedule B9) the environmental consultant is responsible for the assessment of contaminated sites and preparation of assessment reports and should be able to demonstrate relevant qualifications and experience to a level appropriate to the contamination issues at the site under investigation. • The environmental consultant is to have a Certified Environmental Practitioner (Site Contamination) recognised by one of the certifying bodies recognised by the NSW EPA. Any reports

Table 4 – Responsibilities for LTEMP Implementation		
Position	**Company/Entity**	**Responsibilities**
		prepared should be written or reviewed by the individual Certified Environmental Practitioner (Site Contamination). • Responsible for the following: ○ Notifying the Client and Principal Contractor of any unexpected finds. ○ Undertaking the assessment, remediation and validation of an unexpected find. ○ Engaging the Ordnance Contractor should UXO or EOW be identified as an unexpected find. ○ Notifying the Principal Contractor once unexpected finds have been validated and can be reoccupied. • Any environmental monitoring required under the LTEMP.
Construction Worker	Commercial industrial worker during construction	• Any worker on the Site, including any contractor or sub-contractor, must adhere to the requirements of the LTEMP during short to medium term construction. Responsible for undertaking their tasks in a safe manner and notifying the Principal Contractor if they see any items / conditions which may constitute an unexpected find.
Operational worker	Commercial industrial worker during operation	• To adhere to the requirements of the LTEMP during long-term operation of the Proposed Development post construction.

4.2 Approval and Licensing Requirements

SSD 7709 provides specific requirements for the LTEMP which are provided in **Table 5**.

Table 5 – Planning Conditions Specific to the LTEMP	
Condition	**Requirement**
SSD 7709 – B171	Upon Completion of importation and placement of fill and prior to construction of permanent built surface works, the Applicant must submit to the Planning Secretary, a Site Audit Report and a Site Audit Statement A for the whole site, prepared in accordance with the *NSW Contaminated Land Management – Guidelines for the NSW Site Auditor Scheme 2017*, which demonstrates the site is suitable for its intended land uses under MPW Stage 2 SSD 7709.

Table 5 – Planning Conditions Specific to the LTEMP

Condition	Requirement
SSD 7709 – B172	Where remediation outcomes for the site require long term environmental management, a suitably qualified and experienced person must prepare a Long-Term Environmental Management Plan (LTEMP), to the satisfaction of the Site Auditor. The plan must: a) be submitted to the Planning Secretary and EPA prior to commencement of construction (other than vegetation clearing); and b) 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 details of any contingency measures that the Applicant is to carry out to address any ongoing contamination.
SSD 7709 – B173	• The LTEMP must be registered on the title to the land.

All planning conditions of consent for the Proposed Development relevant to the LTEMP are shown in **Table 6**. Further details of the condition of consent / approval and mitigation measures and how they relate to the LTEMP are provided as a compliance matrix at **Appendix D**.

Table 6 – Planning Approval Conditions of Consent

Planning Approval	Condition of Consent	Notes
SSD 7709	B171	Provision of Site Audit Statements to the Planning Secretary upon completion of importation and placement of fill.
	B172	Requirements for the LTEMP
	B173	Registration of the LTEMP
	B180	The Applicant must assess and classify all liquid and non-liquid wastes to be taken off site in accordance with the latest version of the EPA's *Waste Classification Guidelines Part 1: Classifying Waste* (EPA 2014) and dispose of all wastes to a facility that may lawfully accept the materials.
	C1	Management plans required under this consent must be prepared in accordance with relevant guidelines, and include: (a) detailed baseline data; (b) details of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures and criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; (c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits or performance measures and criteria; (d) a program to monitor and report on the: (i) impacts and environmental performance of the development; (ii) effectiveness of the management measures set out pursuant to paragraph (c) above; (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (f) a program to investigate and implement ways to improve the environmental performance of the development over time; (g) a protocol for managing reporting any; (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria); (ii) complaint; (iii) failure to comply with statutory requirements; (h) roles and responsibilities for implementing the plan; and (i) a protocol for periodic review of the plan.

Table 6 – Planning Approval Conditions of Consent		
Planning Approval	**Condition of Consent**	**Notes**
EPBC 2011/6086	8a	MPW Concept EIS, Soil and Contamination PEMF Section 6.2 – Management controls – Early Works and Construction phase
		MPW Concept EIS, Soil and Contamination PEMF Section 6.4– monitoring
		MPW Concept EIS, Soil and Contamination PEMF Section 6.5 – Management response to incidents and non-compliances
	8b) and c)	REMM 7A, REMM 7B, REMM 7C, REMM 7D, REMM 7E, REMM 7F, REMM 7I, REMM 7J, REMM 7K, REMM 8B, REMM 8D, REMM 8E, REMM 8F, REMM 8G, REMM 8H, REMM 8I, REMM 8J, REMM 8K, REMM 8L, REMM 8M, REMM 8N, REMM 8RO, REMM 8P, REMM 8Q, REMM 8R, REMM 8S, REMM 8T, REMM 8U, REMM 8V, REMM 8W, REMM 8X, REMM 8Y, REMM 8Z, REMM 8AA
	8 d)	i), ii), iii), iv), v), vi), vii),
Final Completion of Mitigation Measures	-	OB, 5A, 5I, 6A, 6B, 6C, 6D, 6E, 6F, 6H, 6I, 6J, 7A, 12A,

4.3 Implementation of the LTEMP

The LTEMP will be implemented by the Developer/Principal Contractor and Operational Managing Entity after provision of a SAS A2 and SAR and registrations on title to satisfy Condition B171 and B173 of SSD 7709, respectively. Implementation includes of the LTEMP is for the following stages:

- Phase 2 Construction Works.
- Operational Phase.

This LTEMP will be implemented in compliance with Condition C39 of the MPW Stage 3 Consent (SSD 10431).

Based upon details of the Proposed Development summarised in **Section 2.3**, the following potential activities are proposed to be carried during construction:

Proposed Development Activities

Based upon the description of the proposed development (JBS&G 2021), the following activities are proposed at the Site which may intersect AEC3:

Phase 2 Construction Works

- Installation of underground services.
- Construction of roadways, warehouses, and landscaped areas.

Operational Phase

- Sub-surface maintenance works.

4.4 LTEMP Environmental Management and Monitoring Procedures

The approach to managing the potential source – pathway – receptors addressed within the LTEMP is provided in the environmental management procedures (EMP) below and is consistent with the RAP (Golder 2016). The EMPs are provided in **Appendix B** and summarised as follows:

- EMP 1 – Land use restrictions.
- EMP 2 – Subsurface works – AEC3.
- EMP 3 – Materials Tracking.
- EMP 4 – Stockpile Management.
- EMP 5– Minor Excavation.
- EMP 6– Off-site disposal of excavated / unsuitable material.
- EMP 7 – Subsurface maintenance works.
- EMP 8 - Unexpected finds.
- EMP 9– Additional Validation Requirements.
- EMP 10– Management of groundwater.
- EMP 11 – Management of surface water.
- EMP 12 – Training.
- EMP 13– Contractor and subcontractor management.
- EMP 14– Contingency plan.
- EMP 15– Non-compliances with the LTEMP.
- EMP 16– Record keeping.
- EMP 17– Audit/review of LTEMP implementation.
- EMP 18– LTEMP review.
- EMP 19– Cessation of LTEMP application.

Summary of Source – Pathway – Receptor Linkages Requiring Management

Based upon a review of the source – pathway – receptor linkages reported in **Table 3**, potentially contaminating activities associated with the construction and operation of the Proposed Development which require long term management are provided in **Table 7**.

Table 7 – Management of Potentially Contaminating Activities associated with the Proposed Development			
Project Stage	**AEC**	**Activity**	**Management Procedure**
General	AEC 3	All activities	**EMP 1**
Phase 2 Construction Works	AEC 3	Installation of underground services	**EMP 2, EMP 3, EMP 4, EMP 5, EMP 6, EMP 7, EMP 8, EMP 9, EMP 10, EMP 11**
		Construction of roadways, warehouses, and landscaped areas	**EMP 2, EMP 3, EMP 4, EMP 5, EMP 6, EMP 7, EMP 8, EMP 9, EMP 11**
Operation of Proposed Development	AEC 3	Sub-surface maintenance works	**EMP 7**, **EMP 8, EMP 10, EMP 11**

In addition to the EMPs provided within **Table 7**, **EMP 12** to **EMP 19** are required within all construction and operational stages.

4.5 Reuse of PFAS Impacted Soil

As reported by JBS&G (2021), Engineered Fill material has been imported over the entire footprint of the Site, limiting opportunities for the reuse of PFAS impacted soil from AEC 3.

There is potential for relatively minor disturbance of underlying soils during construction works. Excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be managed under one of the following scenarios (JBS&G 2021):

- Reuse on remaining portions of the MPW Site in accordance with the POEO Act 1997, POEO Regulation 2014, applicable DA, EPL, CMP or LTEMP for the land.
- Off-site disposal in accordance with EPA 2014.

In the event soil is to be reused on-site, reference should be made to previous analytical results provided within **Appendix A.**

JBS&G prepared a Technical Memo (JBS&G 2021a [11]) clarifying stormwater structures and the placement of PFAS impacted soil for the Site in accordance with EnRiskS (2020) and EP Risk (2020b) and considered that following development of the Site the risk of offsite migration of PFAS to sensitive receptors via the stormwater system is considered negligible. JBS&G (2021a) described the mitigation factors as:

- *The reuse of soil at or near surface are required to meet appropriately protective total soil and leachable PFAS criteria (NEMP 2020). Therefore, runoff into the development's stormwater system is anticipated to be within acceptable PFAS concentrations;*

[11] JBS&G (2021), *Technical Memo, Moorebank Precinct West (MPW) – Stormwater Structures and the Placement of PFAS Impacted Soil, Moorebank Logistics Park, NSW,* dated 19 May 2021 (ref: 51997 – 136836 (rev 2)).

- *Other PFAS impacted soils proposed to be reused on site will be isolated by pavements and imported fill, and infiltration water would not reach (or would be negligible in) the underlying PFAS contaminated soil. Therefore, there would be no driver for PFAS to be mobilised;*
- *In order that the development is not geotechnically/structurally compromised, the stormwater system is designed to retain water for discharge offsite. Therefore, exfiltration from the network would not be expected to exacerbate leaching to groundwater to any significant extent; and*
- *The stormwater system is above the groundwater table and therefore the system would not be a preferential flow path for impacted groundwater.*

Based on the JBS&G (2021a) Technical Memo *"It is therefore considered that the management measures detailed in the LTEMP are sufficiently protective of the proposed MPW stormwater system and a setback from enclosed stormwater infrastructure is not warranted, nor contemplated by the approved LTEMP* (JBS&G 2021a). Additionally, JBS&G considered the use of asphalt as a suitable cover (**Appendix G**) as referenced by EnRiskS (2020).

Soil excavated beneath the Engineered Fill layer that has been subject to historical PFAS testing, as outlined in **Appendix A,** or which is sampled and tested in accordance with **EMP 5**, should be assessed by the Environmental Consultant for suitability to remain on-site or off-site disposal.

Further testing of soil where historical data is absent or limited may be undertaken in accordance with **EMP 5**.

4.6 Compliance Matrix

The Development Consent made under *Section 89E of the Environmental Planning and Assessment Act 1979* has listed the conditions of consent for SSD 7709 in **Appendix C** in relation to the LTEMP.

4.7 Adopted Validation Criteria

The adopted criteria for the validation of unexpected finds identified during Stage 2 Construction Works and on-going operation of the Site is provided below.

Soil Criteria

For the purposes of assessing the results of validation analytical testing of soil at the Site, the Environmental Consultant should reference the relevant Guidelines and Standards, including but not limited to the following:

- NSW DEC (2017) Guidelines for the NSW Auditor Scheme (Third Edition).
- National Environment Protection Council (NEPC) 2013, National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), Canberra (ASC NEPM, 2013).
- Friebel, E & Nadebaum, P 2011, Health Screening Levels for Petroleum Hydrocarbons in soil and Groundwater. Part 1: Technical development document, CRC CARE Technical Report no. 10, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.

- Heads of EPAs Australia and New Zealand (HEPA), *PFAS National Environmental Management Plan*, January 2020 (HEPA NEMP 2020).

4.8 Validation Sampling Program

Validation of unexpected finds should be undertaken as directed by the Environmental Consultant in accordance with the applicable Guidelines and Standards at the time of the assessment. Reporting must be undertaken in accordance with the NSW EPA *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land* (NSW EPA 2020).

4.9 Waste Classification

Contaminated soils requiring disposal off-site shall be assessed and classified in accordance with **EMP** .

4.10 Contingency Plan

In accordance with SSD 7709 – B172, the LTEMP must include *'details of any contingency measures that the Applicant is to carry out to address any ongoing contamination'*. Procedures for the management of unexpected finds (**EMP 8**) and a contingency plan (**EMP 14**) are provided within this plan.

5 Monitoring and Reporting

5.1 Contamination Management Plan Periodic Review

A periodic review of the LTEMP should be undertaken for the following (**EMP 18**, **Appendix B**):

- If there are any regulatory changes relevant to the implementation of the LTEMP.
- If there is any significant change in land use or additional development of the Site.
- Once construction activities have been completed and prior to occupation of the Site (if required).

Any revisions to the LTEMP must be approved by the appointed NSW EPA accredited Site Auditor (**EMP 18**, **Appendix B**). Where the LTEMP is revised, copies should be provided to all current stakeholders, training provided, and induction procedures updated where necessary.

5.2 Period of Implementation

The LTEMP is to be implemented during construction and operation of the Proposed Development and will not cease until the conditions detailed in **EMP 19** (**Appendix B**) are met.

5.3 Managing and Reporting

Incidents and Non-compliances

The requirement is for the owner of the Site to be compliant with conditions of consent and undertake the development in accordance with all consent and planning documentation. However, in the event of an incident and/or non-compliance with the LTEMP, these will be managed in accordance with **EMP 15** (**Appendix B**). Reporting registers are provided as **Appendix F**.

Complaints

All complaints will be managed in accordance with the CEMP (during construction) and the Environmental Management System (during operation).

Continual Improvement

Continual improvement of this LTEMP will be undertaken in accordance with the **EMP 17** and **EMP 18** in **Appendix C.** Continuous improvement will be achieved by the ongoing evaluation of environmental management performance and effectiveness of this plan against the environmental policies, objectives, and targets.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure.

5.4 Record Keeping

All documents in relation to the LTEMP will be managed in accordance with **EMP 16** (**Appendix C**).

6 References

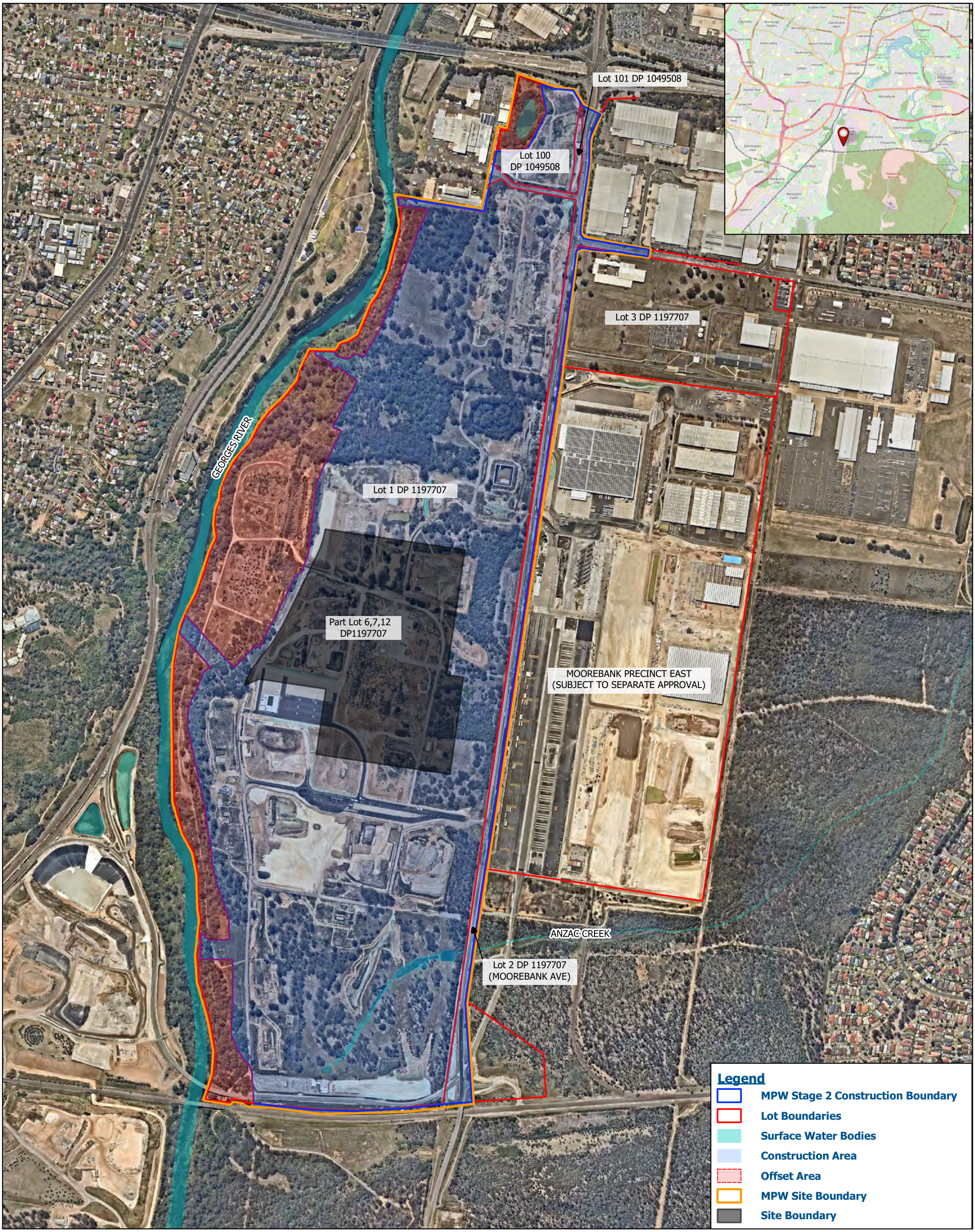
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- Costin Roe Consulting Pty Ltd (2020) Construction Soil and Water Management Plan, Moorebank Logistic Park, Precinct West Stage 2, Moorebank Avenue, Moorebank, NSW, dated 16 March 2020, Revision 10 (ref: 13455.07-03_10.rpt)
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- EnRiskS (2019) *Land Human Health and Ecological Risk Assessment (Land HERA)*, dated 6 May 2019 (ref: MICL/19/BIOR001, Revision B – Revised Draft).
- EnRiskS (2019a) *Waterway Human Health and Ecological Risk Assessment (Waterway HHERA)*, dated 10 May 2019 (ref: MICL/18/GRR001, Revision E – Revised Draft).
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- EP Risk (2018) *Moorebank Precinct West Site-Wide Per- and Poly- Fluoroalkyl Substances (PFAS) Assessment* (ref: EP0748.008 v1, 22.08.18) EP Risk Management Pty Ltd.
- EP Risk (2017c) *Literature Review, Criteria for Assessment of PFAS and Risk Assessment, Moorebank Intermodal Terminal Development* (ref: EP0448.001, v.3, 03.10.17).
- EP Risk (2020) *Contamination Management Plan, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW*, 30 July 2020 (ref: EP1489.002_v11).
- Enviroview (2016) *Site Audit Interim Advice – Golder Associates, Moorebank Intermodal Terminal Stage Specific Remediation Action Plan*, Letter to Tactical Group dated 22 August 2016 from Mr James Davis.
- Enviroview (2019) *Site Audit Interim Advice 29 – Review of Human Health and Ecological Risk Assessment (HHERA): PFAS in Georges River Adjacent to Proposed Moorebank Intermodal Terminal prepared by EnRiskS*. Letter to Tactical Group dated 29 January 2019 from Mr James Davis.

- Enviroview (2019a) *Site Audit Interim Advice 30 – Review of Land and Waterway Human Health and Ecological Risk Assessments (HHERAs) prepared by EnRiskS*. Letter to Tactical Group dated 17 July 2019 from Mr James Davis.
- Enviroview (2020) *Site Audit Interim Advice 31 – Review of JBS&G Report – Remediation Validation Report for Moorebank Precinct West*. Letter to Tactical Group dated 20 February 2020 from Mr James Davis.
- Enviroview (2020a) *Site Audit Interim Advice 32 – Review of EP Risk Reports – Long-Term Environmental Management Plan (LTEMP) and Contamination Management Plan (CMP) for Moorebank Precinct West*. Letter to Tactical Group dated 5 March 2020 from Mr James Davis.
- Enviroview (2020b) *Site Audit Interim Advice 33 – Review of JBS&G Report – Revised Remediation Validation Report for Moorebank Precinct West*. Letter to Tactical Group dated 6 May 2020 from Mr James Davis.
- Enviroview (2020c) *Site Audit Interim Advice 34 – Review of Revised EP Risk Report – Contamination Management Plan (CMP) for Moorebank Precinct West*.
- Enviroview (2020d) *Site Audit Interim Advice 35 – Review of Revised EP Risk Reports – Long-Term Environmental Management Plan (LTEMP) and Contamination Management Plan (CMP) for Moorebank Precinct West*.
- Enviroview (2020e) *Site Audit Interim Advice 37 – Review of Revised Long-Term Environmental Management Plan (LTEMP) (v5) for Moorebank Precinct West*.
- Enviroview (2020f) *Site Audit Interim Advice 38 – Review of Revised Long-Term Environmental Management Plan (LTEMP) (v6) for Moorebank Precinct West*.
- Enviroview (2020g) *Site Audit Interim Advice 02 – Review of Long-Term Environmental Management Plan (LTEMP) (rev 9) for Moorebank Precinct West, Stage 2 works*.
- Enviroview (2020h) *Site Audit Interim Advice 03 – Review of LTEMP Material Reuse Risk Assessment for PFAS for Moorebank Intermodal Terminal*, dated 1 October 2020 (ref: IA 0301-2014_03).
- Enviroview (2020i) *Site Audit Interim Advice 04 – Review of LTEMP Material Reuse Risk Assessment for PFAS for Moorebank Intermodal Terminal*, dated 14 October 2020 (ref: IA 0301-2014_04).
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- GHD (2014) *Stage 1 contamination assessment and data gap analysis report* (report reference 21/24133/204711), December 2014.
- GHD (2015) *Intrusive site investigations* (Ref 21/24133/207651), November 2015.
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- GHD (2018a) *Former DNSDC Refuelling Area, Moorebank NSW, Environmental Management Plan* (report reference 21/25471), October 2018.
- GHD (2019) *Moorebank Precinct West, Report Summarising PFAS Investigations to February 2019*, dated April 2019 (ref: 2128111).
- GHD (2019a) *Moorebank Precinct West, PFAS Management Plan*, dated June 2019.
- Golder (2015) *Post Phase 2 Environmental Site Assessment*. Golder Associates.
- Golder (2015a) *Onsite Quantitative Human Health Risk Assessment, Moorebank Intermodal Terminal* (ref: 147623070-043-R-Rev1).
- Golder (2015b) *Preliminary Aqueous Film Forming Foam Investigation* (ref: 147623070-035-M-Rev0, FINAL, 28.10.15) Golder Associates Pty Ltd.
- Golder (2016) *Land Preparation Works Stage 1 and Stage 2 – Remediation Action Plan*.
- Golder (2016a) *Moorebank Avenue – Site Management Plan*, dated 4 July 2016 (ref: 147623070-052-Rev1).
- (Golder 2016b) *Moorebank Intermodal Terminal, Per- and Poly-fluoroalkyl Substances Investigations: Stage 1 Onsite Screening Assessment* (ref: 147623070-059-R-Rev0, FINAL, 29.10.16) Golder Associates Pty Ltd.
- Golder (2016c) *Perfluoroalkyl Substances Surface Water and Sediment Investigation Georges River*, dated 22 March 2016 (ref: 147623070-047-R-Rev0).
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- Golder (2016e) *Moorebank Intermodal Terminal, Preliminary PFAS in Groundwater Remedial Options Appraisal, Moorebank Intermodal Terminal, Moorebank, NSW* (ref: 147623070-065-R-Rev0, 01.09.16) Golder Associates Pty Ltd.
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- JBS&G (2020a) *MPW Supplementary Validation Report, Moorebank Avenue, Moorebank NSW*, dated 23 September 2020 (ref: 58753/132401 (Rev B)).
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- JBS&G (2021) Moorebank Precinct West (MPW): Woolworths Audit Area Validation Summary, dated 15 January 2021 (ref: 51997-134422 L362 (Rev B)).
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Figures



Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 1 - Site Location

EP RISK

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Job No: EP1489.001
Date: 18/06/2021
Drawing Ref: Fig 1
Version No: v2

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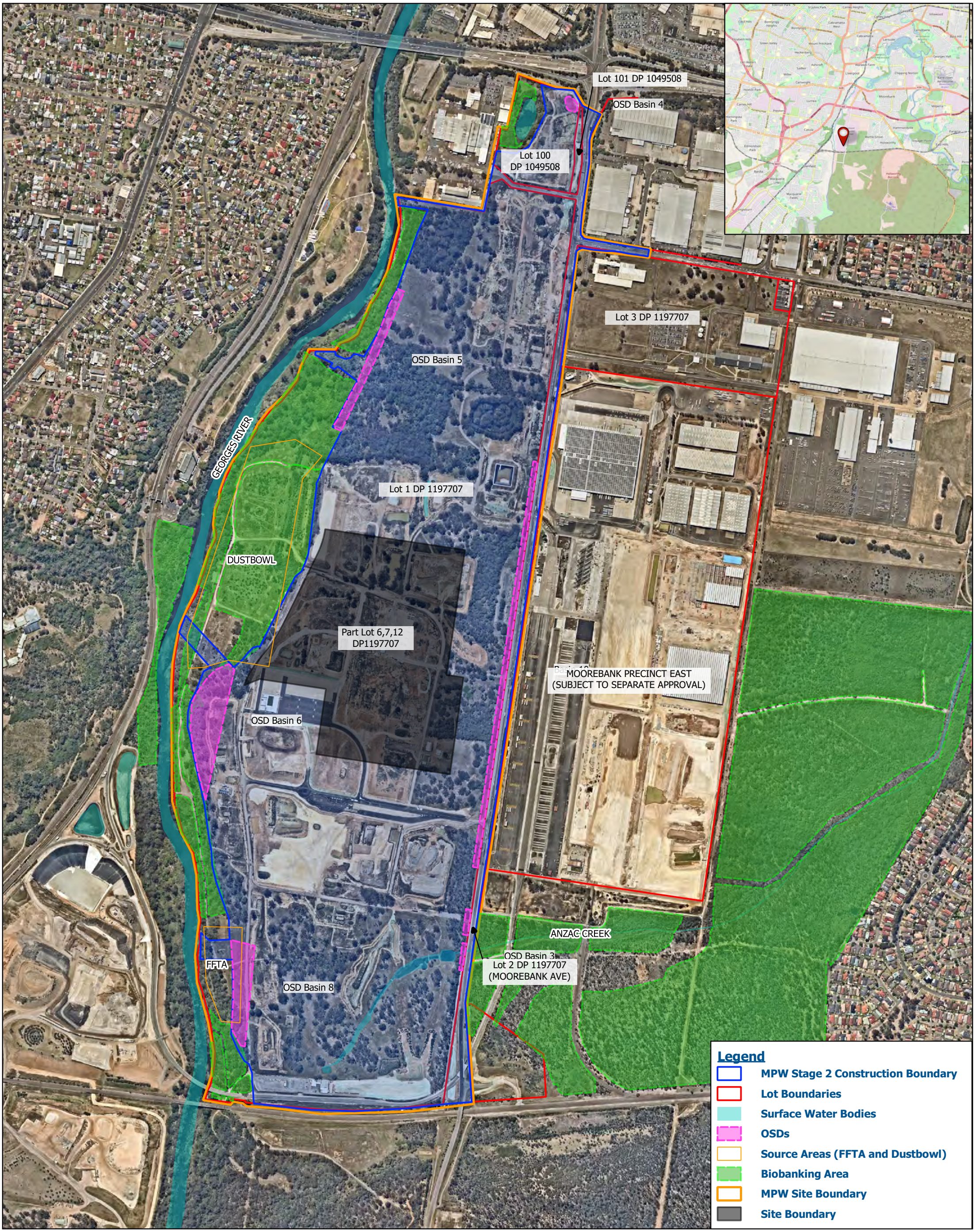
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APPROVED COMPANY ISO 14001 Environmental Management Systems QMS Certification Services



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Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 2 - Site Layout and Features

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Date: 18/06/2021
Drawing Ref: Fig 2
Version No: v2

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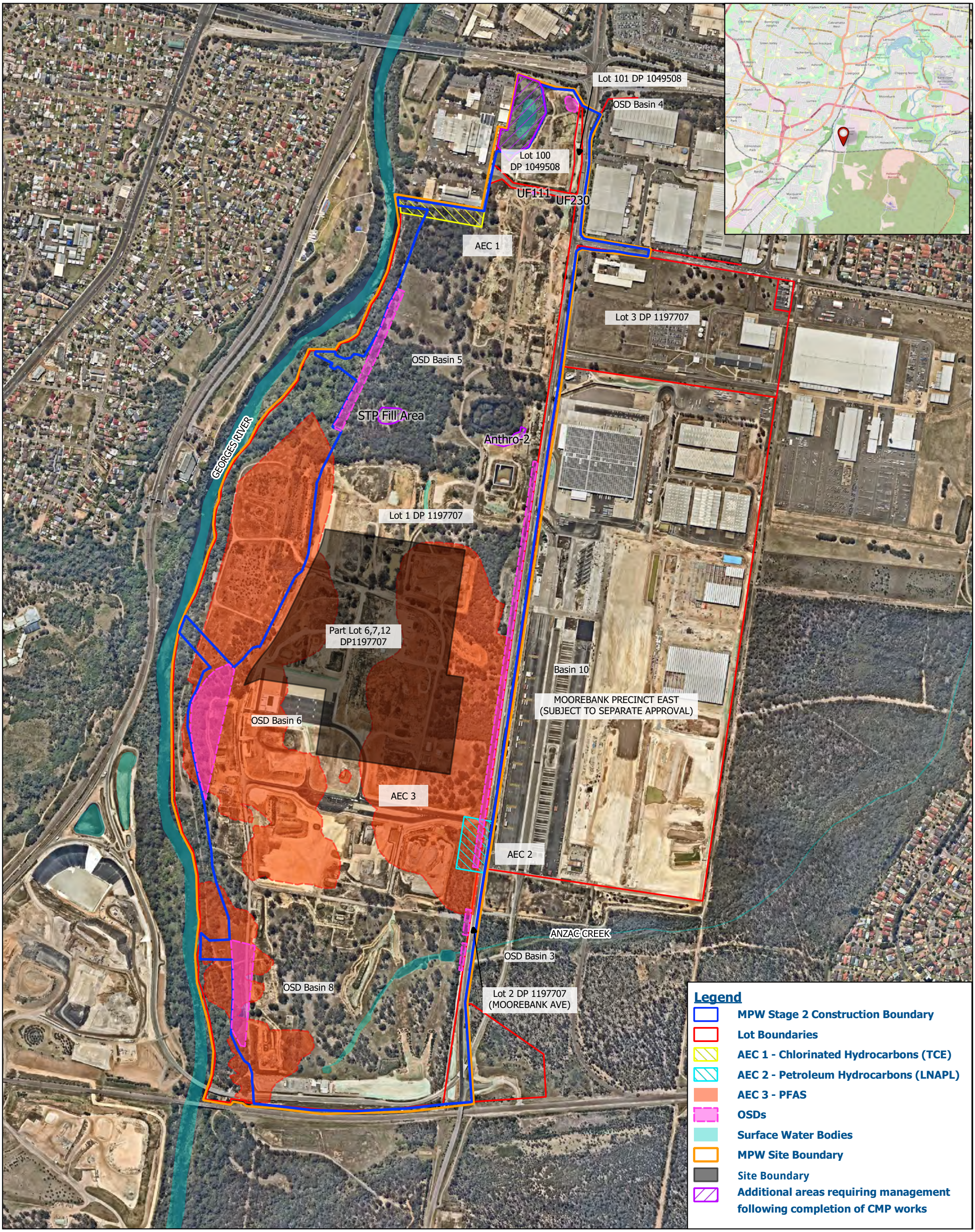
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Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 3 - Areas of Environmental Concern

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Date: 18/06/2021
Drawing Ref: Fig 3
Version No: v2

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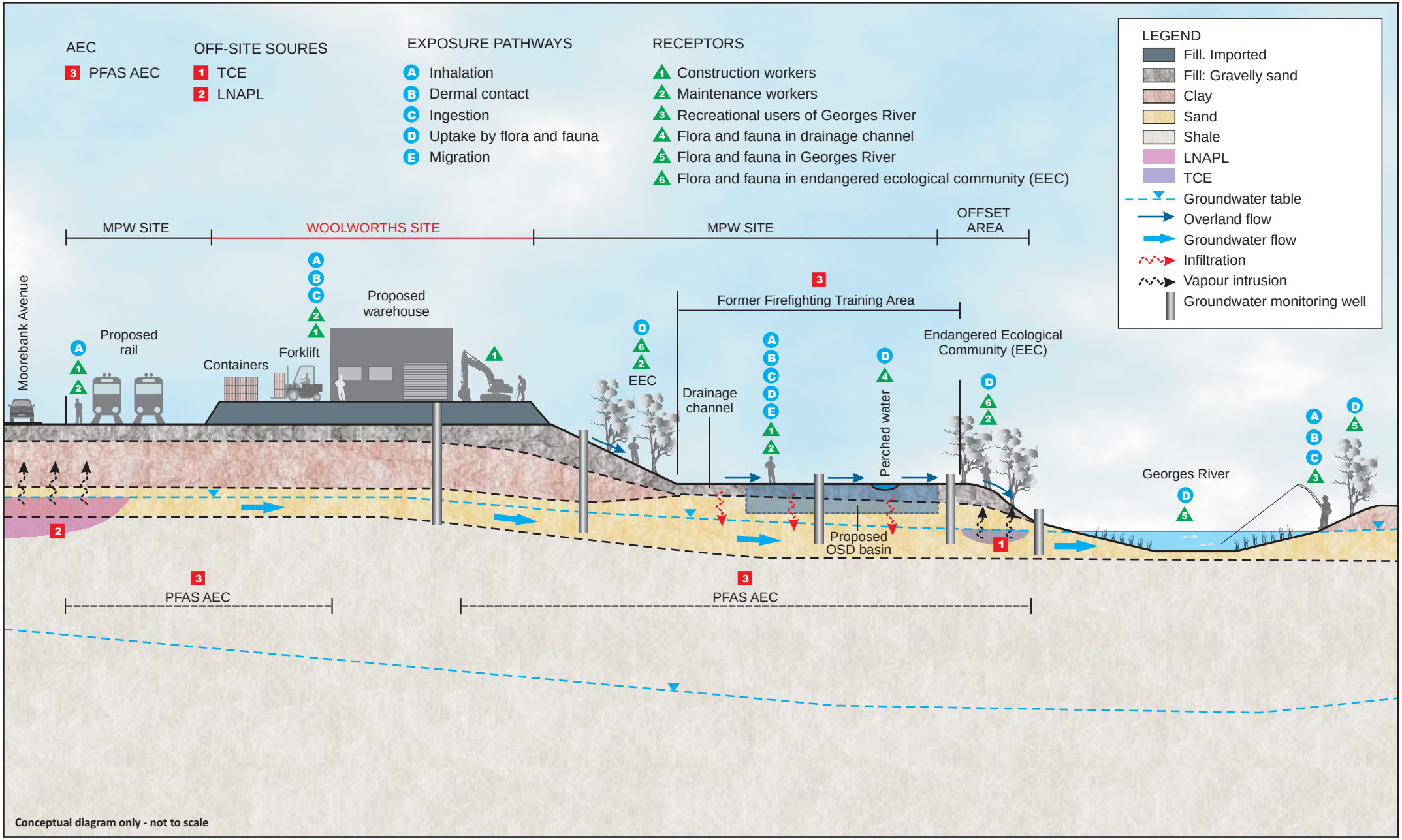
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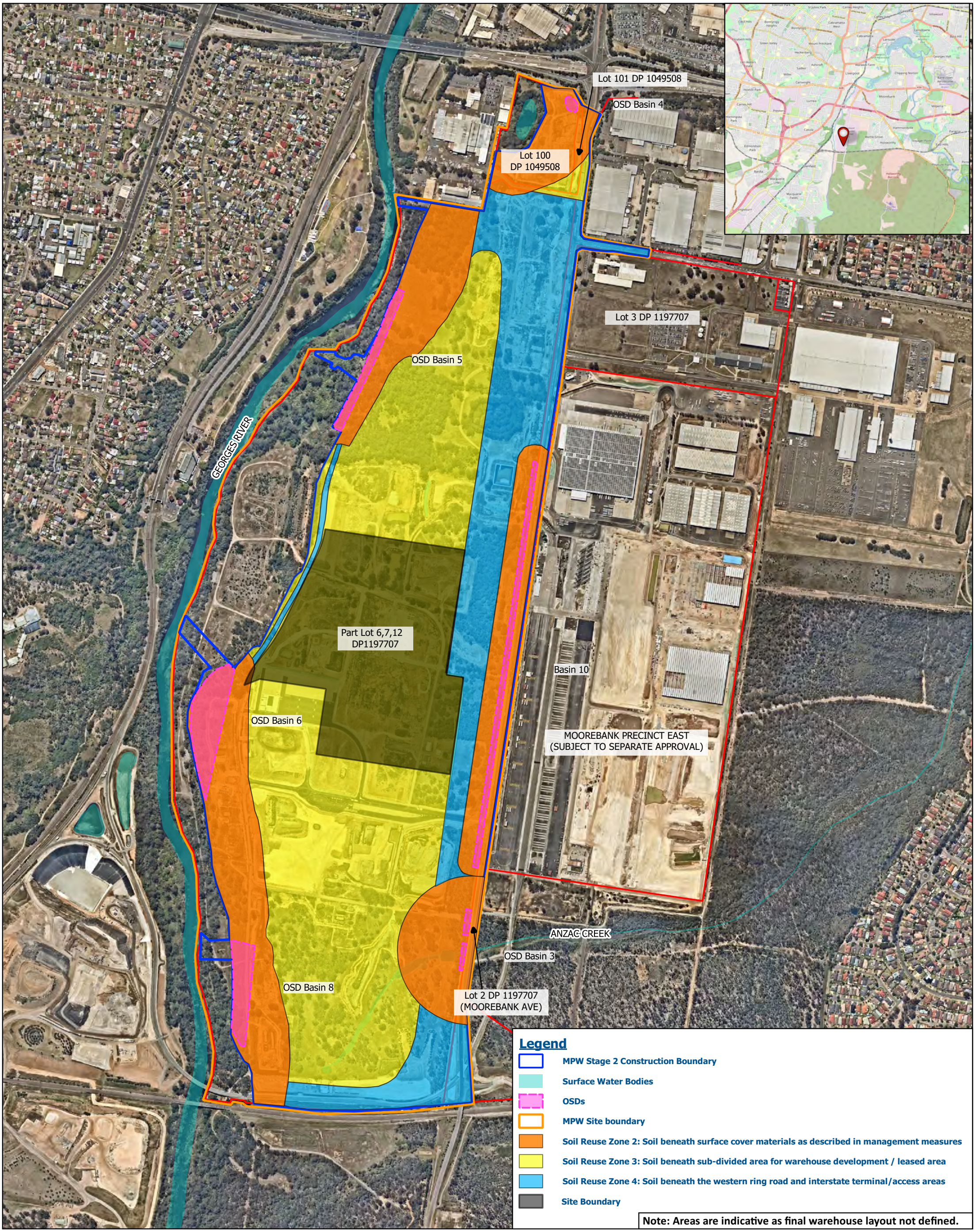


Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 4 - Conceptual Site Model

Job No: EP1489
Date: 19/2/2021
Drawing Ref: EP1489_004.cdr
Version No: v1

Drawn By: B.W.
Checked By: P.S.



Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 5 - Soil Reuse Zones

EP RISK

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Job No: EP1489.007
Date: 18/06/2021
Drawing Ref: Fig 5
Version No: v4

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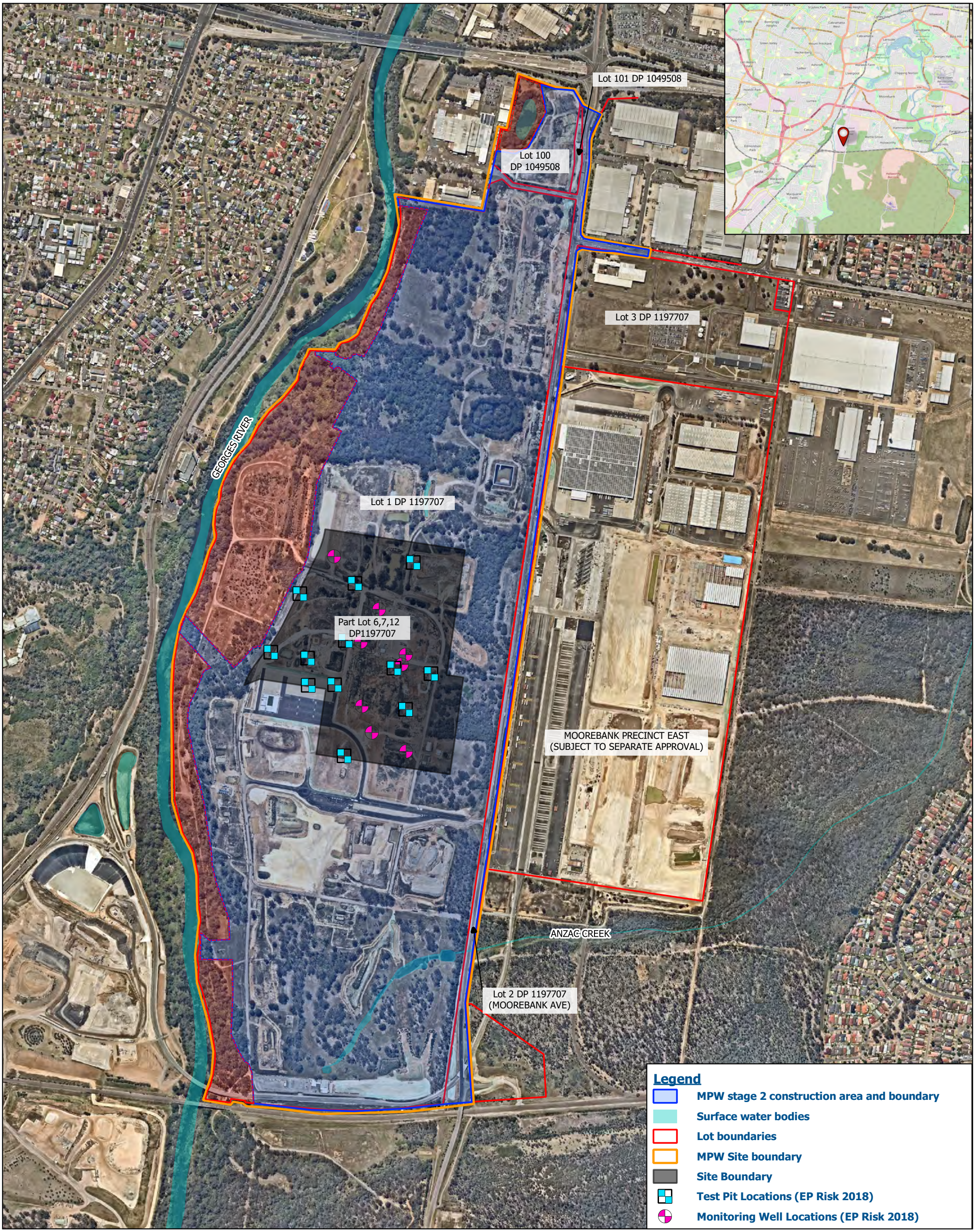
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Source: Near Maps

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Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 6 - Soil Sampling Locations

EP RISK

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Job No: EP1489.007
Date: 18.06.2021
Drawing Ref: Fig 6
Version No: v3

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Approximate Scale Only

Coordinate System: WGS 84
Drawn by: OG **Checked by:** KG
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Source: Near Maps

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Appendix A
CONCEPTUAL SITE MODEL

Conceptual Site Model

The information provided in this section together with the figures included in this report aid in presenting a conceptual site model (CSM) for the Site with respect to PFAS, based on a review of JBS&G 2021, relevant background historical site information and the investigation works undertaken at the MPW Site to date.

ASC NEPM (2013) identifies a CSM as a representation of site related information regarding contamination sources, receptors, and exposure pathways between those sources and human / ecological receptors. The development of a CSM is an essential part of all site assessments and remediation activities.

ASC NEPM (2013) identified the essential elements of a CSM as including:

- Known and potential sources of contamination and contaminants of concern including the mechanism(s) of contamination.
- Potentially affected media (soil, sediment, groundwater, surface water, indoor and ambient air).
- Human and ecological receptors.
- Potential and complete exposure pathways.
- Potential preferential pathways for vapour migration (if potential for vapours identified).

Site Description

At the time of writing, the Site had been covered with a minimum of 1 m Engineered Fill (JBS&G 2021).

The two PFAS source areas were located in the Offset Area of the MPW Site, known as the Dust Bowl and the FFTA (EP Risk 2018), west of the Site. The location of the Dust Bowl and FFTA in relation to the Site is provided as **Figure 2** in the '**Figures**' section of this report.

Proposed Development

The development is believed to include the construction of large warehouse buildings and paving, with a suitable area for a growing medium supporting landscaped areas. There is potential for relatively minor disturbance of underlying soils during construction works, however, excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be managed disposed of off-site or transported to MPW.

Summary of Contamination

A summary of remediation works and previous environmental reports at the Site is provided within the JBS&G Validation Summary (JBS&G 2021).

Based on the JBS&G (2021) summary letter, the following remaining areas of environmental concern (AEC) and contaminants of concern for the Site is provided as follows:

- AEC 3 - PFAS impact associated with residue from historical fire-fighting activities.

In addition, the following potential off-site sources of contamination have been identified:

- AEC 1 - Chlorinated hydrocarbons impact (Trichloroethylene (TCE) and Cis-1,2-dichlorothene (cis-DCE)) and total recoverable hydrocarbons (TRH) in the north west portion of the MPW Site to the south of the ABB Building.
- AEC 2 - Petroleum hydrocarbon impact including light non-aqueous phase hydrocarbons (LNAPL) in the eastern portion of the MPW Site.

JBS&G (2021) considered no long-term management is required in relation to these off-site impacts within the Site, limiting the known sources of contamination to PFAS impacts associated with residue from historical fire-fighting activities (AEC 3), located within the eastern and western portion of the Site. The location of the AECs at the MPW Site in relation to the Site is provided as **Figure 3**. Further information relating to the AECs is provided in the Conceptual Site Model (CSM) provided as **Appendix A.** A CSM Figure is provided as **Figure 4**.

JBS&G (2021) stated *"A minimum of 1 m of Engineered Fill has been placed within the Audit Area* (the Site) *and is also proposed to be substantially covered by warehousing and concrete pavement."* Additionally, *"No residual PFAS impacted soils were placed/reused within the Audit Area* (the Site)"

AEC 3 - PFAS Contamination in Affected Media Onsite

The historical soil, soil leachate, sediment, surface water and groundwater PFAS analytical results at the Site reported by PB (2014), Golder (2015), Golder (2016b), EP Risk (2017a, 2017b and 2018a) and JBS&G (2019b) are presented in **Table C1, Table C2**, **Table C3**, **Table C4** and **Table C5** respectively. The corresponding sampling locations are provided in **Figure 6**. Ecological criteria were only compared to the data set from 0 to 2 mBGL in accordance with the requirements of the ASC NEPM (2013) as this horizon corresponds with the root zone and habitation zone of many species. Figures illustrating the locations of PFAS impacts and historical sampling locations are provided at the end of **Appendix A**.

Table C1 – Summary of Historical Soil PFOS, PFOS + PFHxS and PFOA Concentrations On-site

Area	Depth (mBGL)	Analyte	No. of samples	Min. Conc. (mg/kg)	Max. Conc. (mg/kg)	Mean Conc. (mg/kg)	Standard Deviation (mg/kg)	No. Samples >LOR	No. Samples > Criteria[12]	No. Samples > 250% Criteria	95% UCL_{mean}[13] (mg/kg)[14]	95% UCL_{mean} Exceedance of Criteria[15]
The Site	<2	PFOA	31	<0.0001	0.0031	0.00027	0.00056	5	0	0	-	-
		PFOS	31	<0.0001	0.04	0.0054	0.01	17	EC (ind.)[16] – 5	EC (ind.)[17] – 3	EC (ind.) – 0.0171[18]	EC (ind.) – no
		PFOS + PFHxS	31	<0.0001	0.0427	0.0067	0.012	19	0	0	-	-
	>2	PFOA	12	<0.0001	0.0027	0.00046	0.00074	1	0	0	-	-
		PFOS	12	<0.0001	0.29	0.026	0.083	4	2	EC (ind.)[17] – 1	EC (ind.) – 0.02[18]	EC (ind.) – yes
		PFOS + PFHxS	12	<0.0001	0.2987	0.028	0.085	5	0	0	-	-

[12] Health based criteria assuming commercial / industrial land use for the Construction Area and recreational / open space criteria for the Offset Area and for soil <2m and >2m. Ecological criteria assuming industrial commercial for the Construction Area and public open space / residential for the Offset Area for soil <2m (PFAS NEMP).
[13] UCL_{mean} – Upper confidence limit of the arithmetic mean.
[14] Excluding samples results greater than 250% of the adopted criteria.
[15] Standard deviation must be less than 50% of the adopted criteria.
[16] EC (ind.) – interim soil – ecological indirect exposure (PFAS NEMP) The ecological indirect exposure criteria of 0.14 mg/kg was adopted for the Construction Area on the basis that the Site has been intensively developed in the past and further intensive development is proposed which will limit the presence of secondary consumers and the potential for indirect ecological exposure.
[17] Hotspot exceedances of ecological indirect criteria are all located in areas that are proposed to be covered with impermeable pavement or building footprints.
[18] Standard deviation exceeds 50% of the adopted criteria.

Table C2 – Summary of Historical Neutral pH Leachate PFOS, PFOS + PFHxS and PFOA Concentrations On-site

Area	Depth (mBGL)	Analyte	No. of samples	Minimum conc. (µg/L)	Maximum Conc. (µg/L)	Mean Conc. (µg/L)	Standard Deviation (µg/L)	No. Samples >LOR	95% UCL_{mean} (µg/L)
The Site	< 2	PFOA	28	<0.01	0.13	0.012	0.024	6	-
		PFOS	28	<0.01	1.5	0.23	0.41	17	-
		PFOS + PFHxS	28	<0.01	1.68	0.27	0.48	21	-
	> 2	PFOA	10	<0.01	0.09	0.014	0.27	1	-
		PFOS	10	<0.01	5.8	0.64	1.8	3	-
		PFOS + PFHxS	10	<0.01	6.1	0.7	1.9	4	-

Table C3 – Summary of Historical Groundwater PFOS, PFOS + PFHxS and PFOA Concentrations On-site

Area	Analyte	No. of samples	Minimum conc. (µg/L)	Maximum Conc. (µg/L)	Mean Conc. (µg/L)	Standard Deviation (µg/L)	No. Samples >LOR	No. Samples > Criteria[19]	95% UCL_{mean} (µg/L)	95% UCL_{mean} Exceedance of Criteria
The Site	PFOA	9	<0.001	0.004	0.001	0.001	4	0	-	-
	PFOS	9	<0.0001	0.05	0.013	0.02	7	7	0.063	Yes
	PFOS + PFHxS	9	<0.001	0.171	0.052	0.064	8	2	0.0919	Yes

[19] Criteria adopted for human health (drinking water and recreational water quality) and ecological (Freshwater 99% species protection) (PFAS NEMP).

Assessment of Precursors

EP Risk (2018) reported that total oxidising precursor assay (TOPA) results indicated that total oxidising concentrations of PFOS and PFHxS + PFOS were generally decreasing in concentration post oxidation under laboratory conditions using a strong oxidant. Based on the laboratory results, it was considered unlikely that significant transformation of PFAS precursors would occur under the less oxidising conditions present on-site.

Sensitive Receptors

Sensitive receptors identified at and near the Site are:

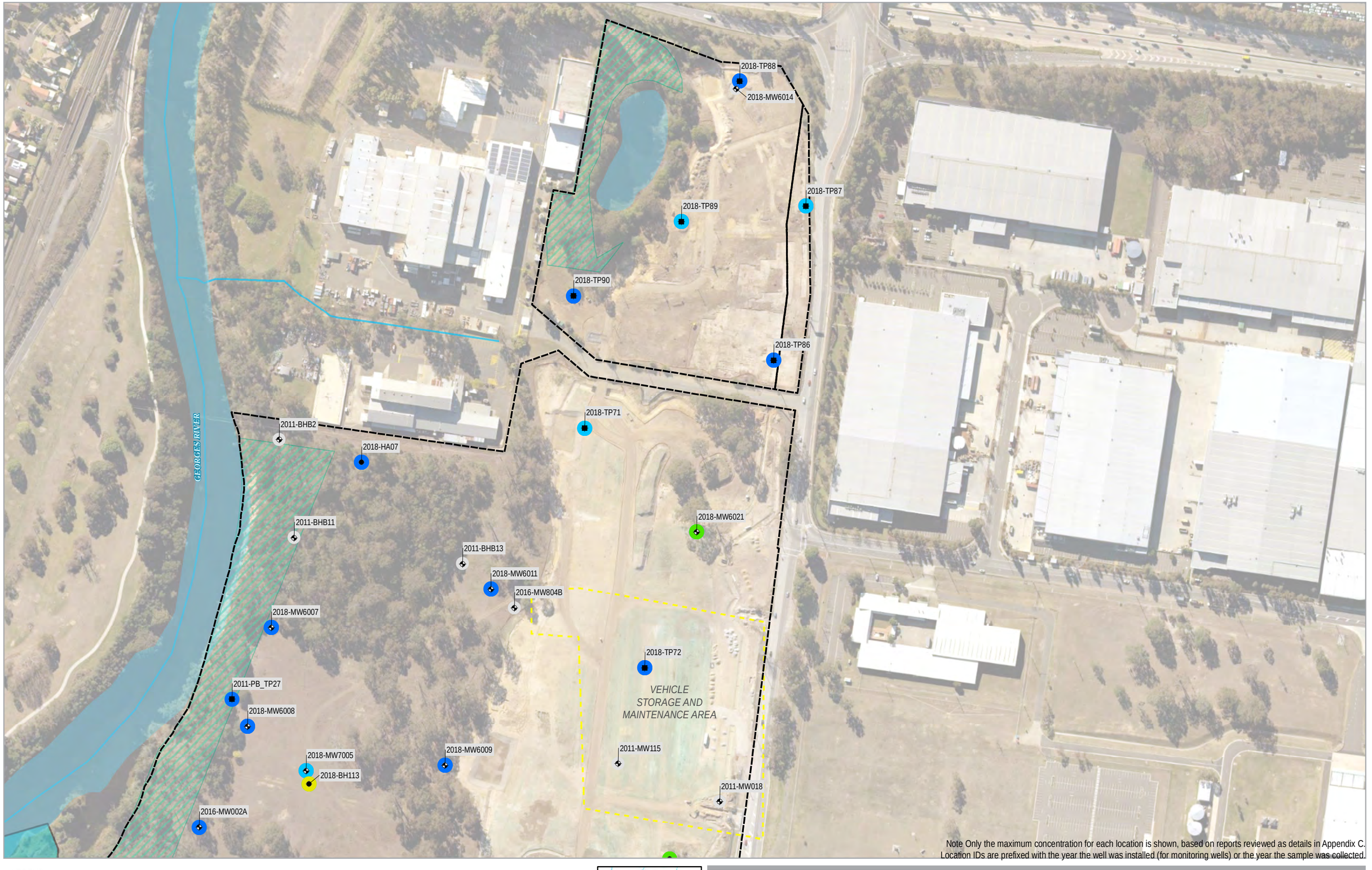
- On-site receptors:
    - Construction and subsurface maintenance workers and future commercial / industrial site users.
    - Future terrestrial flora and fauna in proposed landscaped areas.
- Off-site receptors:
    - Construction, remediation and subsurface maintenance workers and future commercial / industrial site users at the MPW Site.
    - Recreational users of the Georges River.
    - Recreational users who trespass on the Offset Area.
    - Terrestrial flora and fauna including threatened species in the Offset Area.
    - Terrestrial and aquatic flora and fauna dependent upon the Georges River and Anzac Creek.

Source-Pathway-Receptor Linkages

Based upon the findings of the most recent human health and ecological risk assessments prepared for the Site and the Georges River by EnRiskS (2019 and 2019a) and Golder (2015a), an analysis of the potential source-pathway-receptor linkages are provided in **Table C4** and illustrated in **Figure 4** in the '**Figures**' section of the report.

Table C4 – Source-Pathway-Receptor Linkages

Sources		Pathways		Receptors	Linkages
Primary	**Secondary**	**Transport Mechanisms**	**Exposure Pathways**		
AEC 3 – PFAS Impacted Area					
PFAS impact associated with residue from historical fire-fighting training	PFAS impacted soil and sediment within primary source areas and surrounding land.	- Leaching of PFAS through the soil profile to groundwater. - Leaching of PFAS from exposed soil to surface water.	Human Health: - incidental ingestion. - Dermal contact. - inhalation of dust.	- Construction, remediation, subsurface maintenance workers. - Future commercial / industrial site users.	Incomplete given PFAS concentrations below health-based criteria and assuming appropriate health and safety controls and PPE are implemented during construction or sub-surface maintenance works.
			Ecological (direct): - Direct uptake.	Terrestrial flora and fauna exposed to soil (<2 mBGL).	Incomplete given PFAS concentrations below ecological (direct) criteria.
			Ecological (indirect) - Bioaccumulation and biomagnification.	Terrestrial flora and fauna exposed to soil (<2 mBGL).	Potentially complete if appropriate soil management controls are not implemented in landscaped areas.
	PFAS impacted groundwater, surface water.	Groundwater migration and surface water flow to the Georges River and Anzac Creek.	Human Health: - Incidental ingestion. - Dermal contact.	- Construction, remediation, subsurface maintenance workers. - Future commercial / industrial site users.	Incomplete as it is unlikely that groundwater would be encountered during construction works or extracted for a beneficial use.
			Ecological: - Bioaccumulation and biomagnification.	Ecosystems dependent upon the Georges River and Anzac Creek.	Potentially complete if appropriate soil and water management controls are not implemented during construction due to the high leachability of PFAS in soils.



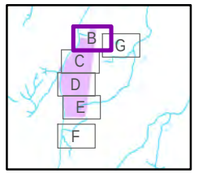
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C. Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Note: The location of 2018-BH113 has been provided in error in this drawing

Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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GHD

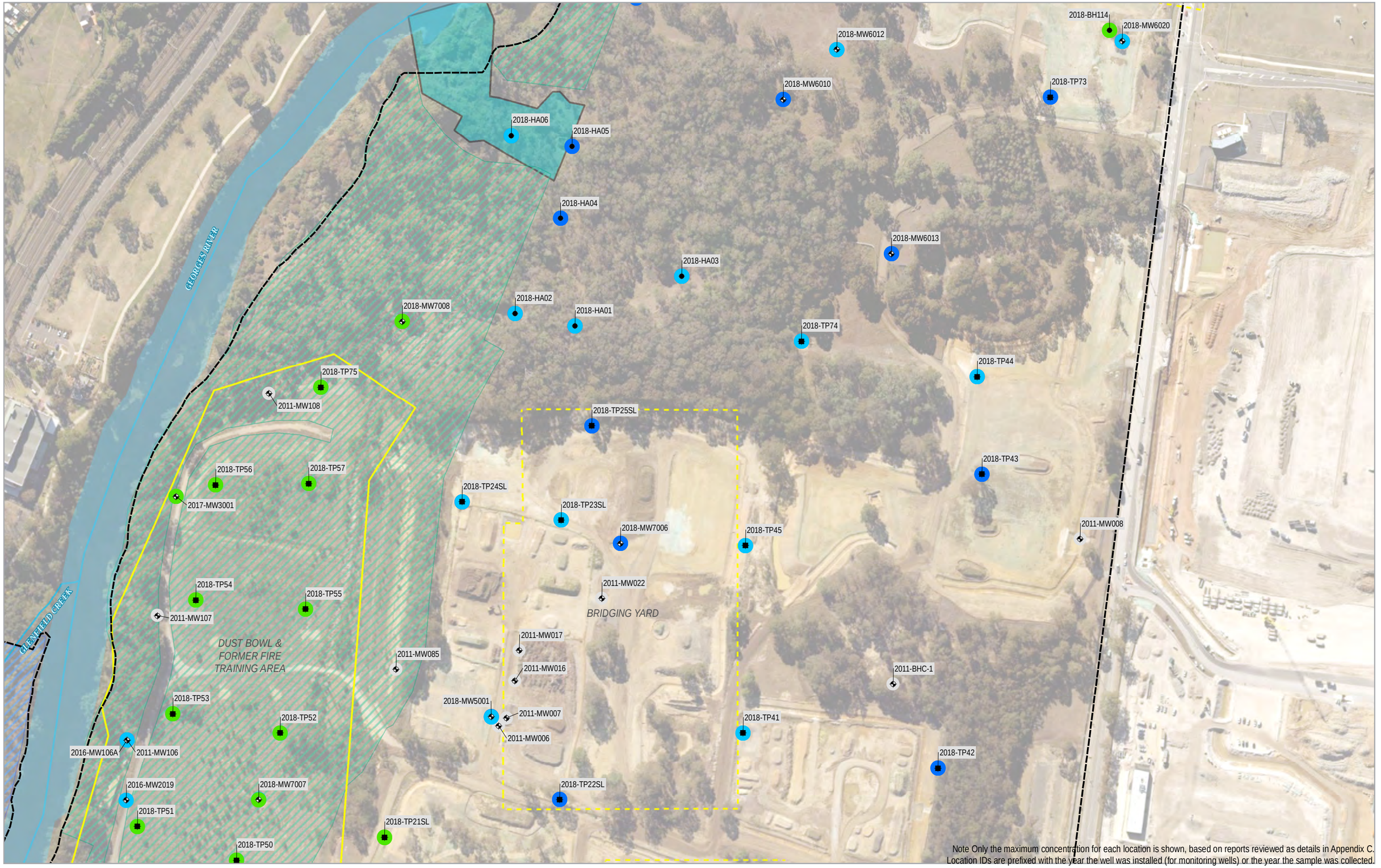
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Soil
PFOS + PFHxS Results
Grid 1

Project No.	21-28111
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FIGURE 6B

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



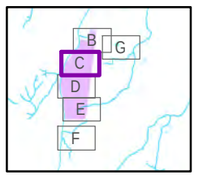
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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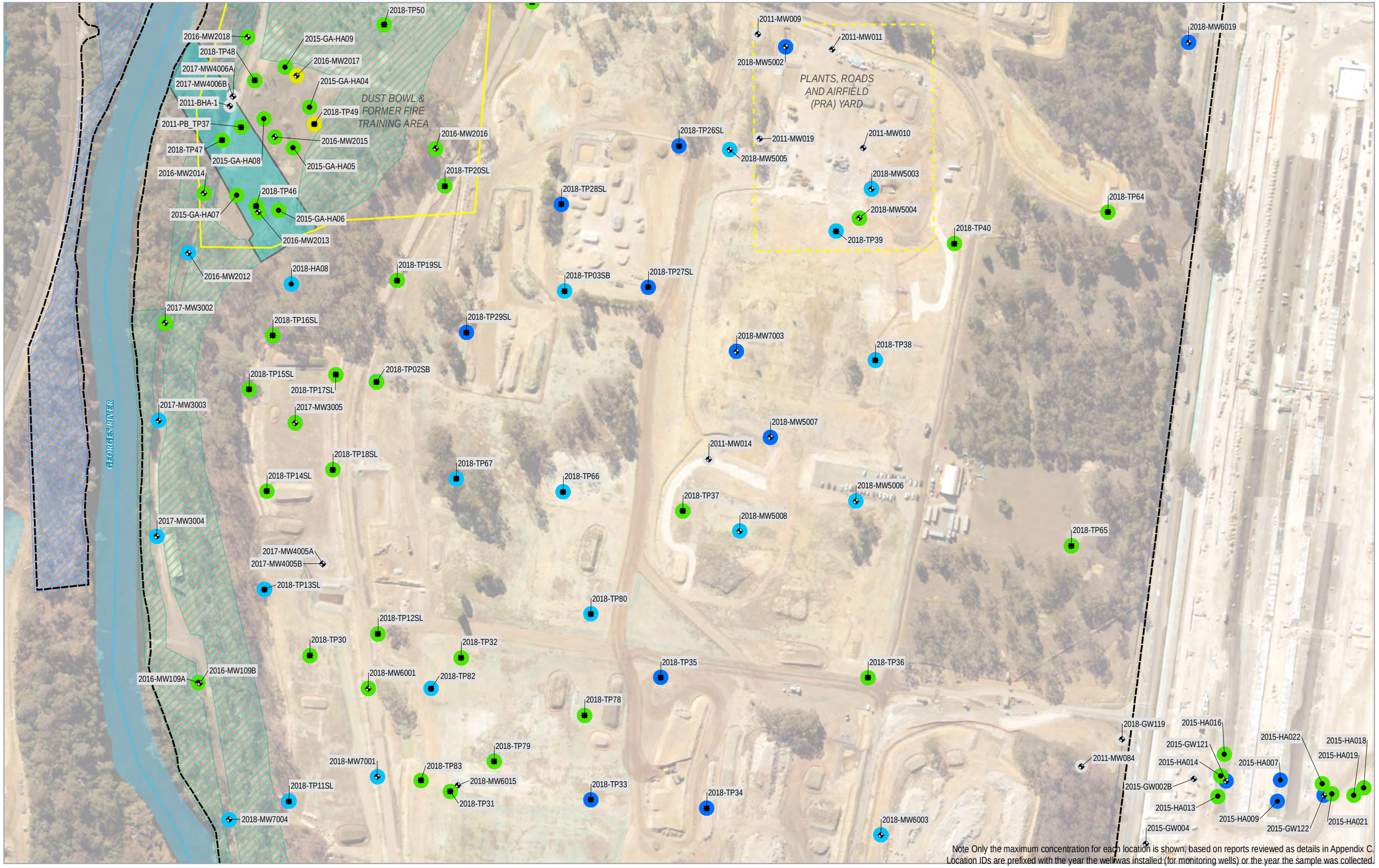
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Summary Report PFAS Investigations
Moorebank Precinct West

Soil
PFOS + PFHxS Results
Grid 2

Project No.	21-28111
Revision No.	A
Date	12 Apr 2019

FIGURE 6C

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



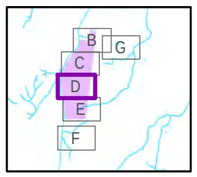
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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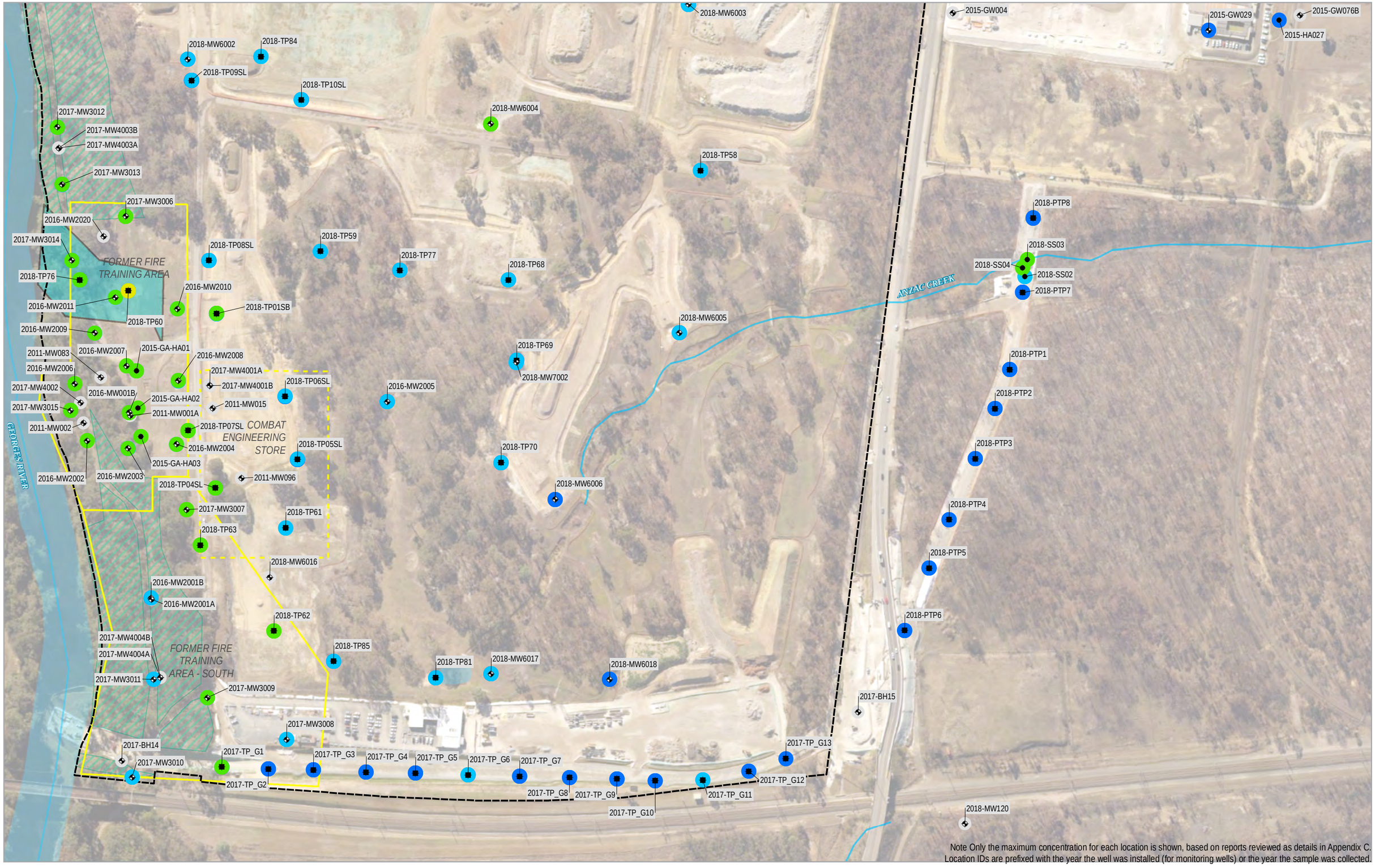
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Summary Report PFAS Investigations
Moorebank Precinct West

Soil
PFOS + PFHxS Results
Grid 3

Project No.	21-28111
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FIGURE 6D

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



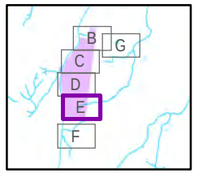
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Summary Report PFAS Investigations
Moorebank Precinct West

Soil
PFOS + PFHxS Results
Grid 4

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Date 12 Apr 2019

FIGURE 6E

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



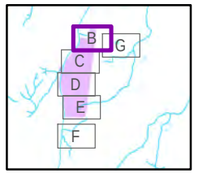
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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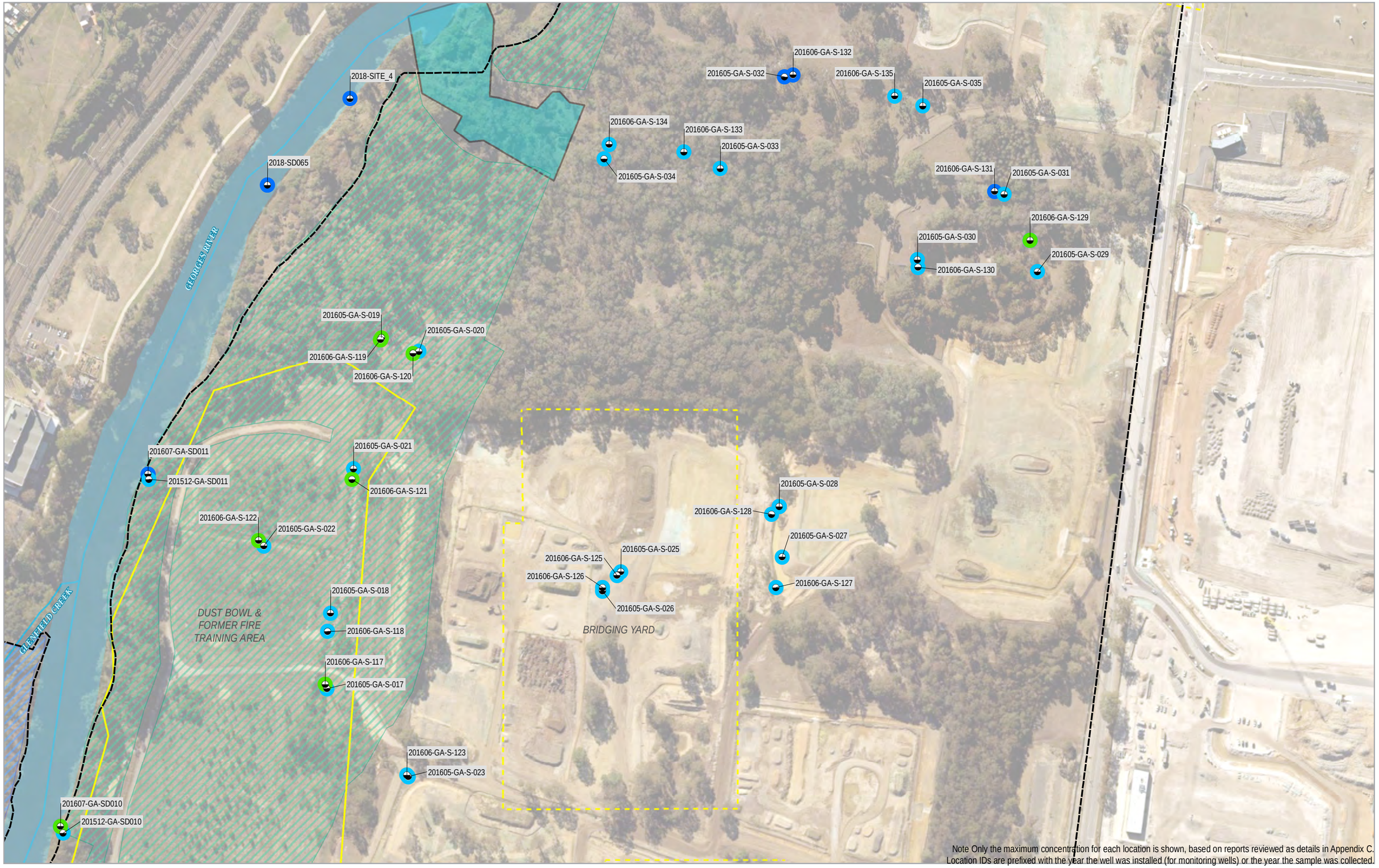
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Sediment
PFOS + PFHxS Results
Grid 1

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7B

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

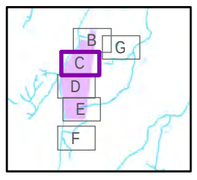
LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)

- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

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Meters

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Grid: GDA 1994 MGA Zone 56

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GHD

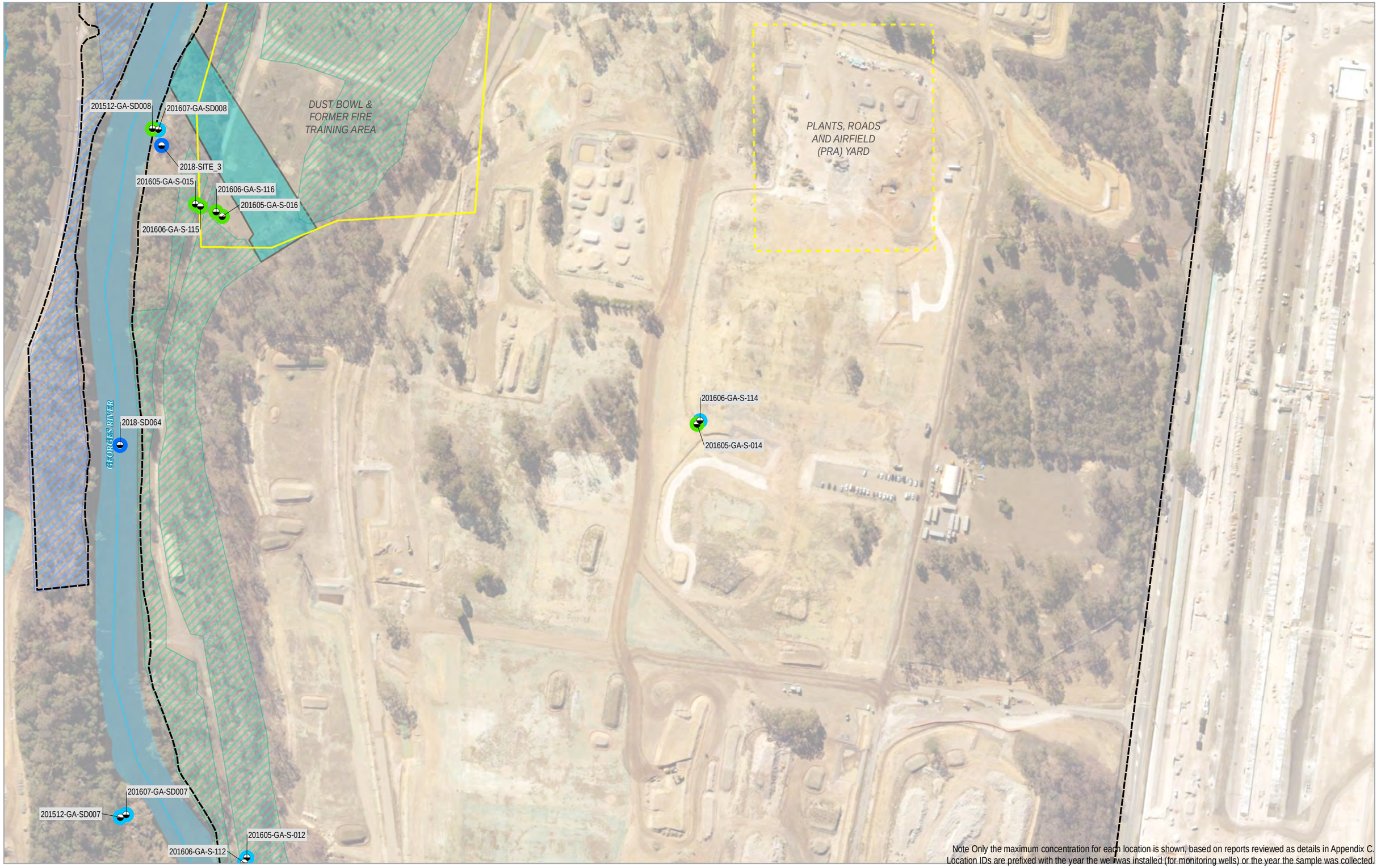
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Sediment
PFOS + PFHxS Results
Grid 2

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7C

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



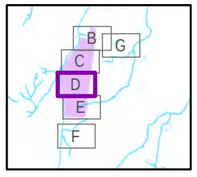
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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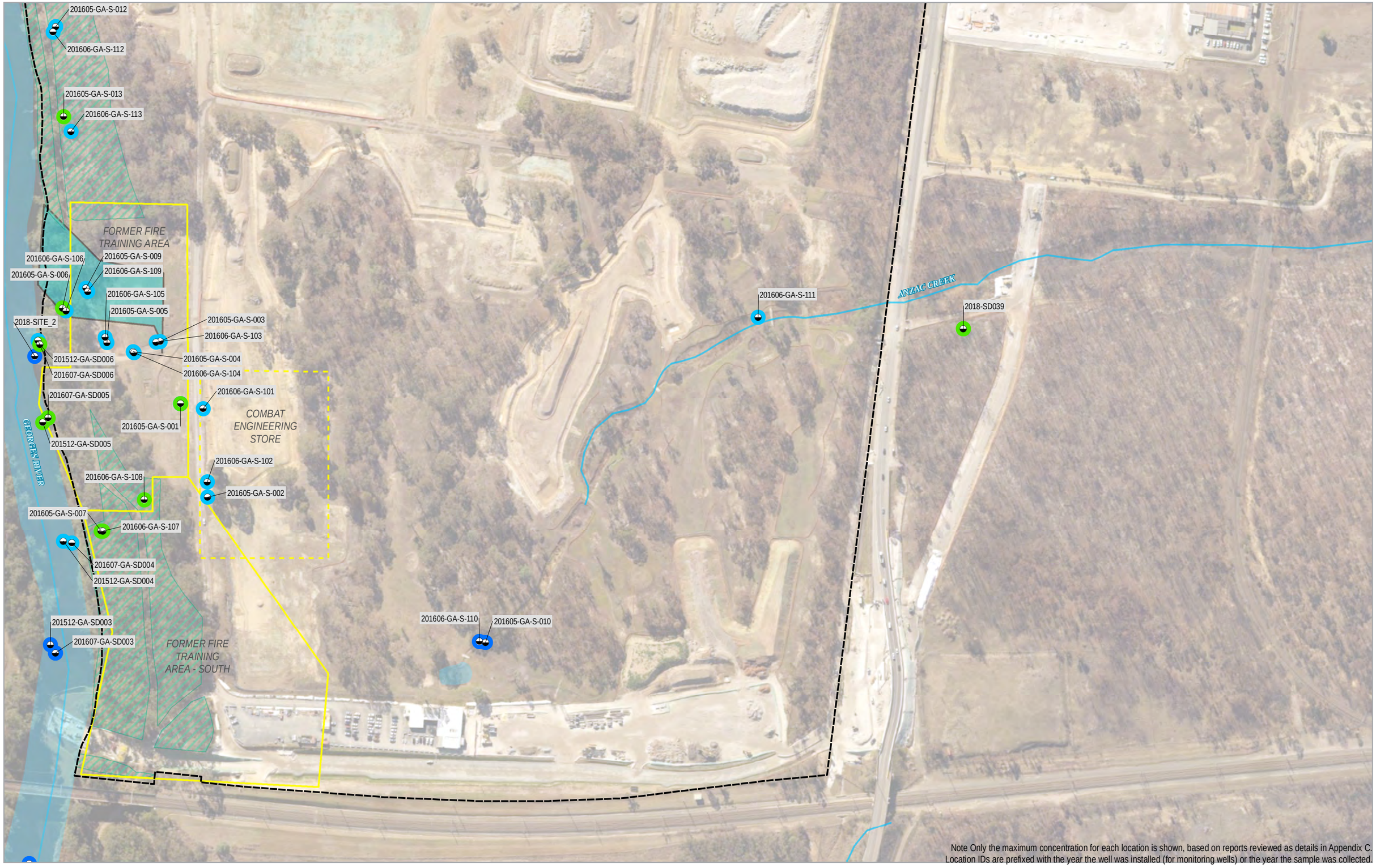
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Sediment
PFOS + PFHxS Results
Grid 3

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7D

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



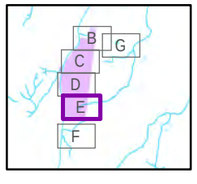
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Sediment
PFOS + PFHxS Results
Grid 4

Project No. 21-28111
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Date 12 Apr 2019

FIGURE 7E

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



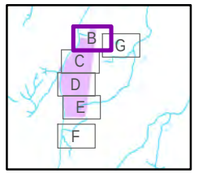
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Surface Water

Max PFOS + PFHxS Concentration (µg/L)

- <LOR
- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Surface Water
PFOS + PFHxS Results
Grid 1

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 8B

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

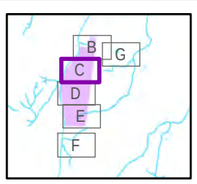
LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)

- Surface Water

Max PFOS + PFHxS Concentration (µg/L)

- <LOR
- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

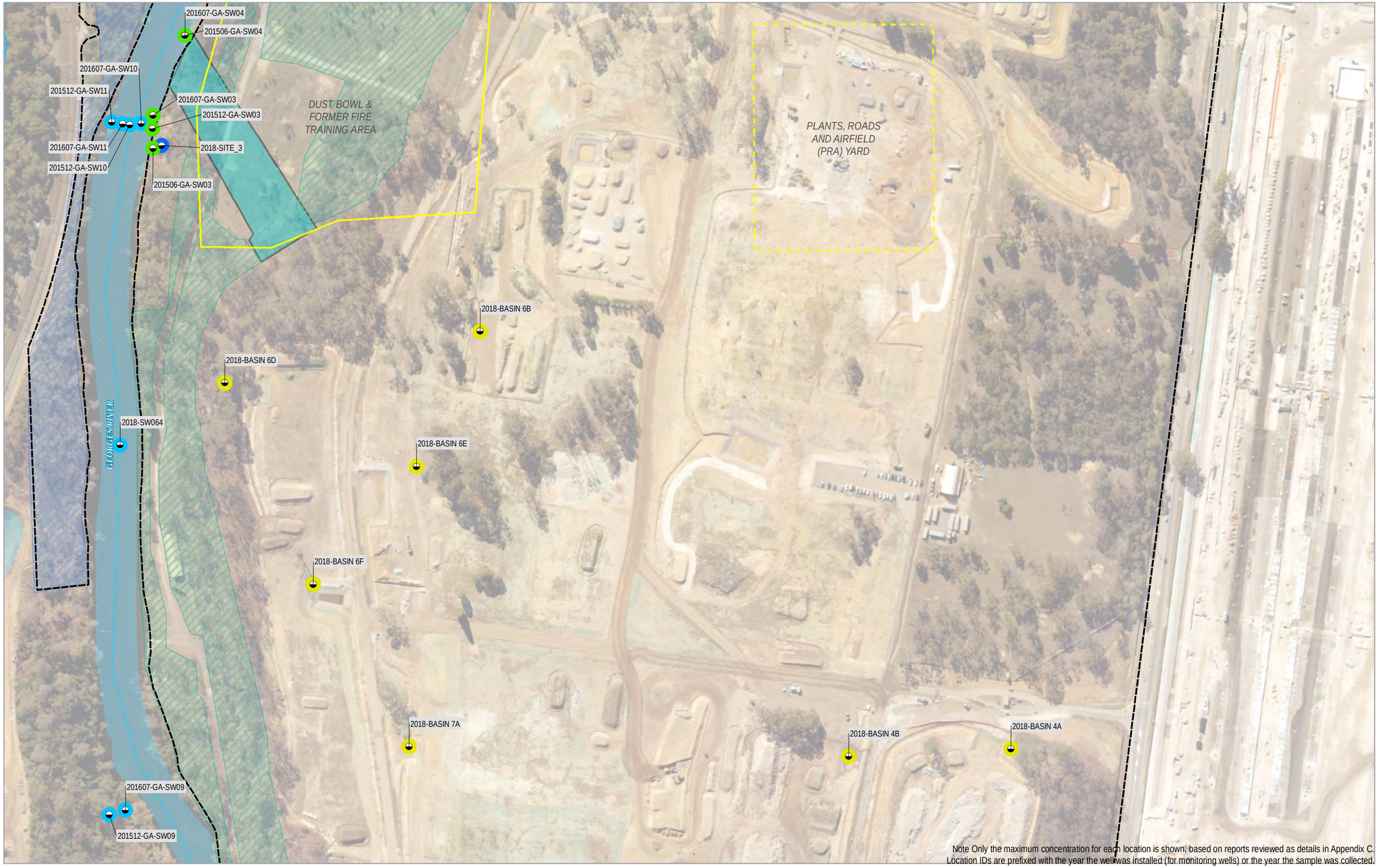
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Surface Water
PFOS + PFHxS Results
Grid 2

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 8C

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



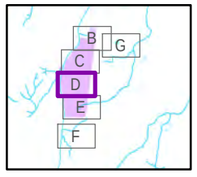
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Surface Water

Max PFOS + PFHxS Concentration (µg/L)

- <LOR
- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

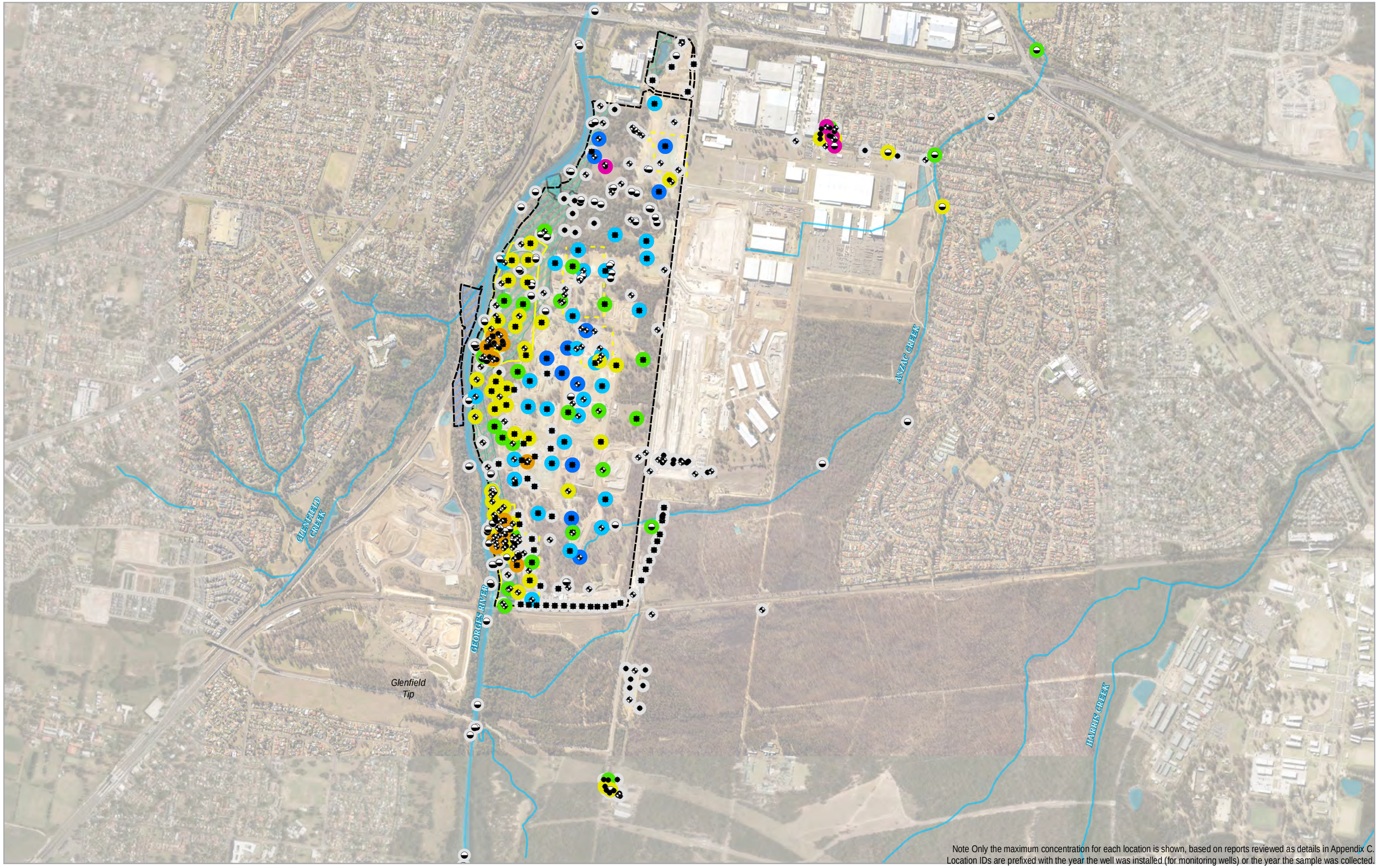
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Surface Water
PFOS + PFHxS Results
Grid 3

Project No.	21-28111
Revision No.	A
Date	12 Apr 2019

FIGURE 8D

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Liverpool Fire Station
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit
- Sediment Sample

Max PFOS + PFHxS Concentration (µg/L)

- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data

Paper Size ISO A3

0 200 400

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Soil & Sediment ASLP

PFOS + PFHxS Results Overview

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 11

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber

Appendix B

ENVIRONMENTAL MANAGEMENT PROCEDURES

Land use restrictions		EMP 1
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To manage risk to human health and the environment through land use restrictions	
Areas of the Site	AEC - 3	

Beneficial Use of Groundwater

Groundwater must not be abstracted from the Site for any beneficial use.

Future Excavation

The management measures for future excavation within AEC 3 and across the Site must be conducted in accordance with **EMP 2, EMP 5** and **EMP 7.**

Cessation of Land Use Restrictions

The land use restrictions provided in **EMP 1** can be removed where a site specific human health and ecological risk assessment concludes that a risk to human health and the environment is no longer present and subject to approval by a NSW EPA accredited Site Auditor and / or the NSW EPA.

Subsurface Works – AEC 3		EMP 2
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Stage 2 Works and Operation	
Objective:	To protect human health and the environment	
Areas of the Site	PFAS Impacted Areas (AEC) underlying the Engineered Fill.	

Human Health

Based on the EnRiskS (2019) Land HHERA, the potential risk to human health associated with workers having direct contact with PFAS in soil, sediment and water was low and acceptable on the assumption that typical workplace safety protocols and PPE are implemented. In order to manage exposure of PFAS to workers at the Site, the following management controls should be implemented during excavation works within PFAS impacted areas:

- Project inductions to identify areas with high risk of PFAS contamination.
- Prepare SWMS to identify risks associated with PFAS and appropriate control measures.
- Where appropriate, the area of the excavation/disturbance shall be appropriately separated from the balance of the Site to minimise inadvertent traffic and/or worker exposure.
- PPE used in the PFAS impacted area to include:
  - Disposable coverall suits including boots.
  - Disposable waterproof nitrite gloves in addition to standard glove requirements.
  - All other standard PPE required for works on Site.
- Signage placed in ablution blocks to ensure all workers wash hands and face prior to eating, regardless if gloves are worn.
- If worker's skin comes into contact with PFAS impacted water, ensure skin is immediately washed with clean water and wet clothing is removed immediately after work is complete.
- Dewatering of water in excavations impacted with PFAS should be avoided where practicable.

Ecological

EnRiskS (2019) reported PFAS impacted soil is leachable and the following control measures should be implemented to minimise the risk to ecological receptors during construction:

- Excavation to be scheduled to minimise the area of PFAS impacted soil exposed at any one time.
- All soils excavated from AEC 3 should be handled in alignment with the requirements for PFAS-Impacted Stockpiles in **EMP 4**.
- Erosion and sediment controls outlined in **EMP 11** to be adopted to minimize the potential for leaching and migration to surface water bodies.
- When PFAS impacted soil is to be temporarily stockpiled, it should be stockpiled on impermeable surfaces (e.g. hardstand, high density polyethylene (HDPE) plastic or geomembrane) within a designated area.
- Appropriate bunding (e.g. hay bales or silt fences) should be placed around stockpiles.

Subsurface Works – AEC 3	EMP 2

- Stockpiling areas should not be located near stormwater drains, pits or gutters.
- Water runoff from stockpiling areas should be managed and retained at the Site or under the relevant management plan for the receiving area of the MPW Site and not be allowed to flow into the Offset Area and off-site to surface water bodies (Anzac Creek and Georges River) (refer to **EMP 11** for management of surface water).
- During windy weather conditions, dust control measures should be implemented (e.g. fine water spray or covers).
- Odour suppressant should be applied to the soil where odorous soils are encountered.
- Where practicable, excavated soil should be backfilled in the excavation in the reverse order to which it was excavated.
- Where excavated soil is surplus to requirements, then the soil should be classified in accordance with **EMP 6**.
- Materials tracking, and off-site disposal records and documentation should be retained for all soil that is to be reused on-site or disposed offsite in accordance with **EMP 6**.

Earthworks and Excavation

Where soil is excavated during earthworks, soil reuse opportunities should be adopted in accordance with **EMP 5**.

Materials Tracking		EMP 3
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Stage 2 Construction Works	
Objective:	To protect human health and the environment	
Areas of the Site	AEC 3 and Unexpected Finds	

Impacted materials generated as part of the construction works will be tracked via a Materials Tracking Plan (MTP) by the Principal Contractor. The aim of the MTP is to identify the source and destination of all materials on the Site at any time and requires the following tasks:

- Establish and maintain a nomenclature system for identification of all source and destination areas for soil both on and off the Site. This includes excavations, stockpiles (both clean and potentially contaminated), soils for treatment or disposal (including destination) and offsite sources of material.
- Use appropriate signage to identify the classification of the material and area number for each excavation prior to soil movement using the project documentation or in consultation with the Contract Administrator, prior to work being undertaken.
- Complete a 'Record of Soil Movement' sheet identifying the source of the materials, classification, volume, and destination area of each load of material moved on or off-site.
- Place the soil in an approved location for the material based on its soil classification.
- Maintain the location of the soil without mixing with other soil classes.
- Educate all operators in the requirements of the system.
- Monitoring and Review.

Stockpile Management		EMP 4
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required in the event of the stockpiling of soil	
Objective:	To minimise the risk to human health and the environment from the stockpiling of soil.	
Areas of the Site	AEC 3 and Unexpected Finds	

General Stockpiles

All stockpiles will be managed in accordance with the CEMP and sub-plans, and in accordance with the EPBC Act conditions of approval for 2011/6086 and maintained in an orderly and safe condition. Batters would be formed with sloped angles that are appropriate to mitigate collapse or sliding of the stockpiled materials. Stockpiles are to be placed at approved locations and would be strategically located to mitigate environmental impacts while facilitating handling requirements. Stockpiles would only be constructed in areas of the Project site that had been prepared in accordance with the requirements of the Project Preliminary RAP in Appendix G of Technical Paper 5 – Environmental Site Assessment (Phase 2), Volume 4. All such preparatory works would be undertaken prior to the placement of material in the stockpile. Stockpiles must be located on sealed surfaces such as sealed concrete, asphalt, high density polyethylene or a mixture of these, to appropriately mitigate potential cross contamination of underlying soil. All stockpiling to be undertaken in accordance with the Costin Roe Consulting Pty Ltd (2020) Construction Soil and Water Management Plan.

Earthworks undertaken as part of construction and ongoing works within the Site, which are located outside of AEC 3 may temporarily generate excess material which may be stockpiled for re-use subject to assessment by the Environmental Consultant (as required). Unless some event or observation indicates the material excavated and placed into the stockpile is potentially contaminated, no treatment is required other than normal dust suppression, and erosion controls in accordance with relevant CEMP requirements.

Where temporary stockpiling is permitted such stockpiles shall be installed and maintained to eliminate risk to workers and other people due to exposure to contaminants in dust or vapours and risk to the environment as a result of silt or contamination of stormwater in accordance with the any site materials management and tracking plan as part of the CEMP.

If cover is required, they shall extend beyond the footprint of the stockpiles and shall be secured to prevent being blown away by wind. Stockpiles must be placed in a secure location onsite and covered if to remain for more than 24 hours. Stockpiles will be placed at approved locations and located to mitigate environmental impacts while facilitating material handling requirements.

Where the material is suspected to be contaminated then it should be managed in accordance with the Unexpected Finds Protocol provided in **EMP 8.**

Contaminated Stockpiles

If assessment by the Environmental Consultant or the Ordnance Contractor identifies contamination in soil excavated from the Site, or a stockpile is observed to be contaminated, then the Environmental Consultant will assess the stockpile in accordance with the unexpected finds protocol (**EMP 8**) to delineate the contamination and assess the extent of management, if required.

Contaminated or potentially contaminated materials would only be stockpiled within areas of the Site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas

(e.g. hardstand areas).

PFAS Impacted Stockpiles

In addition to the general and contaminated stockpile management controls provided above, the following additional management controls in accordance with the PFAS NEMP provided in **Table 1_EMP 4** should be applied for PFAS impacted soil, which exceeds the adopted site criteria. Historical concentration of PFAS within soil and groundwater are provided within **Appendix A**.

Table 1_EMP 4 – Temporary PFAS Stockpile Management

Stockpile Description	**Timeframe**	**Storage infrastructure for solid wastes and contaminated equipment**
Transient	Less than 48 hours with no rain predicted	Covered stockpile or storage area on impervious bottom liner (e.g. tarp, plastic sheeting, membrane, etc.).
Temporary	From 48 hours to 6 months	Managed stockpile, covered, on impervious, bunded hardstand, with effective stormwater controls (e.g. diversion drains, banks, etc.).
Short-term	From 6 months to 2 years	Constructed stockpile with robust anchored covers, impervious bottom liner, and effective stormwater controls to ensure that rainwater and sheet flow do not contact impacted solids.
Medium-term	From 2 to 5 years	Engineered containment facility, with effective stormwater controls.
Long-term •	More than 5 years	Engineered containment facility, with effective stormwater controls.

Minor Excavation		EMP 5
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Stage 2 works	
Objective:	To ensure that appropriate reuse of soil the exceeds the PFAS site criteria (PFAS impacted materials) is achieved during Stage 2 works to ensure that there are no additional risks to human health or the Environment.	

Reuse of Soil

There is potential for relatively minor disturbance of underlying soils during construction works, however, excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be managed disposed of off-site or transported to MPW. Additional unexpected finds or assessments for reuse (if required) would be subject to the implementation of the following measures provided by EnRiskS (2020) or a separate risk assessment.

Assessment of Soil for Reuse

The result of soil and leachate (neutral pH) PFAS testing results from the proposed cut areas during Stage 2 works at the MPW Site are provided in **Appendix A**. Prior to breaching of the Engineered Fill layer, the soil and leachate (neutral pH) analytical results summarised in **Appendix A** should be reviewed and assessment should be made by the Environmental Consultant as to whether soil can remain on-site, be transported to the MPW Site or whether waste classification is required.

Where additional excavation is required within AEC 3 then additional assessment / delineation may be required where there is insufficient data available. Additional in-situ sampling or stockpiling sampling must be undertaken in accordance with the following as a minimum:

- Sampling should be undertaken by a suitably qualified Environmental Consultant.
- Additional insitu / delineation sampling to be undertaken in accordance with the NSW EPA Sampling Design Guidelines (1995).
- Samples to be collected from 0-0.2 mBGL, 0.5 mBGL, 1.0 mBGL and every metre thereafter to a maximum depth of 0.5 mBGL beyond the maximum proposed depth of excavation.
- Stockpile sampling to be undertaken in accordance with the sampling methodology provided in **EMP 6**.

Additional testing of site won stockpiles will be required where:

- Stockpiles have reported detectable PFAS total concentrations above the laboratory limit of reporting, but leachate testing was not undertaken.
- Soil in the stockpile has been excavated from AEC 3 and has not been sampled or tested.
- Soil tracking documentation identifying the source location of the stockpile is not available.

Sampling of stockpiles should be undertaken in accordance with the following:

- One test per 25 m^3 for soils assessed for volumes less than 200 m^3.
- The use of the statistical assessment of the data set from each stockpile in accordance with the ASC NEPM (2013), with a total number of samples of not less than 10 collected from each stockpile (e.g. for a maximum size stockpile of 2,500 m^3, the sampling frequency of one test per 250 m^3 will be adopted).

Minor Excavation	EMP 5
Analytical testing of additional soil sampling for assessment of reuse opportunities at the Site should include the following analytes: • PFAS suite (28 analytes). • AUS leaching Procedure (neutral pH) for PFAS. Soil results should be compared against the relevant standards for site suitability if to remain on-site or requirements for the receiving site's LTEMP. ***Site Specific Risk Assessment*** Future works that require excavation of soil in the reuse zones can only be undertaken in accordance with the management procedures provided as **EMP 5**, unless a further additional site-specific risk assessment is conducted.	

Off-site Disposal of Excavated / Unsuitable Material		EMP 6
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Continuous	
Objective:	To ensure that surplus material is appropriately classified for off-site disposal or reuse and lawfully disposed from the site.	

Minimise Waste

It is recommended that disturbance of soil within AEC 3 should be minimised by incorporating the following into the construction methodology:

- Conventional footings where practical should not penetrate below the imported fill layer, to minimise the requirements for disposal of excavated contaminated material.
- Where pier footings are required, screw piles would be recommended over bored piers.
- Minimise excavation of materials below the imported fill layer to reduce disposal costs of excavated material.
- Reuse and retain material on the Site where practicable.

Stockpile Classification

Where the Site Owner (or nominated representative) identifies the requirement to remove material from the Site, the material is required to be characterised by an Environmental Consultant to evaluate potential off-site removal options.

The Environmental Consultant shall consider the relevant requirements of NSW legislation, regulations, and guidelines in the identification of appropriate options for off-site disposal / reuse including, but not limited to the following:

- NSW EPA Waste Classification Guidelines (EPA 2014):
    - Part 1: Classifying waste.
    - Part 2: Immobilising Waste.
    - Part 3: Waste containing radioactive material.
    - Part 4: Acid Sulfate Soils.
    - Addendum to Part 1: Classifying Waste.
- Excavated Natural Material Exemption (2014) and Excavated Natural Material Order (2014).
- Relevant resource recovery orders and resource recovery exemptions made by the NSW EPA.

The requirements for use of licensed vehicles, waste tracking, covering of vehicles, etc. as noted in the POEO (Waste) Regulation (2014) will be identified by the Environmental Consultant and documented as part of a waste classification report to facilitate off-site disposal of waste material to a facility with the appropriate NSW EPA Environmental Protection License to accept the classified material.

Disposal records for all material removed from the site shall be required to be provided to the Site Owner or appointed representative, by the appointed contractor upon completion of the disposal works. These records will be maintained in accordance with **EMP 16**. The records will be made available to the Environmental Consultant engaged to prepare final site condition reports upon request to demonstrate the lawful off-site disposal of material from the Site.

ACM conduits or ACM impacted soils identified as unexpected finds must be disposed offsite as Special Waste

(Asbestos) in combination with other classes of waste (if applicable). Asbestos waste is to be tracked in accordance with Clauses 76 and 79 of the POEO (Waste) Regulation 2014.

Stockpile Classification Testing for Off-site Disposal

Stockpile classification testing will be undertaken by the Environmental Consultant in accordance with the following:

- All stockpiles must be classified prior to off-site disposal. Stockpiles of general fill (non-soil) may be classified visually based on their waste content and observations. All other stockpiles will be classified based on classification testing, with samples scheduled for laboratory analysis of the contaminants of concern corresponding with the source of the stockpile.
- Classification testing will be undertaken by the Environmental Consultant, and classification samples will be collected from the stockpiled material at the following sampling frequency:
    - One test per 25 m^3 for soils assessed for volumes less than 200 m^3.
    - The use of the 95% UCL_{mean} value for the data set from each stockpile, with a total number of samples of not less than 10 collected from each stockpile (e.g. for a maximum size stockpile of 2,500 m^3, the sampling frequency of one test per 250 m^3 will be adopted).
- Sampling densities for resource recovery should be undertaken in accordance with the respective resource recovery order and exemption.

Liquid Wastes

All liquid wastes requiring offsite disposal should be classified in accordance with NSW EPA (2014).

Subsurface Maintenance Works		EMP 7
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Operation	
Objective:	To ensure that subsurface maintenance works will not result in risk to human health and the environment.	

Given that the depth of fill material imported to the Woolworth Site is in excess of 1 m, and the depth of any anticipated subsurface maintenance activities will not likely penetrate depths greater than 2 mBGL, the risk to subsurface maintenance contractors undertaking routine subsurface maintenance is considered to be low.

Should subsurface maintenance works exceed the depth of imported fill material and encounter natural site soil then the following procedure should be followed.

Work Health and Safety

All works are to comply with the Work Health and Safety Act (2011). Note any works involving confined spaces should also be carried out in accordance with AS 2865: Safe Working in a Confined Space (2009) and any revisions. Pits or excavations may be considered confined spaces due to the limitations on egress and the potential accumulation of vapours or presence of depleted oxygen within the pits or excavations.

Any subsurface works that penetrate the capping layer shall include the following measures:

- Providing a safe work method statement (SWMS). This shall be reviewed and authorised by the Site Owner (or their representative) or any future occupier.
- All upstream stormwater flow to be redirected around the work area.
- All stormwater from the works area to be diverted through sediment controls.
- If encountered, groundwater is always to be kept contained.
- If any strong odours are present on breaching sealed surfaces, or in an excavation, a precautionary approach shall be applied to consider if additional management measures are required to manage vapour inhalation risk prior to proceeding. The UFP (**EMP 8**) must be implemented.
- Respiratory protective equipment (RPE) would also be provided for subsurface works where necessary.
- Air monitoring would be mandatory for entry into confined space works within excavations.
- Additional controls may include the use of blowers to increase flushing of the trench/excavation with fresh air.

All workers potentially exposed to impacted materials are required to wear appropriate levels of PPE, which shall include as a minimum:

- Long sleeve shirt and trousers.
- Appropriate respirator.
- Head covering.
- Over boots.
- Gloves.

Subsurface Maintenance Works	EMP 7

Ecological

Excavation and reinstatement of excavations should consider the following general principles:

- Stockpiling of excavated soil to be managed in accordance with **EMP 4**.
- Excavated imported fill material that was stockpiled separately after excavation is to be returned to the excavations in the reverse order to which it came out.
- Reuse of excavated soil to be undertaken in accordance with **EMP 5**.
- Movement of soil should be tracked in accordance with **EMP 3**.
- All surplus soil removed from excavations must be classified in accordance with NSW EPA (2014) Waste Classification Guidelines and NSW EPA (2016) Addendum for PFAS prior to disposal at an appropriately licensed facility in accordance with **EMP 6**.
- Recontoured site surfaces must permit free drainage and not permit ponding of surface water.
- All discharges of water from the site comply with the EPL.

Unexpected finds		EMP 8
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Stage 2 Works and Operation	
Objective:	To minimise exposure of contractors and site personnel to impacted sub-surface soils during future excavation works beneath the Site.	

During Stage 2 Works

An unexpected finds protocol (UFP) has been prepared by SIMTA (2018)[20] for the Stage 2 works in accordance with SSD 7709. This UFP has been developed to manage the unexpected discovery of contamination within imported spoil, heritage items, threatened flora and fauna, and onsite contamination during the construction phase of Stage 2 Works. A copy of the SIMTA 2018 UFP is provided as **Appendix D** and has been incorporated into the CEMP for Stage 2 Works. An unexploded ordnance (UXO) Risk Review and Management Plan has been prepared by Gtek (2019)[21] to inform management of any unexpected finds involving UXO.

During Operation

During subsurface maintenance works post construction, there is a possibility some hazards within the Site have not been identified to date. The nature of hazards which may be present, and which may be discovered are expected to generally be detectable through visual or olfactory means, for example:

- The presence of significant aggregates of friable or non-friable asbestos materials (visible) including redundant services conduits.
- Excessive quantities of Construction/Demolition Waste (visible).
- Hydrocarbon impacted materials (visible/odorous).
- Drums or underground storage tanks (USTs) (visible).
- Oily Ash and/or oily slag contaminated soils/fill materials (visible/odorous).

As a precautionary measure to ensure the protection of the workforce, should any of the abovementioned substances (or any other unexpected potentially hazardous substance) be uncovered during ground disturbance activities, then the following should be immediately implemented:

- Stop work within the area. Isolate the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc.) to prevent exposure to site personnel and/or off-site airborne dust migration.
- an Environmental Consultant should be immediately contacted to determine an appropriate course of action regarding the assessment and/or management of the “Unexpected Find”.

It is envisaged the assessment strategy will be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

The Environmental Consultant will also be responsible for any reporting necessary to document the details of the Unexpected Find and the results of the validation sampling and will be responsible for providing

[20] SIMTA (2018) Unexpected Finds Protocol, Moorebank Precinct West Stage 2, dated 26 October 2018 (ref: MIC2-QPMS-EN-APP-00022).
[21] Gtek (2019) Unexploded Ordnance (UXO) Risk Review and Management Plan, Moorebank Precinct West Stage 2 (MPW2) Incorporating Moorebank Avenue Upgrade Works (MAUW) Moorebank, NSW, dated 9 October 2019 (ref: 17114EPR1, version 1.01).

Unexpected finds	EMP 8

clearance certificates stating it is suitable to resume works at the remediated Unexpected Find area.

The UFP for the operational facility post construction should be developed at the completion of Stage 2 works when the LTEMP is updated.

Management of Unexpected Asbestos Finds

Should asbestos be identified as an unexpected find during soil disturbance works, the following procedures for the safe removal of asbestos must be adopted:

- All asbestos removal, transport and disposal must be performed in accordance with the Work Health and Safety Regulation 2011 (WH&S Regulation).
- The removal works would be conducted in accordance with the Code of Practice – How to Safely Remove Asbestos (SafeWork NSW, August 2019).
- An appropriate asbestos removal licence issued by SafeWork NSW would be required for the removal of asbestos impacted soil.
- Environmental management and WH&S procedures would be put in place for the asbestos removal during excavation to protect workers, surrounding residents and the environment.
- Temporary stockpiles of asbestos containing material (ACM) soils would be covered to minimise dust and potential asbestos release.
- An asbestos removal clearance certification would be prepared by an occupational hygienist at the completion of the removal work. This would follow the systematic removal of asbestos containing materials and any affected soils from the Project site and validation of these areas (through visual inspection and laboratory analysis of selected soil samples).
- Asbestos fibre air monitoring would be undertaken during the removal of the asbestos materials and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with Code of Practice – How to Safely Remove Asbestos (SafeWork NSW, August 2019).

Additional Validation Requirements		EMP 9
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure contamination management activities and unexpected finds have been appropriately characterised and validation for the intended land use.	

Unexpected Finds requiring remediation or soil reuse will require validation which should be undertaken in accordance with the methodology and criteria provided in Section 7 of the Golder (2016) RAP. Additional information relating to validation relevant to the LTEMP is provided below.

AEC 3

The following information to verify that appropriate reuse or off-site disposal of surplus material is to be undertaken:

- Soil tracking data to confirm the source and final location of PFAS impacted soil reused at the Site in accordance with **EMP 3**.
- Soil sampling and analytical results to confirm that the soil meets the requirements for reuse outlined in **EMP 5** and the receiving LTEMP.
- Survey data to confirm the location and depth of PFAS impacted soil reused at the Site under the conditions of reuse provided in **EMP 5**.
- Soil classification data and landfill receipts for soil disposed off-site.

Unexpected Finds

Validation of Unexpected Finds will be undertaken as per Section 8 of the RAP (Golder 2016). The usability of the data collected during the validation program will be assessed in accordance with Section 8.7 of the RAP (Golder 2016).

Validation reporting

Validation reporting should be prepared in accordance with the NSW EPA (2020) *Guidelines for Consultants Reporting on Contaminated Land*.

Management of Groundwater		EMP 10
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure that groundwater is managed so as not to present a risk to human health or the environment.	

Based upon previous assessments undertaken, elevated levels of PFAS in groundwater samples collected have been reported at the Site (**Appendix A**). Further discussion of groundwater management is provided below.

Groundwater Extraction

Groundwater extraction during and post construction is not permitted at the Site for any beneficial use in accordance with **EMP 1**. Based upon the proposed commercial / industrial land use of the Proposed Development and the availability of a reticulated water supply, it is considered the requirement for the beneficial use of groundwater at the Site is low.

It is not anticipated that groundwater will be encountered during construction of the Proposed Development and construction dewatering of contaminated groundwater should be avoided where practicable. However, should construction dewatering be unavoidable then a Dewatering Management Plan must be prepared which details appropriate control measures to manage and treat contaminated groundwater which is generated from dewatering. An extraction licence should be sought form the appropriate regulatory authority prior to commencing dewatering in accordance with the relevant legislation (if required).

Worker Health and Safety

In order to manage workers exposure to contaminated groundwater the following should be implemented for works where groundwater is expected to be encountered:

- Project inductions should be undertaken to identify areas with high risk of groundwater contamination.
- SWMS and JSAs to identify hazards associated with contaminated groundwater and detail appropriate control measures.
- PPE used in high-risk areas including:
  - Disposable overall suits including boots.
  - Disposable waterproof nitrite gloves in addition to standard glove requirements.
  - All other standard PPE required for works on Site.
- Signage placed in ablution blocks to ensure all workers wash hands and face prior to eating, regardless if gloves are worn.
- If worker's skin comes into contact with contaminated water, ensure skin is immediately washed with clean water and wet clothing is removed immediately after work is complete.

Groundwater Monitoring

Groundwater monitoring is not required for the Site unless required to address unexpected finds or if groundwater is expected to be encountered during construction / operation.

Management of surface water		EMP 11
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure that surface water is managed so as not to present a risk to human health or the environment.	

Based upon previous assessments undertaken, disturbance of soil in the AEC 3 has the potential to leach PFAS to stormwater during future minor excavation works. Further discussion of surface water management is provided below.

Management of On-site Surface Water

Use of contaminated surface water at the Site is not permitted for any beneficial use.

During construction / maintenance works below the layer of Engineered Fill and within AEC 3, the following precautions should be implemented:

- Excavation to be scheduled to minimise the area of soil exposed at any one time.
- To reduce PFAS impacted sediment, stormwater controls should be designed to limit infiltration of run-off into areas where PFAS impacted soils are located.
- Excavated soil should be removed from Site or returned to the excavation as soon as reasonably practicable to prevent leaching of PFAS to stormwater.
- The UFP (**EMP 8**) must be implemented.
- Stormwater in any sediment basins (if required through construction) should be tested prior to being discharged. PFAS impacted stormwater must be managed in accordance with the PFAS NEMP, the EPL, and the requirements within the relevant PFAS LTEMP for the applicable area of the MPW Site.

Water Treatment

If water treatment is required, it should be undertaken in accordance with the relevant standard, EPL and LTEMP.

Worker Health and Safety

If encountered, in order to manage workers exposure to contaminated surface water the following should be implemented for works where groundwater is expected to be encountered:

- Project inductions should be undertaken to identify areas with high risk of surface water contamination.
- SWMS and JSAs to identify hazards associated with contaminated surface water and detail appropriate control measures.
- PPE used in high risk areas including:
    - Disposable overall suits including boots.
    - Disposable waterproof nitrite gloves in addition to standard glove requirements.
    - All other standard PPE required for works on Site.
- Signage placed in ablution blocks to ensure all workers wash hands and face prior to eating, regardless if gloves are worn.

Management of surface water	EMP 11

- If worker's skin comes into contact with contaminated water, ensure skin is immediately washed with clean water and wet clothing is removed immediately after work is complete.

Surface Water Monitoring

In the event contaminated water is encountered, Surface water must be sampled in accordance with the relevant LTEMP, EPL and HEPA NEMP or applicable regulations at the time of the assessment by the Environmental Consultant.

Fieldwork was undertaken in accordance with Table A1 of the Western Australia Department of Environment Regulation (WA DER), Interim Guideline on the Assessment and Management of PFAS, 2016 (WA DER 2016), and the PFAS NEMP.

Given that the Site is covered with a minimum of 1m of imported fill material and groundwater is unlikely to be encountered during construction works, groundwater monitoring at the Site is not considered to be warranted.

Training		EMP 12
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	Suitably trained personnel will be available to implement the requirements of the LTEMP.	

The Site owner or nominated responsible party, shall ensure that any personnel engaged in the implementation of nominated tasks for which the Site Occupant is responsible, have been provided with adequate training to manage the site contamination and hazardous materials conditions which may be encountered during site ground disturbance activities.

Personnel conducting sampling, measuring, monitoring and reporting activities are to be suitably trained or experienced in the activity. Records of all training are to be filed in accordance with the project filing system.

As a minimum the induction will include the following:

- Existence and requirements of this LTEMP.
- Relevant legislation, penalties, fines.
- Roles and responsibilities for Contamination Management.
- Landscape management measures.
- Asbestos identification and management requirements.
- Stockpile management measures.
- Material movement and tracking measures.
- Unexpected finds.
- Toolbox meetings will also be undertaken, as and when required.

The Site Occupant shall maintain records of personnel engaged in the nominated tasks and their relevant training/qualifications for the period of implementation of the LTEMP in accordance with **EMP 16** and with the document control system outlined in the CEMP.

Works involving contractors and subcontractors will be managed in accordance with **EMP 13**.

Contractor and Subcontractor Management		EMP 13
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	Ensure that all persons who may be exposed to contaminated material are suitably aware of conditions and requirements of this LTEMP.	

The Site Owner (or nominated representative) is required to ensure that Contractors and Sub-contractors are advised of potential safety and environmental issues on site during site-specific induction training. This induction shall include the occupational health and safety responsibilities, requirements and controls for all (sub)contractors working on site. In addition, all site workers, including contractors and subcontractors shall be made aware that they are required to implement the provisions of this LTEMP.

All subcontractor activities will be monitored by the Site Owner, or a nominated representative, to ensure compliance with the requirements of this LTEMP.

They shall be solely responsible for the health and safety of their employees and shall comply with all applicable laws and regulations. All contractors and subcontractors are responsible for:

1. Providing their own personal protective equipment.
2. Training their employees in accordance with applicable laws.
3. Providing medical surveillance and obtaining medical approvals for their employees.
4. Ensuring their employees are advised of and meet the minimum requirements of this LTEMP and any other additional measures required by their site activities.
5. Designating their own site safety officer.

All contractors/subcontractors must sign an acceptance form prior to commencing work on site.

Part 6.5 of the *Work Health and Safety Regulation 2011* required that an employer of employees undertaking construction work must ensure that the employees have completed induction training as specified by the Regulation. In addition, the Principal Contractor (if required) must not allow any person to carry out construction work unless he/she is satisfied that the person has undergone work health and safety induction training, including:

- General occupational health and safety training for construction work.
- Work activity-based health and safety training (job specific training).
- Site specific health and safety induction training.

The Site Owner (or nominated representative) shall require all contractors completing such works to maintain, for each person carrying out construction/maintenance works, for a period of three years:

- A copy of relevant statements of OHS induction training, or a statement indicating that the Principal Contractor is satisfied that the relevant OHS induction training has been undertaken; and
- A brief description of the site-specific training undertaken by the person.

Contingency Plan		EMP 14
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	Ensure that in the event of unplanned exposure of impacted materials all appropriate measures are implemented to minimise the risk to on-site personnel and the environment.	

In the event site operations or conditions result in the disturbance of significant impacted material without the prior preparation of specific works/management procedures and implementation of appropriate exposure minimisation measures, or alternatively an environmental incident occurs (contaminant leak/spill, identification of asbestos in imported material, etc.), the following shall be implemented:

- Isolation of the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc.) to prevent exposure to site personnel and/or off-site airborne dust migration; and
- Implementation of applicable EMPs with respect to personnel and site management, or where appropriate the Unexpected Finds Protocol included in this LTEMP (**EMP 8**), and subsequent appropriate removal/management of the identified impacted material via excavation and off-site removal or otherwise containment/treatment as applicable.

Where considered appropriate by the Site Owner (or its nominated representative), an appointed Environmental Consultant shall undertake an assessment of the impacted area such it can be confirmed the disturbance of material has not resulted in conditions with unacceptable risks to site users or the environment. This may include inspections, and or soil/water sampling within the site and subsequent analysis of samples for identified contaminants of concern at the site.

Following implementation of these procedures to ensure there are no further unacceptable exposures to site workers and/or environmental emissions, consideration shall be given to the requirements of **EMP 15** to **EMP 17** inclusive, in relation to documentation and renewal of the LTEMP to minimise the potential for future exposure of impacted material. This should include a formal review of the incident by an appropriately qualified person appointed by the Site Owner (or nominated representative) with the objective of identifying the cause of the incident and providing recommendations on alternative procedures or systems to be implemented at the site and/or within the LTEMP to prevent/minimise the likelihood of the incident reoccurring.

The incident shall be documented within the activity register as outlined in **EMP 16** and where appropriate, amendment(s) to the LTEMP will be undertaken as outlined in **EMP 21**.

Non-compliance with LTEMP		EMP 15
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure the LTEMP is implemented as intended.	

Non-compliances with the intent and procedures of the LTEMP may occur during the implementation of the LTEMP.

Where a non-compliance is identified by a responsible organisation, they shall inform the affected organisations of the non-compliance in writing. Where a non-compliance with the LTEMP is identified by another organisation (in the activities of an alternate organisation), then they shall have the responsibility of informing the non-complying party in writing of the non-compliance. The non-complying party will be required to rectify the non-conformity as soon as possible, as per the requirements of the relevant procedure(s) where non-compliance has occurred.

Detail of the action taken to rectify the non-compliance shall be provided to each of the affected organisations in writing. Where a non-compliance cannot be rectified, then the LTEMP will require to be reviewed as per the requirements of **EMP 18** LTEMP Review.

Where contaminated soil/spoil, water and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal / discharge) this will constitute a non-conformance to be managed under the CEMP or Environmental Management System.

Where contaminated soil/spoil, water and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal / discharge) the following will be undertaken:

- Where required, isolation of the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc) to prevent exposure to site personnel and/or off-site airborne dust migration.
- Implementation the Unexpected Finds Protocol included in this LTEMP, and subsequent appropriate removal/management of the identified impacted material via excavation and off-site removal or otherwise containment/treatment as applicable.
- Fill out incident response form and raise a non-conformance for improvement.
- Where required, notify regulatory authorities.

Record Keeping		EMP 16
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	Records of the implementation of the LTEMP require to be retained.	

The Site Owner (or nominated representative) shall be responsible for the maintenance of all documents relating to the implementation of the LTEMP. This shall include any contamination assessments and validation undertaken, registers for the maintenance of the LTEMP (site inspection forms, works approval checklists, revised plans, *etc.*) and any relevant correspondence between the Site Owner (or nominated representative), Contractors and/or any other party.

All records shall be retained by the Site Owner (or nominated representative) throughout the time of implementation of the LTEMP. In the event that the role of the Site Owner (or nominated representative) is transferred from one organisation to another, control of all relevant (historical and current) documents will be transferred for safe keeping to the current Site Owner (or nominated representative).

Audit / Review of LTEMP Implementation		EMP 17
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Once every 12 months	
Objective:	The implementation of the LTEMP requires to be audited in accordance with EPA guidance publications to identify areas of non-compliance or partial compliance with relevant legislation/regulations and/or the requirements of this plan.	

An environmental audit shall be undertaken annually from implementation of this LTEMP to ensure ongoing compliance with the LTEMP requirements. The audit shall be undertaken by an Environmental Consultant in general compliance with the DEC '*Compliance Audit Handbook*' (DEC, Feb 2006) and identify areas of non-compliance or partial compliance with the requirements of:

- Relevant legislation / regulations; and
- This plan.

The findings of the audit should be documented and form the basis of the subsequent management review process as outlined following.

Specific tasks that will be undertaken as part of the audit include:

- Review of records generated by the Site Owner, and their respective contractors to ensure they meet the intended scope of the LTEMP.
- Review of the works register documenting ground disturbance activities completed at the site and associated work method statements, monitoring/validation activities to ensure that the management activities undertaken have met the intended scope of the LTEMP.
- Periodic review and inspection of the Site condition, including annual inspection of liners within the OSDs and overflow drainage channels.

Where a non-compliance is detected during the audit process, then the non-compliance shall be informed as per the requirements of **EMP 15**: Non-Compliances with LTEMP.

The Site Owner (or nominated representative) is required to maintain records of the audit review. Records will require to be maintained on site and made available to relevant authorities in the event of a site inspection.

The results of the audit will be considered as part of a broader review of the LTEMP to be undertaken on an annual basis by an Environmental Consultant in conjunction with the Site Owner. This review shall consider:

- The results of the LTEMP Audit as outlined above.
- Any non-compliances with the LTEMP that have been unable to be resolved.
- Practicalities and efficiencies of management measures and whether there are more effective ways to improve environmental compliance.
- Any changes in state or national environmental protection legislation or guidelines that impact any part of the LTEMP.
- Any proposed changes in land-use of the site or adjoining sites which may impact upon exposure pathways.

Audit / Review of LTEMP Implementation	EMP 17
Where a review identifies items, which are required to be modified, or added to the LTEMP, then a revision of the LTEMP shall be prepared by a Suitably Qualified Person. The revised LTEMP will require approval by relevant stakeholders prior to implementation of the revised plan.	

LTEMP Review	EMP 18
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)
Frequency:	As required
Objective:	The LTEMP requires review to ensure its continued appropriateness to be used on the Site.

A review of the LTEMP shall be undertaken as required by an Environmental Consultant in conjunction with the Site Owner (or nominated representative). This review shall consider:

- The results of the LTEMP Audit as outlined in **EMP 17**.
- Any non-compliances with the LTEMP that have been unable to be resolved.
- Practicalities and efficiencies of management measures and whether there are more effective ways to improve environmental compliance.
- Any changes in state or national environmental protection legislation or guidelines that impact any part of the LTEMP.
- Any proposed changes in land-use of the site or adjoining sites which may impact upon exposure pathways.

If the Site Owner ceases to be recognised as the Site Manager, a review of the LTEMP document and compliance measures will be necessary to identify suitable replacement LTEMP compliance mechanisms.

In addition, where a review identifies items which are required to be modified, or added to the LTEMP, then a revision of the LTEMP shall be prepared by a suitably qualified person.

Any revisions to the LTEMP must be approved by the by the NSW EPA or appointed NSW EPA accredited Site Auditor.

Cessation of LTEMP Application		EMP 19
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure impacts associated with residual issues requiring management at the Site during construction and operation of the Proposed Development been appropriately resolved to ensure the ongoing suitability of the site for the proposed land use.	

To address potential residual soil and groundwater issues after the scope of the remediation is completed, the Golder (2016) RAP envisaged implementation of a LTEMP to provide a management, monitoring and review framework.

Cessation of the application of the LTEMP will be dependent upon the results of additional assessment and will require a revised site-specific human health and ecological risk assessment.

Once the Environmental Consultant is satisfied that the residual contamination at the Site does not present a risk of harm to human health and the environment, then the final site-specific human health and ecological risk assessment will include recommendations for cessation of the LTEMP for approval by the NSW EPA or appointed NSW EPA accredited Site Auditor.

Appendix C

CONDITIONS OF CONSENT COMPLIANCE MATRIX

Table D1 – Conditions of Consent (CoC) – SSD 7709			
CoC	**Requirement**	**Document Reference**	**How Addressed**
B171	Upon completion of importation and placement of fill and prior to construction of permanent built surface works, the Applicant must submit to the Planning Secretary, a Site Audit Report and a Site Audit Statement A for the whole site, prepared in accordance with the NSW Contaminated Land Management - Guidelines for the NSW Site Auditor Scheme 2017, which demonstrates the site is suitable for its intended land uses under MPW Stage 2 SSD 7709.	NA	To be actioned by the Site Auditor
B172	Where remediation outcomes for the site require long term environmental management, a suitably qualified and experienced person must prepare a Long-Term Environmental Management Plan (LTEMP), to the satisfaction of the Site Auditor. The plan must:	This Plan	LTEMP prepared by a suitably qualified and experienced person – Certified Environmental Practitioner – Contaminated Land (CEnvP CL). This Plan has been sent to the Site Auditor for approval.
	a) be submitted to the Planning Secretary and EPA prior to commencement of construction (other than vegetation clearing); and		Qube to provide this Plan to the Planning Secretary once approved by the Site Auditor.
	b) include, but not be limited to:		
	i. a description of the nature and location of any contamination remaining on site,		**Appendix A** of this Plan.
	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,		**Appendix B** of the LTEMP provides Environmental Management Procedures including details of restrictions. A containment cell is not proposed in this Plan.
	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,		A containment cell is not proposed in this Plan.
	iv. a description of the procedures for monitoring the integrity of the containment cell,		A containment cell is not proposed in this Plan.

Table D1 – Conditions of Consent (CoC) – SSD 7709

CoC	Requirement	Document Reference	How Addressed
	v. a surface and groundwater monitoring program,		The surface and groundwater monitoring program is detailed in **Section 5** of this Plan and **EMP 10** and **EMP 11** in **Appendix B** of this Plan.
	vi. mechanisms to report results to relevant agencies,		Reporting mechanisms provided in Section 5 and **Appendix B** of this Plan. **EMP 19** in **Appendix B** provides protocols for the cessation of monitoring post development subject to approval by the Site Auditor and / or NSW EPA.
	vii. triggers that would indicate if further remediation is required, and		An unexpected finds protocol to manage further remediation is provided as **Appendix D** of the LTEMP.
	viii. details of any contingency measures that the Applicant is to carry out to address any ongoing contamination.		A contingency plan is provided as **EMP 14** in **Appendix B** of this Plan.
B173	The LTEMP must be registered on the title to the land.	This Plan	**Section 1.3** and **Section 1.4**
B180	The Applicant must assess and classify all liquid and nonliquid wastes to be taken off site in accordance with the latest version of EPA's Waste Classification Guidelines Part 1: Classifying Waste (NSW EPA 2014) and dispose of all wastes to a facility that may lawfully accept the waste.	**Appendix B**	**EMP 6** in **Appendix B** addresses liquid and non-liquid waste classification
C1	The applicant must ensure that the environmental management plans required under this consent are prepared in accordance with any relevant guidelines, and include: a) Baseline data; b) A description of: (i) The relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) Any relevant limits or performance measures/criteria; and (iii) The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any measurement measures;	a) **Section 3** and **Appendix B** b) i) **Section 4** ii) **Appendix B** iii) **Appendix B** c) **Appendix B** d) i) **Appendix B** ii) **Section 5** e) **EMP 14** f) **EMP 17** g) **EMP 15 and 16** h) **Section 4.1** i) **EMP 28**	a) Includes known site conditions and summarised remaining contamination issues. b) (i) Covers any relevant approval and/or licence. (ii) Specifies adopted criteria to be used for assessment and validation. (iii) Specifies sampling and validation plans and the decision questions needing to be answered for each different type of assessment/validation. c) Specifies the details of each management plan as required by Golder (2016a). d)

Table D1 – Conditions of Consent (CoC) – SSD 7709

CoC	Requirement	Document Reference	How Addressed
	c) A description of the management measures to be implemented to comply with the relevant statutory requirements, limits or performance measures/criteria; d) A program to monitor and report on the: (i) Impacts and environmental performance of the development; and (ii) Effectiveness of any management measures (see (c) above); e) A contingency plan to manage any unpredicted impacts and their consequences; f) A program to investigate and implement ways to improve the environmental performance of the development over time; g) A protocol for management and reporting any: (i) Incidents and non-compliances; (ii) Complaints; (iii) Non-compliances with statutory requirements; and h) Roles and responsibilities for implementing the plan; and i) A protocol for periodic review of the plan.		(i) Describes the sampling analysis and reporting program for each contamination issue requiring management; and (ii) The sampling and validation programs will report on the effectiveness of the management measures. e) Details the Unexpected Finds Procedure in relation to contamination. f) Continual improvement for the LTEMP is discussed. g) **Appendix B** provides protocols and reporting: (i) Specifies how incidents and non-compliances will be managed. (ii) Specifies how complaints in relation to contamination will be managed. (iii) Specifies how non-compliance to statutory requirements will be managed. h) Lists the responsibilities for the LTEMP Implementation. i) Specified how the LTEMP will be reviewed/updated.

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
8a)	MPW Concept EIS, Soil and Contamination PEMF Section 6.2 – Management controls – Early Works and Construction phase	Contaminated soil/fill material present will be 'chased out' during the excavation works based on visual, olfactory and preliminary field test results.	**Section 3** provides an overview on the remaining contamination issues remaining at the Site. **Appendix B** – **EMP 5-9** describes the chase out of impacted soils and fill for unexpected finds.
		Excavated soil would be temporarily stockpiled, sampled and analysed for waste classification processes. Following receipt of waste classification results, the material would be transported to a licensed off-site waste disposal facility as soon as practicable to minimise dust and odour issue through storage of materials on-site	**EMP 4, EMP5** and **EMP 6**
		Stockpiled soils would be stored on a sealed surface and the stockpiled areas would be securely bunded using silt fencing to prevent silt laden surface water from entering or leaving the stockpiles or the Project site.	**EMP 5**
		All excavation works would be undertaken by licensed contractor experienced in remediation projects and the handling of contaminated soils.	**Section 4**
		All asbestos removal, transport and disposal must be performed in accordance with the Work Health and Safety Regulation 2011 (WH&S Regulation).	**EMP 6** and **EMP 8**
		The removal works would be conducted in accordance with the National Occupational Health and Safety Commission Code of Practice for the Safe Removal of	**EMP 6** and **EMP 8**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		Asbestos, 2nd Edition [NOHSC 2002 (2005)] (NOHSC 2005a).	
		An appropriate asbestos removal licence issued by WorkCover would be required for the removal of asbestos impacted soil.	**EMP 6** and **EMP 8**
		Environmental management and WH&S procedures would be put in place for the asbestos removal during excavation to protect workers, surrounding residents and the environment.	**EMP 6** and **EMP 8**
		Temporary stockpiles of asbestos containing material (ACM) soils would be covered to minimise dust and potential asbestos release	**EMP 6** and **EMP 8**
		An asbestos removal clearance certification would be prepared by an occupational hygienist at the completion of the removal work. This would follow the systematic removal of asbestos containing materials and any affected soils from the Project site and validation of these areas (through visual inspection and laboratory analysis of selected soil samples).	**EMP 6** and **EMP 8**
		Asbestos fibre air monitoring would be undertaken during the removal of the asbestos materials and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with the National Occupational Health and Safety Commission Guidance Note on the Membrane Filter Method for the Estimating	**EMP 6** and **EMP 8**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		Airborne Asbestos Fibre, 2nd Edition [NOHSC 3003 (2005)] (NOHSC 2005b).	
		All stockpiles would be maintained in an orderly and safe condition. Batters would be formed with sloped angles that are appropriate to prevent collapse or sliding of the stockpiled materials.	**EMP 4**
		Stockpiles would be placed at approved locations and would be strategically located to mitigate environmental impacts while facilitating material handling requirements. Contaminated or potentially contaminated materials would only be stockpiled in unremediated areas of the Project site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas (e.g. hardstand areas).	**EMP 4**
		Stockpiles would only be constructed in areas of the Project site that had been prepared in accordance with the requirements of the Project Preliminary RAP in Appendix G of Technical Paper 5 – Environmental Site Assessment (Phase 2), Volume 4. All such preparatory works would be undertaken prior to the placement of material in the stockpile. Stockpiles must be located on sealed surfaces such as sealed concrete, asphalt, high density polyethylene or a mixture of these, to appropriately mitigate potential cross contamination of underlying soil.	**EMP 4**
		The stockpiles of contaminated material would be covered with a waterproof membrane (such as polyethylene sheeting) to prevent increased moisture from rainwater	**EMP 4**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		infiltration and to reduce windblown dust or odour emission	
		Before the reuse of any material on-site, it would be validated so that the lateral and vertical extent of the contamination is defined	**EMP 4 and EMP 5**
		Where required, contaminated materials and wastes generated from the Project remediation and construction works would be taken to suitable licensed offsite disposal facilities	**EMP 6**
8a)	MPW Concept EIS, Soil and Contamination PEMF Section 6.4– monitoring	Within each of the Project specific management plans, the private sector developer would need to detail what monitoring would be undertaken to ensure compliance with the following:	
		The Project's EIS, with respect to the commitments made as well as the management and mitigation measures proposed;	**EMP 17, EMP 18 and EMP 19**
		Project approvals issued under the EPBC Act and EP&A Act;	Approval provided
		Contractual requirements established between MIC and the developer and operator for the Project;	N/A
		Other permits and/or licences required during the Project; and	N/A
		Objectives, targets and indicators as presented in this PEMF.	CEMP

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
8a)	MPW Concept EIS, Soil and Contamination PEMF Section 6.5 – Management response to incidents and non-compliances	Contaminated soil/spoil and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal).	**EMP 3, EMP 4, EMP 5, EMP 6**
8b) and c)	REMM 7A	To minimise the risk of leakages involving natural gas, liquid natural gas (LNG) and flammable and combustible liquids to the atmosphere: appropriate standards for a gas reticulation network, including AS 2944-1 (2007) and AS 2944-2 (2007), would be referred to in the detailed design process; correct schedule pipes would be used; a fire protection system would be installed if necessary for gas users; cathodic protection would be installed for external corrosion if appropriate; and access to the Project site would be secure.	CEMP
	REMM 7B	To minimise the risks of leakage of LNG and liquid petroleum gas (LPG) and flammable liquids during transport: materials would be transported according to the Australian Dangerous Goods (ADG) Code, relevant standards and regulations; and contractors delivering the gas would be trained, competent and certified by the relevant authorities	CEMP

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
	REMM 7C	To minimise hazards associated with venting of natural gas, LNG and LPG: LNG storage would be designed to AS/NZS 1596-2008 standards; access to the Project site would be secure; and significant separation distances to residences and other assets would be put in place	CEMP
8b) and c)	REMM 7D	Storage of flammable/combustible liquids would be carried out in accordance with AS 1940, with secondary containment in place and location away from drainage paths	CEMP
	REMM 7E	Standby or emergency generators and transformers would all have secondary containment	CEMP
	REMM 7F	Oil coolers would generally be located in areas where leaks and runoff are appropriately controlled at source or in a retention basin.	CEMP
	REMM 7I	No hazardous or regulated wastes would be disposed of onsite.	**EMP 4 and EMP 6**
	REMM 7J	All offsite disposals would be carried out by approved transport operators and to approved facilities	**EMP 6** and CEMP
	REMM 7K	Other dangerous goods, including any waste materials present on the Project site, would be suitably contained, with secondary containment and runoff controls implemented where appropriate to prevent leaks or spills	CEMP

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		migrating to environmentally sensitive areas, in particular via stormwater systems that drain to the Georges River.	
	REMM 8B	Before construction, a remediation program would be implemented in accordance with the Moorebank Intermodal Terminal Preliminary Remediation Action Plan (RAP) (or equivalent). The program will have been formally reviewed and approved by the Site Auditor under Part 4 of the NSW Contaminated Land Management Act 1997 (CLM Act).	Currently Stage 1 works have been completed in accordance with the RAP (Golder 2016a). The outcomes of the remediation are documented in the JBS&G (2020) Remediation Validation Report under review by the Site NSW EPA Accredited Auditor. The remaining contamination is documented in this Plan in **Appendix A** along with the management measures in **Appendix B**
	REMM 8D	An unexploded ordnance (UXO) management plan (or equivalent) would be developed for the Project site. This plan would detail a framework for addressing the discovery of UXO or explosive ordnance waste (EOW) to ensure a safe environment for all Project staff, visitors and contractors.	**EMP 8**
	REMM 8E	An ASS management plan (or equivalent) would be developed in accordance with the ASSMAC Assessment Guidelines (1998), with active ongoing management through the construction phases. Offsite disposal would need to be in accordance with the NSW Waste Classification Guidelines Part 4: Acid Sulfate Soils (2009).	EP Risk (2020b) has prepared an Acid Sulfate Soil Management Plan which has been included in the CEMP for Stage 2 works.
	REMM 8F	Further testing of residual sediments would be undertaken to gather data to inform the management of sediments likely to be disturbed/dewatered during construction.	Further testing of sediments has been undertaken by JBS&G 2018a[1].

[1] L144 (PFAS Soil Assessment - Swales and Basins) Rev 0. JBS&G April 2018.

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
	REMM 8G	Ground penetrating radar (GPR) or similar techniques would be used to locate and document all existing and underground tank infrastructure across the Project site.	This process was conducted as part of the Stage 1 MPW works and is documented in the validation report (JBS&G 2020).
	REMM 8H	A management tracking system for excavated materials would be developed to ensure the proper management of the material movements at the Project site, particularly during excavation works.	**EMP 3** and **EMP 4**
	REMM 8I	Contaminated soil/fill material present will be 'chased out' during the excavation works based on visual, olfactory and preliminary field test results.	**EMP 1, EMP 2**
	REMM 8J	Excavated soil would be temporarily stockpiled, sampled and analysed for waste classification processes. Subject to receipt of waste classification results, the material would be transported to a licensed offsite waste disposal facility as soon as practicable to minimise dust and odour issue through storage of materials on site.	**EMP 4** and **EMP 6**
8b) and c)	REMM 8K	Stockpiled soils would be stored on a sealed surface and the stockpiled areas would be securely bunded using silt fencing to prevent silt laden surface water from entering or leaving the stockpiles or the Project site	**EMP 4**
	REMM 8L	All excavation works associated with potential contaminated lands would be undertaken by licensed contractors, experienced in remediation projects and the handling of contaminated soils.	**Section 4**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
	REMM 8M	All asbestos removal, transport and disposal would be performed in accordance with the Work Health and Safety Regulation 2011 (WHS Regulation)	**EMP 8**
	REMM 8N	The removal works would be conducted in accordance with the National Occupational Health and Safety Commission Code of Practice for the Safe Removal of Asbestos, 2nd Edition [NOHSC 2002 (2005)] (NOHSC 2005a).	**EMP 8**
	REMM 8RO	An appropriate asbestos removal licence issued by WorkCover NSW would be required for the removal of asbestos contaminated soil.	**EMP 8**
	REMM 8P	Environmental management and WHS procedures would be put in place for the asbestos removal during excavation to protect workers, surrounding residents and the environment.	**EMP 8**
	REMM 8Q	Temporary stockpiles of asbestos containing material (ACM) soils would be covered to minimise dust and potential asbestos release	**EMP 10**
	REMM 8R	An asbestos removal clearance certification would be prepared by an occupational hygienist at the completion of the removal work. This would follow the systematic removal of asbestos containing materials and any affected soils from the Project site, and validation of these areas (through visual inspection and laboratory analysis of selected soil samples)	**EMP 8**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
8b) and c)	REMM 8S	Asbestos fibre air monitoring would be undertaken during the removal of ACMs and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with the National Occupational Health and Safety Commission Guidance Note on the Membrane Filter Method For the Estimating Airborne Asbestos Fibre, 2nd Edition [NOHSC 3003 (2005)] (NOHSC 2005b).	**EMP 8**
	REMM 8T	All stockpiles would be maintained in an orderly and safe condition. Batters would be formed with sloped angles that are appropriate to prevent collapse or sliding of the stockpiled materials	**EMP 4**
	REMM 8U	Stockpiles would be placed at approved locations and would be strategically located to mitigate environmental impacts while facilitating material handling requirements. Contaminated or potentially contaminated materials would only be stockpiled in unremediated areas of the Project site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas (e.g. hardstand areas)	**EMP 4**
	REMM 8V	Stockpiles would only be constructed in areas of the Project site that had been prepared in accordance with the requirements of the Project Preliminary RAP in Appendix G of Technical Paper 5 – Environmental Site Assessment (Phase 2), Volume 5A and 5B. All such preparatory works would be undertaken before material is placed in the stockpile. Stockpiles must be located on sealed surfaces such as sealed concrete, asphalt, high density	**EMP 4**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		polyethylene or a mixture of these, to appropriately mitigate potential cross contamination of underlying soil	
8b) and c)	REMM 8W	Any stockpiles of contaminated material would be covered with a waterproof membrane (such as polyethylene sheeting) to prevent increased moisture from rainwater infiltration and to reduce windblown dust or odour emission	**EMP 4**
	REMM 8X	Before the reuse of any material on site, it would be validated so that the lateral and vertical extent of the contamination is defined.	**EMP 5**
	REMM 8Y	Where required, contaminated materials and wastes generated from the Project remediation and construction works would be taken to suitable licensed offsite disposal facilities	**EMP 6**
	REMM 8Z	Where necessary, consider undertaking further investigations to determine whether other buildings have organochlorine pesticides (OCP) impacts subgrade materials, and to quantify the volume of OCP impacted materials across the site	Not relevant as all buildings have been removed as part of the Stage 1 Early Works.
	REMM 8AA	Additional Aqueous Film Forming Foam assessment (AFFF) be undertaken to determine if any direct remedial and/or management actions are required. A stage approach is considered appropriate and is detailed in the Preliminary AFFF Assessment (Golder Associates 2015b).	Additional PFAS Investigations have been undertaken on the Site and are summarised by EP Risk (2018) and ongoing requirements presented in **Appendix B**.
8 d)	-	In relation to management of PFAS:	

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
	i)	be consistent with: • National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) (ASC NEPM 2013). • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (under the National Water Quality Management Strategy) including the draft default guideline values for perfluorooctanoic acid (PFOS) and perfluorooctane sulfonic acid (PFOA) in freshwater as applied by the State government • relevant Commonwealth environmental management guidance on PFOS and PFOA	**Section 4** and **Appendix B** of this Plan are consistent with these guidelines (where relevant).
	ii)	detail implementation and operational procedures, appropriate to the risk posed by any contamination, including: • roles and responsibilities • management of potential PFAS contaminated sites as yet un-investigated • management of areas of known PFAS contamination, including strategies to reduce runoff, dewatering and migration of contamination across and off the proposed site • a contingency action plan for unexpected PFAS contaminant discoveries	**Section 4.1** EP Risk (2018) **EMP 2, EMP 3, EMP 4, EMP 5, EMP 8,** **EMP 14**
	iii)	detail soil, groundwater and surface water PFAS contamination monitoring requirements and testing and	**EMP 8** and **EMP 9**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		disposal procedures appropriate to the risk posed by any contamination	
	iv)	include requirements for site validation reports appropriate to the risk posed by any contamination	Golder 2016a RAP
	v)	include requirements for remedial action plans appropriate to the risk posed by any contamination	Golder 2016a RAP
	vi)	detail review procedures appropriate to the risk posed by any contamination	**EMP 18**
	vii)	impose the following performance measures for managing earthworks and the potential for effects to occur due to disturbance of PFAS contaminated soils during construction: • contaminated sediment to be discharged outside the site of the action to be minimised • contaminated waste material, including excavated soil, to be released through dewatering to be handled appropriately to the risk posed by the contamination and disposed of in an environmentally sound manner such that potential for the PFAS content to enter the environment is minimised contaminated waste material, including excavated soil, with a PFOS or PFOA content above 50 milligrams per kilogram (mg / kg) to be stored or disposed of in an environmentally sound manner, such that PFAS content does not enter the environment	**Appendix B**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		• all soil remaining at the site of the action to be suitable for purpose	

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
OB	The CEMP, or equivalent, for the Proposal would be based on the PCEMP (Appendix I of this EIS), and include the following preliminary management plans: • Preliminary Construction Traffic Management Plan (PCTMP) (Appendix M of the EIS) • Air Quality Management Plan (Appendix O of the EIS) • Erosion and Sediment Control Plans (ESCPs) and Bulk Earthworks Plans, within the Stormwater Drainage Design Drawings (Appendix R of the EIS) As a minimum, the CEMP would include the following sub-plans: • Construction Traffic Management Plan (CTMP) • Construction Noise and Vibration Management Plan (CNVMP), prepared in accordance with the Interim Construction Noise Guideline • Cultural Heritage Assessment Report/Management Plan • Construction Air Quality Management Plan • Construction Soil and Water Management Plan (SWMP), prepared in accordance with Managing Urban Stormwater, 4th Edition, Volume 1, (2004) • ESCP • Flood Emergency Response and Evacuation Plan • UXO, EO, and EOW Management Plan • Acid Sulfate Soils Management Plan • Bushfire Management Strategy • Community Information and Awareness Strategy. • Flora and Fauna Management Plan (FFMP) • Groundwater Monitoring Program (GMP)	**CEMP**	CEMP prepared by the Principal Contractor during construction

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
5A	A SWMP and ESCP, or equivalent, would be prepared for the Proposal. The SWMP and ESCPs would be prepared in accordance with the principles and requirements of the Blue Book and based on the Preliminary ESCPs provided in the Stormwater and Flooding Assessment Report (refer to Appendix R of the EIS). The following aspects would be addressed within the SWMP and ESCPs: Stockpiles would be located away from flow paths on appropriate impermeable surfaces, to minimise potential sediment transportation. Where practicable, stockpiles would be stabilised if the exposed face of the stockpile is inactive more than ten days, and would be formed with sediment filters in place immediately downslope	**CEMP**	While this plan is separate to the SWMP and ESCP it does include this requirement for the management of stockpiles.
5I	Stockpile sites established during construction are to be managed in accordance with stockpile management principles set out in Appendix L of this RtS. Mitigation measures within the Stockpile Management Protocol include: In order to accept fill material onto site, material characterisation reports/certification showing that the material being supplied is virgin excavated natural material (VENM) / excavated natural material (ENM) must be provided. Each truck entering the Site will be visually checked and documented to confirm that only approved materials that are consistent with the environmental approvals are allowed to enter the site. Only fully tarped loads are to be accepted by the gatekeeper. Environmental Assurance of imported fill material will be conducted to confirm that the materials comply with the NSW EPA Waste Classification Guidelines and the Earthworks Specification for the MPW site. The	**EMP 4, EMP 6** and **CEMP**	These measures have been included in the LTEMP.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	frequency of assurance testing will be as nominated by the Environmental assuror/auditor. All trucks accessing the site for the purpose of clean general fill importation would enter and exit via the existing main Site access located from Moorebank Avenue. Ingress and egress to the stockpiling areas would be arranged so that the reversing of trucks within the site is minimised. Stockpiles would not exceed ten-metres in height from the final site levels, with battered walls at gradients of 1V:3H For any stockpile heights greater than 4 m, benching would be implemented. Where reasonable and feasible, and to minimise the potential for erosion and sedimentation of stockpile(s), stockpile profiles would typically be at angle of repose (the steepest angle at which a sloping surface formed of loose material is stable) with a slight concave slope to limit the loss of sediments off the slope, or through the profile and the formation of a toe drain. The top surface of the stockpile(s) would be slightly sloped to avoid ponding and increase run off. Topsoil stockpiles would be vegetated to minimise erosion. Stockpiles would be protected from upslope stormwater surface flow through the use of catch drains, berms, or similar feature(s) to divert water around the stockpile(s). A sediment control device, such as a sediment fence, berm, or similar, would be positioned downslope of the stockpile to minimise sediment migration. Any water seepage from stockpiles would be directed by toe drains at the base of the stockpiles toward the sediment basins or check dams and away from the emplacement or extraction working face.		

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	Newly formed stockpiles would be compacted (sealed off) using a smooth drum roller at the end of each working day to minimise water infiltration. Haul roads would be located alongside the stockpile to the work/tipping area. As per best practice, the catchment area of haul roads for surface water runoff would be approximately 2530 m lengths, facilitated by the provision of spine drains which would convey water from the haul road to toe drains at the base of the stockpile, and then to sediment basins. Temporary sediment basins would be established in accordance with the ESCP prepared for the site. Stockpiling of clean fill material is to be carried out during Works Period A (pre-construction) and Works Period D (bulk earthworks). Any imported clean general fill material that would be subject to stockpiling within the Proposal site for more than a 10-day period without being worked on, would be subject to stabilisation works, to minimise the potential for erosion. Where the material being stockpiled is less coarse or has a significant component of fines then surface and slope stabilisation would be undertaken. Methods for slope stabilisation may include one or a combination of the following: – Application of a polymer to bind material together – Application of hydro-seed or hydromulch – Covering batters with mulch to provide ground cover – Covering batters with geofabric – Use of a simple sprinkler system for temporary stockpiles, including use of radiating sprinkler nozzles to maintain fine spray over exposed surfaces		

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	– Other options identified by the Contractor Topsoil stockpiles would be seeded with a grass/legume or nitrogen fixing species (such as acacia) to assist in erosion control and reduce loss of beneficial soil nutrients and micro-organisms		
6A	The CEMP would identify the actions to be taken should additional contamination be identified during the development of the site (i.e. an unexpected finds protocol), and will address REMM items 8H, 8T, 8U, 8V and 8W (of the MPW Concept Plan Approval (SSD 5066)).	**CEMP**	To be addressed in the CEMP.
6B	A site-specific Remediation Action Plan (RAP) is not considered to be required for the Proposal. The following documentation would be utilised for the purposes of remediating the site: • The Preliminary Remediation Action Plan (PB, 2014a) • The Validation Plan – Principles (Golder, 2015b) • The Demolition and Remediation Specification (Golder 2015c) • Any other contamination documentation prepared for the remediation activities undertaken for MPW Early Works (Stage 1).	**JBS&G 2020**	Currently Stage 1 works are completed and have been completed in accordance with the RAP (Golder 2016). The outcomes of the remediation are documented in the Validation Report (JBS&G 2020) under review by the Site NSW EPA Accredited Auditor.
6C	The CEMP would include the preparation of a site-wide UXO, EO, and EOW management plan (or equivalent) based on the UXO Risk Review and Management Plan (G-Tek, 2016). This plan would be implemented to address the discovery of UXO or EOW during construction, to ensure a safe environment for all staff, visitors and contractors.	**CEMP**	The plan outlines the review and actions required to manage any unexpected finds in relation to the UXO Risk.
6D	An Asbestos in Soils Management Plan (AMP) is to be implemented as part of the CEMP in accordance with the Safe Work NSW requirements, including but not limited to: • the Guidelines for Managing asbestos in or on soil (2014), and • Codes of Practice - How to Safely Remove Asbestos (2011) and	**Golder 2016b**	The asbestos in soils management plan has been developed in accordance with current Guidelines and codes of practice.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	• How to Manage and Control Asbestos in the Workplace (2011).		
6E	An Acid Sulfate Soils Management Plan (ASSMP) (or equivalent) would be prepared as part of the CEMP in accordance with the ASSMAC Assessment Guidelines (1998), for areas identified as being of low or high risk i.e. works within close vicinity of the Georges River (Figure 13-2 of this EIS). In addition, a risk assessment quantifying the risks associated with the volumes of soil to be disturbed, the laboratory results from ASS testing undertaken, the end use of the materials and the proximity to sensitive environments is to be undertaken. All offsite disposal would be in accordance with the *NSW Waste Classification Guidelines Part 4: Acid Sulfate Soils* (2009).	**EP Risk 2020b**	A separate ASSMP has been prepared for the Site.
6F	The existing groundwater monitoring undertaken for the Proposal would continue. A GMP would be developed at the conclusion of remediation activities for the Proposal and included as part a Long-Term Environmental Management Plan (LTEMP) (to be prepared for approval by the Accredited Site Auditor and in association with the OEMP). The main purpose of the GMP would be to assist in the management of groundwater contamination (particularly PFAS impacts) at the site, and to minimise potential harm to human health and the environment. The GMP would achieve the following objectives: Establish whether the residual groundwater contamination plume is shrinking, stable, or increasing, and whether natural attenuation and/or migration is occurring according to expectations through line-of-evidence collection Provide appropriate groundwater investigation levels (GILs) for groundwater contaminants, in accordance with the National	**EMP 10**	A groundwater sampling strategy is included in **EMP 10**.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM). Should exceedances be identified, contingency plans for further investigations or remediation would be prepared. Provide appropriate trigger levels for key contaminants (where available), based on the receptor of interest and identified contaminants Serve as a compliance program, so that potential impacts to down-gradient receptors are identified before adverse effect occurs (relative to above objectives) Detect changes in environmental conditions (e.g. hydrogeologic, geochemical or other changes) that may reduce the efficacy of any natural attenuation processes or that could lead to a change in the nature of impact. Establish groundwater conditions (i.e. concentrations and/or trends) which indicated that groundwater monitoring could be reduced or ceased and the requirements of the GMP absolved. The monitoring program is to be undertaken for two years post operation of the Proposal to ensure a range of seasonal and river flow variations is assessed. At the completion of the two-year period, subject to analysis of results, consideration would be given to whether this monitoring is required to continue. The approach to PFAS management will be confirmed following further monitoring in consultation with, and the approval of, the NSW EPA Accredited Site Auditor.		
6H	At the conclusion of remediation works, a Remediation and Validation Report (RVR) is to be prepared for the Proposal to facilitate the Auditor's review of remediation and validation activities. The RVR is to document the remediation and validation activities completed within specific areas of the Proposal, including:	**JBS&G 2020**	Currently Stage 1 works are completed and have been completed in accordance with the RAP (Golder 2016a). The outcomes of the remediation are documented in the Validation Report (JBS&G 2020) under review by the Site NSW EPA Accredited Auditor.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	• Information relating to the materials used in the separation layers such as the soil types, geotextile materials, and sealant types etc. (if required) • An as-constructed plan of the site showing the locations, depths and materials of the separation layers installed at the site.		
6I	The existing site-wide Long-Term Environmental Management Plan (LTEMP), such as the one established at the completion of Early Works, is to be revised at the completion of the Proposal remediation activities to include protocols for ongoing maintenance and/or monitoring or any long term remedial/mitigation measures to be implemented following completion of the Site Audit Statement.	**This Plan**	Provides requirements to revise the LTEMP post construction.
6J	In order to accept fill material onto site, the following will be undertaken: • Material characterisation reports/certification showing that the material being supplied is VENM/ENM must be provided. • Each truck entry will be visually checked and documented to confirm that only approved materials that are consistent with the environmental approvals are allowed to enter the site. Only fully tarped loads are to be accepted by the gatekeeper. Environmental Assurance of imported fill material will be conducted to confirm that the materials comply with the NSW EPA Waste Classification Guidelines and the Earthworks Specification for the MPW site. The frequency of assurance testing will be as nominated by the Environmental assuror/auditor.	**Golder 2016 RAP** **EMP 7**	Both requirements for the acceptance of fill are stated within this section.
7A	The following measures would be included in the CEMP (or equivalent) to minimise hazards and risks: • Procedures for safe removal of asbestos	**CEMP**	This plan includes procedures for the safe removal of asbestos.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	• Provision for safe operational access and egress for emergency service personnel and workers would be provided at all times • An Incident Response Plan that would include a Spill Management Procedure.		The remaining two requirements are not the scope of this plan.
12A	The following mitigation measures would be implemented as part of the CEMP (or equivalent) for waste management: • Characterisation of construction waste streams in accordance with the NSW Waste Classification Guidelines • Management of any identified hazardous waste streams • Procedures to manage construction waste streams, including handling, storage, classification, quantification, identification and tracking • Mitigation measures for avoidance and minimisation of waste materials • Procedures and targets for re-use and recycling of waste materials.	**CEMP**	To be included in the CEMP

Appendix D

UNEXPECTED FINDS PROTOCOL

Construction

UNEXPECTED FINDS PROTOCOL

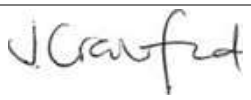
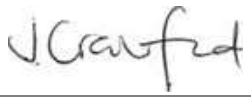
Moorebank Precinct West Stage 2

02 AUGUST 2019

SYDNEY INTERMODAL TERMINAL ALLIANCE

Moorebank Precinct East Stage 2

Unexpected Finds Protocol

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REVISIONS

Revision	Date	Description	Prepared by	Approved by
001	27/07/2018	Draft for review	AK	KP
002	14/09/2018	Second draft for client review	KN	JC
003	26/10/2018	Issued for ER Review	JC	JC
004	02/08/2019	Updated based on Conditions of Consent	KP	KP
005	27/08/2019	Updated to reflect the CFFMP	KP	KP

ACRONYMS AND DEFINITIONS

Acronym/Term	Meaning
BAR	Biodiversity Assessment Report
CFFMP	Construction Flora and Fauna Management Plan
CoCs	Conditions of Consent
DoTEE	Commonwealth Department of the Environment and Energy
EM	Contractor's Environment Manager
EP&A Act	*Environmental Planning and Assessment Act, 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
MPW	Moorebank Precinct West
OEH	NSW Office of Environment and Heritage
PE	Project Ecologist
PFAS	Per & Poly-Fluoroalkyl Substances
RCMM	Revised Compilation of Mitigation Measures
SIMTA	Sydney Intermodal Terminal Alliance
SSD	State significant development
UFP	Unexpected Finds Protocol

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1 INTRODUCTION

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 2 of the Moorebank Precinct West (MPW) Project (SSD 7709), which comprises the second stage of development under the MPW Concept Approval (SSD 5066). This Unexpected Finds Protocol (UFP) has been developed to manage the unexpected discovery of contamination within imported spoil, heritage items, threatened flora and fauna, and onsite contamination during the construction phase of Stage 2 of the Moorebank Precinct West (MPW) Project (the Project).

Within this protocol, a strategy has been established to demonstrate the Construction Contractor's approach to the management of unexpected discoveries.

1.1 Objectives and Targets

Refer to Table 1 for high level objectives and targets set for the Project for the management of unexpected discoveries.

Table 1 Objectives and Targets

Objective	Target	Timeframe	Accountability
To implement the unexpected finds protocol to minimise impacts of imported spoil	STOP works in 100% cases where potential contamination is identified in accordance with the Unexpected (Contamination within Imported Spoil) Finds Protocol (Appendix A)	Duration of works	Contractor's CM
To implement the unexpected finds protocol to minimise impacts on unknown heritage items	STOP works in 100% cases where potential heritage is identified in accordance with the Unexpected (Heritage) Finds Protocol (Appendix B)	Duration of works	Contractor's CM
To implement the unexpected finds protocol to minimise impacts on threatened flora and/or fauna species or threatened ecological communities that have not been previously recorded within the Project Site	Stop relevant works in 100% of cases where potential threatened flora and/or fauna species or threatened ecological communities are identified in accordance with the Unexpected (Biodiversity) Finds Protocol (Appendix C)	Duration of works	Contractor's CM
To implement the unexpected finds protocol to minimise the impacts of onsite contamination that has not previously been recorded within the Project site.	Stop relevant works in 100% of cases where potential contamination is identified in accordance with the Unexpected Finds (Onsite Contamination) Protocol (Appendix D)	Duration of works	Contractor's CM

2 ENVIRONMENTAL MANAGEMENT

2.1 Compliance Matrices

The Project is being delivered under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act, 1979* (EP&A Act). The Conditions of Consent (CoCs) include requirements to be addressed in this protocol and delivered during the Project. These requirements, and how they are addressed are provided within Table 2.

Table 2 Conditions of Consent (CoCs)

CoC	Requirement	Plan Section	How Addressed
B174	Unexpected Ordnance (UXO), Exploded Ordnance (EO) and Exploded Ordnance Waste (EOW) protocols must be prepared by an UXO contractor listed on the Defence Panel of suitably qualified UXO consultants and contractors.	Appendix D	This Protocol
B175	The CEMP required under **Condition C2** must include an Unexpected Finds Protocol(s) for, but not limited to, contamination, ordnances, Aboriginal sites, non-indigenous heritage and flora and fauna.	Appendix B	This Protocol

The Revised Compilation of Mitigation Measures (RCMMs) were prepared as part of the Response to Submissions (Arcadis 2017). A list of the RCMMs as relevant to the Project and how they have been complied within this protocol are provided in Table 3.

Table 3 Revised Compilation of Mitigation Measures (RCMMs)

RCMM	Requirement	Document Reference
6A	The CEMP would identify the actions to be taken should additional contamination be identified during the development of the site (i.e. an unexpected finds protocol), and will address REMM items 8H, 8T, 8U, 8V and 8W (of the MPW Concept Approval (SSD 5066)).	Appendix D
9E	An unexpected finds procedure would be included in the ACHAR and in place for the construction phase of the Proposal.	Appendix B
9G	Consultation with RAPs would continue throughout the life of the Proposal, as necessary. Ongoing consultation with RAPs would take place throughout the reburial of retrieved artefacts and in the event of the discovery of any unexpected Aboriginal objects.	Appendix A Appendix B
10C	An unexpected finds protocol (or equivalent) would be included within the CEMP. If unexpected finds are identified during works, a suitably qualified archaeological consultant would be engaged to assess the significance of the finds and the NSW Heritage Council notified. In this instance, further archaeological work or recording may be required.	Appendix B

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval for the MPW Concept was granted by the Commonwealth Department of the Environment and Energy (DoTEE) in September 2016 (No. 2011/6086). This approval was provided for the impact of the MPW Project on listed threatened species and communities (Sections 18 and 18A of the EPBC Act) and Commonwealth action (Section 28 of the EPBC Act).

The construction and operation of the Project has been designed to be consistent with the EPBC Act Approval conditions, where relevant. EPBC Act Approval conditions for the Project include specific conditions

and commitments that are required to be addressed in this UFP. These conditions relevant to this UFP are identified below in Table 4.

Table 4 Commonwealth Approvals

Commonwealth	Requirement	Document Reference
8	Sections of the CEMP and OEMP relating to contamination and soils must be prepared by a suitably qualified expert and must: … (d) in relation to management of PFAS: … ii) detail implementation and operational procedures, appropriate to the risk posed by any contamination, including: … • a contingency action plan for unexpected PFAS contaminant discoveries	Refer to the Moorebank Precinct West – Early Works Per & Poly-Fluoroalkyl Substances (PFAS) Management Plan

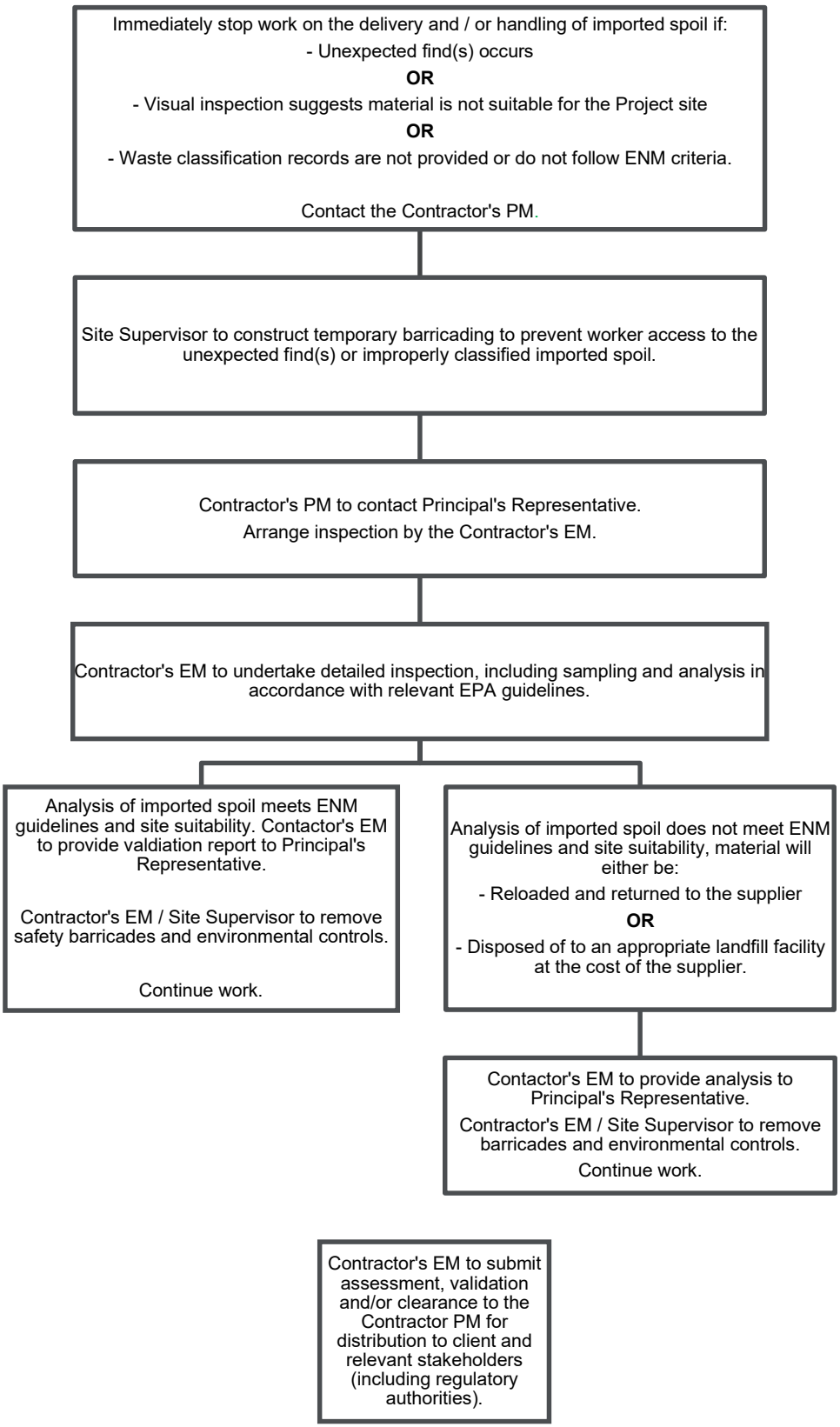
2.2 Unexpected Finds Protocols

Specific protocols for the discovery of unexpected finds have been developed for potential:

- Contamination within imported spoil
- Aboriginal and non-Aboriginal finds
- Threatened flora and/or fauna species or threatened ecological communities
- Onsite contamination including ordnance.

Each of these specific protocols is included in the following appendices.

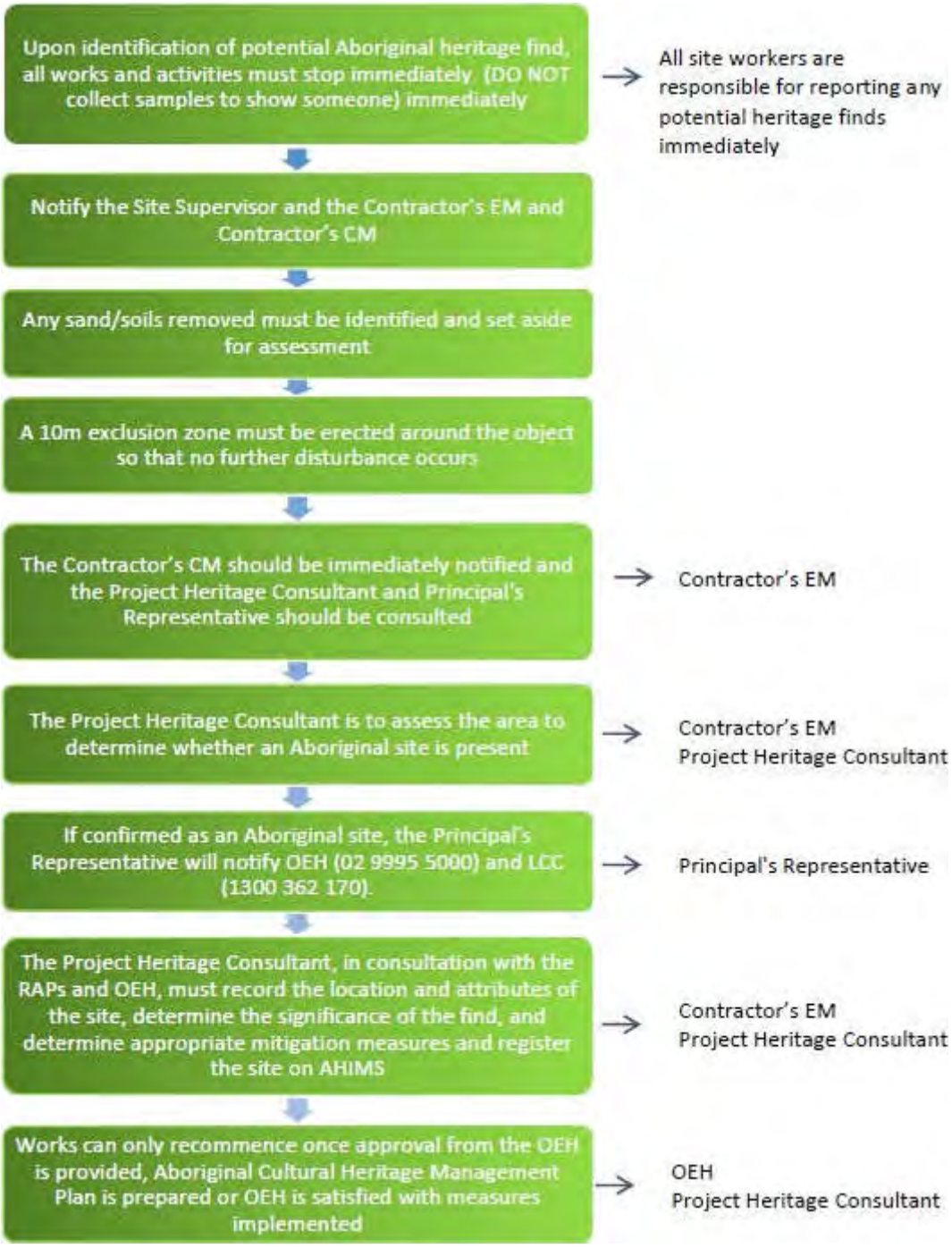
APPENDIX A UNEXPECTED (CONTAMINATION WITHIN IMPORTED SPOIL) FINDS PROTOCOL


Immediately stop work on the delivery and / or handling of imported spoil if:
- Unexpected find(s) occurs
OR
- Visual inspection suggests material is not suitable for the Project site
OR
- Waste classification records are not provided or do not follow ENM criteria.
Contact the Contractor's PM.
Site Supervisor to construct temporary barricading to prevent worker access to the unexpected find(s) or improperly classified imported spoil.
Contractor's PM to contact Principal's Representative.
Arrange inspection by the Contractor's EM.
Contractor's EM to undertake detailed inspection, including sampling and analysis in accordance with relevant EPA guidelines.
Analysis of imported spoil meets ENM guidelines and site suitability. Contactor's EM to provide valdiation report to Principal's Representative.
Contractor's EM / Site Supervisor to remove safety barricades and environmental controls.
Continue work.
Analysis of imported spoil does not meet ENM guidelines and site suitability, material will either be:
- Reloaded and returned to the supplier
OR
- Disposed of to an appropriate landfill facility at the cost of the supplier.
Contactor's EM to provide analysis to Principal's Representative.
Contractor's EM / Site Supervisor to remove barricades and environmental controls.
Continue work.
Contractor's EM to submit assessment, validation and/or clearance to the Contractor PM for distribution to client and relevant stakeholders (including regulatory authorities).

APPENDIX B UNEXPECTED (HERITAGE) FINDS

Unexpected (Heritage) Finds Protocol

Aboriginal Heritage



Examples of Potential Unexpected Aboriginal Finds

It is highly unlikely that any Aboriginal artefacts will be identified on the site due to the historical disturbance of the area. However, the most likely finds are isolated finds such as flaked stone tools.

Typical characteristics of flaked stone tools include:

- Sharp edges.
  - Retouch along one or more edges.
  - Stone rich in silica.

  - Stone type often different to the natural rock in the area.
- Flakes
  - Usually less than 50 mm long.
  - A ‘striking platform’ visible.
  - Impact point often present on the striking platform.
  - A ‘bulb of percussion’ often present below the striking platform.
  - May have been shaped into a recognisable tool form, such as a point or scraper.
- Cores
- May be fist-sized or smaller.
- May have one or more scars where flakes have been removed.

It is noted that not all features can be seen on each stone tool and some require an experienced eye to identify them. Breakage can remove key features.

Skeletal Remains



Non-Aboriginal Heritage



Note: In the context of this UFP, an unexpected find is defined as a previously unknown heritage item or evidence of heritage value. It does not include uncovering findings within previously identified potential archaeological deposits.

APPENDIX C UNEXPECTED (BIODIVERSITY) FINDS

Unexpected (Biodiversity) Finds protocol

Purpose

This Unexpected Finds Protocol explains the actions and measures to be implemented if any threatened flora and/or fauna species or threatened ecological communities that have not been previously recorded within the Project Site (as identified in the documents outlined in CoC A3) are identified during construction.

Training

All personnel undertaking construction activities within the Project site will be inducted on the identification of known and potential threatened species and ecological communities occurring on site, and will be trained in this protocol through Toolbox Talks or a site induction.

Protocol

Upon detection of a threatened species or ecological community during construction activities, the following steps must be followed.

1. **STOP ALL WORK** in the vicinity of the find. Immediately notify the Contractor's Environment Manager (Contractor's EM) who will notify the Project Ecologist (PE) and Principal's Representative. The project ecologist must confirm the presence of the threatened species.
2. **EXCLUSION ZONE.** In consultation with the PE, create a buffer zone/ exclusion zone around the find
3. **EXTERNAL NOTIFICATION.** Principal's Representative to notify OEH of previously unidentified species
4. **ASSESS IMPACT**. An assessment is to be undertaken by the Contractor's EM, PE and Principal's Representative in consultation with OEH to identify the flora and/or fauna species level, the likely impact to them and appropriate management options, such as re-location measures.
5. **OBTAIN APPROVALS**. Obtain any relevant licences, permits or approvals required if the threatened species / ecological community is likely to be significantly impacted. Consultation with OEH must be completed for any proposed amendments to the location or reclassification of threatened species, populations and ecological communities as identified in the updated BAR.
6. **RECOMMENCE WORKS**. Construction works may recommence once the Contractor's EM has:
    a. Obtained approvals as required, and
    b. Confirmed that all corrective actions and additional mitigation measures have been implemented.
7. **UPDATE PLANS AND PROCEDURES**. The Contractor's EM must ensure that the threatened species / ecological community is included in subsequent site plans and/or sensitive area drawings, inductions and Toolbox Talks. The Contractor's EM must provide information to enable an update of ecological monitoring and/ or biodiversity offset requirements

APPENDIX D UNEXPECTED (ONSITE CONTAMINATION) FINDS PROTOCOL

Potential Site Hazards











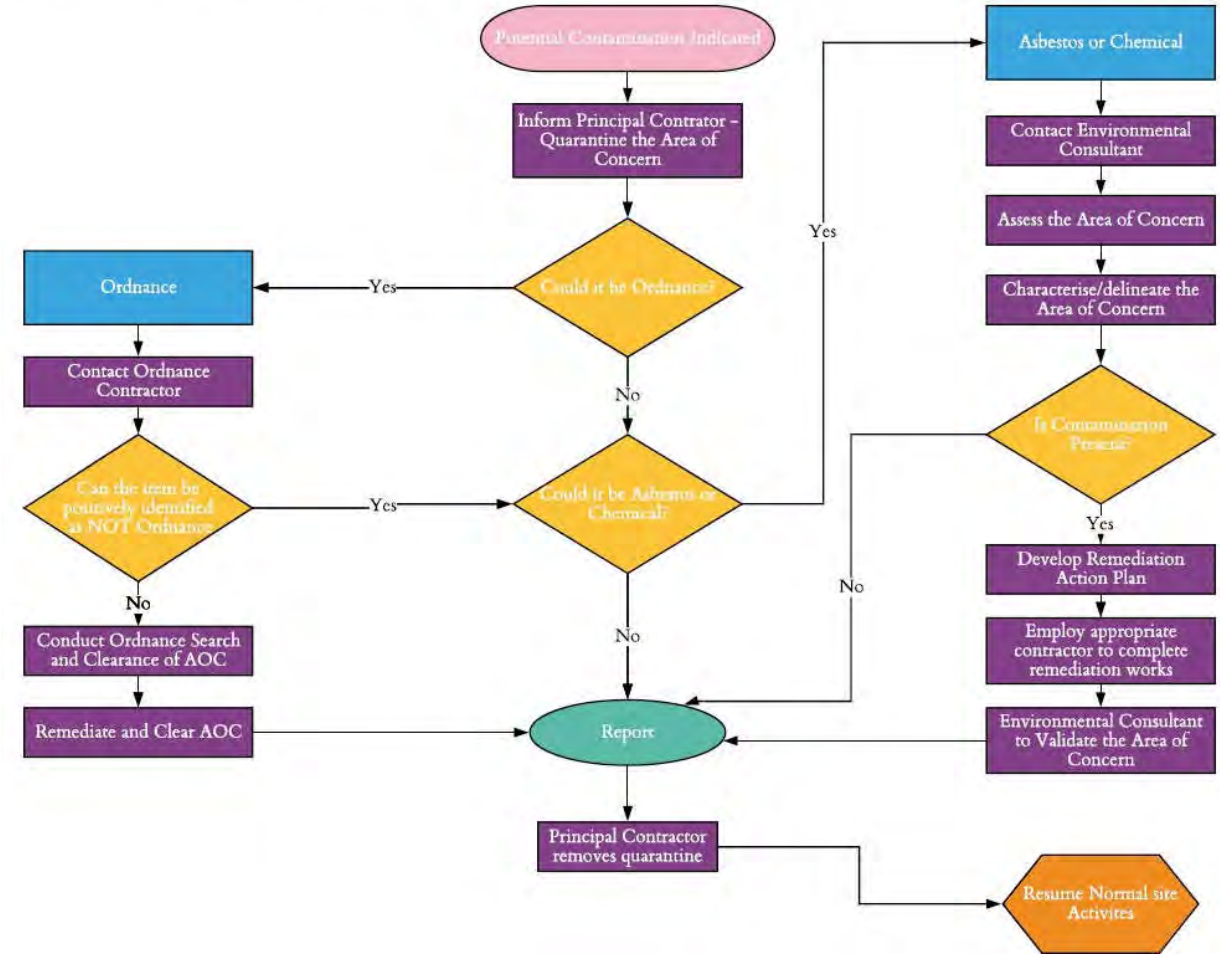


If you SEE or SMELL anything unusual

STOP WORK & contact Site Foreman

Do not restart work before the area has been investigated and cleared by an Environmental Consultant

Unexpected Finds Protocol (UFP)



Operation

8D – Process Report Form

Customer:		Report no:	
Report Title:			
Project Number:			
Project Description:			
Date Opened:		Updated:	
Team Leader:			
Team Members: (D1)			

Problem Description (D2)

Immediate Containment Action (D3)	Responsibility	Effective Date(s):

Verification of Containment Action (D3)	By Whom	Date(s):

Root Causes (D4)		% Contribution

Permanent Corrective/Preventative Action (Short and/or Long Term) (D5)	Responsibility	Effective Date(s):

Verification of Permanent Corrective/Preventative Action (D6)	By Whom	Date(s):

Prevent Recurrence / Lessons Learned (D7)

Signature & Congratulate Team (D8)		
Team Leader:		**Quality Systems Manager**
Date:		*for external customers*
		Other signatures - nominate as required **Date:**

WI_007

Appendix E

REPORTING REGISTERS

Appendix F

Table F-1: Incidents and Non-conformances Register

Name of Person Who Raised Issue	Date Raised	Category (Int Audit, NCR, Injury/Incident, System Imp, Inspection)	Details of Issue	Has it already been resolved? How?	What action was or will be taken to prevent recurrence of the problem or improve the system?	Responsibility	Verification Results: Action verified as effective? Verification outcomes	Open / Closed?	Name & date when action veified as effective

Appendix F

Table F**-2: Complaints Register**

Name of Person Who Complained	Date Raised	Contact details - address	Contact details - Phone	Contact details - email	Details of Complaint	Action taken to prevent recurrence of the problem or improve the system?	Responsibility	Verification Results: Action verified as effective? Verification outcomes	Open / Closed?	Name & date when action veified as effective

Appendix F
GROUNDWATER LEVELS

Table H1 - Groundwater Gauging and Field Parameters

Well ID	Date	Easting	Northing	Well RL (AHD)	Standing Water Level (mBTOC)	Reduced Water Level (AHD)	Temp.	Electrical Cond.	DO	Redox	pH	Salinity	TDS	Intake Depth (m BTOC)	Comments
MW5001	11.04.2018	307532.7355	6241251.084	14.127	10.376	3.751	21.9	837	2.19	181.7	5.12	0.44	578.5	10.7	Clear, no sheen, no odour
MW5002	11.04.2018	307658.4459	6241109.66	15.752	10.642	5.11	22.2	4515	2.88	212.7	4.73	2.56	3100.5	11	Brown, no sheen, no odour
MW5003	11.04.2018	307733.8721	6240987.541	16.299	9.873	6.426	22.7	11468	-	168.2	4.76	6.86	7800	10.5	Brown, no sheen, no odour
MW5004	11.04.2018	307723.5459	6240960.603	16.197	9.59	6.607	27.6	8638	-	136.3	5.37	4.56	5375	9.9	Clear, slightly orange / brown, minor organic odour
MW5005	11.04.2018	307610.8555	6241019.867	16.166	11.034	5.132	23.9	6577	0.98	174.2	4.7	3.68	4368	11.5	Clear, minor brown sediment, no sheen, no odur
MW5006	11.04.2018	307740.1577	6240724.447	17.184	9.031	8.153	25.7	18950	3.09	187.9	5.54	11.07	12168	9.75	Clear, no sheen, no odour
MW5007	11.04.2018	307645.4289	6240773.834	15.765	9.329	6.436	22	17028	4.43	1860	4.93	10.7	11732.5	9.7	Clear, minor light brown sediment, no sheen, no odour
MW7003A	18.06.2018	307617.059	6240845.306	15.536	10.275	5.261	18.7	3610	3.11	158.5	5.19	1.91	2346.5	14.11	Clear / light brown, no sheen, no odour
MW7003B	18.06.2018	307615.406	6240843.667	15.631	10.416	5.215	20.3	30.8	6.02	117.8	5.7	0.02	20.15	20.1	Clear / light brown, no sheen, no odour
Minimum Value						3.751	18.7	30.8	0.98	117.8	4.7	0.02	20.15		
Maximum Value						8.153	27.6	18950	6.02	1860	5.7	11.07	12168		
Average						5.79	22.78	7961.53	3.24	355.26	5.12	4.64	5276.57		

Appendix G
CONSULTATION LOG

Consultation Log – Long Term Environmental Management Plan (LTEMP) – Lot 6, 7 and 12							
Item	**Original Version**	**Date**	**Stakeholder**	**Communication Method**	**Comments**	**Changes**	**Finalised Version**
1	-	12.03.2021	Qube / Tactical	N/A	Issued to Client (v1)	N/A	v1
2	v1	18.05.2021	Enviroview	*IA 301-2020-1_03 RE: Site Audit Interim Advice 03 – Review of the Woolworths Audit Area Long-Term Environmental Management Plan (LTEMP) and the revised Woolworths Audit Area Validation Summary reports,* dated 18 May 2021.	a) Site boundary confirmation. b) Section 4, Table 4. Enforcement. c) Appendix B – EMPs. d) Section 4.5 Reuse of PFAS Impacted Soils unlikely. e) Removal of sections not relevant to the proposed development.	a) Section 1.3 amended. b) Section 4 amended. c) Appendix B – EMPs amended. d) Section 4.5 amended. e) Amended.	v2
3	v1	04.06.2021	Tactical	*Email (04.06.2021)*	a) Removal of Woolworths b) Amendments to Table 4	a) Amended b) Amended	v2
4	v1	08.06.2021	Tactical	*Correspondence email – Qube/Auditor/MIC Catchup email summary (08.06.2021).*	a) Removal of masterplan from LTEMPs. b) Table 4 acceptance. c) Defined responsibilities.	a) Amended b) Noted c) Amended	v2
5	v1	18.06.2021	Qube / Tactical	N/A	Issued to Client (v2)	N/A	v2
6	v2	08.07.2021	Enviroview	*IA_301-2020-1_04R1_RE: Site Audit Interim Advice 03 – RE: Site Audit Interim Advice 04R1 – Review of the revised (v2) Woolworths Audit Area Long-Term Environmental Management Plan (LTEMP),* dated 8 July 2021.	a) Section 1.3 – Enforcement of LTEMP. b) Section 4, Table 4. Enforcement. c) Minor changes.	a) See Item 7 b) See Item 7. c) Amended.	v3

Consultation Log – Long Term Environmental Management Plan (LTEMP) – Lot 6, 7 and 12							
Item	**Original Version**	**Date**	**Stakeholder**	**Communication Method**	**Comments**	**Changes**	**Finalised Version**
7	v2	24.08.2021	Tactical	*Letter from Lawyers*	Letter on enforcement of the LTEMP.	Section 1 and Table 4 amended.	v3
8	v2	10.09.2021	Qube / Tactical	N/A	Issued to Client (v3)	N/A	v3
9	v3	05.10.2021	JBS&G	*Email – JBS&G email to Tactical (05.10.2021)*	Provision of Technical Memo: *JBS&G 51997 – 136836 (Rev 2),* dated 19 May 2021. Email: *"It is recommended that it be confirmed with the Auditor that the use of asphalt paving as a isolating layer/management measure is appropriate and consistent with the risk assessment, and that subsequently asphalt paving as an isolating layer be explicitly incorporated into future LTEMPs applying to MPW."*	Section 4.5.	v4
10	v3	22.10.2021	Tactical	*Email*	a) Remove Letter from Lawyers (Appendix G) and all references. b) Remove enforcement and reference to B172 in combined Section 1.3 and 1.4.	a) Removed b) Amended	v4
12	v4	09.11.2021	Qube /Tactical	N/A	Issued to Client (v4)	N/A	v4
13	v4	01.12.2021	Qube /Tactical	*Email*	Insert: *"This LTEMP will be implemented in compliance with Condition C39 of the MPW Stage 3 Consent (SSD 10431)."* Section 1.3 and 4.3	Section 1.3 and 4.3	v5
14	v5	08.12.2021	Qube /Tactical	N/A	Issued to Client (v5)	N/A	v5

Site Audit Statement

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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. 0301-2020-1

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	James Davis				
Company	Enviroview Pty Ltd				
Address	PO Box 327				
	GLADESVILLE	NSW	Postcode	2110	
Phone	0467 375 481				
Email	james.davis@enviroview.com.au				

Site details

Address	Parts of proposed Lots 6, 7, and 12			
	Moorebank Intermodal and Logistics Park			
	Moorebank Ave			
	MOOREBANK	NSW	Postcode	2170

Property description

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

Part Lot 1 DP 1197707 (current property description)

Parts of proposed Lots 6, 7, and 12 within the subdivision plan (see attached plan)

Local government area	Liverpool City Council
Area of site (include units, e.g. hectares)	26 Ha (approx.)
Current zoning	IN1 – General Industrial

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	Ian Meares
Company	Moorebank Intermodal Company Ltd
Address	Suite 3, Level 33,
	1 O'Connell Street
	SYDNEY NSW Postcode 2000
Phone	02 8265 5600
Email	Ian.Meares@micl.com.au

Contact details for contact person (if different from above)

Name	Mark Howley – Tactical Project Management Pty Ltd
Phone	02 8907 0700
Email	mhowley@tacticalgroup.com.au

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)

Development Consent SSD 7709 determined by The Independent Planning Commission on the 11 November 2019 (Condition B171)

❑ 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: Commercial/Industrial land use

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:

EP Risk Pty Ltd and JBS&G Australia Pty Ltd

Titles of reports reviewed:

JBS&G Australia Pty Ltd (JBS&G). *Moorebank Precinct West (MPW): Woolworths Audit Area Validation Summary.* (Report Ref.: 51997-134422 L362_Rev-C). 19 February 2021. (JBS&G, Feb 2021) [The Woolworths Site Audit Site Validation Report.]

EP Risk. *Long-Term Environmental Management Plan, Lot 6, 7, and 12, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: EP1489.007.v5). 8 December 2021. (EP Risk, Dec 2021) [The Woolworths Site Audit Site LTEMP].

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

Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, IMEX Terminal Site, Moorebank Precinct East, Sydney Intermodal, 402 Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 600099_0301-1613-2). 15 August 2019. (Enviroview [James Davis Site Auditor], Aug 2019a) SAS # 0301-1613-2

Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, Stage 1 Early Works (Land Preparation Works – Demolition and Remediation), Moorebank Precinct West, Moorebank Intermodal and Logistics Park (MLP), Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 600099_0301-1613-7). 18 September 2020. (Enviroview [James Davis Site Auditor], Sept 2020) SAS # 0301-1613-7

Enviroview Pty Ltd [James Davis Site Auditor]. *Site Audit Report and Site Audit Statement, Stage 2 Works – Completion of Remediation Pre-Construction (Condition B169 Audit), Moorebank Precinct West, Moorebank Intermodal and Logistics Park (MLP), Moorebank Avenue, Moorebank, NSW.* (Report Ref.: 600099_0301-2014). 11 November 2020. (Enviroview [James Davis Site Auditor], Nov 2020) SAS # 0301-2014.

Site audit report details

Title	Site Audit Report,
	Parts of proposed Lots 6, 7, and 12
	Moorebank Intermodal and Logistics Park
	Moorebank, NSW
Report no. 600099_0301-2020-1	Date 14 February 2022

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):~~

EMP details

Title	*Long-Term Environmental Management Plan Lot 6, 7, and 12, Moorebank Precinct West.*
Author	EP Risk Pty Ltd
Date	8 December 2021
No. of pages	144

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 Long-Term Environmental Management Plan (LTEMP) for Lot 6, 7, and 12 (also known as the Woolworths Audit Area LTEMP) enables management of residual contamination issues at the site during Stage 2, construction works and long-term.

Description of the nature of the residual contamination:

Limited PFAS contamination remains at depth within the Woolworths Audit Area site.

Summary of the actions required by the EMP:

The plans will guide the management of the residual contamination at the site that may be encountered during development and infrastructure works during Stage 2 approved works, construction, and/or landscaping works and the long-term operation of the site. The plans detail the management requirements to address the residual contamination – that primarily consist of maintaining the engineered fill in place across the site.

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

The requirement to have the LTEMP is a condition of the Stage 2 Development Consent for the construction and operation of the site (SSD 7709). Implementation of the LTEMP for the duration of construction and operation of the development is a condition of the Stage 3 MPW development consent (SSD 10431).

How there will be appropriate public notification:

This SAS with the EMP attached will be provided to Liverpool City Council and recorded on the s 10.7 planning certificate in accordance with guidelines to State Environmental Planning Policy No.55.

Overall comments:

Section B

Purpose of the plan[4] 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

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

❑ 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):

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. 0301

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 14 February 2022

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

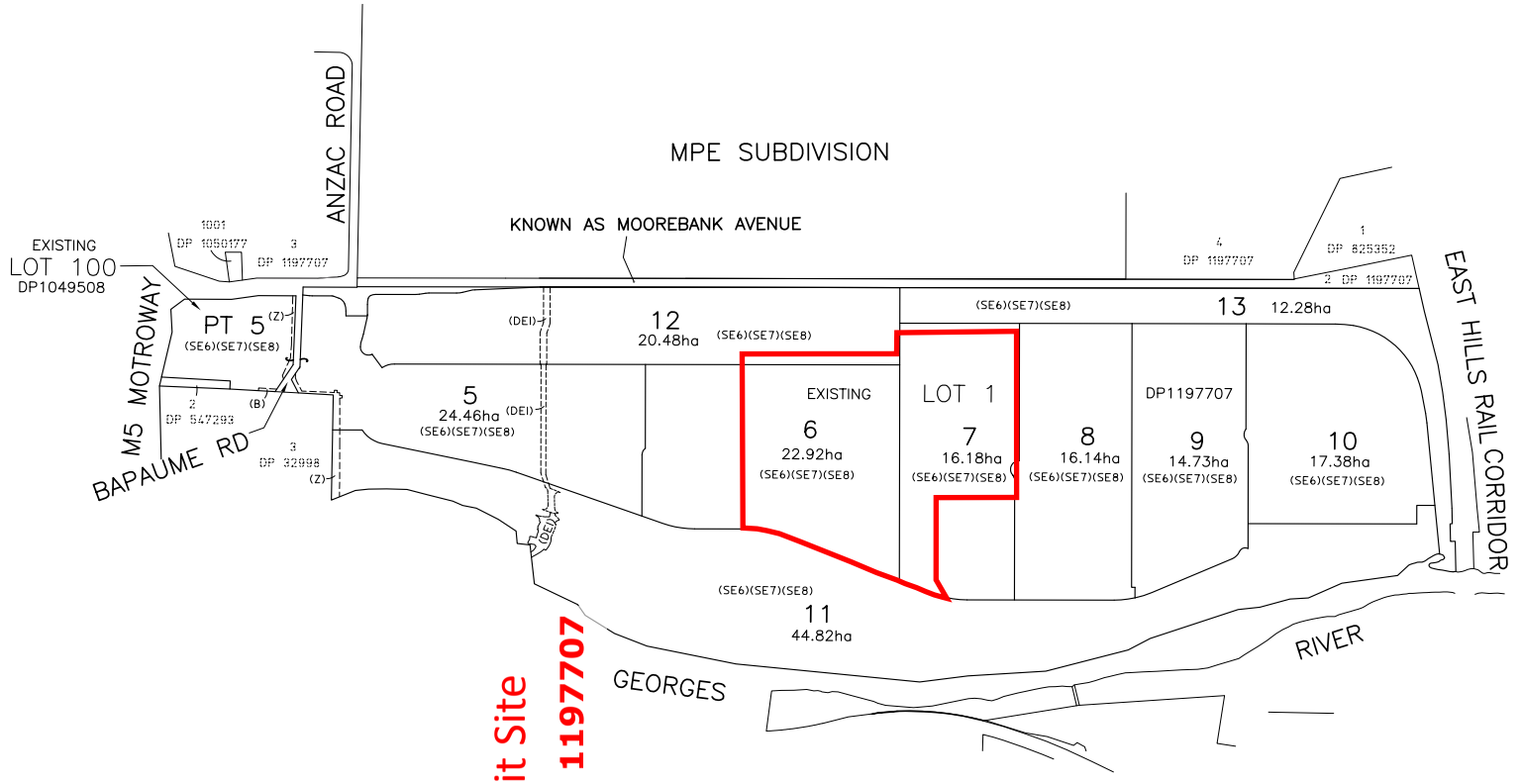
  AND

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

PLAN FORM 2 (A2) WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION ePlan Sheet 01 of 03 sheets

STAGED PLAN OF PROPOSED SUBDIVISION OF LOT 1 DP1197707 AND LOT 100 DP1049508

M.G.A. NORTH (ZONE 56) SCIMS



(B) EASEMENT FOR DRAINAGE OF WATER 6 WIDE (DP1049508)
(DEI) EASEMENT FOR DRAINAGE OF WATER
(SE6) EASEMENT FOR SERVICES (WHOLE OF LOT)
(SE7) EASEMENT FOR FUTURE SERVICES (WHOLE OF LOT)
(SE8) EASEMENT FOR ACCESS (WHOLE OF LOT)
(Z) EASEMENT FOR OVERHEAD POWERLINES VARIABLE WIDTH (DP1125932)

Surveyor: GREGORY K OXLEY, LandPartners PTY LTD, PO BOX 1144 DUNDAS 2117 Date of Survey: 00/00/2019 Surveyor's Ref: SY073909.013.2.1	PLAN OF SUBDIVISION OF LOT 1 IN DP1197707 AND LOT 100 DP1049508	LGA: LIVERPOOL Locality: MOOREBANK Subdivision No: XXX Lengths are in metres. Reduction Ratio 1:7500	Registered	DP

10 20 30 40 50 Table of mm 90 100 110 120 130 140

SAS Figure
Date: 14 Feb 2022
Drawn By: CTA
Checked: JRAD
ENVIROVIEW PTY LTD

Site Audit Area - Site Audit Statement 0301-2020-1
Part Lot 1 DP 1197707 (Parts of Proposed Lots 6, 7, and 12)
Moorebank Intermodal and Logistics Park, MOOREBANK, NSW

ENVIROVIEW



Long-Term Environmental Management Plan

Lot 6, 7 and 12, Moorebank Precinct West,
400 Moorebank Avenue, Moorebank, NSW

Prepared for: Qube c/- Tactical
EP1489.007_v5 8 December 2021

APPROVED COMPANY ISO 9001 Quality Management Systems QMS Certification Services

APPROVED COMPANY AS/NZS 4801 Occupational Health & Safety Management Systems QMS Certification Services

APPROVED COMPANY ISO 14001 Environmental Management Systems QMS Certification Services

EP RISK

Long-Term Environmental Management Plan

Lot 6, 7 and 12, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW

Qube Property Management Services Pty Ltd c/o Tactical Group Pty Ltd
Via email: mhowley@tacticalgroup.com.au

8 December 2021

Our Ref: EP1489.007_v5

LIMITATIONS

This Long-Term Environmental Management Plan was conducted on the behalf of Qube Property Management Services Pty Ltd c/o Tactical Group Pty Ltd for the purpose/s stated in **Section 1**.

EP Risk has prepared this document in good faith but is unable to provide certification outside of areas over which EP Risk had some control or were reasonably able to check. The report also relies upon information provided by third parties. EP Risk has undertaken all practical steps to confirm the reliability of the information provided by third parties and do not accept any liability for false or misleading information provided by these parties.

It is not possible in a Long-Term Environmental Management Plan to present all data, which could be of interest to all readers of this report. Readers are referred to any referenced investigation reports for further data.

Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

All work conducted and reports produced by EP Risk are based on a specific scope and have been prepared for Qube Property Management Services Pty Ltd c/o Tactical Group Pty Ltd and therefore cannot be relied upon by any other third parties unless agreed in writing by EP Risk.

The report(s) and/or information produced by EP Risk should not be reproduced and/or presented/reviewed except in full.

QUALITY CONTROL

Version	Author	Date	Reviewer	Date	Quality Review	Date
v1	A. Thomson	12.03.2021	P. Simpson	12.03.2021	P. Simpson	12.03.2021
v2	A. Thomson	18.06.2021	P. Simpson	18.06.2021	P. Simpson	18.06.2021
v3	A. Thomson	10.09.2021	P. Simpson	10.09.2021	P. Simpson	10.09.2021
v4	A. Thomson	09.11.2021	P. Simpson	09.11.2021	P. Simpson	09.11.2021
v5	A. Thomson	08.12.2021	P. Simpson	08.12.2021	P. Simpson	08.12.2021

DOCUMENT CONTROL

Version	Date	Reference	Submitted to
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v3	10.09.2021	EP1489.007_Qube_MPW_Lot 6, 7, 12_LTEMP_v3	Qube c/- Tactical
v4	09.11.2021	EP1489.007_Qube_MPW_Lot 6, 7, 12_LTEMP_v4	Qube c/- Tactical
v5	08.12.2021	EP1489.007_Qube_MPW_Lot 6, 7, 12_LTEMP_v5	Qube c/- Tactical

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Appendix G Consultation Log

Abbreviations and Terminology		
Abbreviations	**Term**	**Definition**
AF	Asbestos Fines	AF includes free fibres, small fibre bundles and small fragments of bonded ACM that pass through a 7 mm x 7mm sieve. Equivalent to "friable" asbestos in SafeWork NSW *Code of Practice: How to Manage and control asbestos in the workplace* (SafeWork NSW 2019).
AHD	-	Australian Height Datum
Ammunition	Ammunition	A device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological, or chemical material for use in connection with defence or offence including demolitions. Certain ammunition can be used for training, ceremonial, or other non-operational purposes.
AMP	Asbestos Management Plan	See **(Golder 2016b).**
AOC	Area of Concern	An area identified as containing potential contamination. Can also be referred to as Quarantined Area.
As	-	Arsenic
BGS	-	Below Ground Surface
BioBanking Agreement Area	See also Offset Area	Vegetated areas which are to be conserved and no construction to occur.
Bonded ACM	Bonded Asbestos Containing Materials	Bonded ACM comprises ACM, which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin. This term is restricted to material that cannot pass a 7 mm x 7mm sieve. Equivalent to "non-friable" asbestos in SafeWork NSW *Code of Practice: How to Manage and control asbestos in the workplace* (SafeWork NSW 2019).
BTEX	-	Benzene, Toluene, Ethylbenzene and Xylenes
Cd	-	Cadmium
CLM	-	Contaminated Land Management
CMP	Contamination Management Plan	EP Risk 2020
CoC	Conditions of Consent	Conditions of Consent SSD 5066
Conservation Area	Same as BioBanking Area	See BioBanking Area
Construction Area	-	Extent of construction works, namely areas to be disturbed during the construction of the Site.
COPC	-	Contaminants of Potential Concern
Cr	-	Chromium
CSM	-	Conceptual Site Model
Cu	-	Copper
DBYD	-	Dial Before You Dig
DNAPL	-	Dense Non-Aqueous Phase Hydrocarbons
DPI&E	-	NSW Department of Planning, Industry and Environment
DQI	-	Data Quality Indicator
DQO	-	Data Quality Objective
DSI	-	Detailed Site Investigation
DUXOP	Defence Unexploded Ordnance Panel	The panel of contractors and consultants from whom the Department of Defence selects remembers for UXO related tasks

Abbreviations and Terminology		
Abbreviations	**Term**	**Definition**
EEC	Endangered Ecological Communities	Vegetated areas inaccessible during SSD 5066 development works. Located within both the Construction and Offset Areas.
EIL	-	Ecological Investigation Level
EO	-	Explosive Ordnance
EOW	-	Exploded Ordnance Waste
EPA	-	Environment Protection Authority
ESL	-	Ecological Screening Level
FA	Fibrous Asbestos	FA comprises friable asbestos material and includes severely weather cement sheet, insulation products and woven asbestos material. Defined as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. Equivalent to "friable" asbestos in SafeWork NSW *Code of Practice: How to Manage and control asbestos in the workplace* (SafeWork NSW 2019).
Ha	-	Hectares
HCB	-	Hexachlorobenzene
Hg	-	Mercury
HIL	-	Health Investigation Level
HSL	-	Health Screening Level
IMEX	-	Import-Export
IMT	-	Intermodal Terminal
Induction	Site Specific Induction	The *Work Health and Safety Act 2011* (WHS Act) main objective is to secure the health and safety of workers and workplaces. A site-specific induction is necessary for all workers on the Site to understand the site-specific risks.
LGA	-	Local Government Area
LNAPL	-	Light Non-Aqueous Phase Hydrocarbons
Metallic Debris	Metallic Debris	Debris comprising metal (ferrous) items. May include fragments of former ordnance items.
MIC	-	Moorebank Intermodal Company
MPE Project	Moorebank Precinct East Project	The MPE Intermodal Terminal Facility, including a rail link and warehouse and distribution facilities at Moorebank (eastern side of Moorebank Avenue) as approved by the Concept Plan Approval (MP10_0913) and the MPE Stage 1 Consent (14_6766).
MPE Stage 1 Site	Moorebank Precinct East Stage 1 Site	Moorebank Precinct East Stage 1 Site, including the MPE Stage 1 Site and the Rail Corridor, i.e. the area for which approval (construction and operation) was sought within the MPE Stage 1 Proposal EIS.
MPE Stage 2 Site	Moorebank Precinct East Stage 2 Site	Stage 2 of the MPE Concept Plan Approval including the construction and operation of 300,000m^2 of warehousing and distribution facilities on the MPE Site and the Moorebank Avenue upgrade within the Moorebank Precinct.
MPW Project	Moorebank Precinct West Project	The subject of this LTEMP. The MPW Intermodal Terminal Facility as approved under the MPW Concept and Early Works Consent (SSD_5066), MPW EPBC Approval (No. 2011/6086) and MPW Stage 2 Consent (SSD_7709).
MPW Site	Moorebank Precinct West Site	The site which is the subject of the MPW Concept and Early Works (Stage 1) Consent, MPW EPBC Approval and MPW

Abbreviations and Terminology		
Abbreviations	**Term**	**Definition**
		Stage 2 SSD 7709. The MPW Site does not include the rail link as referenced in the MPW Concept Consent or MPE Concept Plan Approval. For the purpose of this LTEMP, this excludes the Site (see **the Site**)
Ni	-	Nickel
OCP	-	Organochlorine Pesticides
Offset Area	BioBanking Agreement Area	Vegetated areas which are to be conserved and no construction to occur.
Ordnance	Ordnance	Any item of potential military origin. See Ammunition, Category A and B Ordnance Item and UXO.
PAH	-	Polycyclic Aromatic Hydrocarbons
Pb	-	Lead
PCB	-	Polychlorinated Biphenyls
PFAS	Per- and polyfluoroalkyl substances	Per- and polyfluoroalkyl substances are a diverse group of compounds resistant to heat, water, and oil. These chemicals are persistent, and resist degradation in the environment. They also bioaccumulate, meaning their concentration increases over time in blood and organs.
PFOS, PFOA and PFHxS	Perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorohexane sulfonate (PFHxS)	Man-made chemicals belonging to the group known as PFAS. See PFAS.
PSH	-	Phase Separated Hydrocarbon
PSI	-	Preliminary Site Investigation
QA/QC	-	Quality Assurance and Quality Control
QUBE	QUBE Holdings Ltd	Owners of the Moorebank Precinct
RAE	-	Royal Australian Engineers
Rail Corridor	-	Area defined as the 'Rail Corridor' within the MPE Concept Plan Approval.
Rail Link	-	The rail link from the South Sydney Freight Line to the MPE IMEX Terminal, including the area on either side to be impacted by the construction works included in MPE Stage 1.
RPD	-	Relative Percentage Difference
SAQP	-	Sampling Analysis and Quality Plan
SIMTA	-	Sydney Intermodal Terminal Alliance - a consortium comprising Qube and Aurizon Holdings.
The Site	-	Part of the proposed subdivision of Lot 1 in DP1197707 as partial Lots 6,7 and 12 (The Site).
SME	-	School of Military Engineering.
SMP	-	Site Management Plan.
SSD	-	State Significant Development.
SSFL	-	South Sydney Freight Line.
SVOC	-	Semi Volatile Organic Compounds.
Tactical	Tactical Group	Project Managers of the Moorebank Precinct for Qube.
MAUW	Moorebank Avenue Upgrade Works	The extent of construction works to facilitate the construction of the Moorebank Avenue upgrade. Raising of the vertical alignment of Moorebank Avenue for 1.5 kilometres of its length by approximately two metres, from

Abbreviations and Terminology		
Abbreviations	**Term**	**Definition**
		the northern boundary of the MPE Site to approximately 120 metres south of the MPE Site. The Moorebank Avenue upgrade also includes upgrades to intersections, ancillary works, and the construction of an on-site detention basin to the west of Moorebank Avenue within the MPW Site.
The Moorebank Precinct	-	Refers to the whole Moorebank intermodal precinct, i.e. the MPE Site and the MPW Site.
TPH	-	Total Petroleum Hydrocarbons
TRH	-	Total Recoverable Hydrocarbons
UCL	-	Upper Confidence Limit
UST	-	Underground Storage Tank
UXO	Unexploded Ordnance	Explosive ordnance that has been primed, fused, armed or otherwise prepared for action and which has been fired, dropped, launched, projected or placed in such a manner as to constitute a hazard to operations, installations, personnel or material but remains unexploded either by malfunction or design or for any cause. UXO includes items of military ammunition or explosives removed from their original resting place for any reason, including souveniring.
Vegetated Areas	EEC	Refers only to those areas inaccessible during SSD 5066 works.
VOC	-	Volatile Organic Compounds
Zn	-	Zinc

1 Introduction

Qube (Qube) Property Management Services Pty Ltd, c/o Tactical Group Pty Ltd (Tactical), engaged EP Risk Management Pty Ltd (EP Risk) to prepare a Long-Term Environmental Management Plan (LTEMP) for the proposed Development following a subdivision, within the Moorebank Precinct West site located at 400 Moorebank Avenue, Moorebank NSW, 2170 (MPW Site).

The development includes the proposed subdivision of Lot 1 in DP1197707 as partial Lots 6,7 and 12 (The Site). The location of the Site and MPW Site is provided as **Figure 1.**

It is understood the MPW Site has been owned by the Commonwealth Government since 1913, used as a Defence facility since the 1940s, and is approximately 190 hectares (ha) in area. The Site is located in the central portion of the MPW Site and is approximately 264,030 m^2 in area.

The MPW Site is currently being redeveloped into the Moorebank Intermodal Terminal Development (MITD) (Proposed Development) and comprises land within a developable area, for construction and operation of the Intermodal Terminal (IMT), and land reserved as an offset and conservation area. These areas are identified as follows:

- **Construction Area**: Encompasses the portion of the MPW Site inside the MPW Stage 2 Construction Boundary, including the Site (ref: **Figure 1**).
- **Offset Area**: Comprises the riparian area adjacent the Georges River which is located outside the MPW Stage 2 Construction Area Boundary to the west of the Site (ref: **Figure 1**).

The Site is within the construction area of the MPW Site and does not include the Offset Area of the MPW Site or areas of endangered ecological communities (EEC) present within the greater MPW Site.

Planning consent for the Proposed Development at the MPW Site included MPW Early Works (Stage 1) under State Significant Development (SSD) (SSD 5066), and the Stage 2 Development (SSD 7099).

In accordance with the conditions of planning consent SSD 5066, remediation of the MPW Site was required in accordance with the approved Remediation Action Plan (RAP) prepared by Golder (2016)[1] and Contamination Management Plan (CMP) prepared by EP Risk (2020[2]). At the completion of remediation, A Site Audit Statement A2 and Site Audit Report for the MPW Site was provided by Enviroview (2020)[3] subject to the implementation of a LTEMP for the MPW Site (EP Risk 2020b)[4]. It is understood that upon completion of placement of fill and prior to construction at the Woolworth Site, a SAR and SAS for the Site is required to demonstrate the Site is suitable for the intended land use under Condition B171, SSD 7709.

[1] Golder (2016) *Land Preparation Works Stage 1 and Stage 2 – Remediation Action Plan*.
[2] EP Risk (2020) *Contamination Management Plan, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW*, 30 July 2020 (ref: EP1489.002_v11.0).
[3] Enviroview (2020) *Stage 2 Works – Completion of Remediation Pre- Construction (Condition B169 Audit)* Moorebank Precinct West Moorebank Intermodal and Logistics Park (MLP) Moorebank Avenue, Moorebank, NSW, dated 20 November 2020 (ref: 600099_0301-2014)
[4] EP Risk (2020b) *Long-Term Environmental Management Plan*, Moorebank Precinct West (MPW), dated 27 October 2020 (ref: EP1489.001_v12).

JBS&G prepared a Woolworths Audit Area Validation Summary (JBS&G 2021)[5], intended to summarise the information available for the Site to demonstrate the area is suitable for the intended land use following importation of fill so a SAS A and SAR could be prepared to satisfy Condition B171. JBS&G (2021) concluded remediation, validation, management and importation works had been completed in accordance with EP Risk 2020, EP Risk 2020b and Golder 2016. The Site was considered suitable for its intended land use subject to the implementation of an LTEMP.

This LTEMP is a standalone document that provides environmental management framework for the Site and is focused on both short to medium-term management during construction and long-term management of the Proposed Development post construction. The LTEMP was prepared to inform a SAR and SAS for the Site following placement of fill, consistent with Stage 2 SSD 7709 (Condition B171).

1.1 Purpose

The LTEMP has been prepared in accordance with the requirements of relevant legislation, regulations, codes of practice, Australian Standards and conditions of consent to address the potential risk to human health and the environment from impacted media during construction and operation of the Proposed Site Development. The objectives of this LTEMP are to:

- Outline the nature and extent of impacted soils, sediment, surface water and groundwater requiring short to long-term management at the Site.
- Develop management measures for the management of impacted materials encountered during construction works and long-term operation of the Site including monitoring and reporting in satisfaction of relevant health and safety and environmental legislation.
- Assign responsibilities for the implementation of management measures.

[5] JBS&G (2021) *Moorebank Precinct West (MPW): Woolworths Audit Area Validation Summary*, dated 27 May 2021 (ref: 51997-134422 L362 (Rev 0)).

1.2 Parties Responsible for the Implementation and Review / Maintenance

The parties responsible for the implementation and review / maintenance of the LTEMP include:

- Land Owner.
- Land Owner Representative.
- Developer (or their representative)
- Principal Contractor (during construction).
- Operational Managing Entity (post construction).
- Environmental Consultant.
- Construction Worker.
- Operational Worker.

1.3 How the LTEMP will be complied with

The LTEMP is prepared in compliance and to satisfy Moorebank Intermodal West Stage 2 Condition B172 of SSD 7709, which specifies that: '*Where remediation outcomes for the site require long term environmental management, a suitably qualified and experienced person must prepare a Long-Term Environmental Management Plan (LTEMP), to the satisfaction of the Site Auditor'.* The LTEMP will inform a statutory SAS to be prepared by the Site Auditor.

This LTEMP will be implemented in compliance with Condition C39 of the MPW Stage 3 Consent (SSD 10431).

2 Background

2.1 Site Identification

The site identification details are presented in **Table 1**.

Table 1 – Site Identification

Item	Description
Site Address	MPW Site – 400 Moorebank Avenue, Moorebank, NSW, 2170 (see **Figure 1**) The Site – Portion of the MPW Site, as described below.
Legal Description	**The Site:** Proposed subdivision of Lot 1 in DP 1197707 to: Partial Lots 6, 7 and 12. The Site boundary is provided as **Figure 1**.
Approximate Site Area	264,030 m^2
Site Owner	Moorebank Intermodal Company
Municipality	Liverpool City Council
Site Zoning	IN1 General Industry

The Site is located approximately 27 km south-west of the Sydney Central Business District (CBD) and approximately 26 km west of Port Botany. The Site is situated within the Liverpool Local Government Area (LGA), in Sydney's South West subregion, approximately 2.5 km from the Liverpool City Centre and is located approximately 1.5 km south of the intersection of Moorebank Avenue and the M5 Motorway. The Site is entirely within the MPW Site footprint.

2.2 Current Land Use

At the time of writing, the Site had been covered with a minimum of 1 m engineered fill to design levels (JBS&G 2021).

2.3 Proposed Land Use

The development is believed to include the construction of large warehouse buildings and paving, with a suitable area for a growing medium supporting landscaped areas. There is potential for relatively minor disturbance of underlying soils during construction works. Excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be managed under one of the following scenarios (JBS&G 2021):

- Reuse on remaining portions of the MPW Site in accordance with the POEO Act 1997, Protection of the Environment Operations (Waste) Regulation 2014 (POEO Regulation), applicable Development Application (DA), Environmental Protection License (EPL), Contamination Management Plan (CMP) or LTEMP for the land.
- Off-site disposal in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014).

2.4 Surrounding Land Use

The land surrounding the Site comprises:

- **North:** MPW Site, Industrial warehouses, the M5 motorway, small pockets of remnant bushland and further industrial and residential properties beyond. The Georges River meanders to the north east.
- **South:** MPW Site, Rail corridor, Holsworthy Defence land, and residential properties to the west of the Georges River.
- **East:** MPW Site, Moorebank Avenue, MPE, general industrial properties and infrastructure (Defence), Liverpool Fire Station (north-east), Anzac Creek, low density and medium density residential properties beyond.
- **West:** MPW Site, Offset Area, The Georges River (which flows north), Glenfield Tip, rail corridor and Casula Station, Leacock Regional Park and low and medium density residential properties beyond.

2.5 Topography

With reference to the JBS&G Woolworths Validation Summary (JBS&G 2021), the Site comprising MPW Pad C and D has been filled to final design levels with a minimum of 1 m of Engineered Fill.

2.6 Hydrology

Drainage at the Site is anticipated to follow the design level contours as overland flow or via drainage channels, swales and detention basins via the MPW Site to the Georges River to the west.

The historical drainage system at the Site was replaced by temporary sediment control swales and dams during Stage 1 and Stage 2 Works which have since been backfilled during importation of Engineered Fill.

2.7 Geology

Based upon a review of the NSW Government Planning and Environment Resources and Energy Penrith 1:100,000 Geological Map (Sheet 9030, First Edition) (1991), the majority of the Site is underlain by Fluvial, clayey quartzose sand and clay from the Tertiary period. The underlying bedrock consists of interbedded Hawkesbury Sandstone and Ashfield Shale (Wianamatta) from the middle Triassic period.

The Site has been covered in a minimum of 1 m of Engineered Fill (JBS&G 2021).

2.8 Hydrogeology

EP Risk (2018) reported groundwater flow was towards the west and the nearest surface water body, the Georges River. Groundwater ranged from 3.751 m Australian Height Datum (AHD) to 8.153 m AHD.

EP Risk (2018) reported that groundwater was predominantly fresh to brackish water (relatively low electrical conductivity, EC) with the exception of three (3) groundwater monitoring wells (GMWs) which indicated an area of high salinity (> 10,000 µS/cm). Dissolved oxygen (DO) measurements

indicated generally anaerobic conditions. The oxidation-reduction potential (ORP) indicated reducing conditions and the pH measurements were generally slightly acidic.

Groundwater elevation and gauging information is provided in **Appendix F**.

2.9 Acid Sulfate Soil

A review of the Liverpool Local Environmental Plan 2008 indicates the Site is located within a Class 5 acid sulfate soil (ASS) developmental control area. The surrounding MPW Site is partially within a Class 5 and Class 1 ASS area. Development consent is required for works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

Based on the review of available information (PB 2014[6] and Golder 2015[7]) actual and potential acid sulfate soils were identified in shallow soils between 1.0 metres below ground level (mBGL) and 2.0 mBGL in the MPW Site Offset Area along the Georges River to the west of the Site. Golder 2015 concluded the acid generating potential of the soils was not caused by sulfidic material. Both Golder (2015) and PB (2014) recommended an Acid Sulfate Soil Management Plan (ASSMP) was a requirement for future earthworks.

Development consent SSD 7709 Condition B39 for MPW Stage 2, required the preparation of an ASSMP for the MPW Site, which includes the Site. EP Risk (2020b) prepared an ASSMP for inclusion as a sub-plan to the CEMP[8] for Stage 2 works at the MPW Site in satisfaction of condition C2 of SSD 7709. The purpose of the ASSMP was to deal with any unexpected discovery of actual or potential acid sulfate soil. The ASSMP included procedures for the investigation, handling, treatment and management of such soil and water seepage.

2.10 Summary of Site History

Numerous contamination assessments have been undertaken at the Woolworth Site as part of assessment of the greater MPW Site, the findings of which are summarised in **Appendix A**.

A summary of the site history is provided in **Table 2**.

[6] PB (2014) *Phase 2 Environmental Site Assessment Moorebank Intermodal Terminal*, dated 28.05.14 (ref: 2103829A-CLM_REP-1 Rev B) Parsons Brinkerhoff Pty Ltd.
[7] Golder (2015) *Post Phase 2 Environmental Site Assessment*. Golder Associates.
[8] SIMTA (2020) Construction Environmental Management Plan, Moorebank Precinct West Stage 2, dated 14 January 2020 (ref: MIC2-QPMS-EN-APP-00001).

Table 2 – Summary of Site History	
Year	**Summary**
1913	The Site, as part of the MPW Site, was purchased by the Commonwealth Government.
1930	The Site was predominantly vacant and covered in bushland/grazing land.
1940s	The Site was used by Australian Defence Force (ADF) as a training base for the Army.
Prior to 1956	The Site had had been developed as a Defence base.
1956 to circa 1995	There was no known fire training activities that occurred within the Site. The MPW Site had undergone various phases of development. A former fire training area (FFTA) approximately 50 m wide and 100 m long was identified close to the Georges River in the southern portion of the MPW Site opposite Jacquinot Road. Fire training involved pouring diesel and other flammable materials into shallow drains, in pans, in above ground storage tanks and car bodies, igniting the fuel and then extinguishing the fire using foam extinguishers. Based upon a review of aerial photographs, it was inferred that fire training activities in this area ceased somewhere between 1991 and 1994. Another fire training area approximately 60 m wide by 160 m long was located in the southern portion of the Dust Bowl. It was understood that fire activities in this area included igniting oil in trays and extinguishing them with foam including AFFF and there was no information available on when fire training activities ceased in this area. Historical excavator training within the Dust Bowl resulted in routine excavation up to depths of 4 m.
2015	The Site and MPW Site was vacated by Defence, with the relocation of military units to new facilities at the nearby Holsworthy Base.

Numerous contamination assessments have been undertaken at the MPW Site and Site, the findings of which are summarised in **Appendix A** and various stages of development are summarised by JBS&G (2021).

3 Description of Existing / Residual Contamination

3.1 Summary of Impacted Media

Based on the JBS&G (2021) summary letter, the following remaining areas of environmental concern (AEC) and contaminants of concern for the MPW Site is provided as follows:

- AEC 1 - Chlorinated hydrocarbons impact (Trichloroethylene (TCE) and Cis-1,2-dichlorothene (cis-DCE)) and total recoverable hydrocarbons (TRH) in the north west portion of the MPW Site to the south of the ABB Building.
- AEC 2 - Petroleum hydrocarbon impact including light non-aqueous phase hydrocarbons (LNAPL) in the eastern portion of the MPW Site.
- AEC 3 - PFAS impact associated with residue from historical fire-fighting activities.

The chlorinated hydrocarbon impacted area (AEC 1) is located approximately 860 m north of the Site and the petroleum hydrocarbon impact are (AEC 2) is located approximately 110 m to the south west. JBS&G (2021) considered no long-term management is required in relation to these off-site impacts within the Site, limiting the known sources of contamination to PFAS impacts associated with residue from historical fire-fighting activities (AEC 3), partially located within the eastern and western portion of the Site. The location of the AECs at the MPW Site in relation to the Site is provided as **Figure 3**. Further information relating to the AECs is provided in the Conceptual Site Model (CSM) provided as **Appendix A.** A CSM Figure is provided as **Figure 4**.

JBS&G (2021) stated *"A minimum of 1 m of Engineered Fill has been placed within the Audit Area* (the Site) *and is also proposed to be substantially covered by warehousing and concrete pavement."* Additionally, *"No residual PFAS impacted soils were placed/reused within the Audit Area* (the Site)".

3.2 Source – Pathway – Receptor Linkages Requiring Management

Based on the CSM provided in **Appendix A** for the Site, a summary of impacted media requiring management in this LTEMP is provided in **Table 3**. However, based on the placement of a minimum 1 m of Engineered Fill, it is considered unlikely underlying soils will be significantly disturbed as part of construction of a warehouse facility. Management of any unidentified contamination is to be managed in accordance with an unexpected finds protocol provided as **Appendix D**.

Table 3 – Identified Areas of Environmental Concern and Impacted Media

Area of Environmental Concern (AEC)	COPC	Impacted Media	Risk Assessment / Management	Source – pathway receptor linkages requiring management
AEC 3 - PFAS impact associated with residue from historical fire-fighting training.	PFAS	**Soil** – Exceedances of Tier 1 ecological indirect commercial / industrial criteria. **Soil leachate** – Detectable leachable PFOS + PFHxS concentrations reported up to a maximum concentration of 1.68 µg/L (<2 m BGL) and 6.1µg/L (>2 m BGL). **Sediments** - Detectable PFAS concentrations historically reported within on-site sediment. **Surface water** - Exceedances of Tier 1 criteria for samples collected within temporary detention basins during Early Works construction and from the Georges River. **Groundwater** – Exceedances of Tier 1 criteria.	• EnRiskS (2019)[9] undertook a human health risk assessment of the MPW Site and reported the risk to human health at the MPW Site was low and acceptable, but bioaccumulation and the effects on higher order ecological consumers were unable to be excluded. • EnRiskS (2019a) [10] reported a potential health risk to children who consume more than two serves of fish per month sourced from the Georges River and potential adverse effects to the aquatic environment by bioaccumulation and the effects on higher order ecological consumers.	• Leaching and erosion of PFAS from soil to surface water and groundwater associated with soil disturbance during construction. • Recreational fishing resulting in the consumption by children of more than two serves of fish per month. • Bioaccumulation and the effects on higher order ecological consumers.

[9] EnRiskS (2019) *Land Human Health and Ecological Risk Assessment (Land HERA)*, dated 6 May 2019 (ref: MICL/19/BIOR001, Revision B – Revised Draft).
[10] EnRiskS (2019a) *Waterway Human Health and Ecological Risk Assessment (Waterway HHERA)*, dated 10 May 2019 (ref: MICL/18/GRR001, Revision E – Revised Draft).

4 Management Activities

4.1 LTEMP Roles and Responsibilities

This LTEMP has been developed to provide an environmental framework for short to medium term environmental management during construction and operation of the Proposed Development at the Site. The terminology, roles and responsibilities relevant to the LTEMP are provided in **Table 4**.

Table 4 – Responsibilities for LTEMP Implementation

Position	Company/Entity	Responsibilities
Land Owner	Commonwealth	To consent to the registration of the LTEMP on title.
Land Owner Representative	Moorebank Intermodal Consortium (MIC)	To consent to the registration of the LTEMP on title.
Developer (or their representative)	Moorebank Precinct Nominees Pty Ltd	The Developer is responsible for: • The engagement of the Principal Contractor (during construction). • Management of the operation of the Site post construction or engagement of the Operational Managing Entity. • Ensuring that the Principal Contractor or Managing Operational Entity implement the LTEMP.
Principal Contractor (during construction)	To be appointed	• Responsible for the implementation of the LTEMP during construction works and has primary control of the Site (partial Lots 6,7 and 12). Responsible for inductions, training, notifying the owner, appropriate consultant or contractor in relation to unexpected finds. Also responsible for quarantining unexpected finds requiring management with suitable barricades and informing other workers of its location. • Persons and/or company appropriately qualified to undertake the required management works and has the appropriate insurances and licences. • Responsible for undertaking works in accordance with this LTEMP.
Operational Managing Entity (post construction)	To be appointed	• Responsible for the implementation of the LTEMP at the Proposed Development during long-term operation.
Environmental Consultant	To be appointed	• As defined under the NEPM (NEPC 2013) (Schedule B9) the environmental consultant is responsible for the assessment of contaminated sites and preparation of assessment reports and should be able to demonstrate relevant qualifications and experience to a level appropriate to the contamination issues at the site under investigation. • The environmental consultant is to have a Certified Environmental Practitioner (Site Contamination) recognised by one of the certifying bodies recognised by the NSW EPA. Any reports

Table 4 – Responsibilities for LTEMP Implementation		
Position	**Company/Entity**	**Responsibilities**
		prepared should be written or reviewed by the individual Certified Environmental Practitioner (Site Contamination). • Responsible for the following: ○ Notifying the Client and Principal Contractor of any unexpected finds. ○ Undertaking the assessment, remediation and validation of an unexpected find. ○ Engaging the Ordnance Contractor should UXO or EOW be identified as an unexpected find. ○ Notifying the Principal Contractor once unexpected finds have been validated and can be reoccupied. • Any environmental monitoring required under the LTEMP.
Construction Worker	Commercial industrial worker during construction	• Any worker on the Site, including any contractor or sub-contractor, must adhere to the requirements of the LTEMP during short to medium term construction. Responsible for undertaking their tasks in a safe manner and notifying the Principal Contractor if they see any items / conditions which may constitute an unexpected find.
Operational worker	Commercial industrial worker during operation	• To adhere to the requirements of the LTEMP during long-term operation of the Proposed Development post construction.

4.2 Approval and Licensing Requirements

SSD 7709 provides specific requirements for the LTEMP which are provided in **Table 5**.

Table 5 – Planning Conditions Specific to the LTEMP	
Condition	**Requirement**
SSD 7709 – B171	Upon Completion of importation and placement of fill and prior to construction of permanent built surface works, the Applicant must submit to the Planning Secretary, a Site Audit Report and a Site Audit Statement A for the whole site, prepared in accordance with the *NSW Contaminated Land Management – Guidelines for the NSW Site Auditor Scheme 2017*, which demonstrates the site is suitable for its intended land uses under MPW Stage 2 SSD 7709.

Table 5 – Planning Conditions Specific to the LTEMP

Condition	Requirement
SSD 7709 – B172	Where remediation outcomes for the site require long term environmental management, a suitably qualified and experienced person must prepare a Long-Term Environmental Management Plan (LTEMP), to the satisfaction of the Site Auditor. The plan must: a) be submitted to the Planning Secretary and EPA prior to commencement of construction (other than vegetation clearing); and b) 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 details of any contingency measures that the Applicant is to carry out to address any ongoing contamination.
SSD 7709 – B173	• The LTEMP must be registered on the title to the land.

All planning conditions of consent for the Proposed Development relevant to the LTEMP are shown in **Table 6**. Further details of the condition of consent / approval and mitigation measures and how they relate to the LTEMP are provided as a compliance matrix at **Appendix D**.

Table 6 – Planning Approval Conditions of Consent

Planning Approval	Condition of Consent	Notes
SSD 7709	B171	Provision of Site Audit Statements to the Planning Secretary upon completion of importation and placement of fill.
	B172	Requirements for the LTEMP
	B173	Registration of the LTEMP
	B180	The Applicant must assess and classify all liquid and non-liquid wastes to be taken off site in accordance with the latest version of the EPA's *Waste Classification Guidelines Part 1: Classifying Waste* (EPA 2014) and dispose of all wastes to a facility that may lawfully accept the materials.
	C1	Management plans required under this consent must be prepared in accordance with relevant guidelines, and include: (a) detailed baseline data; (b) details of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures and criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; (c) a description of the measures to be implemented to comply with the relevant statutory requirements, limits or performance measures and criteria; (d) a program to monitor and report on the: (i) impacts and environmental performance of the development; (ii) effectiveness of the management measures set out pursuant to paragraph (c) above; (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (f) a program to investigate and implement ways to improve the environmental performance of the development over time; (g) a protocol for managing reporting any; (i) incident and any non-compliance (specifically including any exceedance of the impact assessment criteria and performance criteria); (ii) complaint; (iii) failure to comply with statutory requirements; (h) roles and responsibilities for implementing the plan; and (i) a protocol for periodic review of the plan.

Table 6 – Planning Approval Conditions of Consent		
Planning Approval	**Condition of Consent**	**Notes**
EPBC 2011/6086	8a	MPW Concept EIS, Soil and Contamination PEMF Section 6.2 – Management controls – Early Works and Construction phase
		MPW Concept EIS, Soil and Contamination PEMF Section 6.4– monitoring
		MPW Concept EIS, Soil and Contamination PEMF Section 6.5 – Management response to incidents and non-compliances
	8b) and c)	REMM 7A, REMM 7B, REMM 7C, REMM 7D, REMM 7E, REMM 7F, REMM 7I, REMM 7J, REMM 7K, REMM 8B, REMM 8D, REMM 8E, REMM 8F, REMM 8G, REMM 8H, REMM 8I, REMM 8J, REMM 8K, REMM 8L, REMM 8M, REMM 8N, REMM 8RO, REMM 8P, REMM 8Q, REMM 8R, REMM 8S, REMM 8T, REMM 8U, REMM 8V, REMM 8W, REMM 8X, REMM 8Y, REMM 8Z, REMM 8AA
	8 d)	i), ii), iii), iv), v), vi), vii),
Final Completion of Mitigation Measures	-	OB, 5A, 5I, 6A, 6B, 6C, 6D, 6E, 6F, 6H, 6I, 6J, 7A, 12A,

4.3 Implementation of the LTEMP

The LTEMP will be implemented by the Developer/Principal Contractor and Operational Managing Entity after provision of a SAS A2 and SAR and registrations on title to satisfy Condition B171 and B173 of SSD 7709, respectively. Implementation includes of the LTEMP is for the following stages:

- Phase 2 Construction Works.
- Operational Phase.

This LTEMP will be implemented in compliance with Condition C39 of the MPW Stage 3 Consent (SSD 10431).

Based upon details of the Proposed Development summarised in **Section 2.3**, the following potential activities are proposed to be carried during construction:

Proposed Development Activities

Based upon the description of the proposed development (JBS&G 2021), the following activities are proposed at the Site which may intersect AEC3:

Phase 2 Construction Works

- Installation of underground services.
- Construction of roadways, warehouses, and landscaped areas.

Operational Phase

- Sub-surface maintenance works.

4.4 LTEMP Environmental Management and Monitoring Procedures

The approach to managing the potential source – pathway – receptors addressed within the LTEMP is provided in the environmental management procedures (EMP) below and is consistent with the RAP (Golder 2016). The EMPs are provided in **Appendix B** and summarised as follows:

- EMP 1 – Land use restrictions.
- EMP 2 – Subsurface works – AEC3.
- EMP 3 – Materials Tracking.
- EMP 4 – Stockpile Management.
- EMP 5– Minor Excavation.
- EMP 6– Off-site disposal of excavated / unsuitable material.
- EMP 7 – Subsurface maintenance works.
- EMP 8 - Unexpected finds.
- EMP 9– Additional Validation Requirements.
- EMP 10– Management of groundwater.
- EMP 11 – Management of surface water.
- EMP 12 – Training.
- EMP 13– Contractor and subcontractor management.
- EMP 14– Contingency plan.
- EMP 15– Non-compliances with the LTEMP.
- EMP 16– Record keeping.
- EMP 17– Audit/review of LTEMP implementation.
- EMP 18– LTEMP review.
- EMP 19– Cessation of LTEMP application.

Summary of Source – Pathway – Receptor Linkages Requiring Management

Based upon a review of the source – pathway – receptor linkages reported in **Table 3**, potentially contaminating activities associated with the construction and operation of the Proposed Development which require long term management are provided in **Table 7**.

Table 7 – Management of Potentially Contaminating Activities associated with the Proposed Development			
Project Stage	**AEC**	**Activity**	**Management Procedure**
General	AEC 3	All activities	**EMP 1**
Phase 2 Construction Works	AEC 3	Installation of underground services	**EMP 2, EMP 3, EMP 4, EMP 5, EMP 6, EMP 7, EMP 8, EMP 9, EMP 10, EMP 11**
		Construction of roadways, warehouses, and landscaped areas	**EMP 2, EMP 3, EMP 4, EMP 5, EMP 6, EMP 7, EMP 8, EMP 9, EMP 11**
Operation of Proposed Development	AEC 3	Sub-surface maintenance works	**EMP 7**, **EMP 8, EMP 10, EMP 11**

In addition to the EMPs provided within **Table 7**, **EMP 12** to **EMP 19** are required within all construction and operational stages.

4.5 Reuse of PFAS Impacted Soil

As reported by JBS&G (2021), Engineered Fill material has been imported over the entire footprint of the Site, limiting opportunities for the reuse of PFAS impacted soil from AEC 3.

There is potential for relatively minor disturbance of underlying soils during construction works. Excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be managed under one of the following scenarios (JBS&G 2021):

- Reuse on remaining portions of the MPW Site in accordance with the POEO Act 1997, POEO Regulation 2014, applicable DA, EPL, CMP or LTEMP for the land.
- Off-site disposal in accordance with EPA 2014.

In the event soil is to be reused on-site, reference should be made to previous analytical results provided within **Appendix A.**

JBS&G prepared a Technical Memo (JBS&G 2021a [11]) clarifying stormwater structures and the placement of PFAS impacted soil for the Site in accordance with EnRiskS (2020) and EP Risk (2020b) and considered that following development of the Site the risk of offsite migration of PFAS to sensitive receptors via the stormwater system is considered negligible. JBS&G (2021a) described the mitigation factors as:

- *The reuse of soil at or near surface are required to meet appropriately protective total soil and leachable PFAS criteria (NEMP 2020). Therefore, runoff into the development's stormwater system is anticipated to be within acceptable PFAS concentrations;*

[11] JBS&G (2021), *Technical Memo, Moorebank Precinct West (MPW) – Stormwater Structures and the Placement of PFAS Impacted Soil, Moorebank Logistics Park, NSW,* dated 19 May 2021 (ref: 51997 – 136836 (rev 2)).

- *Other PFAS impacted soils proposed to be reused on site will be isolated by pavements and imported fill, and infiltration water would not reach (or would be negligible in) the underlying PFAS contaminated soil. Therefore, there would be no driver for PFAS to be mobilised;*
- *In order that the development is not geotechnically/structurally compromised, the stormwater system is designed to retain water for discharge offsite. Therefore, exfiltration from the network would not be expected to exacerbate leaching to groundwater to any significant extent; and*
- *The stormwater system is above the groundwater table and therefore the system would not be a preferential flow path for impacted groundwater.*

Based on the JBS&G (2021a) Technical Memo *"It is therefore considered that the management measures detailed in the LTEMP are sufficiently protective of the proposed MPW stormwater system and a setback from enclosed stormwater infrastructure is not warranted, nor contemplated by the approved LTEMP* (JBS&G 2021a). Additionally, JBS&G considered the use of asphalt as a suitable cover (**Appendix G**) as referenced by EnRiskS (2020).

Soil excavated beneath the Engineered Fill layer that has been subject to historical PFAS testing, as outlined in **Appendix A,** or which is sampled and tested in accordance with **EMP 5**, should be assessed by the Environmental Consultant for suitability to remain on-site or off-site disposal.

Further testing of soil where historical data is absent or limited may be undertaken in accordance with **EMP 5**.

4.6 Compliance Matrix

The Development Consent made under *Section 89E of the Environmental Planning and Assessment Act 1979* has listed the conditions of consent for SSD 7709 in **Appendix C** in relation to the LTEMP.

4.7 Adopted Validation Criteria

The adopted criteria for the validation of unexpected finds identified during Stage 2 Construction Works and on-going operation of the Site is provided below.

Soil Criteria

For the purposes of assessing the results of validation analytical testing of soil at the Site, the Environmental Consultant should reference the relevant Guidelines and Standards, including but not limited to the following:

- NSW DEC (2017) Guidelines for the NSW Auditor Scheme (Third Edition).
- National Environment Protection Council (NEPC) 2013, National Environment Protection (Assessment of Site Contamination) Measure 1999 (April 2013), Canberra (ASC NEPM, 2013).
- Friebel, E & Nadebaum, P 2011, Health Screening Levels for Petroleum Hydrocarbons in soil and Groundwater. Part 1: Technical development document, CRC CARE Technical Report no. 10, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.

- Heads of EPAs Australia and New Zealand (HEPA), *PFAS National Environmental Management Plan*, January 2020 (HEPA NEMP 2020).

4.8 Validation Sampling Program

Validation of unexpected finds should be undertaken as directed by the Environmental Consultant in accordance with the applicable Guidelines and Standards at the time of the assessment. Reporting must be undertaken in accordance with the NSW EPA *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land* (NSW EPA 2020).

4.9 Waste Classification

Contaminated soils requiring disposal off-site shall be assessed and classified in accordance with **EMP** .

4.10 Contingency Plan

In accordance with SSD 7709 – B172, the LTEMP must include *'details of any contingency measures that the Applicant is to carry out to address any ongoing contamination'*. Procedures for the management of unexpected finds (**EMP 8**) and a contingency plan (**EMP 14**) are provided within this plan.

5 Monitoring and Reporting

5.1 Contamination Management Plan Periodic Review

A periodic review of the LTEMP should be undertaken for the following (**EMP 18**, **Appendix B**):

- If there are any regulatory changes relevant to the implementation of the LTEMP.
- If there is any significant change in land use or additional development of the Site.
- Once construction activities have been completed and prior to occupation of the Site (if required).

Any revisions to the LTEMP must be approved by the appointed NSW EPA accredited Site Auditor (**EMP 18**, **Appendix B**). Where the LTEMP is revised, copies should be provided to all current stakeholders, training provided, and induction procedures updated where necessary.

5.2 Period of Implementation

The LTEMP is to be implemented during construction and operation of the Proposed Development and will not cease until the conditions detailed in **EMP 19** (**Appendix B**) are met.

5.3 Managing and Reporting

Incidents and Non-compliances

The requirement is for the owner of the Site to be compliant with conditions of consent and undertake the development in accordance with all consent and planning documentation. However, in the event of an incident and/or non-compliance with the LTEMP, these will be managed in accordance with **EMP 15** (**Appendix B**). Reporting registers are provided as **Appendix F**.

Complaints

All complaints will be managed in accordance with the CEMP (during construction) and the Environmental Management System (during operation).

Continual Improvement

Continual improvement of this LTEMP will be undertaken in accordance with the **EMP 17** and **EMP 18** in **Appendix C.** Continuous improvement will be achieved by the ongoing evaluation of environmental management performance and effectiveness of this plan against the environmental policies, objectives, and targets.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure.

5.4 Record Keeping

All documents in relation to the LTEMP will be managed in accordance with **EMP 16** (**Appendix C**).

6 References

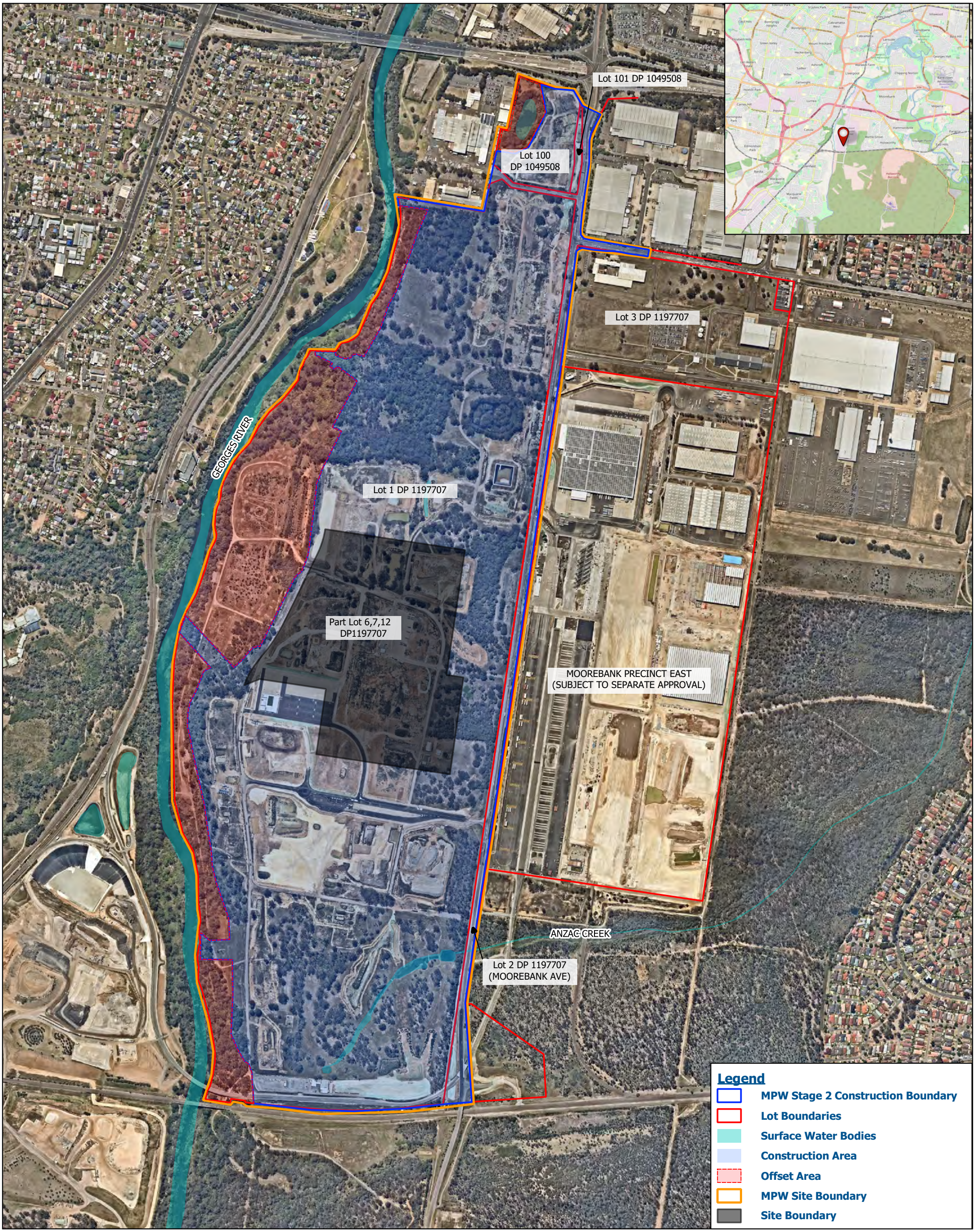
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- Costin Roe Consulting Pty Ltd (2020) Construction Soil and Water Management Plan, Moorebank Logistic Park, Precinct West Stage 2, Moorebank Avenue, Moorebank, NSW, dated 16 March 2020, Revision 10 (ref: 13455.07-03_10.rpt)
- DIPNR (2004) Department of Infrastructure, Planning and Natural Resources, *Guidelines for the preparation of Environmental Management Plans.*
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- EnRiskS (2019a) *Waterway Human Health and Ecological Risk Assessment (Waterway HHERA)*, dated 10 May 2019 (ref: MICL/18/GRR001, Revision E – Revised Draft).
- EnRiskS (2020) *Moorebank Intermodal Terminal: LTEMP Material Reuse Risk Assessment for PFAS*, letter dated 9 October 2020.
- EP Risk (2017) *Literature Review, Criteria for Assessment of PFAS and Risk Assessment, Moorebank Intermodal Terminal Development* (ref: EP0448.001, v3, 03.10.17) EP Risk Management Pty Ltd.
- EP Risk (2017a) *Per- and Poly-fluoroalkyl Substances (PFAS) Data Gap Investigation* (ref: EP00464.002, v2, 20.11.17) EP Risk Management Pty Ltd.
- EP Risk (2017b) *Per- and Poly-fluoroalkyl Substances (PFAS) Nested Well Investigation* (ref: EP00561.002, v1, 10.07.17) EP Risk Management Pty Ltd.
- EP Risk (2018) *Moorebank Precinct West Site-Wide Per- and Poly- Fluoroalkyl Substances (PFAS) Assessment* (ref: EP0748.008 v1, 22.08.18) EP Risk Management Pty Ltd.
- EP Risk (2017c) *Literature Review, Criteria for Assessment of PFAS and Risk Assessment, Moorebank Intermodal Terminal Development* (ref: EP0448.001, v.3, 03.10.17).
- EP Risk (2020) *Contamination Management Plan, Moorebank Precinct West, 400 Moorebank Avenue, Moorebank, NSW*, 30 July 2020 (ref: EP1489.002_v11).
- Enviroview (2016) *Site Audit Interim Advice – Golder Associates, Moorebank Intermodal Terminal Stage Specific Remediation Action Plan*, Letter to Tactical Group dated 22 August 2016 from Mr James Davis.
- Enviroview (2019) *Site Audit Interim Advice 29 – Review of Human Health and Ecological Risk Assessment (HHERA): PFAS in Georges River Adjacent to Proposed Moorebank Intermodal Terminal prepared by EnRiskS*. Letter to Tactical Group dated 29 January 2019 from Mr James Davis.

- Enviroview (2019a) *Site Audit Interim Advice 30 – Review of Land and Waterway Human Health and Ecological Risk Assessments (HHERAs) prepared by EnRiskS*. Letter to Tactical Group dated 17 July 2019 from Mr James Davis.
- Enviroview (2020) *Site Audit Interim Advice 31 – Review of JBS&G Report – Remediation Validation Report for Moorebank Precinct West*. Letter to Tactical Group dated 20 February 2020 from Mr James Davis.
- Enviroview (2020a) *Site Audit Interim Advice 32 – Review of EP Risk Reports – Long-Term Environmental Management Plan (LTEMP) and Contamination Management Plan (CMP) for Moorebank Precinct West*. Letter to Tactical Group dated 5 March 2020 from Mr James Davis.
- Enviroview (2020b) *Site Audit Interim Advice 33 – Review of JBS&G Report – Revised Remediation Validation Report for Moorebank Precinct West*. Letter to Tactical Group dated 6 May 2020 from Mr James Davis.
- Enviroview (2020c) *Site Audit Interim Advice 34 – Review of Revised EP Risk Report – Contamination Management Plan (CMP) for Moorebank Precinct West*.
- Enviroview (2020d) *Site Audit Interim Advice 35 – Review of Revised EP Risk Reports – Long-Term Environmental Management Plan (LTEMP) and Contamination Management Plan (CMP) for Moorebank Precinct West*.
- Enviroview (2020e) *Site Audit Interim Advice 37 – Review of Revised Long-Term Environmental Management Plan (LTEMP) (v5) for Moorebank Precinct West*.
- Enviroview (2020f) *Site Audit Interim Advice 38 – Review of Revised Long-Term Environmental Management Plan (LTEMP) (v6) for Moorebank Precinct West*.
- Enviroview (2020g) *Site Audit Interim Advice 02 – Review of Long-Term Environmental Management Plan (LTEMP) (rev 9) for Moorebank Precinct West, Stage 2 works*.
- Enviroview (2020h) *Site Audit Interim Advice 03 – Review of LTEMP Material Reuse Risk Assessment for PFAS for Moorebank Intermodal Terminal*, dated 1 October 2020 (ref: IA 0301-2014_03).
- Enviroview (2020i) *Site Audit Interim Advice 04 – Review of LTEMP Material Reuse Risk Assessment for PFAS for Moorebank Intermodal Terminal*, dated 14 October 2020 (ref: IA 0301-2014_04).
- Enviroview (2020j) *Site Audit Interim Advice 05 – Review of Revised LTEMP Material Reuse Risk Assessment for PFAS for Moorebank Intermodal Terminal*, dated 22 October 2020 (ref: IA0301-2014_05).
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Figures



Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 1 - Site Location

EP RISK

www.eprisk.com.au

Job No: EP1489.001
Date: 18/06/2021
Drawing Ref: Fig 1
Version No: v2

N

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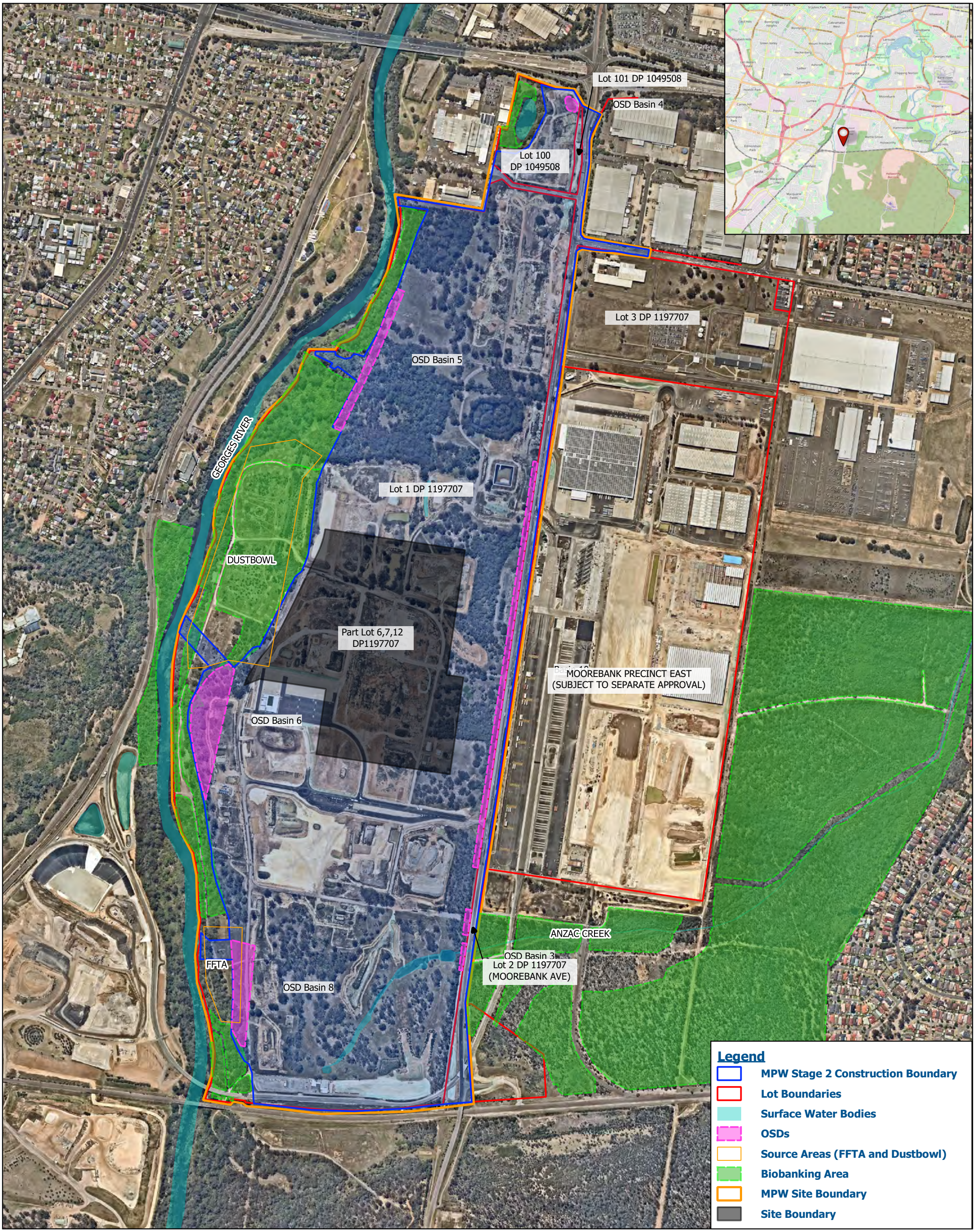
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Source: Near Maps

APPROVED COMPANY ISO 9001 Quality Management Systems QMS Certification Services

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Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 2 - Site Layout and Features

Job No: EP1489.007
Date: 18/06/2021
Drawing Ref: Fig 2
Version No: v2

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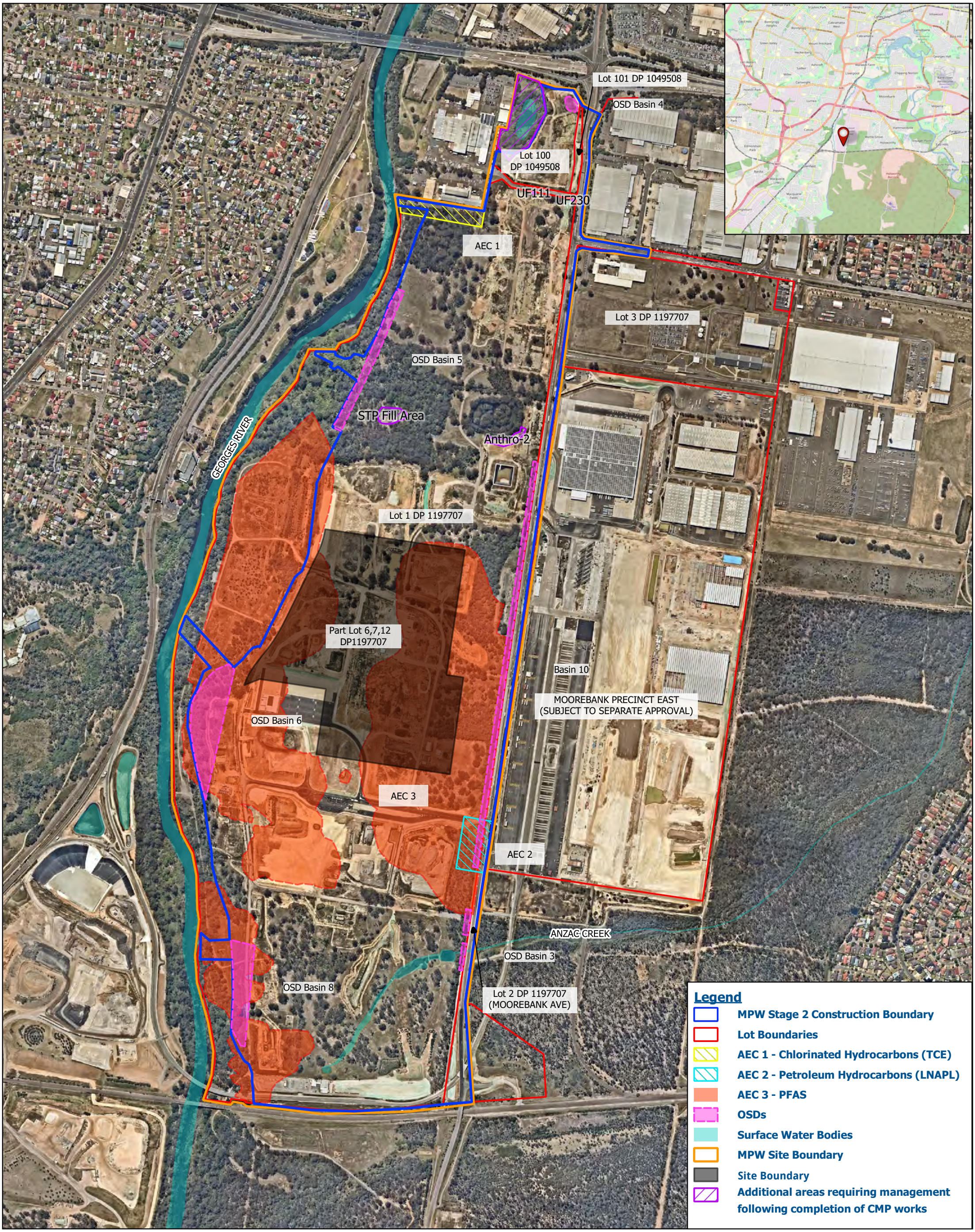
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APPROVED COMPANY ISO 9001 Quality Management Systems QMS Certification Services

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Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 3 - Areas of Environmental Concern

Job No: EP1489.007
Date: 18/06/2021
Drawing Ref: Fig 3
Version No: v2

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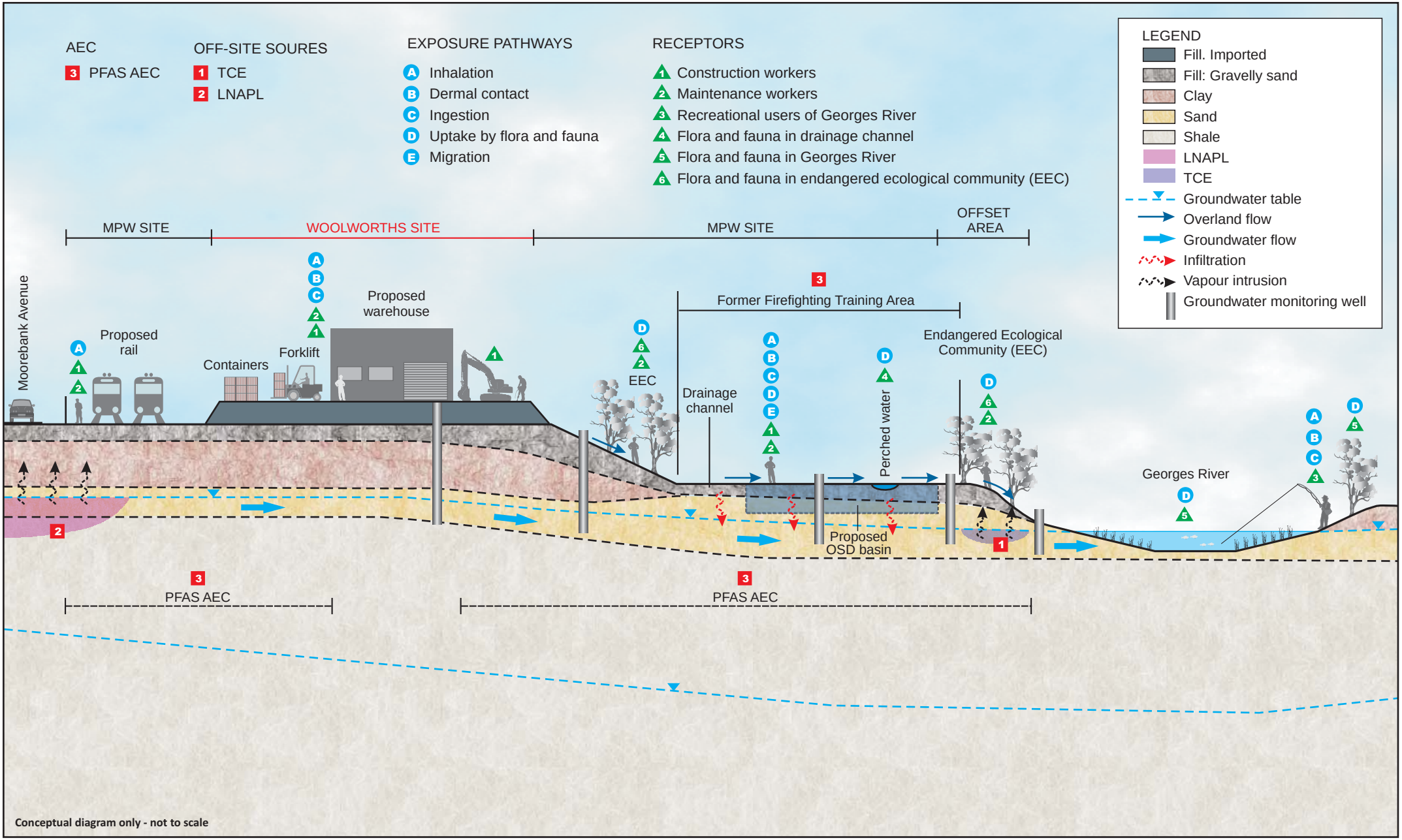
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Source: Near Maps

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APPROVED COMPANY AS/NZS 4801 OH&S Management Systems QMS Certification Services

APPROVED COMPANY ISO 14001 Environmental Management Systems QMS Certification Services

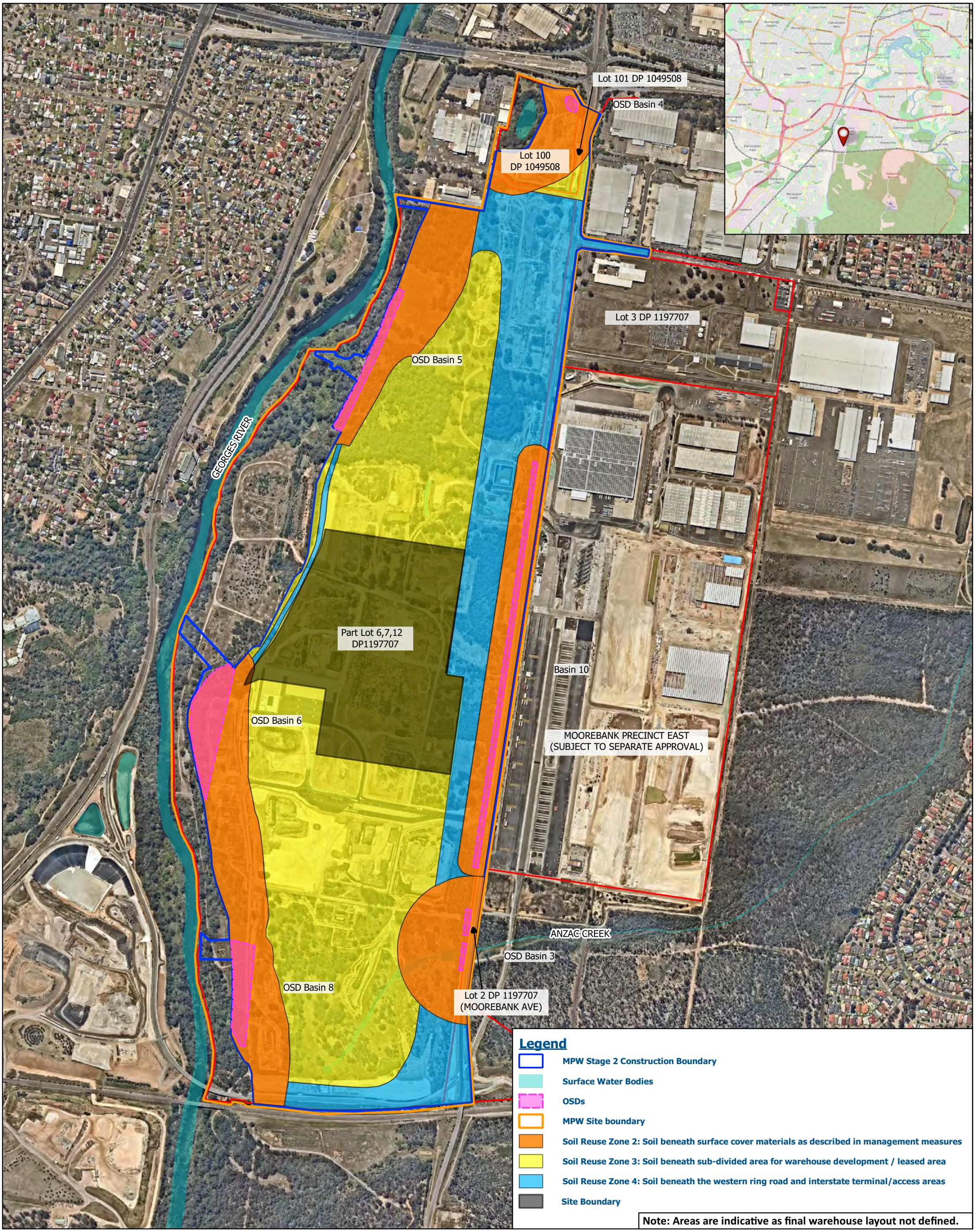


Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 4 - Conceptual Site Model

Job No: EP1489
Date: 19/2/2021
Drawing Ref: EP1489_004.cdr
Version No: v1

Drawn By: B.W.
Checked By: P.S.



Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 5 - Soil Reuse Zones

EP RISK

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Job No: EP1489.007
Date: 18/06/2021
Drawing Ref: Fig 5
Version No: v4

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0 130 260 390 m

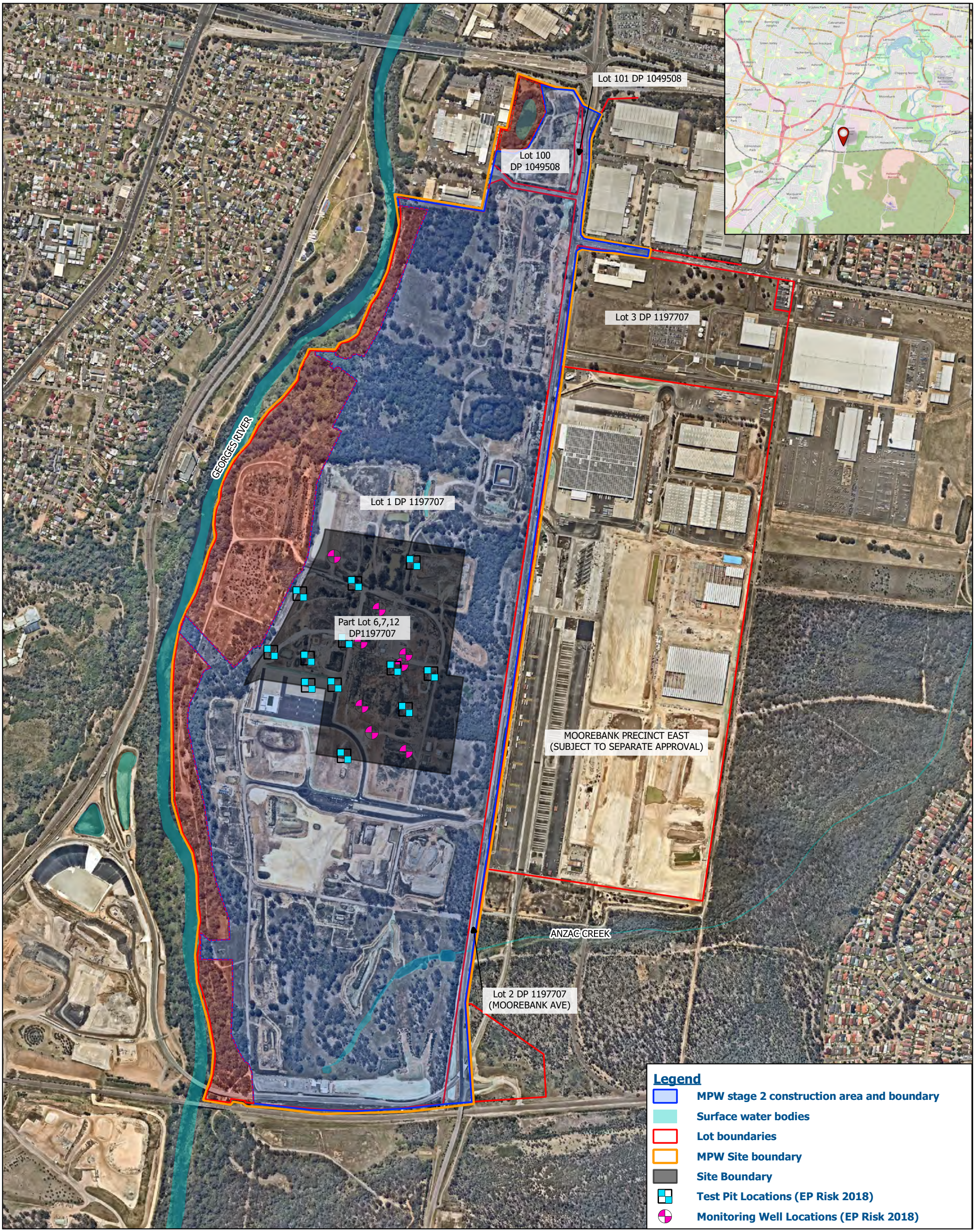
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Scale of regional map not shown
Source: Near Maps

APPROVED COMPANY ISO 9001 Quality Management Systems QMS Certification Services

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Long Term Environmental Management Plan
Part Lot 6, 7 and 12 - Moorebank Precinct West

Figure 6 - Soil Sampling Locations

EP RISK

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Job No: EP1489.007
Date: 18.06.2021
Drawing Ref: Fig 6
Version No: v3

N

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Approximate Scale Only

Coordinate System: WGS 84
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Scale of regional map not shown
Source: Near Maps

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Appendix A
CONCEPTUAL SITE MODEL

Conceptual Site Model

The information provided in this section together with the figures included in this report aid in presenting a conceptual site model (CSM) for the Site with respect to PFAS, based on a review of JBS&G 2021, relevant background historical site information and the investigation works undertaken at the MPW Site to date.

ASC NEPM (2013) identifies a CSM as a representation of site related information regarding contamination sources, receptors, and exposure pathways between those sources and human / ecological receptors. The development of a CSM is an essential part of all site assessments and remediation activities.

ASC NEPM (2013) identified the essential elements of a CSM as including:

- Known and potential sources of contamination and contaminants of concern including the mechanism(s) of contamination.
- Potentially affected media (soil, sediment, groundwater, surface water, indoor and ambient air).
- Human and ecological receptors.
- Potential and complete exposure pathways.
- Potential preferential pathways for vapour migration (if potential for vapours identified).

Site Description

At the time of writing, the Site had been covered with a minimum of 1 m Engineered Fill (JBS&G 2021).

The two PFAS source areas were located in the Offset Area of the MPW Site, known as the Dust Bowl and the FFTA (EP Risk 2018), west of the Site. The location of the Dust Bowl and FFTA in relation to the Site is provided as **Figure 2** in the '**Figures**' section of this report.

Proposed Development

The development is believed to include the construction of large warehouse buildings and paving, with a suitable area for a growing medium supporting landscaped areas. There is potential for relatively minor disturbance of underlying soils during construction works, however, excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be managed disposed of off-site or transported to MPW.

Summary of Contamination

A summary of remediation works and previous environmental reports at the Site is provided within the JBS&G Validation Summary (JBS&G 2021).

Based on the JBS&G (2021) summary letter, the following remaining areas of environmental concern (AEC) and contaminants of concern for the Site is provided as follows:

- AEC 3 - PFAS impact associated with residue from historical fire-fighting activities.

In addition, the following potential off-site sources of contamination have been identified:

- AEC 1 - Chlorinated hydrocarbons impact (Trichloroethylene (TCE) and Cis-1,2-dichlorothene (cis-DCE)) and total recoverable hydrocarbons (TRH) in the north west portion of the MPW Site to the south of the ABB Building.
- AEC 2 - Petroleum hydrocarbon impact including light non-aqueous phase hydrocarbons (LNAPL) in the eastern portion of the MPW Site.

JBS&G (2021) considered no long-term management is required in relation to these off-site impacts within the Site, limiting the known sources of contamination to PFAS impacts associated with residue from historical fire-fighting activities (AEC 3), located within the eastern and western portion of the Site. The location of the AECs at the MPW Site in relation to the Site is provided as **Figure 3**. Further information relating to the AECs is provided in the Conceptual Site Model (CSM) provided as **Appendix A.** A CSM Figure is provided as **Figure 4**.

JBS&G (2021) stated *"A minimum of 1 m of Engineered Fill has been placed within the Audit Area* (the Site) *and is also proposed to be substantially covered by warehousing and concrete pavement."* Additionally, *"No residual PFAS impacted soils were placed/reused within the Audit Area* (the Site)"

AEC 3 - PFAS Contamination in Affected Media Onsite

The historical soil, soil leachate, sediment, surface water and groundwater PFAS analytical results at the Site reported by PB (2014), Golder (2015), Golder (2016b), EP Risk (2017a, 2017b and 2018a) and JBS&G (2019b) are presented in **Table C1, Table C2**, **Table C3**, **Table C4** and **Table C5** respectively. The corresponding sampling locations are provided in **Figure 6**. Ecological criteria were only compared to the data set from 0 to 2 mBGL in accordance with the requirements of the ASC NEPM (2013) as this horizon corresponds with the root zone and habitation zone of many species. Figures illustrating the locations of PFAS impacts and historical sampling locations are provided at the end of **Appendix A**.

Table C1 – Summary of Historical Soil PFOS, PFOS + PFHxS and PFOA Concentrations On-site

Area	Depth (mBGL)	Analyte	No. of samples	Min. Conc. (mg/kg)	Max. Conc. (mg/kg)	Mean Conc. (mg/kg)	Standard Deviation (mg/kg)	No. Samples >LOR	No. Samples > Criteria[12]	No. Samples > 250% Criteria	95% UCL_{mean}[13] (mg/kg)[14]	95% UCL_{mean} Exceedance of Criteria[15]
The Site	<2	PFOA	31	<0.0001	0.0031	0.00027	0.00056	5	0	0	-	-
		PFOS	31	<0.0001	0.04	0.0054	0.01	17	EC (ind.)[16] – 5	EC (ind.)[17] – 3	EC (ind.) – 0.0171[18]	EC (ind.) – no
		PFOS + PFHxS	31	<0.0001	0.0427	0.0067	0.012	19	0	0	-	-
	>2	PFOA	12	<0.0001	0.0027	0.00046	0.00074	1	0	0	-	-
		PFOS	12	<0.0001	0.29	0.026	0.083	4	2	EC (ind.)[17] – 1	EC (ind.) – 0.02[18]	EC (ind.) – yes
		PFOS + PFHxS	12	<0.0001	0.2987	0.028	0.085	5	0	0	-	-

[12] Health based criteria assuming commercial / industrial land use for the Construction Area and recreational / open space criteria for the Offset Area and for soil <2m and >2m. Ecological criteria assuming industrial commercial for the Construction Area and public open space / residential for the Offset Area for soil <2m (PFAS NEMP).
[13] UCL_{mean} – Upper confidence limit of the arithmetic mean.
[14] Excluding samples results greater than 250% of the adopted criteria.
[15] Standard deviation must be less than 50% of the adopted criteria.
[16] EC (ind.) – interim soil – ecological indirect exposure (PFAS NEMP) The ecological indirect exposure criteria of 0.14 mg/kg was adopted for the Construction Area on the basis that the Site has been intensively developed in the past and further intensive development is proposed which will limit the presence of secondary consumers and the potential for indirect ecological exposure.
[17] Hotspot exceedances of ecological indirect criteria are all located in areas that are proposed to be covered with impermeable pavement or building footprints.
[18] Standard deviation exceeds 50% of the adopted criteria.

Table C2 – Summary of Historical Neutral pH Leachate PFOS, PFOS + PFHxS and PFOA Concentrations On-site

Area	Depth (mBGL)	Analyte	No. of samples	Minimum conc. (µg/L)	Maximum Conc. (µg/L)	Mean Conc. (µg/L)	Standard Deviation (µg/L)	No. Samples >LOR	95% UCL_{mean} (µg/L)
The Site	< 2	PFOA	28	<0.01	0.13	0.012	0.024	6	-
		PFOS	28	<0.01	1.5	0.23	0.41	17	-
		PFOS + PFHxS	28	<0.01	1.68	0.27	0.48	21	-
	> 2	PFOA	10	<0.01	0.09	0.014	0.27	1	-
		PFOS	10	<0.01	5.8	0.64	1.8	3	-
		PFOS + PFHxS	10	<0.01	6.1	0.7	1.9	4	-

Table C3 – Summary of Historical Groundwater PFOS, PFOS + PFHxS and PFOA Concentrations On-site

Area	Analyte	No. of samples	Minimum conc. (µg/L)	Maximum Conc. (µg/L)	Mean Conc. (µg/L)	Standard Deviation (µg/L)	No. Samples >LOR	No. Samples > Criteria[19]	95% UCL_{mean} (µg/L)	95% UCL_{mean} Exceedance of Criteria
The Site	PFOA	9	<0.001	0.004	0.001	0.001	4	0	-	-
	PFOS	9	<0.0001	0.05	0.013	0.02	7	7	0.063	Yes
	PFOS + PFHxS	9	<0.001	0.171	0.052	0.064	8	2	0.0919	Yes

[19] Criteria adopted for human health (drinking water and recreational water quality) and ecological (Freshwater 99% species protection) (PFAS NEMP).

Assessment of Precursors

EP Risk (2018) reported that total oxidising precursor assay (TOPA) results indicated that total oxidising concentrations of PFOS and PFHxS + PFOS were generally decreasing in concentration post oxidation under laboratory conditions using a strong oxidant. Based on the laboratory results, it was considered unlikely that significant transformation of PFAS precursors would occur under the less oxidising conditions present on-site.

Sensitive Receptors

Sensitive receptors identified at and near the Site are:

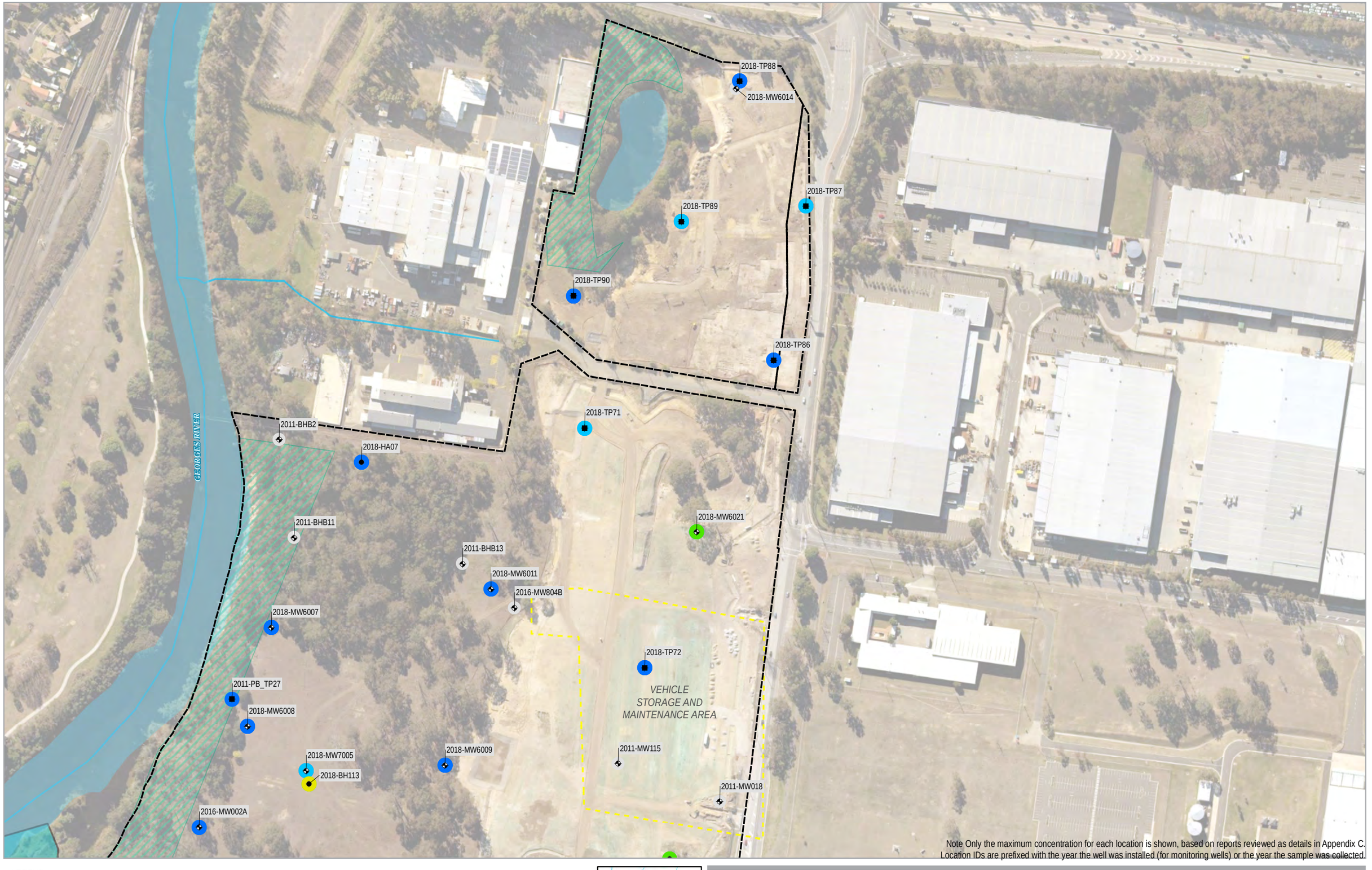
- On-site receptors:
    - Construction and subsurface maintenance workers and future commercial / industrial site users.
    - Future terrestrial flora and fauna in proposed landscaped areas.
- Off-site receptors:
    - Construction, remediation and subsurface maintenance workers and future commercial / industrial site users at the MPW Site.
    - Recreational users of the Georges River.
    - Recreational users who trespass on the Offset Area.
    - Terrestrial flora and fauna including threatened species in the Offset Area.
    - Terrestrial and aquatic flora and fauna dependent upon the Georges River and Anzac Creek.

Source-Pathway-Receptor Linkages

Based upon the findings of the most recent human health and ecological risk assessments prepared for the Site and the Georges River by EnRiskS (2019 and 2019a) and Golder (2015a), an analysis of the potential source-pathway-receptor linkages are provided in **Table C4** and illustrated in **Figure 4** in the '**Figures**' section of the report.

Table C4 – Source-Pathway-Receptor Linkages

Sources		Pathways		Receptors	Linkages
Primary	**Secondary**	**Transport Mechanisms**	**Exposure Pathways**		
AEC 3 – PFAS Impacted Area					
PFAS impact associated with residue from historical fire-fighting training	PFAS impacted soil and sediment within primary source areas and surrounding land.	- Leaching of PFAS through the soil profile to groundwater. - Leaching of PFAS from exposed soil to surface water.	Human Health: - incidental ingestion. - Dermal contact. - inhalation of dust.	- Construction, remediation, subsurface maintenance workers. - Future commercial / industrial site users.	Incomplete given PFAS concentrations below health-based criteria and assuming appropriate health and safety controls and PPE are implemented during construction or sub-surface maintenance works.
			Ecological (direct): - Direct uptake.	Terrestrial flora and fauna exposed to soil (<2 mBGL).	Incomplete given PFAS concentrations below ecological (direct) criteria.
			Ecological (indirect) - Bioaccumulation and biomagnification.	Terrestrial flora and fauna exposed to soil (<2 mBGL).	Potentially complete if appropriate soil management controls are not implemented in landscaped areas.
	PFAS impacted groundwater, surface water.	Groundwater migration and surface water flow to the Georges River and Anzac Creek.	Human Health: - Incidental ingestion. - Dermal contact.	- Construction, remediation, subsurface maintenance workers. - Future commercial / industrial site users.	Incomplete as it is unlikely that groundwater would be encountered during construction works or extracted for a beneficial use.
			Ecological: - Bioaccumulation and biomagnification.	Ecosystems dependent upon the Georges River and Anzac Creek.	Potentially complete if appropriate soil and water management controls are not implemented during construction due to the high leachability of PFAS in soils.



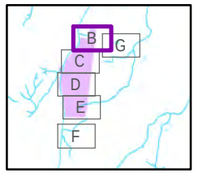
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C. Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Note: The location of 2018-BH113 has been provided in error in this drawing

Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
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Grid: GDA 1994 MGA Zone 56

N

GHD

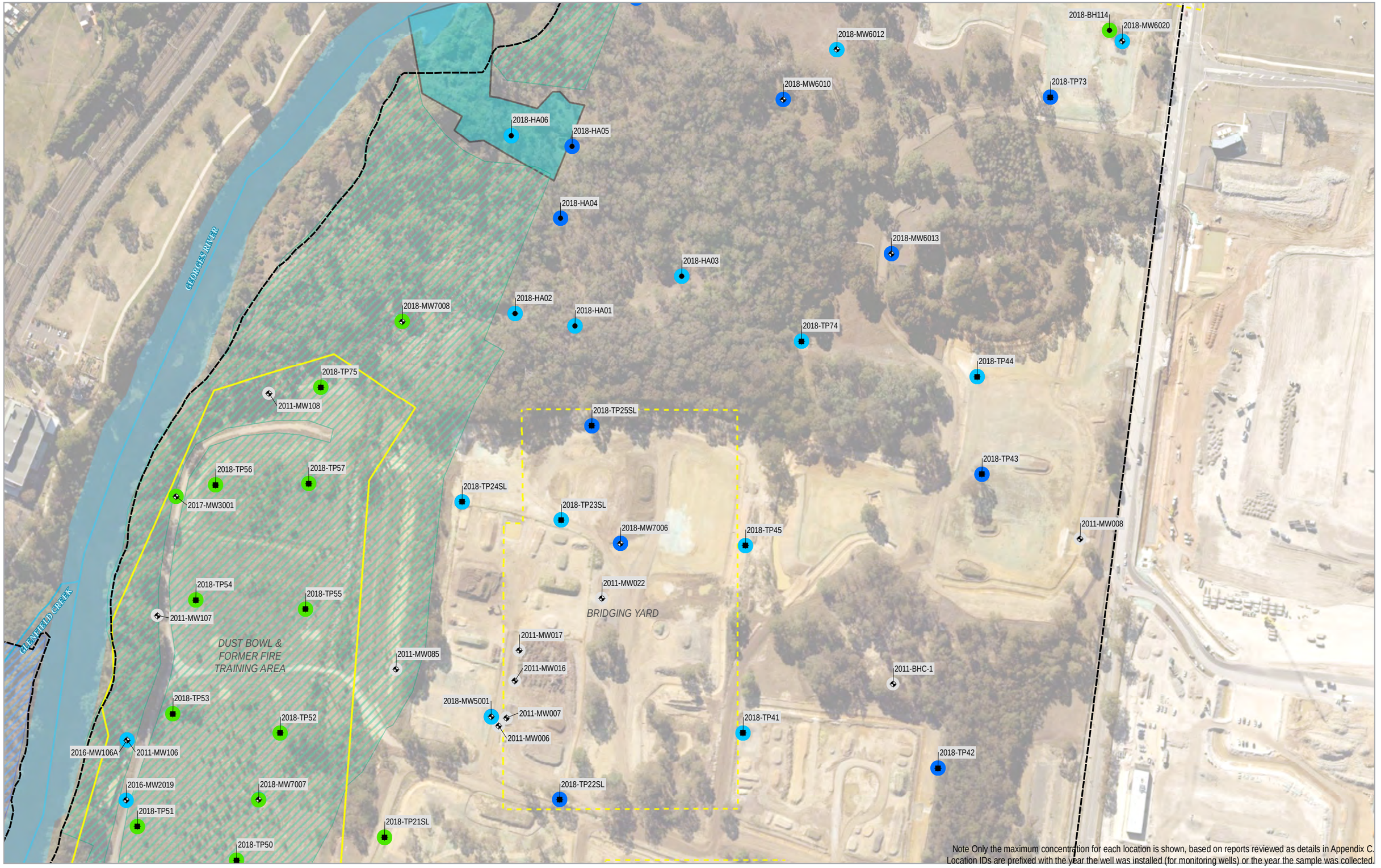
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Soil
PFOS + PFHxS Results
Grid 1

Project No.	21-28111
Revision No.	A
Date	12 Apr 2019

FIGURE 6B

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



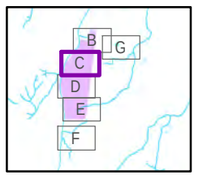
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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GHD

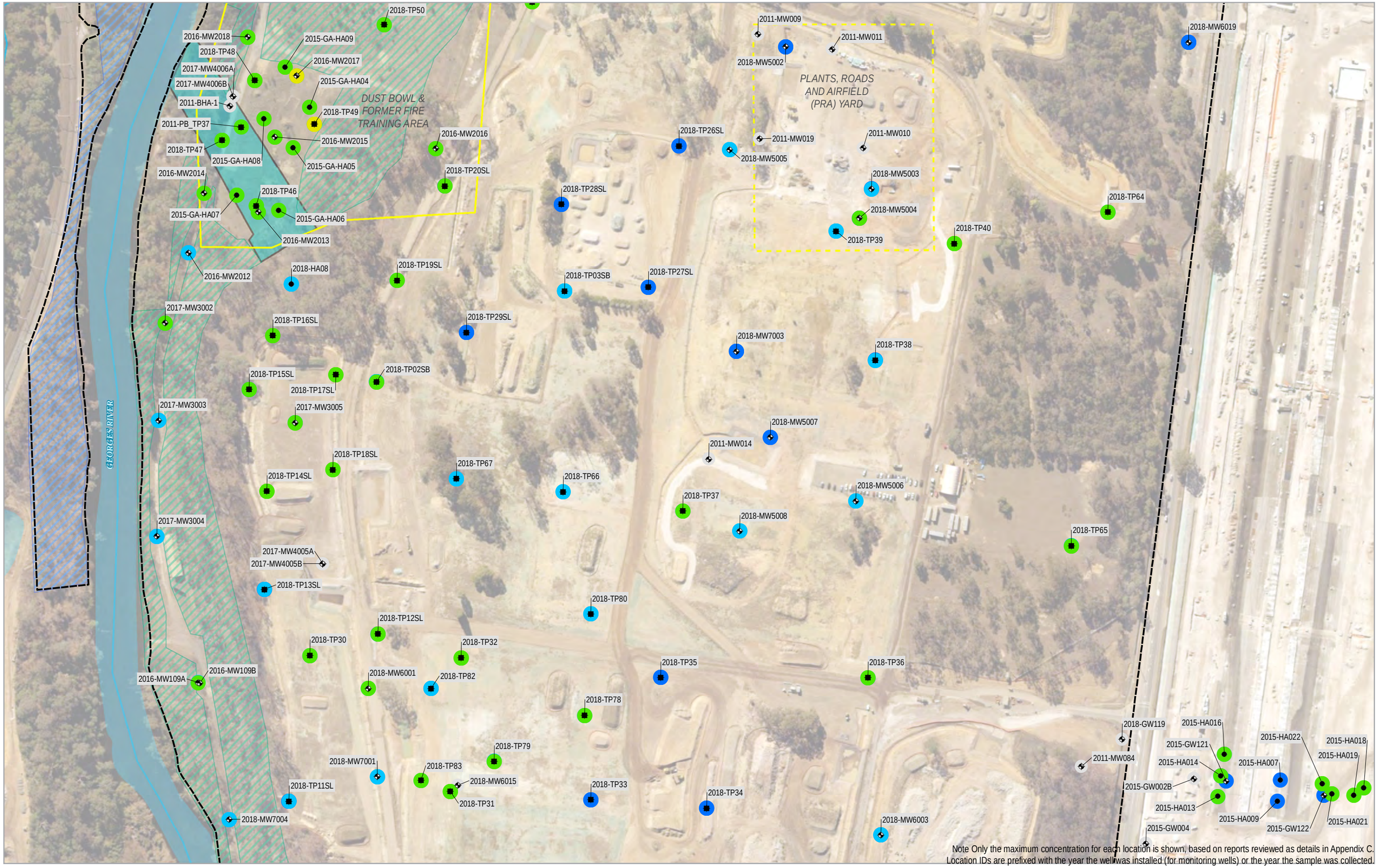
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Soil
PFOS + PFHxS Results
Grid 2

Project No.	21-28111
Revision No.	A
Date	12 Apr 2019

FIGURE 6C

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



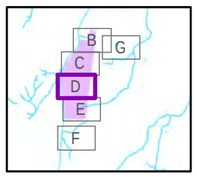
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

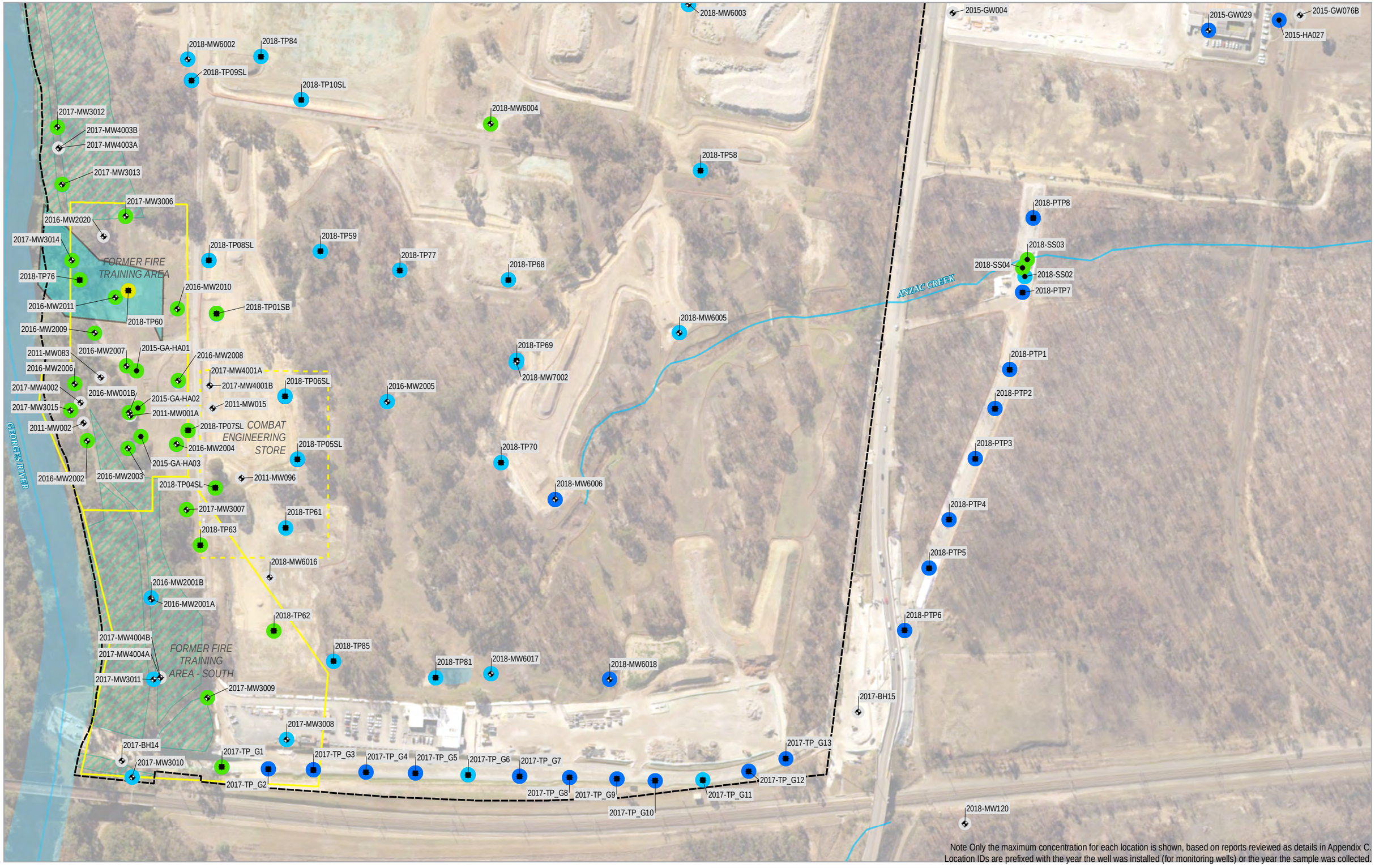
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Soil
PFOS + PFHxS Results
Grid 3

Project No.	21-28111
Revision No.	A
Date	12 Apr 2019

FIGURE 6D

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



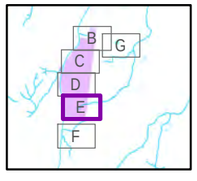
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Soil
PFOS + PFHxS Results
Grid 4

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 6E

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



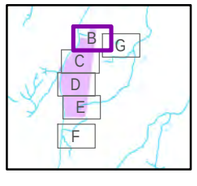
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

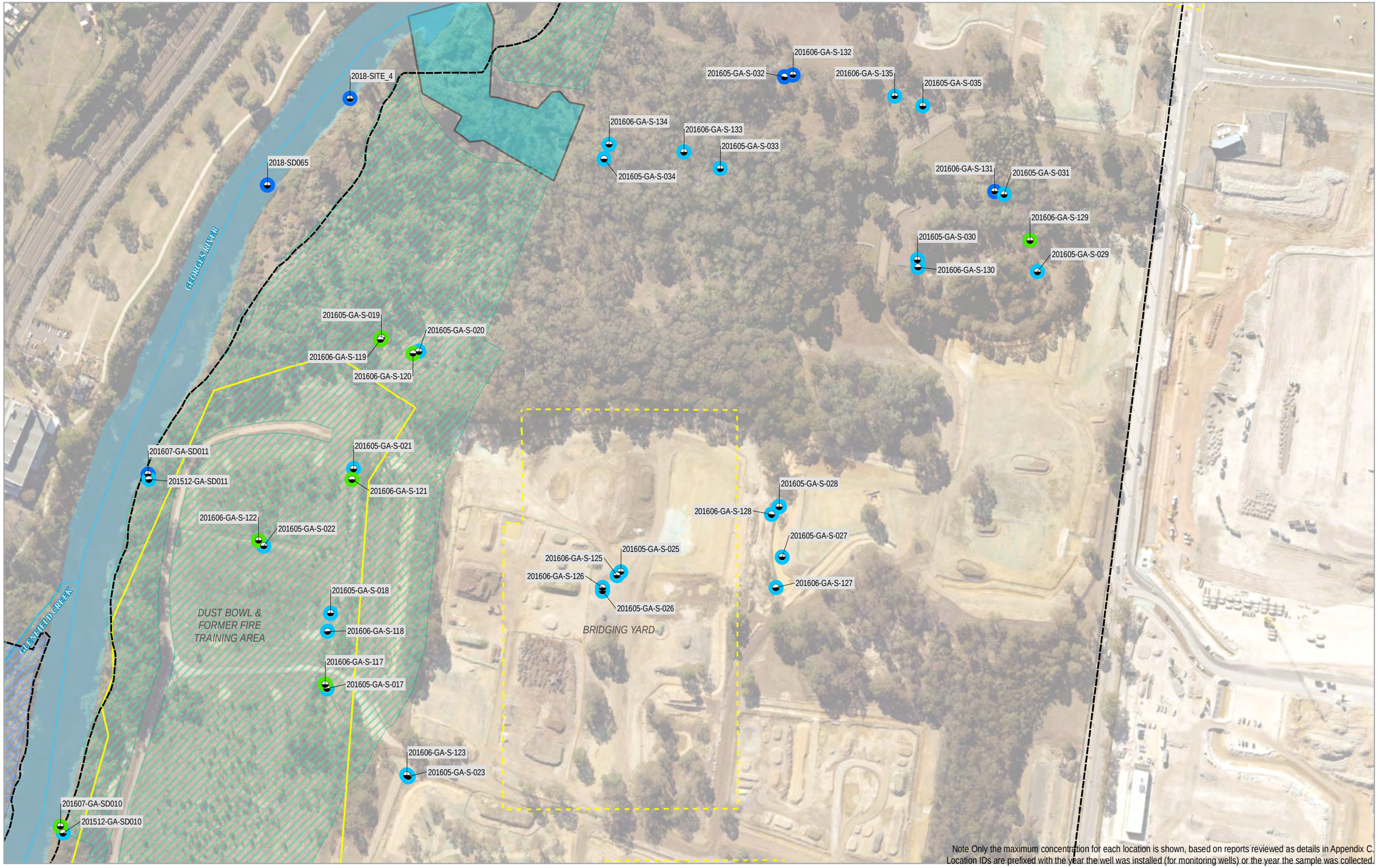
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Sediment
PFOS + PFHxS Results
Grid 1

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7B

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

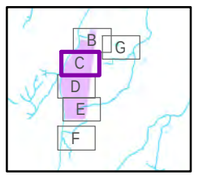
LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)

- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

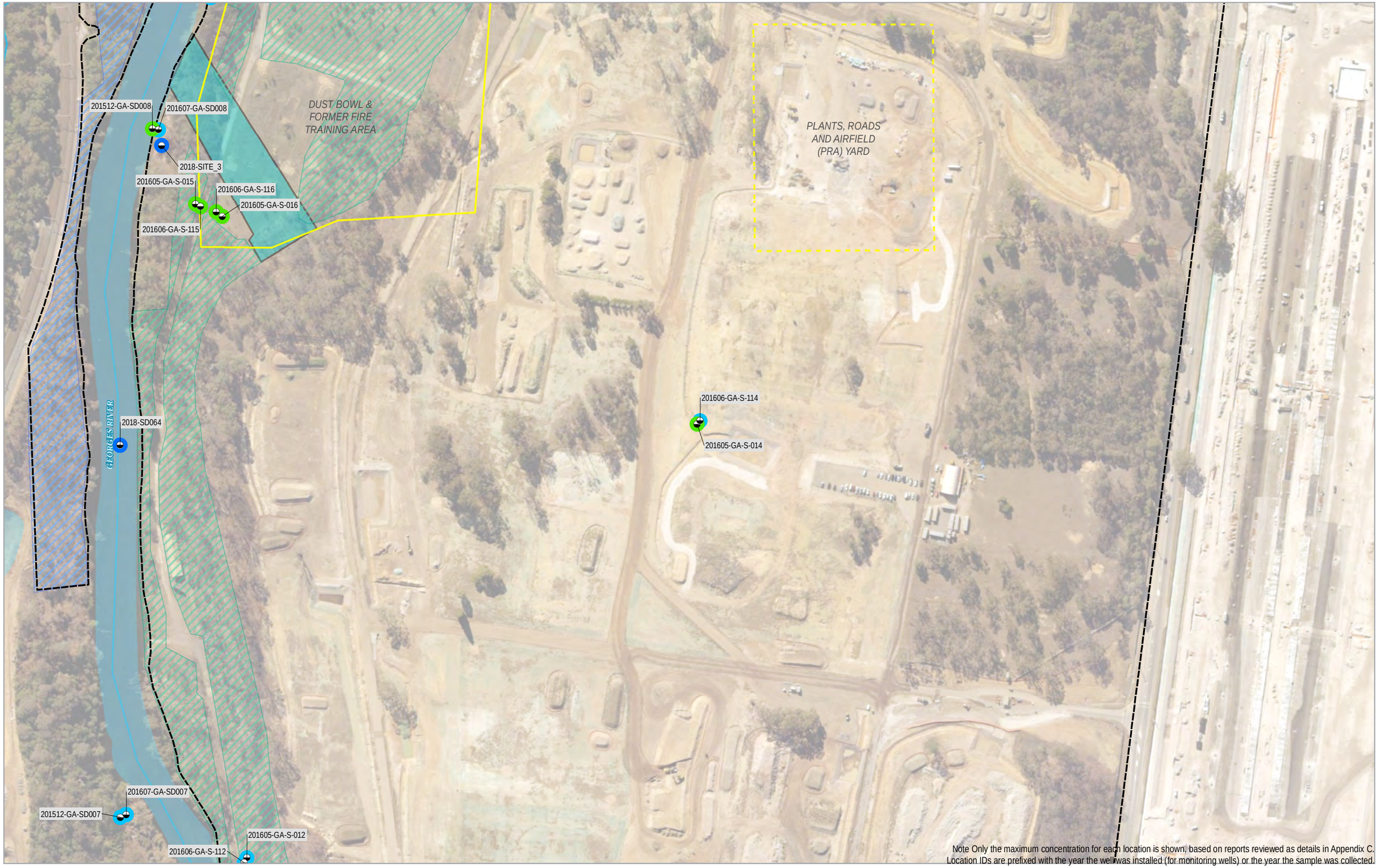
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Sediment
PFOS + PFHxS Results
Grid 2

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7C

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



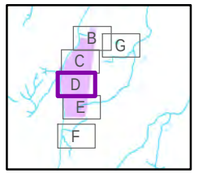
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

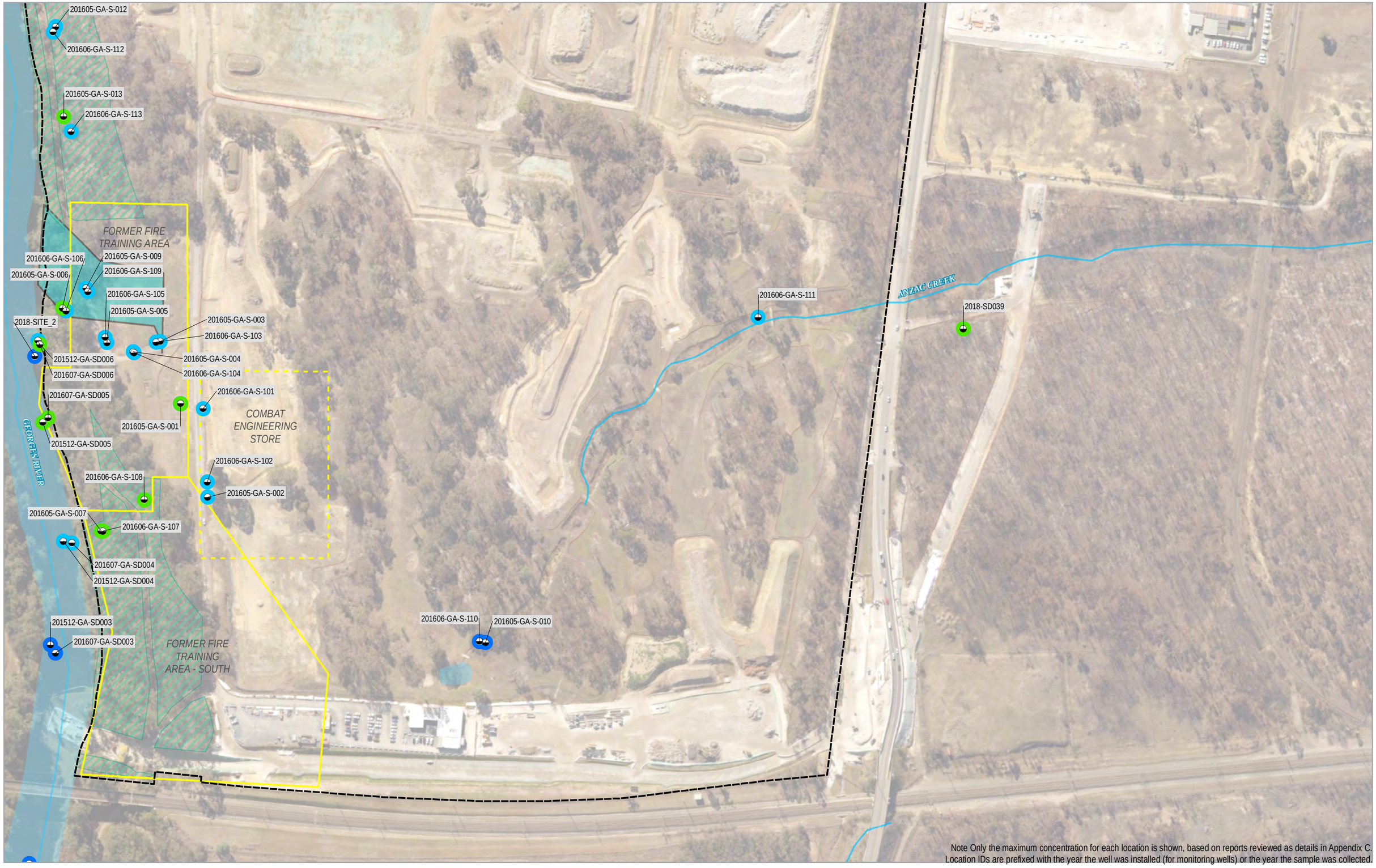
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Sediment
PFOS + PFHxS Results
Grid 3

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 7D

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



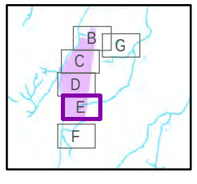
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Sediment Sample

Max PFOS + PFHxS Concentration (mg/kg)

- <LOR
- LOR - 0.01
- >0.01
- >1
- >5
- >10
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Sediment
PFOS + PFHxS Results
Grid 4

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Revision No. A
Date 12 Apr 2019

FIGURE 7E

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



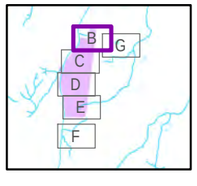
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Other Potential PFAS Source
- Moorebank Offset
- Drainage Basin (Approximate)
- Surface Water

Max PFOS + PFHxS Concentration (µg/L)

- <LOR
- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Surface Water
PFOS + PFHxS Results
Grid 1

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 8B

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

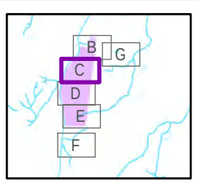
LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)

- Surface Water

Max PFOS + PFHxS Concentration (µg/L)

- <LOR
- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

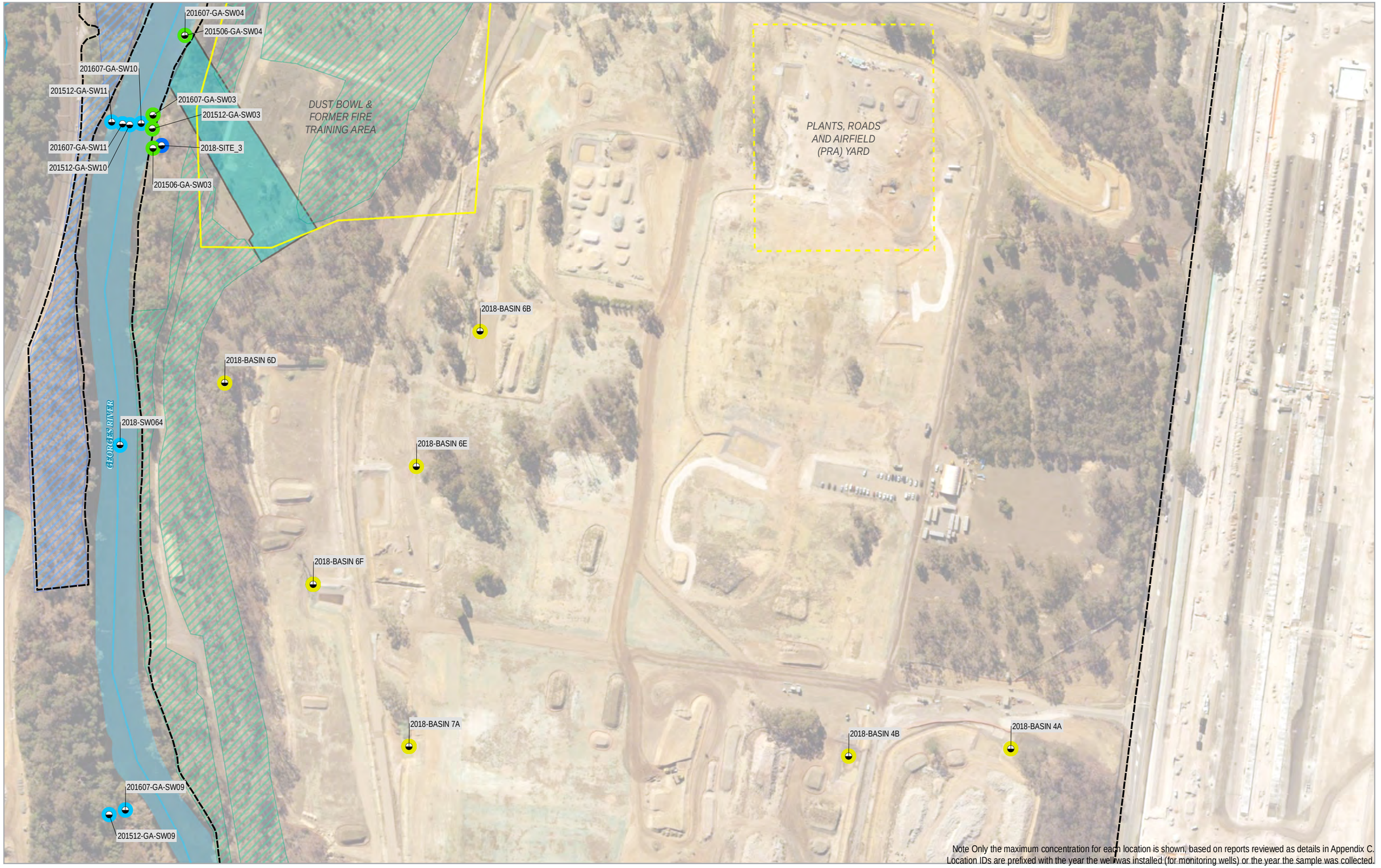
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Surface Water
PFOS + PFHxS Results
Grid 2

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 8C

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



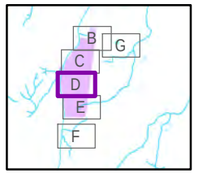
Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Surface Water

Max PFOS + PFHxS Concentration (µg/L)

- <LOR
- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data



Paper Size ISO A3

0 20 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

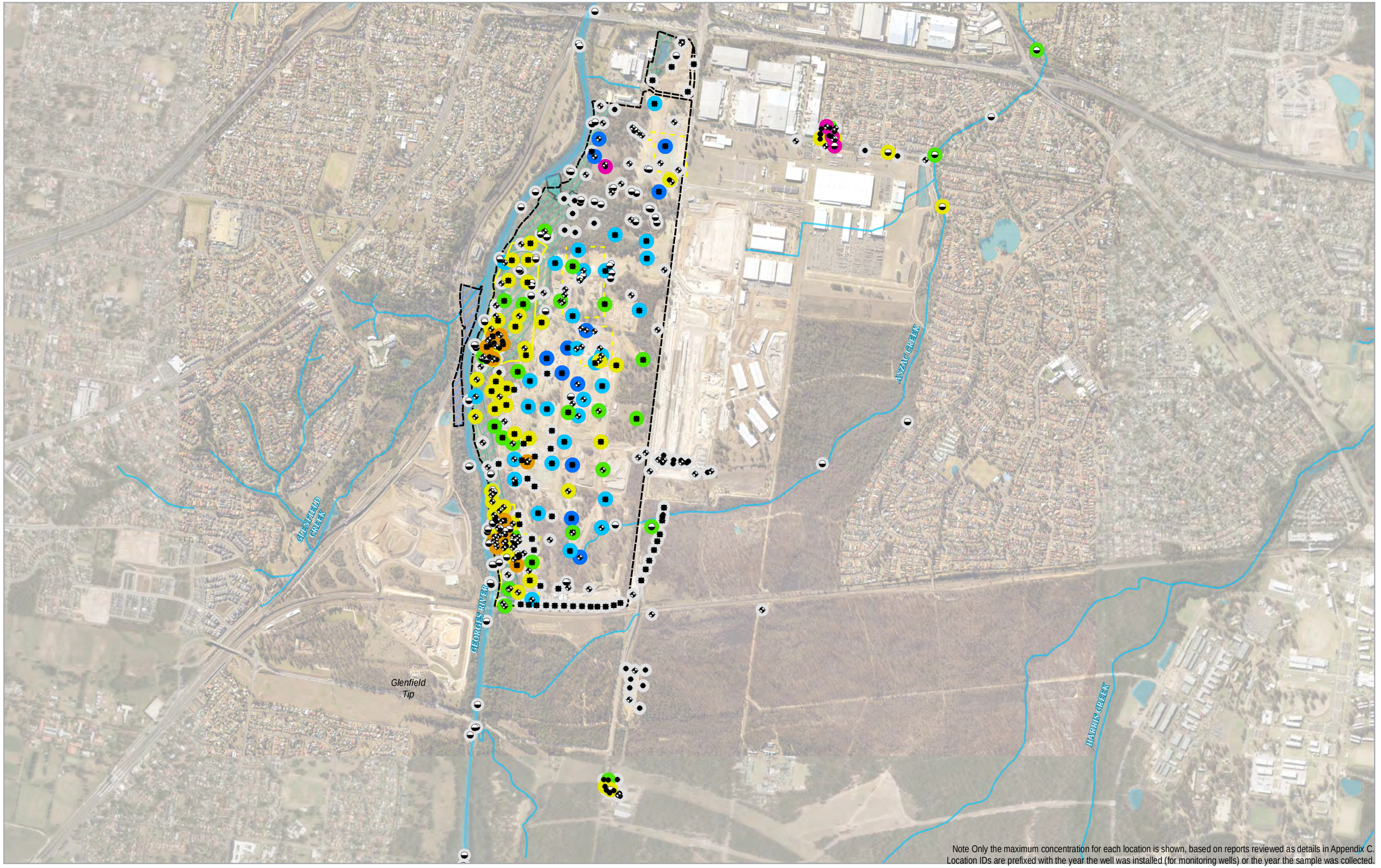
Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Surface Water
PFOS + PFHxS Results
Grid 3

Project No.	21-28111
Revision No.	A
Date	12 Apr 2019

FIGURE 8D

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber



Note Only the maximum concentration for each location is shown, based on reports reviewed as details in Appendix C.
Location IDs are prefixed with the year the well was installed (for monitoring wells) or the year the sample was collected.

LEGEND

- Investigation Area
- Liverpool Fire Station
- Key PFAS Source
- Other Potential PFAS Source
- Casula (Hourglass) Offset Biobank Site
- Moorebank Offset
- Drainage Basin (Approximate)
- Borehole/Hand Auger/Surface
- Monitoring Well
- Testpit
- Sediment Sample

Max PFOS + PFHxS Concentration (µg/L)

- LOR - 0.13
- >0.13
- >0.7
- >10
- >100
- No PFAS Data

Paper Size ISO A3

0 200 400

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Moorebank Intermodal Company Limited
Summary Report PFAS Investigations
Moorebank Precinct West

Soil & Sediment ASLP

PFOS + PFHxS Results Overview

Project No. 21-28111
Revision No. A
Date 12 Apr 2019

FIGURE 11

Data source: General Topo - NSW LPI DTDB 2018 (Date Extracted: 18 Feb 2019). Cadastre - NSW LPI DCDB 2018 (Date Extracted: 18 Feb 2019). Aerial Imagery - Sixmaps 2018. . Created by: mweber

Appendix B

ENVIRONMENTAL MANAGEMENT PROCEDURES

Land use restrictions		EMP 1
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To manage risk to human health and the environment through land use restrictions	
Areas of the Site	AEC - 3	

Beneficial Use of Groundwater

Groundwater must not be abstracted from the Site for any beneficial use.

Future Excavation

The management measures for future excavation within AEC 3 and across the Site must be conducted in accordance with **EMP 2, EMP 5** and **EMP 7.**

Cessation of Land Use Restrictions

The land use restrictions provided in **EMP 1** can be removed where a site specific human health and ecological risk assessment concludes that a risk to human health and the environment is no longer present and subject to approval by a NSW EPA accredited Site Auditor and / or the NSW EPA.

Subsurface Works – AEC 3		EMP 2
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Stage 2 Works and Operation	
Objective:	To protect human health and the environment	
Areas of the Site	PFAS Impacted Areas (AEC) underlying the Engineered Fill.	

Human Health

Based on the EnRiskS (2019) Land HHERA, the potential risk to human health associated with workers having direct contact with PFAS in soil, sediment and water was low and acceptable on the assumption that typical workplace safety protocols and PPE are implemented. In order to manage exposure of PFAS to workers at the Site, the following management controls should be implemented during excavation works within PFAS impacted areas:

- Project inductions to identify areas with high risk of PFAS contamination.
- Prepare SWMS to identify risks associated with PFAS and appropriate control measures.
- Where appropriate, the area of the excavation/disturbance shall be appropriately separated from the balance of the Site to minimise inadvertent traffic and/or worker exposure.
- PPE used in the PFAS impacted area to include:
  - Disposable coverall suits including boots.
  - Disposable waterproof nitrite gloves in addition to standard glove requirements.
  - All other standard PPE required for works on Site.
- Signage placed in ablution blocks to ensure all workers wash hands and face prior to eating, regardless if gloves are worn.
- If worker's skin comes into contact with PFAS impacted water, ensure skin is immediately washed with clean water and wet clothing is removed immediately after work is complete.
- Dewatering of water in excavations impacted with PFAS should be avoided where practicable.

Ecological

EnRiskS (2019) reported PFAS impacted soil is leachable and the following control measures should be implemented to minimise the risk to ecological receptors during construction:

- Excavation to be scheduled to minimise the area of PFAS impacted soil exposed at any one time.
- All soils excavated from AEC 3 should be handled in alignment with the requirements for PFAS-Impacted Stockpiles in **EMP 4**.
- Erosion and sediment controls outlined in **EMP 11** to be adopted to minimize the potential for leaching and migration to surface water bodies.
- When PFAS impacted soil is to be temporarily stockpiled, it should be stockpiled on impermeable surfaces (e.g. hardstand, high density polyethylene (HDPE) plastic or geomembrane) within a designated area.
- Appropriate bunding (e.g. hay bales or silt fences) should be placed around stockpiles.

Subsurface Works – AEC 3	EMP 2

- Stockpiling areas should not be located near stormwater drains, pits or gutters.
- Water runoff from stockpiling areas should be managed and retained at the Site or under the relevant management plan for the receiving area of the MPW Site and not be allowed to flow into the Offset Area and off-site to surface water bodies (Anzac Creek and Georges River) (refer to **EMP 11** for management of surface water).
- During windy weather conditions, dust control measures should be implemented (e.g. fine water spray or covers).
- Odour suppressant should be applied to the soil where odorous soils are encountered.
- Where practicable, excavated soil should be backfilled in the excavation in the reverse order to which it was excavated.
- Where excavated soil is surplus to requirements, then the soil should be classified in accordance with **EMP 6**.
- Materials tracking, and off-site disposal records and documentation should be retained for all soil that is to be reused on-site or disposed offsite in accordance with **EMP 6**.

Earthworks and Excavation

Where soil is excavated during earthworks, soil reuse opportunities should be adopted in accordance with **EMP 5**.

Materials Tracking		EMP 3
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Stage 2 Construction Works	
Objective:	To protect human health and the environment	
Areas of the Site	AEC 3 and Unexpected Finds	

Impacted materials generated as part of the construction works will be tracked via a Materials Tracking Plan (MTP) by the Principal Contractor. The aim of the MTP is to identify the source and destination of all materials on the Site at any time and requires the following tasks:

- Establish and maintain a nomenclature system for identification of all source and destination areas for soil both on and off the Site. This includes excavations, stockpiles (both clean and potentially contaminated), soils for treatment or disposal (including destination) and offsite sources of material.
- Use appropriate signage to identify the classification of the material and area number for each excavation prior to soil movement using the project documentation or in consultation with the Contract Administrator, prior to work being undertaken.
- Complete a 'Record of Soil Movement' sheet identifying the source of the materials, classification, volume, and destination area of each load of material moved on or off-site.
- Place the soil in an approved location for the material based on its soil classification.
- Maintain the location of the soil without mixing with other soil classes.
- Educate all operators in the requirements of the system.
- Monitoring and Review.

Stockpile Management		EMP 4
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required in the event of the stockpiling of soil	
Objective:	To minimise the risk to human health and the environment from the stockpiling of soil.	
Areas of the Site	AEC 3 and Unexpected Finds	

General Stockpiles

All stockpiles will be managed in accordance with the CEMP and sub-plans, and in accordance with the EPBC Act conditions of approval for 2011/6086 and maintained in an orderly and safe condition. Batters would be formed with sloped angles that are appropriate to mitigate collapse or sliding of the stockpiled materials. Stockpiles are to be placed at approved locations and would be strategically located to mitigate environmental impacts while facilitating handling requirements. Stockpiles would only be constructed in areas of the Project site that had been prepared in accordance with the requirements of the Project Preliminary RAP in Appendix G of Technical Paper 5 – Environmental Site Assessment (Phase 2), Volume 4. All such preparatory works would be undertaken prior to the placement of material in the stockpile. Stockpiles must be located on sealed surfaces such as sealed concrete, asphalt, high density polyethylene or a mixture of these, to appropriately mitigate potential cross contamination of underlying soil. All stockpiling to be undertaken in accordance with the Costin Roe Consulting Pty Ltd (2020) Construction Soil and Water Management Plan.

Earthworks undertaken as part of construction and ongoing works within the Site, which are located outside of AEC 3 may temporarily generate excess material which may be stockpiled for re-use subject to assessment by the Environmental Consultant (as required). Unless some event or observation indicates the material excavated and placed into the stockpile is potentially contaminated, no treatment is required other than normal dust suppression, and erosion controls in accordance with relevant CEMP requirements.

Where temporary stockpiling is permitted such stockpiles shall be installed and maintained to eliminate risk to workers and other people due to exposure to contaminants in dust or vapours and risk to the environment as a result of silt or contamination of stormwater in accordance with the any site materials management and tracking plan as part of the CEMP.

If cover is required, they shall extend beyond the footprint of the stockpiles and shall be secured to prevent being blown away by wind. Stockpiles must be placed in a secure location onsite and covered if to remain for more than 24 hours. Stockpiles will be placed at approved locations and located to mitigate environmental impacts while facilitating material handling requirements.

Where the material is suspected to be contaminated then it should be managed in accordance with the Unexpected Finds Protocol provided in **EMP 8.**

Contaminated Stockpiles

If assessment by the Environmental Consultant or the Ordnance Contractor identifies contamination in soil excavated from the Site, or a stockpile is observed to be contaminated, then the Environmental Consultant will assess the stockpile in accordance with the unexpected finds protocol (**EMP 8**) to delineate the contamination and assess the extent of management, if required.

Contaminated or potentially contaminated materials would only be stockpiled within areas of the Site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas

(e.g. hardstand areas).

PFAS Impacted Stockpiles

In addition to the general and contaminated stockpile management controls provided above, the following additional management controls in accordance with the PFAS NEMP provided in **Table 1_EMP 4** should be applied for PFAS impacted soil, which exceeds the adopted site criteria. Historical concentration of PFAS within soil and groundwater are provided within **Appendix A**.

Table 1_EMP 4 – Temporary PFAS Stockpile Management

Stockpile Description	**Timeframe**	**Storage infrastructure for solid wastes and contaminated equipment**
Transient	Less than 48 hours with no rain predicted	Covered stockpile or storage area on impervious bottom liner (e.g. tarp, plastic sheeting, membrane, etc.).
Temporary	From 48 hours to 6 months	Managed stockpile, covered, on impervious, bunded hardstand, with effective stormwater controls (e.g. diversion drains, banks, etc.).
Short-term	From 6 months to 2 years	Constructed stockpile with robust anchored covers, impervious bottom liner, and effective stormwater controls to ensure that rainwater and sheet flow do not contact impacted solids.
Medium-term	From 2 to 5 years	Engineered containment facility, with effective stormwater controls.
Long-term •	More than 5 years	Engineered containment facility, with effective stormwater controls.

Minor Excavation		EMP 5
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Stage 2 works	
Objective:	To ensure that appropriate reuse of soil the exceeds the PFAS site criteria (PFAS impacted materials) is achieved during Stage 2 works to ensure that there are no additional risks to human health or the Environment.	

Reuse of Soil

There is potential for relatively minor disturbance of underlying soils during construction works, however, excess spoil is unlikely to be suitable as growing medium in landscape areas and would likely be managed disposed of off-site or transported to MPW. Additional unexpected finds or assessments for reuse (if required) would be subject to the implementation of the following measures provided by EnRiskS (2020) or a separate risk assessment.

Assessment of Soil for Reuse

The result of soil and leachate (neutral pH) PFAS testing results from the proposed cut areas during Stage 2 works at the MPW Site are provided in **Appendix A**. Prior to breaching of the Engineered Fill layer, the soil and leachate (neutral pH) analytical results summarised in **Appendix A** should be reviewed and assessment should be made by the Environmental Consultant as to whether soil can remain on-site, be transported to the MPW Site or whether waste classification is required.

Where additional excavation is required within AEC 3 then additional assessment / delineation may be required where there is insufficient data available. Additional in-situ sampling or stockpiling sampling must be undertaken in accordance with the following as a minimum:

- Sampling should be undertaken by a suitably qualified Environmental Consultant.
- Additional insitu / delineation sampling to be undertaken in accordance with the NSW EPA Sampling Design Guidelines (1995).
- Samples to be collected from 0-0.2 mBGL, 0.5 mBGL, 1.0 mBGL and every metre thereafter to a maximum depth of 0.5 mBGL beyond the maximum proposed depth of excavation.
- Stockpile sampling to be undertaken in accordance with the sampling methodology provided in **EMP 6**.

Additional testing of site won stockpiles will be required where:

- Stockpiles have reported detectable PFAS total concentrations above the laboratory limit of reporting, but leachate testing was not undertaken.
- Soil in the stockpile has been excavated from AEC 3 and has not been sampled or tested.
- Soil tracking documentation identifying the source location of the stockpile is not available.

Sampling of stockpiles should be undertaken in accordance with the following:

- One test per 25 m^3 for soils assessed for volumes less than 200 m^3.
- The use of the statistical assessment of the data set from each stockpile in accordance with the ASC NEPM (2013), with a total number of samples of not less than 10 collected from each stockpile (e.g. for a maximum size stockpile of 2,500 m^3, the sampling frequency of one test per 250 m^3 will be adopted).

Minor Excavation	EMP 5
Analytical testing of additional soil sampling for assessment of reuse opportunities at the Site should include the following analytes: • PFAS suite (28 analytes). • AUS leaching Procedure (neutral pH) for PFAS. Soil results should be compared against the relevant standards for site suitability if to remain on-site or requirements for the receiving site's LTEMP. ***Site Specific Risk Assessment*** Future works that require excavation of soil in the reuse zones can only be undertaken in accordance with the management procedures provided as **EMP 5**, unless a further additional site-specific risk assessment is conducted.	

Off-site Disposal of Excavated / Unsuitable Material		EMP 6
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Continuous	
Objective:	To ensure that surplus material is appropriately classified for off-site disposal or reuse and lawfully disposed from the site.	

Minimise Waste

It is recommended that disturbance of soil within AEC 3 should be minimised by incorporating the following into the construction methodology:

- Conventional footings where practical should not penetrate below the imported fill layer, to minimise the requirements for disposal of excavated contaminated material.
- Where pier footings are required, screw piles would be recommended over bored piers.
- Minimise excavation of materials below the imported fill layer to reduce disposal costs of excavated material.
- Reuse and retain material on the Site where practicable.

Stockpile Classification

Where the Site Owner (or nominated representative) identifies the requirement to remove material from the Site, the material is required to be characterised by an Environmental Consultant to evaluate potential off-site removal options.

The Environmental Consultant shall consider the relevant requirements of NSW legislation, regulations, and guidelines in the identification of appropriate options for off-site disposal / reuse including, but not limited to the following:

- NSW EPA Waste Classification Guidelines (EPA 2014):
    - Part 1: Classifying waste.
    - Part 2: Immobilising Waste.
    - Part 3: Waste containing radioactive material.
    - Part 4: Acid Sulfate Soils.
    - Addendum to Part 1: Classifying Waste.
- Excavated Natural Material Exemption (2014) and Excavated Natural Material Order (2014).
- Relevant resource recovery orders and resource recovery exemptions made by the NSW EPA.

The requirements for use of licensed vehicles, waste tracking, covering of vehicles, etc. as noted in the POEO (Waste) Regulation (2014) will be identified by the Environmental Consultant and documented as part of a waste classification report to facilitate off-site disposal of waste material to a facility with the appropriate NSW EPA Environmental Protection License to accept the classified material.

Disposal records for all material removed from the site shall be required to be provided to the Site Owner or appointed representative, by the appointed contractor upon completion of the disposal works. These records will be maintained in accordance with **EMP 16**. The records will be made available to the Environmental Consultant engaged to prepare final site condition reports upon request to demonstrate the lawful off-site disposal of material from the Site.

ACM conduits or ACM impacted soils identified as unexpected finds must be disposed offsite as Special Waste

(Asbestos) in combination with other classes of waste (if applicable). Asbestos waste is to be tracked in accordance with Clauses 76 and 79 of the POEO (Waste) Regulation 2014.

Stockpile Classification Testing for Off-site Disposal

Stockpile classification testing will be undertaken by the Environmental Consultant in accordance with the following:

- All stockpiles must be classified prior to off-site disposal. Stockpiles of general fill (non-soil) may be classified visually based on their waste content and observations. All other stockpiles will be classified based on classification testing, with samples scheduled for laboratory analysis of the contaminants of concern corresponding with the source of the stockpile.
- Classification testing will be undertaken by the Environmental Consultant, and classification samples will be collected from the stockpiled material at the following sampling frequency:
    - One test per 25 m^3 for soils assessed for volumes less than 200 m^3.
    - The use of the 95% UCL_{mean} value for the data set from each stockpile, with a total number of samples of not less than 10 collected from each stockpile (e.g. for a maximum size stockpile of 2,500 m^3, the sampling frequency of one test per 250 m^3 will be adopted).
- Sampling densities for resource recovery should be undertaken in accordance with the respective resource recovery order and exemption.

Liquid Wastes

All liquid wastes requiring offsite disposal should be classified in accordance with NSW EPA (2014).

Subsurface Maintenance Works		EMP 7
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Operation	
Objective:	To ensure that subsurface maintenance works will not result in risk to human health and the environment.	

Given that the depth of fill material imported to the Woolworth Site is in excess of 1 m, and the depth of any anticipated subsurface maintenance activities will not likely penetrate depths greater than 2 mBGL, the risk to subsurface maintenance contractors undertaking routine subsurface maintenance is considered to be low.

Should subsurface maintenance works exceed the depth of imported fill material and encounter natural site soil then the following procedure should be followed.

Work Health and Safety

All works are to comply with the Work Health and Safety Act (2011). Note any works involving confined spaces should also be carried out in accordance with AS 2865: Safe Working in a Confined Space (2009) and any revisions. Pits or excavations may be considered confined spaces due to the limitations on egress and the potential accumulation of vapours or presence of depleted oxygen within the pits or excavations.

Any subsurface works that penetrate the capping layer shall include the following measures:

- Providing a safe work method statement (SWMS). This shall be reviewed and authorised by the Site Owner (or their representative) or any future occupier.
- All upstream stormwater flow to be redirected around the work area.
- All stormwater from the works area to be diverted through sediment controls.
- If encountered, groundwater is always to be kept contained.
- If any strong odours are present on breaching sealed surfaces, or in an excavation, a precautionary approach shall be applied to consider if additional management measures are required to manage vapour inhalation risk prior to proceeding. The UFP (**EMP 8**) must be implemented.
- Respiratory protective equipment (RPE) would also be provided for subsurface works where necessary.
- Air monitoring would be mandatory for entry into confined space works within excavations.
- Additional controls may include the use of blowers to increase flushing of the trench/excavation with fresh air.

All workers potentially exposed to impacted materials are required to wear appropriate levels of PPE, which shall include as a minimum:

- Long sleeve shirt and trousers.
- Appropriate respirator.
- Head covering.
- Over boots.
- Gloves.

Subsurface Maintenance Works	EMP 7

Ecological

Excavation and reinstatement of excavations should consider the following general principles:

- Stockpiling of excavated soil to be managed in accordance with **EMP 4**.
- Excavated imported fill material that was stockpiled separately after excavation is to be returned to the excavations in the reverse order to which it came out.
- Reuse of excavated soil to be undertaken in accordance with **EMP 5**.
- Movement of soil should be tracked in accordance with **EMP 3**.
- All surplus soil removed from excavations must be classified in accordance with NSW EPA (2014) Waste Classification Guidelines and NSW EPA (2016) Addendum for PFAS prior to disposal at an appropriately licensed facility in accordance with **EMP 6**.
- Recontoured site surfaces must permit free drainage and not permit ponding of surface water.
- All discharges of water from the site comply with the EPL.

Unexpected finds		EMP 8
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Stage 2 Works and Operation	
Objective:	To minimise exposure of contractors and site personnel to impacted sub-surface soils during future excavation works beneath the Site.	

During Stage 2 Works

An unexpected finds protocol (UFP) has been prepared by SIMTA (2018)[20] for the Stage 2 works in accordance with SSD 7709. This UFP has been developed to manage the unexpected discovery of contamination within imported spoil, heritage items, threatened flora and fauna, and onsite contamination during the construction phase of Stage 2 Works. A copy of the SIMTA 2018 UFP is provided as **Appendix D** and has been incorporated into the CEMP for Stage 2 Works. An unexploded ordnance (UXO) Risk Review and Management Plan has been prepared by Gtek (2019)[21] to inform management of any unexpected finds involving UXO.

During Operation

During subsurface maintenance works post construction, there is a possibility some hazards within the Site have not been identified to date. The nature of hazards which may be present, and which may be discovered are expected to generally be detectable through visual or olfactory means, for example:

- The presence of significant aggregates of friable or non-friable asbestos materials (visible) including redundant services conduits.
- Excessive quantities of Construction/Demolition Waste (visible).
- Hydrocarbon impacted materials (visible/odorous).
- Drums or underground storage tanks (USTs) (visible).
- Oily Ash and/or oily slag contaminated soils/fill materials (visible/odorous).

As a precautionary measure to ensure the protection of the workforce, should any of the abovementioned substances (or any other unexpected potentially hazardous substance) be uncovered during ground disturbance activities, then the following should be immediately implemented:

- Stop work within the area. Isolate the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc.) to prevent exposure to site personnel and/or off-site airborne dust migration.
- an Environmental Consultant should be immediately contacted to determine an appropriate course of action regarding the assessment and/or management of the “Unexpected Find”.

It is envisaged the assessment strategy will be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

The Environmental Consultant will also be responsible for any reporting necessary to document the details of the Unexpected Find and the results of the validation sampling and will be responsible for providing

[20] SIMTA (2018) Unexpected Finds Protocol, Moorebank Precinct West Stage 2, dated 26 October 2018 (ref: MIC2-QPMS-EN-APP-00022).
[21] Gtek (2019) Unexploded Ordnance (UXO) Risk Review and Management Plan, Moorebank Precinct West Stage 2 (MPW2) Incorporating Moorebank Avenue Upgrade Works (MAUW) Moorebank, NSW, dated 9 October 2019 (ref: 17114EPR1, version 1.01).

Unexpected finds	EMP 8

clearance certificates stating it is suitable to resume works at the remediated Unexpected Find area.

The UFP for the operational facility post construction should be developed at the completion of Stage 2 works when the LTEMP is updated.

Management of Unexpected Asbestos Finds

Should asbestos be identified as an unexpected find during soil disturbance works, the following procedures for the safe removal of asbestos must be adopted:

- All asbestos removal, transport and disposal must be performed in accordance with the Work Health and Safety Regulation 2011 (WH&S Regulation).
- The removal works would be conducted in accordance with the Code of Practice – How to Safely Remove Asbestos (SafeWork NSW, August 2019).
- An appropriate asbestos removal licence issued by SafeWork NSW would be required for the removal of asbestos impacted soil.
- Environmental management and WH&S procedures would be put in place for the asbestos removal during excavation to protect workers, surrounding residents and the environment.
- Temporary stockpiles of asbestos containing material (ACM) soils would be covered to minimise dust and potential asbestos release.
- An asbestos removal clearance certification would be prepared by an occupational hygienist at the completion of the removal work. This would follow the systematic removal of asbestos containing materials and any affected soils from the Project site and validation of these areas (through visual inspection and laboratory analysis of selected soil samples).
- Asbestos fibre air monitoring would be undertaken during the removal of the asbestos materials and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with Code of Practice – How to Safely Remove Asbestos (SafeWork NSW, August 2019).

Additional Validation Requirements		EMP 9
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure contamination management activities and unexpected finds have been appropriately characterised and validation for the intended land use.	

Unexpected Finds requiring remediation or soil reuse will require validation which should be undertaken in accordance with the methodology and criteria provided in Section 7 of the Golder (2016) RAP. Additional information relating to validation relevant to the LTEMP is provided below.

AEC 3

The following information to verify that appropriate reuse or off-site disposal of surplus material is to be undertaken:

- Soil tracking data to confirm the source and final location of PFAS impacted soil reused at the Site in accordance with **EMP 3**.
- Soil sampling and analytical results to confirm that the soil meets the requirements for reuse outlined in **EMP 5** and the receiving LTEMP.
- Survey data to confirm the location and depth of PFAS impacted soil reused at the Site under the conditions of reuse provided in **EMP 5**.
- Soil classification data and landfill receipts for soil disposed off-site.

Unexpected Finds

Validation of Unexpected Finds will be undertaken as per Section 8 of the RAP (Golder 2016). The usability of the data collected during the validation program will be assessed in accordance with Section 8.7 of the RAP (Golder 2016).

Validation reporting

Validation reporting should be prepared in accordance with the NSW EPA (2020) *Guidelines for Consultants Reporting on Contaminated Land*.

Management of Groundwater		EMP 10
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure that groundwater is managed so as not to present a risk to human health or the environment.	

Based upon previous assessments undertaken, elevated levels of PFAS in groundwater samples collected have been reported at the Site (**Appendix A**). Further discussion of groundwater management is provided below.

Groundwater Extraction

Groundwater extraction during and post construction is not permitted at the Site for any beneficial use in accordance with **EMP 1**. Based upon the proposed commercial / industrial land use of the Proposed Development and the availability of a reticulated water supply, it is considered the requirement for the beneficial use of groundwater at the Site is low.

It is not anticipated that groundwater will be encountered during construction of the Proposed Development and construction dewatering of contaminated groundwater should be avoided where practicable. However, should construction dewatering be unavoidable then a Dewatering Management Plan must be prepared which details appropriate control measures to manage and treat contaminated groundwater which is generated from dewatering. An extraction licence should be sought form the appropriate regulatory authority prior to commencing dewatering in accordance with the relevant legislation (if required).

Worker Health and Safety

In order to manage workers exposure to contaminated groundwater the following should be implemented for works where groundwater is expected to be encountered:

- Project inductions should be undertaken to identify areas with high risk of groundwater contamination.
- SWMS and JSAs to identify hazards associated with contaminated groundwater and detail appropriate control measures.
- PPE used in high-risk areas including:
  - Disposable overall suits including boots.
  - Disposable waterproof nitrite gloves in addition to standard glove requirements.
  - All other standard PPE required for works on Site.
- Signage placed in ablution blocks to ensure all workers wash hands and face prior to eating, regardless if gloves are worn.
- If worker's skin comes into contact with contaminated water, ensure skin is immediately washed with clean water and wet clothing is removed immediately after work is complete.

Groundwater Monitoring

Groundwater monitoring is not required for the Site unless required to address unexpected finds or if groundwater is expected to be encountered during construction / operation.

Management of surface water		EMP 11
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure that surface water is managed so as not to present a risk to human health or the environment.	

Based upon previous assessments undertaken, disturbance of soil in the AEC 3 has the potential to leach PFAS to stormwater during future minor excavation works. Further discussion of surface water management is provided below.

Management of On-site Surface Water

Use of contaminated surface water at the Site is not permitted for any beneficial use.

During construction / maintenance works below the layer of Engineered Fill and within AEC 3, the following precautions should be implemented:

- Excavation to be scheduled to minimise the area of soil exposed at any one time.
- To reduce PFAS impacted sediment, stormwater controls should be designed to limit infiltration of run-off into areas where PFAS impacted soils are located.
- Excavated soil should be removed from Site or returned to the excavation as soon as reasonably practicable to prevent leaching of PFAS to stormwater.
- The UFP (**EMP 8**) must be implemented.
- Stormwater in any sediment basins (if required through construction) should be tested prior to being discharged. PFAS impacted stormwater must be managed in accordance with the PFAS NEMP, the EPL, and the requirements within the relevant PFAS LTEMP for the applicable area of the MPW Site.

Water Treatment

If water treatment is required, it should be undertaken in accordance with the relevant standard, EPL and LTEMP.

Worker Health and Safety

If encountered, in order to manage workers exposure to contaminated surface water the following should be implemented for works where groundwater is expected to be encountered:

- Project inductions should be undertaken to identify areas with high risk of surface water contamination.
- SWMS and JSAs to identify hazards associated with contaminated surface water and detail appropriate control measures.
- PPE used in high risk areas including:
    - Disposable overall suits including boots.
    - Disposable waterproof nitrite gloves in addition to standard glove requirements.
    - All other standard PPE required for works on Site.
- Signage placed in ablution blocks to ensure all workers wash hands and face prior to eating, regardless if gloves are worn.

Management of surface water	EMP 11

- If worker's skin comes into contact with contaminated water, ensure skin is immediately washed with clean water and wet clothing is removed immediately after work is complete.

Surface Water Monitoring

In the event contaminated water is encountered, Surface water must be sampled in accordance with the relevant LTEMP, EPL and HEPA NEMP or applicable regulations at the time of the assessment by the Environmental Consultant.

Fieldwork was undertaken in accordance with Table A1 of the Western Australia Department of Environment Regulation (WA DER), Interim Guideline on the Assessment and Management of PFAS, 2016 (WA DER 2016), and the PFAS NEMP.

Given that the Site is covered with a minimum of 1m of imported fill material and groundwater is unlikely to be encountered during construction works, groundwater monitoring at the Site is not considered to be warranted.

Training		EMP 12
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	Suitably trained personnel will be available to implement the requirements of the LTEMP.	

The Site owner or nominated responsible party, shall ensure that any personnel engaged in the implementation of nominated tasks for which the Site Occupant is responsible, have been provided with adequate training to manage the site contamination and hazardous materials conditions which may be encountered during site ground disturbance activities.

Personnel conducting sampling, measuring, monitoring and reporting activities are to be suitably trained or experienced in the activity. Records of all training are to be filed in accordance with the project filing system.

As a minimum the induction will include the following:

- Existence and requirements of this LTEMP.
- Relevant legislation, penalties, fines.
- Roles and responsibilities for Contamination Management.
- Landscape management measures.
- Asbestos identification and management requirements.
- Stockpile management measures.
- Material movement and tracking measures.
- Unexpected finds.
- Toolbox meetings will also be undertaken, as and when required.

The Site Occupant shall maintain records of personnel engaged in the nominated tasks and their relevant training/qualifications for the period of implementation of the LTEMP in accordance with **EMP 16** and with the document control system outlined in the CEMP.

Works involving contractors and subcontractors will be managed in accordance with **EMP 13**.

Contractor and Subcontractor Management		EMP 13
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	Ensure that all persons who may be exposed to contaminated material are suitably aware of conditions and requirements of this LTEMP.	

The Site Owner (or nominated representative) is required to ensure that Contractors and Sub-contractors are advised of potential safety and environmental issues on site during site-specific induction training. This induction shall include the occupational health and safety responsibilities, requirements and controls for all (sub)contractors working on site. In addition, all site workers, including contractors and subcontractors shall be made aware that they are required to implement the provisions of this LTEMP.

All subcontractor activities will be monitored by the Site Owner, or a nominated representative, to ensure compliance with the requirements of this LTEMP.

They shall be solely responsible for the health and safety of their employees and shall comply with all applicable laws and regulations. All contractors and subcontractors are responsible for:

1. Providing their own personal protective equipment.
2. Training their employees in accordance with applicable laws.
3. Providing medical surveillance and obtaining medical approvals for their employees.
4. Ensuring their employees are advised of and meet the minimum requirements of this LTEMP and any other additional measures required by their site activities.
5. Designating their own site safety officer.

All contractors/subcontractors must sign an acceptance form prior to commencing work on site.

Part 6.5 of the *Work Health and Safety Regulation 2011* required that an employer of employees undertaking construction work must ensure that the employees have completed induction training as specified by the Regulation. In addition, the Principal Contractor (if required) must not allow any person to carry out construction work unless he/she is satisfied that the person has undergone work health and safety induction training, including:

- General occupational health and safety training for construction work.
- Work activity-based health and safety training (job specific training).
- Site specific health and safety induction training.

The Site Owner (or nominated representative) shall require all contractors completing such works to maintain, for each person carrying out construction/maintenance works, for a period of three years:

- A copy of relevant statements of OHS induction training, or a statement indicating that the Principal Contractor is satisfied that the relevant OHS induction training has been undertaken; and
- A brief description of the site-specific training undertaken by the person.

Contingency Plan		EMP 14
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	Ensure that in the event of unplanned exposure of impacted materials all appropriate measures are implemented to minimise the risk to on-site personnel and the environment.	

In the event site operations or conditions result in the disturbance of significant impacted material without the prior preparation of specific works/management procedures and implementation of appropriate exposure minimisation measures, or alternatively an environmental incident occurs (contaminant leak/spill, identification of asbestos in imported material, etc.), the following shall be implemented:

- Isolation of the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc.) to prevent exposure to site personnel and/or off-site airborne dust migration; and
- Implementation of applicable EMPs with respect to personnel and site management, or where appropriate the Unexpected Finds Protocol included in this LTEMP (**EMP 8**), and subsequent appropriate removal/management of the identified impacted material via excavation and off-site removal or otherwise containment/treatment as applicable.

Where considered appropriate by the Site Owner (or its nominated representative), an appointed Environmental Consultant shall undertake an assessment of the impacted area such it can be confirmed the disturbance of material has not resulted in conditions with unacceptable risks to site users or the environment. This may include inspections, and or soil/water sampling within the site and subsequent analysis of samples for identified contaminants of concern at the site.

Following implementation of these procedures to ensure there are no further unacceptable exposures to site workers and/or environmental emissions, consideration shall be given to the requirements of **EMP 15** to **EMP 17** inclusive, in relation to documentation and renewal of the LTEMP to minimise the potential for future exposure of impacted material. This should include a formal review of the incident by an appropriately qualified person appointed by the Site Owner (or nominated representative) with the objective of identifying the cause of the incident and providing recommendations on alternative procedures or systems to be implemented at the site and/or within the LTEMP to prevent/minimise the likelihood of the incident reoccurring.

The incident shall be documented within the activity register as outlined in **EMP 16** and where appropriate, amendment(s) to the LTEMP will be undertaken as outlined in **EMP 21**.

Non-compliance with LTEMP		EMP 15
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure the LTEMP is implemented as intended.	

Non-compliances with the intent and procedures of the LTEMP may occur during the implementation of the LTEMP.

Where a non-compliance is identified by a responsible organisation, they shall inform the affected organisations of the non-compliance in writing. Where a non-compliance with the LTEMP is identified by another organisation (in the activities of an alternate organisation), then they shall have the responsibility of informing the non-complying party in writing of the non-compliance. The non-complying party will be required to rectify the non-conformity as soon as possible, as per the requirements of the relevant procedure(s) where non-compliance has occurred.

Detail of the action taken to rectify the non-compliance shall be provided to each of the affected organisations in writing. Where a non-compliance cannot be rectified, then the LTEMP will require to be reviewed as per the requirements of **EMP 18** LTEMP Review.

Where contaminated soil/spoil, water and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal / discharge) this will constitute a non-conformance to be managed under the CEMP or Environmental Management System.

Where contaminated soil/spoil, water and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal / discharge) the following will be undertaken:

- Where required, isolation of the affected area via the placement of temporary barriers or other appropriate measures (i.e. plastic sheeting, geotextile fabric covers, polymer dust suppressant spray, etc) to prevent exposure to site personnel and/or off-site airborne dust migration.
- Implementation the Unexpected Finds Protocol included in this LTEMP, and subsequent appropriate removal/management of the identified impacted material via excavation and off-site removal or otherwise containment/treatment as applicable.
- Fill out incident response form and raise a non-conformance for improvement.
- Where required, notify regulatory authorities.

Record Keeping		EMP 16
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	Records of the implementation of the LTEMP require to be retained.	

The Site Owner (or nominated representative) shall be responsible for the maintenance of all documents relating to the implementation of the LTEMP. This shall include any contamination assessments and validation undertaken, registers for the maintenance of the LTEMP (site inspection forms, works approval checklists, revised plans, *etc.*) and any relevant correspondence between the Site Owner (or nominated representative), Contractors and/or any other party.

All records shall be retained by the Site Owner (or nominated representative) throughout the time of implementation of the LTEMP. In the event that the role of the Site Owner (or nominated representative) is transferred from one organisation to another, control of all relevant (historical and current) documents will be transferred for safe keeping to the current Site Owner (or nominated representative).

Audit / Review of LTEMP Implementation		EMP 17
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	Once every 12 months	
Objective:	The implementation of the LTEMP requires to be audited in accordance with EPA guidance publications to identify areas of non-compliance or partial compliance with relevant legislation/regulations and/or the requirements of this plan.	

An environmental audit shall be undertaken annually from implementation of this LTEMP to ensure ongoing compliance with the LTEMP requirements. The audit shall be undertaken by an Environmental Consultant in general compliance with the DEC '*Compliance Audit Handbook*' (DEC, Feb 2006) and identify areas of non-compliance or partial compliance with the requirements of:

- Relevant legislation / regulations; and
- This plan.

The findings of the audit should be documented and form the basis of the subsequent management review process as outlined following.

Specific tasks that will be undertaken as part of the audit include:

- Review of records generated by the Site Owner, and their respective contractors to ensure they meet the intended scope of the LTEMP.
- Review of the works register documenting ground disturbance activities completed at the site and associated work method statements, monitoring/validation activities to ensure that the management activities undertaken have met the intended scope of the LTEMP.
- Periodic review and inspection of the Site condition, including annual inspection of liners within the OSDs and overflow drainage channels.

Where a non-compliance is detected during the audit process, then the non-compliance shall be informed as per the requirements of **EMP 15**: Non-Compliances with LTEMP.

The Site Owner (or nominated representative) is required to maintain records of the audit review. Records will require to be maintained on site and made available to relevant authorities in the event of a site inspection.

The results of the audit will be considered as part of a broader review of the LTEMP to be undertaken on an annual basis by an Environmental Consultant in conjunction with the Site Owner. This review shall consider:

- The results of the LTEMP Audit as outlined above.
- Any non-compliances with the LTEMP that have been unable to be resolved.
- Practicalities and efficiencies of management measures and whether there are more effective ways to improve environmental compliance.
- Any changes in state or national environmental protection legislation or guidelines that impact any part of the LTEMP.
- Any proposed changes in land-use of the site or adjoining sites which may impact upon exposure pathways.

Audit / Review of LTEMP Implementation	EMP 17
Where a review identifies items, which are required to be modified, or added to the LTEMP, then a revision of the LTEMP shall be prepared by a Suitably Qualified Person. The revised LTEMP will require approval by relevant stakeholders prior to implementation of the revised plan.	

LTEMP Review	EMP 18
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)
Frequency:	As required
Objective:	The LTEMP requires review to ensure its continued appropriateness to be used on the Site.

A review of the LTEMP shall be undertaken as required by an Environmental Consultant in conjunction with the Site Owner (or nominated representative). This review shall consider:

- The results of the LTEMP Audit as outlined in **EMP 17**.
- Any non-compliances with the LTEMP that have been unable to be resolved.
- Practicalities and efficiencies of management measures and whether there are more effective ways to improve environmental compliance.
- Any changes in state or national environmental protection legislation or guidelines that impact any part of the LTEMP.
- Any proposed changes in land-use of the site or adjoining sites which may impact upon exposure pathways.

If the Site Owner ceases to be recognised as the Site Manager, a review of the LTEMP document and compliance measures will be necessary to identify suitable replacement LTEMP compliance mechanisms.

In addition, where a review identifies items which are required to be modified, or added to the LTEMP, then a revision of the LTEMP shall be prepared by a suitably qualified person.

Any revisions to the LTEMP must be approved by the by the NSW EPA or appointed NSW EPA accredited Site Auditor.

Cessation of LTEMP Application		EMP 19
Responsibility:	Entity responsible for implementation of LTEMP (as per **Table 4**)	
Frequency:	As required	
Objective:	To ensure impacts associated with residual issues requiring management at the Site during construction and operation of the Proposed Development been appropriately resolved to ensure the ongoing suitability of the site for the proposed land use.	

To address potential residual soil and groundwater issues after the scope of the remediation is completed, the Golder (2016) RAP envisaged implementation of a LTEMP to provide a management, monitoring and review framework.

Cessation of the application of the LTEMP will be dependent upon the results of additional assessment and will require a revised site-specific human health and ecological risk assessment.

Once the Environmental Consultant is satisfied that the residual contamination at the Site does not present a risk of harm to human health and the environment, then the final site-specific human health and ecological risk assessment will include recommendations for cessation of the LTEMP for approval by the NSW EPA or appointed NSW EPA accredited Site Auditor.

Appendix C

CONDITIONS OF CONSENT COMPLIANCE MATRIX

Table D1 – Conditions of Consent (CoC) – SSD 7709			
CoC	**Requirement**	**Document Reference**	**How Addressed**
B171	Upon completion of importation and placement of fill and prior to construction of permanent built surface works, the Applicant must submit to the Planning Secretary, a Site Audit Report and a Site Audit Statement A for the whole site, prepared in accordance with the NSW Contaminated Land Management - Guidelines for the NSW Site Auditor Scheme 2017, which demonstrates the site is suitable for its intended land uses under MPW Stage 2 SSD 7709.	NA	To be actioned by the Site Auditor
B172	Where remediation outcomes for the site require long term environmental management, a suitably qualified and experienced person must prepare a Long-Term Environmental Management Plan (LTEMP), to the satisfaction of the Site Auditor. The plan must:	This Plan	LTEMP prepared by a suitably qualified and experienced person – Certified Environmental Practitioner – Contaminated Land (CEnvP CL). This Plan has been sent to the Site Auditor for approval.
	a) be submitted to the Planning Secretary and EPA prior to commencement of construction (other than vegetation clearing); and		Qube to provide this Plan to the Planning Secretary once approved by the Site Auditor.
	b) include, but not be limited to:		
	i. a description of the nature and location of any contamination remaining on site,		**Appendix A** of this Plan.
	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,		**Appendix B** of the LTEMP provides Environmental Management Procedures including details of restrictions. A containment cell is not proposed in this Plan.
	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,		A containment cell is not proposed in this Plan.
	iv. a description of the procedures for monitoring the integrity of the containment cell,		A containment cell is not proposed in this Plan.

Table D1 – Conditions of Consent (CoC) – SSD 7709

CoC	Requirement	Document Reference	How Addressed
	v. a surface and groundwater monitoring program,		The surface and groundwater monitoring program is detailed in **Section 5** of this Plan and **EMP 10** and **EMP 11** in **Appendix B** of this Plan.
	vi. mechanisms to report results to relevant agencies,		Reporting mechanisms provided in Section 5 and **Appendix B** of this Plan. **EMP 19** in **Appendix B** provides protocols for the cessation of monitoring post development subject to approval by the Site Auditor and / or NSW EPA.
	vii. triggers that would indicate if further remediation is required, and		An unexpected finds protocol to manage further remediation is provided as **Appendix D** of the LTEMP.
	viii. details of any contingency measures that the Applicant is to carry out to address any ongoing contamination.		A contingency plan is provided as **EMP 14** in **Appendix B** of this Plan.
B173	The LTEMP must be registered on the title to the land.	This Plan	**Section 1.3** and **Section 1.4**
B180	The Applicant must assess and classify all liquid and nonliquid wastes to be taken off site in accordance with the latest version of EPA's Waste Classification Guidelines Part 1: Classifying Waste (NSW EPA 2014) and dispose of all wastes to a facility that may lawfully accept the waste.	**Appendix B**	**EMP 6** in **Appendix B** addresses liquid and non-liquid waste classification
C1	The applicant must ensure that the environmental management plans required under this consent are prepared in accordance with any relevant guidelines, and include: a) Baseline data; b) A description of: (i) The relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) Any relevant limits or performance measures/criteria; and (iii) The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any measurement measures;	a) **Section 3** and **Appendix B** b) i) **Section 4** ii) **Appendix B** iii) **Appendix B** c) **Appendix B** d) i) **Appendix B** ii) **Section 5** e) **EMP 14** f) **EMP 17** g) **EMP 15 and 16** h) **Section 4.1** i) **EMP 28**	a) Includes known site conditions and summarised remaining contamination issues. b) (i) Covers any relevant approval and/or licence. (ii) Specifies adopted criteria to be used for assessment and validation. (iii) Specifies sampling and validation plans and the decision questions needing to be answered for each different type of assessment/validation. c) Specifies the details of each management plan as required by Golder (2016a). d)

Table D1 – Conditions of Consent (CoC) – SSD 7709

CoC	Requirement	Document Reference	How Addressed
	c) A description of the management measures to be implemented to comply with the relevant statutory requirements, limits or performance measures/criteria; d) A program to monitor and report on the: (i) Impacts and environmental performance of the development; and (ii) Effectiveness of any management measures (see (c) above); e) A contingency plan to manage any unpredicted impacts and their consequences; f) A program to investigate and implement ways to improve the environmental performance of the development over time; g) A protocol for management and reporting any: (i) Incidents and non-compliances; (ii) Complaints; (iii) Non-compliances with statutory requirements; and h) Roles and responsibilities for implementing the plan; and i) A protocol for periodic review of the plan.		(i) Describes the sampling analysis and reporting program for each contamination issue requiring management; and (ii) The sampling and validation programs will report on the effectiveness of the management measures. e) Details the Unexpected Finds Procedure in relation to contamination. f) Continual improvement for the LTEMP is discussed. g) **Appendix B** provides protocols and reporting: (i) Specifies how incidents and non-compliances will be managed. (ii) Specifies how complaints in relation to contamination will be managed. (iii) Specifies how non-compliance to statutory requirements will be managed. h) Lists the responsibilities for the LTEMP Implementation. i) Specified how the LTEMP will be reviewed/updated.

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
8a)	MPW Concept EIS, Soil and Contamination PEMF Section 6.2 – Management controls – Early Works and Construction phase	Contaminated soil/fill material present will be 'chased out' during the excavation works based on visual, olfactory and preliminary field test results.	**Section 3** provides an overview on the remaining contamination issues remaining at the Site. **Appendix B** – **EMP 5-9** describes the chase out of impacted soils and fill for unexpected finds.
		Excavated soil would be temporarily stockpiled, sampled and analysed for waste classification processes. Following receipt of waste classification results, the material would be transported to a licensed off-site waste disposal facility as soon as practicable to minimise dust and odour issue through storage of materials on-site	**EMP 4, EMP5** and **EMP 6**
		Stockpiled soils would be stored on a sealed surface and the stockpiled areas would be securely bunded using silt fencing to prevent silt laden surface water from entering or leaving the stockpiles or the Project site.	**EMP 5**
		All excavation works would be undertaken by licensed contractor experienced in remediation projects and the handling of contaminated soils.	**Section 4**
		All asbestos removal, transport and disposal must be performed in accordance with the Work Health and Safety Regulation 2011 (WH&S Regulation).	**EMP 6** and **EMP 8**
		The removal works would be conducted in accordance with the National Occupational Health and Safety Commission Code of Practice for the Safe Removal of	**EMP 6** and **EMP 8**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		Asbestos, 2nd Edition [NOHSC 2002 (2005)] (NOHSC 2005a).	
		An appropriate asbestos removal licence issued by WorkCover would be required for the removal of asbestos impacted soil.	**EMP 6** and **EMP 8**
		Environmental management and WH&S procedures would be put in place for the asbestos removal during excavation to protect workers, surrounding residents and the environment.	**EMP 6** and **EMP 8**
		Temporary stockpiles of asbestos containing material (ACM) soils would be covered to minimise dust and potential asbestos release	**EMP 6** and **EMP 8**
		An asbestos removal clearance certification would be prepared by an occupational hygienist at the completion of the removal work. This would follow the systematic removal of asbestos containing materials and any affected soils from the Project site and validation of these areas (through visual inspection and laboratory analysis of selected soil samples).	**EMP 6** and **EMP 8**
		Asbestos fibre air monitoring would be undertaken during the removal of the asbestos materials and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with the National Occupational Health and Safety Commission Guidance Note on the Membrane Filter Method for the Estimating	**EMP 6** and **EMP 8**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		Airborne Asbestos Fibre, 2nd Edition [NOHSC 3003 (2005)] (NOHSC 2005b).	
		All stockpiles would be maintained in an orderly and safe condition. Batters would be formed with sloped angles that are appropriate to prevent collapse or sliding of the stockpiled materials.	**EMP 4**
		Stockpiles would be placed at approved locations and would be strategically located to mitigate environmental impacts while facilitating material handling requirements. Contaminated or potentially contaminated materials would only be stockpiled in unremediated areas of the Project site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas (e.g. hardstand areas).	**EMP 4**
		Stockpiles would only be constructed in areas of the Project site that had been prepared in accordance with the requirements of the Project Preliminary RAP in Appendix G of Technical Paper 5 – Environmental Site Assessment (Phase 2), Volume 4. All such preparatory works would be undertaken prior to the placement of material in the stockpile. Stockpiles must be located on sealed surfaces such as sealed concrete, asphalt, high density polyethylene or a mixture of these, to appropriately mitigate potential cross contamination of underlying soil.	**EMP 4**
		The stockpiles of contaminated material would be covered with a waterproof membrane (such as polyethylene sheeting) to prevent increased moisture from rainwater	**EMP 4**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		infiltration and to reduce windblown dust or odour emission	
		Before the reuse of any material on-site, it would be validated so that the lateral and vertical extent of the contamination is defined	**EMP 4 and EMP 5**
		Where required, contaminated materials and wastes generated from the Project remediation and construction works would be taken to suitable licensed offsite disposal facilities	**EMP 6**
8a)	MPW Concept EIS, Soil and Contamination PEMF Section 6.4– monitoring	Within each of the Project specific management plans, the private sector developer would need to detail what monitoring would be undertaken to ensure compliance with the following:	
		The Project's EIS, with respect to the commitments made as well as the management and mitigation measures proposed;	**EMP 17, EMP 18 and EMP 19**
		Project approvals issued under the EPBC Act and EP&A Act;	Approval provided
		Contractual requirements established between MIC and the developer and operator for the Project;	N/A
		Other permits and/or licences required during the Project; and	N/A
		Objectives, targets and indicators as presented in this PEMF.	CEMP

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
8a)	MPW Concept EIS, Soil and Contamination PEMF Section 6.5 – Management response to incidents and non-compliances	Contaminated soil/spoil and hazardous materials have not been appropriately managed (i.e. classification, handling, storage, transport, and disposal).	**EMP 3, EMP 4, EMP 5, EMP 6**
8b) and c)	REMM 7A	To minimise the risk of leakages involving natural gas, liquid natural gas (LNG) and flammable and combustible liquids to the atmosphere: appropriate standards for a gas reticulation network, including AS 2944-1 (2007) and AS 2944-2 (2007), would be referred to in the detailed design process; correct schedule pipes would be used; a fire protection system would be installed if necessary for gas users; cathodic protection would be installed for external corrosion if appropriate; and access to the Project site would be secure.	CEMP
	REMM 7B	To minimise the risks of leakage of LNG and liquid petroleum gas (LPG) and flammable liquids during transport: materials would be transported according to the Australian Dangerous Goods (ADG) Code, relevant standards and regulations; and contractors delivering the gas would be trained, competent and certified by the relevant authorities	CEMP

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
	REMM 7C	To minimise hazards associated with venting of natural gas, LNG and LPG: LNG storage would be designed to AS/NZS 1596-2008 standards; access to the Project site would be secure; and significant separation distances to residences and other assets would be put in place	CEMP
8b) and c)	REMM 7D	Storage of flammable/combustible liquids would be carried out in accordance with AS 1940, with secondary containment in place and location away from drainage paths	CEMP
	REMM 7E	Standby or emergency generators and transformers would all have secondary containment	CEMP
	REMM 7F	Oil coolers would generally be located in areas where leaks and runoff are appropriately controlled at source or in a retention basin.	CEMP
	REMM 7I	No hazardous or regulated wastes would be disposed of onsite.	**EMP 4 and EMP 6**
	REMM 7J	All offsite disposals would be carried out by approved transport operators and to approved facilities	**EMP 6** and CEMP
	REMM 7K	Other dangerous goods, including any waste materials present on the Project site, would be suitably contained, with secondary containment and runoff controls implemented where appropriate to prevent leaks or spills	CEMP

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		migrating to environmentally sensitive areas, in particular via stormwater systems that drain to the Georges River.	
	REMM 8B	Before construction, a remediation program would be implemented in accordance with the Moorebank Intermodal Terminal Preliminary Remediation Action Plan (RAP) (or equivalent). The program will have been formally reviewed and approved by the Site Auditor under Part 4 of the NSW Contaminated Land Management Act 1997 (CLM Act).	Currently Stage 1 works have been completed in accordance with the RAP (Golder 2016a). The outcomes of the remediation are documented in the JBS&G (2020) Remediation Validation Report under review by the Site NSW EPA Accredited Auditor. The remaining contamination is documented in this Plan in **Appendix A** along with the management measures in **Appendix B**
	REMM 8D	An unexploded ordnance (UXO) management plan (or equivalent) would be developed for the Project site. This plan would detail a framework for addressing the discovery of UXO or explosive ordnance waste (EOW) to ensure a safe environment for all Project staff, visitors and contractors.	**EMP 8**
	REMM 8E	An ASS management plan (or equivalent) would be developed in accordance with the ASSMAC Assessment Guidelines (1998), with active ongoing management through the construction phases. Offsite disposal would need to be in accordance with the NSW Waste Classification Guidelines Part 4: Acid Sulfate Soils (2009).	EP Risk (2020b) has prepared an Acid Sulfate Soil Management Plan which has been included in the CEMP for Stage 2 works.
	REMM 8F	Further testing of residual sediments would be undertaken to gather data to inform the management of sediments likely to be disturbed/dewatered during construction.	Further testing of sediments has been undertaken by JBS&G 2018a[1].

[1] L144 (PFAS Soil Assessment - Swales and Basins) Rev 0. JBS&G April 2018.

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
	REMM 8G	Ground penetrating radar (GPR) or similar techniques would be used to locate and document all existing and underground tank infrastructure across the Project site.	This process was conducted as part of the Stage 1 MPW works and is documented in the validation report (JBS&G 2020).
	REMM 8H	A management tracking system for excavated materials would be developed to ensure the proper management of the material movements at the Project site, particularly during excavation works.	**EMP 3** and **EMP 4**
	REMM 8I	Contaminated soil/fill material present will be 'chased out' during the excavation works based on visual, olfactory and preliminary field test results.	**EMP 1, EMP 2**
	REMM 8J	Excavated soil would be temporarily stockpiled, sampled and analysed for waste classification processes. Subject to receipt of waste classification results, the material would be transported to a licensed offsite waste disposal facility as soon as practicable to minimise dust and odour issue through storage of materials on site.	**EMP 4** and **EMP 6**
8b) and c)	REMM 8K	Stockpiled soils would be stored on a sealed surface and the stockpiled areas would be securely bunded using silt fencing to prevent silt laden surface water from entering or leaving the stockpiles or the Project site	**EMP 4**
	REMM 8L	All excavation works associated with potential contaminated lands would be undertaken by licensed contractors, experienced in remediation projects and the handling of contaminated soils.	**Section 4**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
	REMM 8M	All asbestos removal, transport and disposal would be performed in accordance with the Work Health and Safety Regulation 2011 (WHS Regulation)	**EMP 8**
	REMM 8N	The removal works would be conducted in accordance with the National Occupational Health and Safety Commission Code of Practice for the Safe Removal of Asbestos, 2nd Edition [NOHSC 2002 (2005)] (NOHSC 2005a).	**EMP 8**
	REMM 8RO	An appropriate asbestos removal licence issued by WorkCover NSW would be required for the removal of asbestos contaminated soil.	**EMP 8**
	REMM 8P	Environmental management and WHS procedures would be put in place for the asbestos removal during excavation to protect workers, surrounding residents and the environment.	**EMP 8**
	REMM 8Q	Temporary stockpiles of asbestos containing material (ACM) soils would be covered to minimise dust and potential asbestos release	**EMP 10**
	REMM 8R	An asbestos removal clearance certification would be prepared by an occupational hygienist at the completion of the removal work. This would follow the systematic removal of asbestos containing materials and any affected soils from the Project site, and validation of these areas (through visual inspection and laboratory analysis of selected soil samples)	**EMP 8**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
8b) and c)	REMM 8S	Asbestos fibre air monitoring would be undertaken during the removal of ACMs and in conjunction with the visual clearance inspection. The monitoring would be conducted in accordance with the National Occupational Health and Safety Commission Guidance Note on the Membrane Filter Method For the Estimating Airborne Asbestos Fibre, 2nd Edition [NOHSC 3003 (2005)] (NOHSC 2005b).	**EMP 8**
	REMM 8T	All stockpiles would be maintained in an orderly and safe condition. Batters would be formed with sloped angles that are appropriate to prevent collapse or sliding of the stockpiled materials	**EMP 4**
	REMM 8U	Stockpiles would be placed at approved locations and would be strategically located to mitigate environmental impacts while facilitating material handling requirements. Contaminated or potentially contaminated materials would only be stockpiled in unremediated areas of the Project site or at locations that did not pose any risk of environmental impairment of the stockpile area or surrounding areas (e.g. hardstand areas)	**EMP 4**
	REMM 8V	Stockpiles would only be constructed in areas of the Project site that had been prepared in accordance with the requirements of the Project Preliminary RAP in Appendix G of Technical Paper 5 – Environmental Site Assessment (Phase 2), Volume 5A and 5B. All such preparatory works would be undertaken before material is placed in the stockpile. Stockpiles must be located on sealed surfaces such as sealed concrete, asphalt, high density	**EMP 4**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		polyethylene or a mixture of these, to appropriately mitigate potential cross contamination of underlying soil	
8b) and c)	REMM 8W	Any stockpiles of contaminated material would be covered with a waterproof membrane (such as polyethylene sheeting) to prevent increased moisture from rainwater infiltration and to reduce windblown dust or odour emission	**EMP 4**
	REMM 8X	Before the reuse of any material on site, it would be validated so that the lateral and vertical extent of the contamination is defined.	**EMP 5**
	REMM 8Y	Where required, contaminated materials and wastes generated from the Project remediation and construction works would be taken to suitable licensed offsite disposal facilities	**EMP 6**
	REMM 8Z	Where necessary, consider undertaking further investigations to determine whether other buildings have organochlorine pesticides (OCP) impacts subgrade materials, and to quantify the volume of OCP impacted materials across the site	Not relevant as all buildings have been removed as part of the Stage 1 Early Works.
	REMM 8AA	Additional Aqueous Film Forming Foam assessment (AFFF) be undertaken to determine if any direct remedial and/or management actions are required. A stage approach is considered appropriate and is detailed in the Preliminary AFFF Assessment (Golder Associates 2015b).	Additional PFAS Investigations have been undertaken on the Site and are summarised by EP Risk (2018) and ongoing requirements presented in **Appendix B**.
8 d)	-	In relation to management of PFAS:	

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
	i)	be consistent with: • National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) (ASC NEPM 2013). • Australian and New Zealand Guidelines for Fresh and Marine Water Quality (under the National Water Quality Management Strategy) including the draft default guideline values for perfluorooctanoic acid (PFOS) and perfluorooctane sulfonic acid (PFOA) in freshwater as applied by the State government • relevant Commonwealth environmental management guidance on PFOS and PFOA	**Section 4** and **Appendix B** of this Plan are consistent with these guidelines (where relevant).
	ii)	detail implementation and operational procedures, appropriate to the risk posed by any contamination, including: • roles and responsibilities • management of potential PFAS contaminated sites as yet un-investigated • management of areas of known PFAS contamination, including strategies to reduce runoff, dewatering and migration of contamination across and off the proposed site • a contingency action plan for unexpected PFAS contaminant discoveries	**Section 4.1** EP Risk (2018) **EMP 2, EMP 3, EMP 4, EMP 5, EMP 8,** **EMP 14**
	iii)	detail soil, groundwater and surface water PFAS contamination monitoring requirements and testing and	**EMP 8** and **EMP 9**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		disposal procedures appropriate to the risk posed by any contamination	
	iv)	include requirements for site validation reports appropriate to the risk posed by any contamination	Golder 2016a RAP
	v)	include requirements for remedial action plans appropriate to the risk posed by any contamination	Golder 2016a RAP
	vi)	detail review procedures appropriate to the risk posed by any contamination	**EMP 18**
	vii)	impose the following performance measures for managing earthworks and the potential for effects to occur due to disturbance of PFAS contaminated soils during construction: • contaminated sediment to be discharged outside the site of the action to be minimised • contaminated waste material, including excavated soil, to be released through dewatering to be handled appropriately to the risk posed by the contamination and disposed of in an environmentally sound manner such that potential for the PFAS content to enter the environment is minimised contaminated waste material, including excavated soil, with a PFOS or PFOA content above 50 milligrams per kilogram (mg / kg) to be stored or disposed of in an environmentally sound manner, such that PFAS content does not enter the environment	**Appendix B**

Table D2 – Conditions of Approval (CoA) – EPBC 2011/6086			
CoA	**Reference**	**Condition Requirement**	**Document Reference and How Addressed**
		• all soil remaining at the site of the action to be suitable for purpose	

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
OB	The CEMP, or equivalent, for the Proposal would be based on the PCEMP (Appendix I of this EIS), and include the following preliminary management plans: • Preliminary Construction Traffic Management Plan (PCTMP) (Appendix M of the EIS) • Air Quality Management Plan (Appendix O of the EIS) • Erosion and Sediment Control Plans (ESCPs) and Bulk Earthworks Plans, within the Stormwater Drainage Design Drawings (Appendix R of the EIS) As a minimum, the CEMP would include the following sub-plans: • Construction Traffic Management Plan (CTMP) • Construction Noise and Vibration Management Plan (CNVMP), prepared in accordance with the Interim Construction Noise Guideline • Cultural Heritage Assessment Report/Management Plan • Construction Air Quality Management Plan • Construction Soil and Water Management Plan (SWMP), prepared in accordance with Managing Urban Stormwater, 4th Edition, Volume 1, (2004) • ESCP • Flood Emergency Response and Evacuation Plan • UXO, EO, and EOW Management Plan • Acid Sulfate Soils Management Plan • Bushfire Management Strategy • Community Information and Awareness Strategy. • Flora and Fauna Management Plan (FFMP) • Groundwater Monitoring Program (GMP)	**CEMP**	CEMP prepared by the Principal Contractor during construction

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
5A	A SWMP and ESCP, or equivalent, would be prepared for the Proposal. The SWMP and ESCPs would be prepared in accordance with the principles and requirements of the Blue Book and based on the Preliminary ESCPs provided in the Stormwater and Flooding Assessment Report (refer to Appendix R of the EIS). The following aspects would be addressed within the SWMP and ESCPs: Stockpiles would be located away from flow paths on appropriate impermeable surfaces, to minimise potential sediment transportation. Where practicable, stockpiles would be stabilised if the exposed face of the stockpile is inactive more than ten days, and would be formed with sediment filters in place immediately downslope	**CEMP**	While this plan is separate to the SWMP and ESCP it does include this requirement for the management of stockpiles.
5I	Stockpile sites established during construction are to be managed in accordance with stockpile management principles set out in Appendix L of this RtS. Mitigation measures within the Stockpile Management Protocol include: In order to accept fill material onto site, material characterisation reports/certification showing that the material being supplied is virgin excavated natural material (VENM) / excavated natural material (ENM) must be provided. Each truck entering the Site will be visually checked and documented to confirm that only approved materials that are consistent with the environmental approvals are allowed to enter the site. Only fully tarped loads are to be accepted by the gatekeeper. Environmental Assurance of imported fill material will be conducted to confirm that the materials comply with the NSW EPA Waste Classification Guidelines and the Earthworks Specification for the MPW site. The	**EMP 4, EMP 6** and **CEMP**	These measures have been included in the LTEMP.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	frequency of assurance testing will be as nominated by the Environmental assuror/auditor. All trucks accessing the site for the purpose of clean general fill importation would enter and exit via the existing main Site access located from Moorebank Avenue. Ingress and egress to the stockpiling areas would be arranged so that the reversing of trucks within the site is minimised. Stockpiles would not exceed ten-metres in height from the final site levels, with battered walls at gradients of 1V:3H For any stockpile heights greater than 4 m, benching would be implemented. Where reasonable and feasible, and to minimise the potential for erosion and sedimentation of stockpile(s), stockpile profiles would typically be at angle of repose (the steepest angle at which a sloping surface formed of loose material is stable) with a slight concave slope to limit the loss of sediments off the slope, or through the profile and the formation of a toe drain. The top surface of the stockpile(s) would be slightly sloped to avoid ponding and increase run off. Topsoil stockpiles would be vegetated to minimise erosion. Stockpiles would be protected from upslope stormwater surface flow through the use of catch drains, berms, or similar feature(s) to divert water around the stockpile(s). A sediment control device, such as a sediment fence, berm, or similar, would be positioned downslope of the stockpile to minimise sediment migration. Any water seepage from stockpiles would be directed by toe drains at the base of the stockpiles toward the sediment basins or check dams and away from the emplacement or extraction working face.		

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	Newly formed stockpiles would be compacted (sealed off) using a smooth drum roller at the end of each working day to minimise water infiltration. Haul roads would be located alongside the stockpile to the work/tipping area. As per best practice, the catchment area of haul roads for surface water runoff would be approximately 2530 m lengths, facilitated by the provision of spine drains which would convey water from the haul road to toe drains at the base of the stockpile, and then to sediment basins. Temporary sediment basins would be established in accordance with the ESCP prepared for the site. Stockpiling of clean fill material is to be carried out during Works Period A (pre-construction) and Works Period D (bulk earthworks). Any imported clean general fill material that would be subject to stockpiling within the Proposal site for more than a 10-day period without being worked on, would be subject to stabilisation works, to minimise the potential for erosion. Where the material being stockpiled is less coarse or has a significant component of fines then surface and slope stabilisation would be undertaken. Methods for slope stabilisation may include one or a combination of the following: – Application of a polymer to bind material together – Application of hydro-seed or hydromulch – Covering batters with mulch to provide ground cover – Covering batters with geofabric – Use of a simple sprinkler system for temporary stockpiles, including use of radiating sprinkler nozzles to maintain fine spray over exposed surfaces		

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	– Other options identified by the Contractor Topsoil stockpiles would be seeded with a grass/legume or nitrogen fixing species (such as acacia) to assist in erosion control and reduce loss of beneficial soil nutrients and micro-organisms		
6A	The CEMP would identify the actions to be taken should additional contamination be identified during the development of the site (i.e. an unexpected finds protocol), and will address REMM items 8H, 8T, 8U, 8V and 8W (of the MPW Concept Plan Approval (SSD 5066)).	**CEMP**	To be addressed in the CEMP.
6B	A site-specific Remediation Action Plan (RAP) is not considered to be required for the Proposal. The following documentation would be utilised for the purposes of remediating the site: • The Preliminary Remediation Action Plan (PB, 2014a) • The Validation Plan – Principles (Golder, 2015b) • The Demolition and Remediation Specification (Golder 2015c) • Any other contamination documentation prepared for the remediation activities undertaken for MPW Early Works (Stage 1).	**JBS&G 2020**	Currently Stage 1 works are completed and have been completed in accordance with the RAP (Golder 2016). The outcomes of the remediation are documented in the Validation Report (JBS&G 2020) under review by the Site NSW EPA Accredited Auditor.
6C	The CEMP would include the preparation of a site-wide UXO, EO, and EOW management plan (or equivalent) based on the UXO Risk Review and Management Plan (G-Tek, 2016). This plan would be implemented to address the discovery of UXO or EOW during construction, to ensure a safe environment for all staff, visitors and contractors.	**CEMP**	The plan outlines the review and actions required to manage any unexpected finds in relation to the UXO Risk.
6D	An Asbestos in Soils Management Plan (AMP) is to be implemented as part of the CEMP in accordance with the Safe Work NSW requirements, including but not limited to: • the Guidelines for Managing asbestos in or on soil (2014), and • Codes of Practice - How to Safely Remove Asbestos (2011) and	**Golder 2016b**	The asbestos in soils management plan has been developed in accordance with current Guidelines and codes of practice.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	• How to Manage and Control Asbestos in the Workplace (2011).		
6E	An Acid Sulfate Soils Management Plan (ASSMP) (or equivalent) would be prepared as part of the CEMP in accordance with the ASSMAC Assessment Guidelines (1998), for areas identified as being of low or high risk i.e. works within close vicinity of the Georges River (Figure 13-2 of this EIS). In addition, a risk assessment quantifying the risks associated with the volumes of soil to be disturbed, the laboratory results from ASS testing undertaken, the end use of the materials and the proximity to sensitive environments is to be undertaken. All offsite disposal would be in accordance with the *NSW Waste Classification Guidelines Part 4: Acid Sulfate Soils* (2009).	**EP Risk 2020b**	A separate ASSMP has been prepared for the Site.
6F	The existing groundwater monitoring undertaken for the Proposal would continue. A GMP would be developed at the conclusion of remediation activities for the Proposal and included as part a Long-Term Environmental Management Plan (LTEMP) (to be prepared for approval by the Accredited Site Auditor and in association with the OEMP). The main purpose of the GMP would be to assist in the management of groundwater contamination (particularly PFAS impacts) at the site, and to minimise potential harm to human health and the environment. The GMP would achieve the following objectives: Establish whether the residual groundwater contamination plume is shrinking, stable, or increasing, and whether natural attenuation and/or migration is occurring according to expectations through line-of-evidence collection Provide appropriate groundwater investigation levels (GILs) for groundwater contaminants, in accordance with the National	**EMP 10**	A groundwater sampling strategy is included in **EMP 10**.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM). Should exceedances be identified, contingency plans for further investigations or remediation would be prepared. Provide appropriate trigger levels for key contaminants (where available), based on the receptor of interest and identified contaminants Serve as a compliance program, so that potential impacts to down-gradient receptors are identified before adverse effect occurs (relative to above objectives) Detect changes in environmental conditions (e.g. hydrogeologic, geochemical or other changes) that may reduce the efficacy of any natural attenuation processes or that could lead to a change in the nature of impact. Establish groundwater conditions (i.e. concentrations and/or trends) which indicated that groundwater monitoring could be reduced or ceased and the requirements of the GMP absolved. The monitoring program is to be undertaken for two years post operation of the Proposal to ensure a range of seasonal and river flow variations is assessed. At the completion of the two-year period, subject to analysis of results, consideration would be given to whether this monitoring is required to continue. The approach to PFAS management will be confirmed following further monitoring in consultation with, and the approval of, the NSW EPA Accredited Site Auditor.		
6H	At the conclusion of remediation works, a Remediation and Validation Report (RVR) is to be prepared for the Proposal to facilitate the Auditor's review of remediation and validation activities. The RVR is to document the remediation and validation activities completed within specific areas of the Proposal, including:	**JBS&G 2020**	Currently Stage 1 works are completed and have been completed in accordance with the RAP (Golder 2016a). The outcomes of the remediation are documented in the Validation Report (JBS&G 2020) under review by the Site NSW EPA Accredited Auditor.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	• Information relating to the materials used in the separation layers such as the soil types, geotextile materials, and sealant types etc. (if required) • An as-constructed plan of the site showing the locations, depths and materials of the separation layers installed at the site.		
6I	The existing site-wide Long-Term Environmental Management Plan (LTEMP), such as the one established at the completion of Early Works, is to be revised at the completion of the Proposal remediation activities to include protocols for ongoing maintenance and/or monitoring or any long term remedial/mitigation measures to be implemented following completion of the Site Audit Statement.	**This Plan**	Provides requirements to revise the LTEMP post construction.
6J	In order to accept fill material onto site, the following will be undertaken: • Material characterisation reports/certification showing that the material being supplied is VENM/ENM must be provided. • Each truck entry will be visually checked and documented to confirm that only approved materials that are consistent with the environmental approvals are allowed to enter the site. Only fully tarped loads are to be accepted by the gatekeeper. Environmental Assurance of imported fill material will be conducted to confirm that the materials comply with the NSW EPA Waste Classification Guidelines and the Earthworks Specification for the MPW site. The frequency of assurance testing will be as nominated by the Environmental assuror/auditor.	**Golder 2016 RAP** **EMP 7**	Both requirements for the acceptance of fill are stated within this section.
7A	The following measures would be included in the CEMP (or equivalent) to minimise hazards and risks: • Procedures for safe removal of asbestos	**CEMP**	This plan includes procedures for the safe removal of asbestos.

Table D3 – Final Compilation of Mitigation Measures (FCMMs)

FCMM	Requirement	Document Reference	How Addressed
	• Provision for safe operational access and egress for emergency service personnel and workers would be provided at all times • An Incident Response Plan that would include a Spill Management Procedure.		The remaining two requirements are not the scope of this plan.
12A	The following mitigation measures would be implemented as part of the CEMP (or equivalent) for waste management: • Characterisation of construction waste streams in accordance with the NSW Waste Classification Guidelines • Management of any identified hazardous waste streams • Procedures to manage construction waste streams, including handling, storage, classification, quantification, identification and tracking • Mitigation measures for avoidance and minimisation of waste materials • Procedures and targets for re-use and recycling of waste materials.	**CEMP**	To be included in the CEMP

Appendix D

UNEXPECTED FINDS PROTOCOL

Construction

UNEXPECTED FINDS PROTOCOL

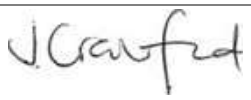
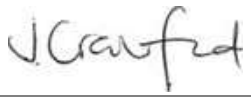
Moorebank Precinct West Stage 2

02 AUGUST 2019

SYDNEY INTERMODAL TERMINAL ALLIANCE

Moorebank Precinct East Stage 2

Unexpected Finds Protocol

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Report No	MIC2-QPMS-EN-APP-00022
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REVISIONS

Revision	Date	Description	Prepared by	Approved by
001	27/07/2018	Draft for review	AK	KP
002	14/09/2018	Second draft for client review	KN	JC
003	26/10/2018	Issued for ER Review	JC	JC
004	02/08/2019	Updated based on Conditions of Consent	KP	KP
005	27/08/2019	Updated to reflect the CFFMP	KP	KP

ACRONYMS AND DEFINITIONS

Acronym/Term	Meaning
BAR	Biodiversity Assessment Report
CFFMP	Construction Flora and Fauna Management Plan
CoCs	Conditions of Consent
DoTEE	Commonwealth Department of the Environment and Energy
EM	Contractor's Environment Manager
EP&A Act	*Environmental Planning and Assessment Act, 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
MPW	Moorebank Precinct West
OEH	NSW Office of Environment and Heritage
PE	Project Ecologist
PFAS	Per & Poly-Fluoroalkyl Substances
RCMM	Revised Compilation of Mitigation Measures
SIMTA	Sydney Intermodal Terminal Alliance
SSD	State significant development
UFP	Unexpected Finds Protocol

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1 INTRODUCTION

The Sydney Intermodal Terminal Alliance (SIMTA) received approval for the construction and operation of Stage 2 of the Moorebank Precinct West (MPW) Project (SSD 7709), which comprises the second stage of development under the MPW Concept Approval (SSD 5066). This Unexpected Finds Protocol (UFP) has been developed to manage the unexpected discovery of contamination within imported spoil, heritage items, threatened flora and fauna, and onsite contamination during the construction phase of Stage 2 of the Moorebank Precinct West (MPW) Project (the Project).

Within this protocol, a strategy has been established to demonstrate the Construction Contractor's approach to the management of unexpected discoveries.

1.1 Objectives and Targets

Refer to Table 1 for high level objectives and targets set for the Project for the management of unexpected discoveries.

Table 1 Objectives and Targets

Objective	Target	Timeframe	Accountability
To implement the unexpected finds protocol to minimise impacts of imported spoil	STOP works in 100% cases where potential contamination is identified in accordance with the Unexpected (Contamination within Imported Spoil) Finds Protocol (Appendix A)	Duration of works	Contractor's CM
To implement the unexpected finds protocol to minimise impacts on unknown heritage items	STOP works in 100% cases where potential heritage is identified in accordance with the Unexpected (Heritage) Finds Protocol (Appendix B)	Duration of works	Contractor's CM
To implement the unexpected finds protocol to minimise impacts on threatened flora and/or fauna species or threatened ecological communities that have not been previously recorded within the Project Site	Stop relevant works in 100% of cases where potential threatened flora and/or fauna species or threatened ecological communities are identified in accordance with the Unexpected (Biodiversity) Finds Protocol (Appendix C)	Duration of works	Contractor's CM
To implement the unexpected finds protocol to minimise the impacts of onsite contamination that has not previously been recorded within the Project site.	Stop relevant works in 100% of cases where potential contamination is identified in accordance with the Unexpected Finds (Onsite Contamination) Protocol (Appendix D)	Duration of works	Contractor's CM

2 ENVIRONMENTAL MANAGEMENT

2.1 Compliance Matrices

The Project is being delivered under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act, 1979* (EP&A Act). The Conditions of Consent (CoCs) include requirements to be addressed in this protocol and delivered during the Project. These requirements, and how they are addressed are provided within Table 2.

Table 2 Conditions of Consent (CoCs)

CoC	Requirement	Plan Section	How Addressed
B174	Unexpected Ordnance (UXO), Exploded Ordnance (EO) and Exploded Ordnance Waste (EOW) protocols must be prepared by an UXO contractor listed on the Defence Panel of suitably qualified UXO consultants and contractors.	Appendix D	This Protocol
B175	The CEMP required under **Condition C2** must include an Unexpected Finds Protocol(s) for, but not limited to, contamination, ordnances, Aboriginal sites, non-indigenous heritage and flora and fauna.	Appendix B	This Protocol

The Revised Compilation of Mitigation Measures (RCMMs) were prepared as part of the Response to Submissions (Arcadis 2017). A list of the RCMMs as relevant to the Project and how they have been complied within this protocol are provided in Table 3.

Table 3 Revised Compilation of Mitigation Measures (RCMMs)

RCMM	Requirement	Document Reference
6A	The CEMP would identify the actions to be taken should additional contamination be identified during the development of the site (i.e. an unexpected finds protocol), and will address REMM items 8H, 8T, 8U, 8V and 8W (of the MPW Concept Approval (SSD 5066)).	Appendix D
9E	An unexpected finds procedure would be included in the ACHAR and in place for the construction phase of the Proposal.	Appendix B
9G	Consultation with RAPs would continue throughout the life of the Proposal, as necessary. Ongoing consultation with RAPs would take place throughout the reburial of retrieved artefacts and in the event of the discovery of any unexpected Aboriginal objects.	Appendix A Appendix B
10C	An unexpected finds protocol (or equivalent) would be included within the CEMP. If unexpected finds are identified during works, a suitably qualified archaeological consultant would be engaged to assess the significance of the finds and the NSW Heritage Council notified. In this instance, further archaeological work or recording may be required.	Appendix B

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval for the MPW Concept was granted by the Commonwealth Department of the Environment and Energy (DoTEE) in September 2016 (No. 2011/6086). This approval was provided for the impact of the MPW Project on listed threatened species and communities (Sections 18 and 18A of the EPBC Act) and Commonwealth action (Section 28 of the EPBC Act).

The construction and operation of the Project has been designed to be consistent with the EPBC Act Approval conditions, where relevant. EPBC Act Approval conditions for the Project include specific conditions

and commitments that are required to be addressed in this UFP. These conditions relevant to this UFP are identified below in Table 4.

Table 4 Commonwealth Approvals

Commonwealth	Requirement	Document Reference
8	Sections of the CEMP and OEMP relating to contamination and soils must be prepared by a suitably qualified expert and must: … (d) in relation to management of PFAS: … ii) detail implementation and operational procedures, appropriate to the risk posed by any contamination, including: … • a contingency action plan for unexpected PFAS contaminant discoveries	Refer to the Moorebank Precinct West – Early Works Per & Poly-Fluoroalkyl Substances (PFAS) Management Plan

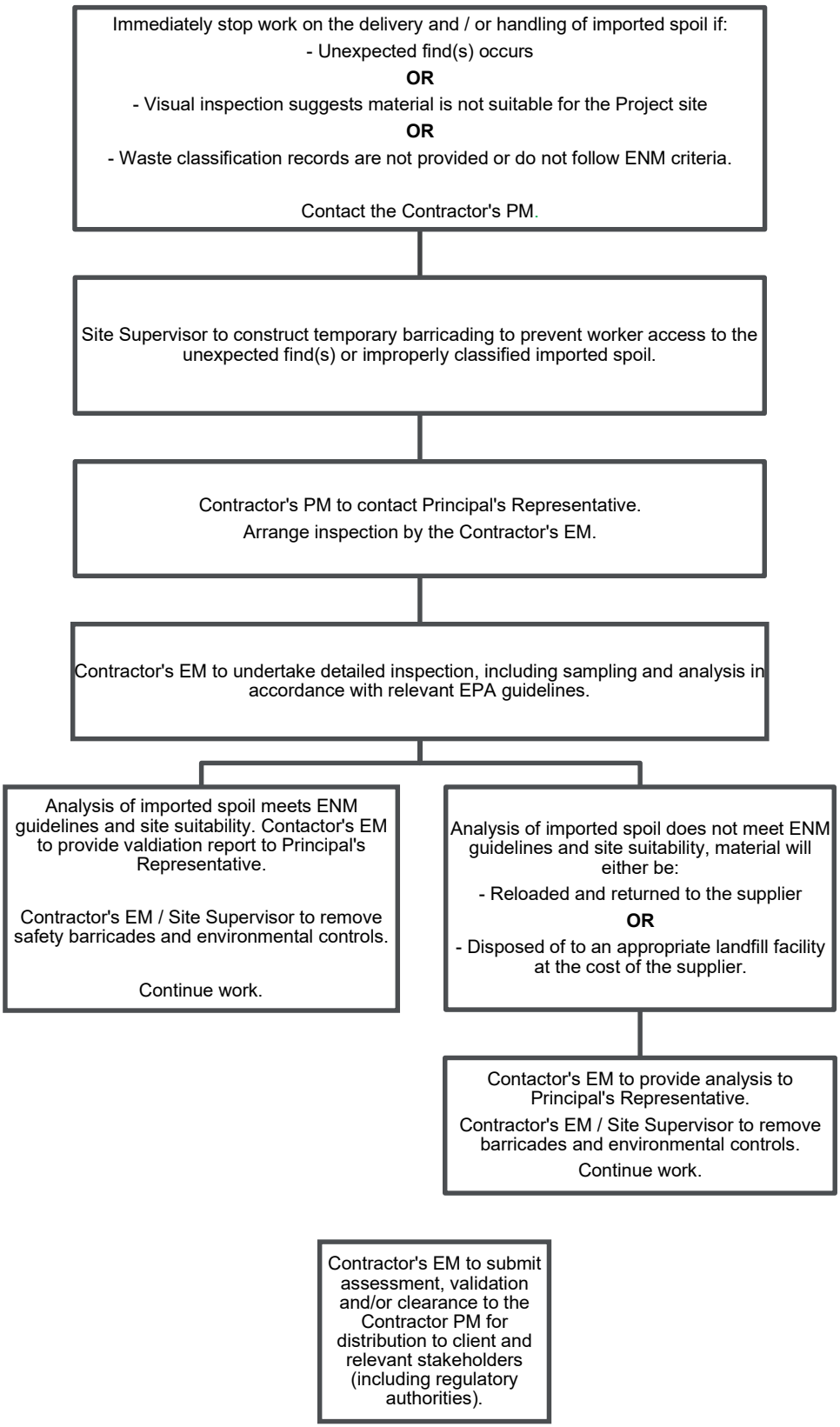
2.2 Unexpected Finds Protocols

Specific protocols for the discovery of unexpected finds have been developed for potential:

- Contamination within imported spoil
- Aboriginal and non-Aboriginal finds
- Threatened flora and/or fauna species or threatened ecological communities
- Onsite contamination including ordnance.

Each of these specific protocols is included in the following appendices.

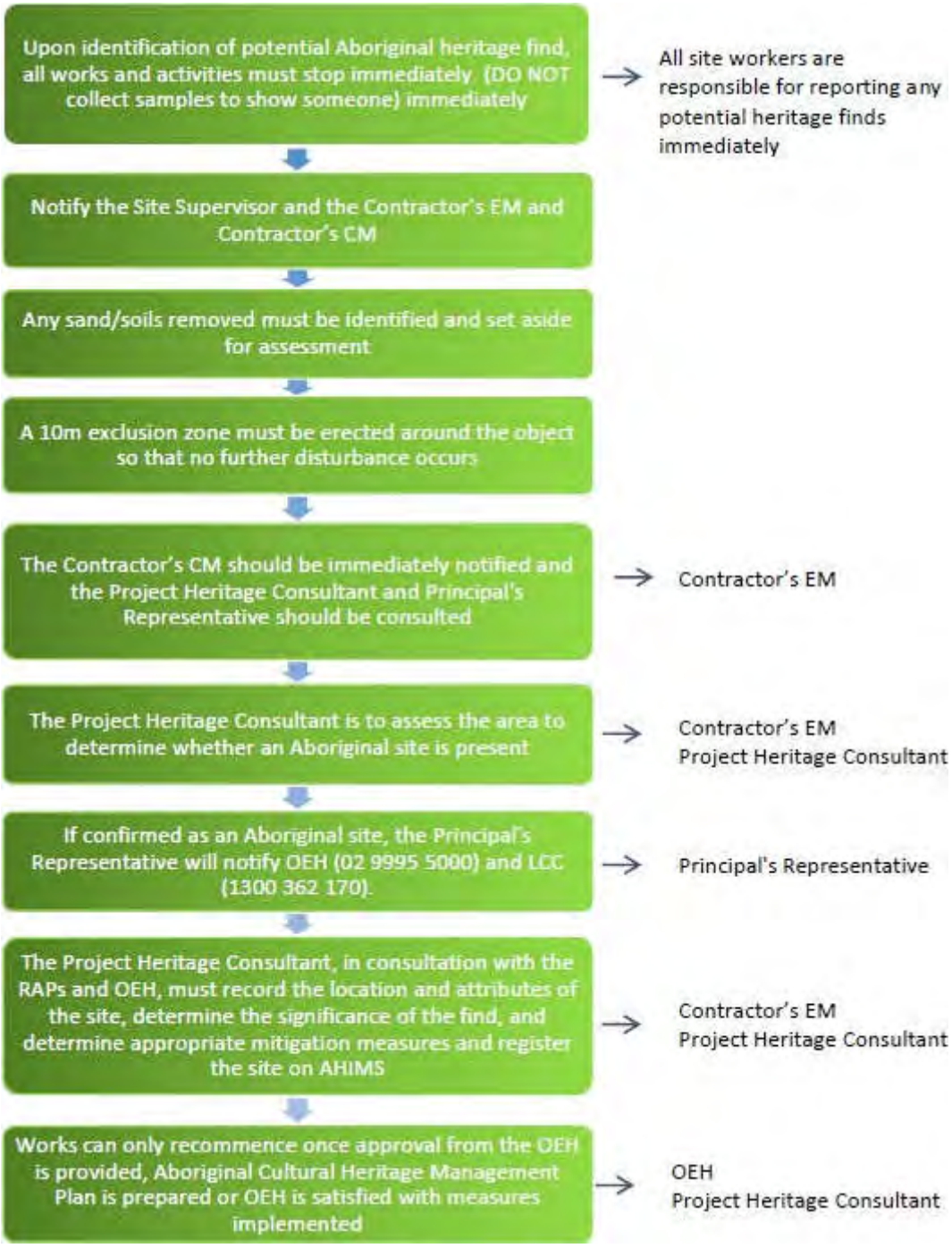
APPENDIX A UNEXPECTED (CONTAMINATION WITHIN IMPORTED SPOIL) FINDS PROTOCOL


Immediately stop work on the delivery and / or handling of imported spoil if:
- Unexpected find(s) occurs
OR
- Visual inspection suggests material is not suitable for the Project site
OR
- Waste classification records are not provided or do not follow ENM criteria.
Contact the Contractor's PM.
Site Supervisor to construct temporary barricading to prevent worker access to the unexpected find(s) or improperly classified imported spoil.
Contractor's PM to contact Principal's Representative.
Arrange inspection by the Contractor's EM.
Contractor's EM to undertake detailed inspection, including sampling and analysis in accordance with relevant EPA guidelines.
Analysis of imported spoil meets ENM guidelines and site suitability. Contactor's EM to provide valdiation report to Principal's Representative.
Contractor's EM / Site Supervisor to remove safety barricades and environmental controls.
Continue work.
Analysis of imported spoil does not meet ENM guidelines and site suitability, material will either be:
- Reloaded and returned to the supplier
OR
- Disposed of to an appropriate landfill facility at the cost of the supplier.
Contactor's EM to provide analysis to Principal's Representative.
Contractor's EM / Site Supervisor to remove barricades and environmental controls.
Continue work.
Contractor's EM to submit assessment, validation and/or clearance to the Contractor PM for distribution to client and relevant stakeholders (including regulatory authorities).

APPENDIX B UNEXPECTED (HERITAGE) FINDS

Unexpected (Heritage) Finds Protocol

Aboriginal Heritage



Examples of Potential Unexpected Aboriginal Finds

It is highly unlikely that any Aboriginal artefacts will be identified on the site due to the historical disturbance of the area. However, the most likely finds are isolated finds such as flaked stone tools.

Typical characteristics of flaked stone tools include:

- Sharp edges.
  - Retouch along one or more edges.
  - Stone rich in silica.

  - Stone type often different to the natural rock in the area.
- Flakes
  - Usually less than 50 mm long.
  - A ‘striking platform’ visible.
  - Impact point often present on the striking platform.
  - A ‘bulb of percussion’ often present below the striking platform.
  - May have been shaped into a recognisable tool form, such as a point or scraper.
- Cores
- May be fist-sized or smaller.
- May have one or more scars where flakes have been removed.

It is noted that not all features can be seen on each stone tool and some require an experienced eye to identify them. Breakage can remove key features.

Skeletal Remains



Non-Aboriginal Heritage



Note: In the context of this UFP, an unexpected find is defined as a previously unknown heritage item or evidence of heritage value. It does not include uncovering findings within previously identified potential archaeological deposits.

APPENDIX C UNEXPECTED (BIODIVERSITY) FINDS

Unexpected (Biodiversity) Finds protocol

Purpose

This Unexpected Finds Protocol explains the actions and measures to be implemented if any threatened flora and/or fauna species or threatened ecological communities that have not been previously recorded within the Project Site (as identified in the documents outlined in CoC A3) are identified during construction.

Training

All personnel undertaking construction activities within the Project site will be inducted on the identification of known and potential threatened species and ecological communities occurring on site, and will be trained in this protocol through Toolbox Talks or a site induction.

Protocol

Upon detection of a threatened species or ecological community during construction activities, the following steps must be followed.

1. **STOP ALL WORK** in the vicinity of the find. Immediately notify the Contractor's Environment Manager (Contractor's EM) who will notify the Project Ecologist (PE) and Principal's Representative. The project ecologist must confirm the presence of the threatened species.
2. **EXCLUSION ZONE.** In consultation with the PE, create a buffer zone/ exclusion zone around the find
3. **EXTERNAL NOTIFICATION.** Principal's Representative to notify OEH of previously unidentified species
4. **ASSESS IMPACT**. An assessment is to be undertaken by the Contractor's EM, PE and Principal's Representative in consultation with OEH to identify the flora and/or fauna species level, the likely impact to them and appropriate management options, such as re-location measures.
5. **OBTAIN APPROVALS**. Obtain any relevant licences, permits or approvals required if the threatened species / ecological community is likely to be significantly impacted. Consultation with OEH must be completed for any proposed amendments to the location or reclassification of threatened species, populations and ecological communities as identified in the updated BAR.
6. **RECOMMENCE WORKS**. Construction works may recommence once the Contractor's EM has:
    a. Obtained approvals as required, and
    b. Confirmed that all corrective actions and additional mitigation measures have been implemented.
7. **UPDATE PLANS AND PROCEDURES**. The Contractor's EM must ensure that the threatened species / ecological community is included in subsequent site plans and/or sensitive area drawings, inductions and Toolbox Talks. The Contractor's EM must provide information to enable an update of ecological monitoring and/ or biodiversity offset requirements

APPENDIX D UNEXPECTED (ONSITE CONTAMINATION) FINDS PROTOCOL

Potential Site Hazards











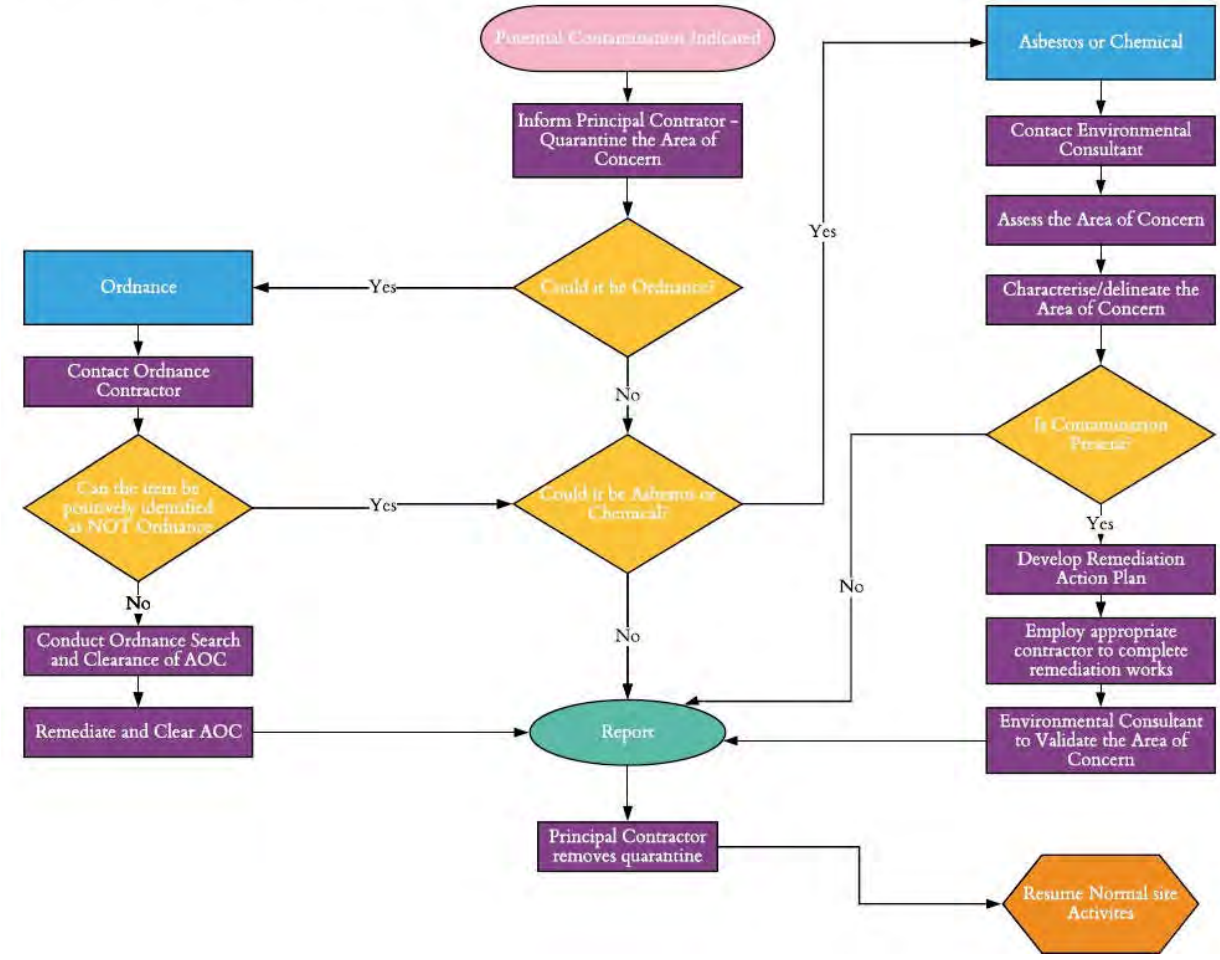


If you SEE or SMELL anything unusual

STOP WORK & contact Site Foreman

Do not restart work before the area has been investigated and cleared by an Environmental Consultant

Unexpected Finds Protocol (UFP)



Operation

8D – Process Report Form

Customer:		Report no:	
Report Title:			
Project Number:			
Project Description:			
Date Opened:		Updated:	
Team Leader:			
Team Members: (D1)			

Problem Description (D2)

Immediate Containment Action (D3)	Responsibility	Effective Date(s):

Verification of Containment Action (D3)	By Whom	Date(s):

Root Causes (D4)		% Contribution

Permanent Corrective/Preventative Action (Short and/or Long Term) (D5)	Responsibility	Effective Date(s):

Verification of Permanent Corrective/Preventative Action (D6)	By Whom	Date(s):

Prevent Recurrence / Lessons Learned (D7)

Signature & Congratulate Team (D8)		
Team Leader:		**Quality Systems Manager**
Date:		*for external customers*
		Other signatures - nominate as required **Date:**

WI_007

Appendix E

REPORTING REGISTERS

Appendix F

Table F-1: Incidents and Non-conformances Register

Name of Person Who Raised Issue	Date Raised	Category (Int Audit, NCR, Injury/Incident, System Imp, Inspection)	Details of Issue	Has it already been resolved? How?	What action was or will be taken to prevent recurrence of the problem or improve the system?	Responsibility	Verification Results: Action verified as effective? Verification outcomes	Open / Closed?	Name & date when action veified as effective

Appendix F

Table F**-2: Complaints Register**

Name of Person Who Complained	Date Raised	Contact details - address	Contact details - Phone	Contact details - email	Details of Complaint	Action taken to prevent recurrence of the problem or improve the system?	Responsibility	Verification Results: Action verified as effective? Verification outcomes	Open / Closed?	Name & date when action veified as effective

Appendix F
GROUNDWATER LEVELS

Table H1 - Groundwater Gauging and Field Parameters

Well ID	Date	Easting	Northing	Well RL (AHD)	Standing Water Level (mBTOC)	Reduced Water Level (AHD)	Temp.	Electrical Cond.	DO	Redox	pH	Salinity	TDS	Intake Depth (m BTOC)	Comments
MW5001	11.04.2018	307532.7355	6241251.084	14.127	10.376	3.751	21.9	837	2.19	181.7	5.12	0.44	578.5	10.7	Clear, no sheen, no odour
MW5002	11.04.2018	307658.4459	6241109.66	15.752	10.642	5.11	22.2	4515	2.88	212.7	4.73	2.56	3100.5	11	Brown, no sheen, no odour
MW5003	11.04.2018	307733.8721	6240987.541	16.299	9.873	6.426	22.7	11468	-	168.2	4.76	6.86	7800	10.5	Brown, no sheen, no odour
MW5004	11.04.2018	307723.5459	6240960.603	16.197	9.59	6.607	27.6	8638	-	136.3	5.37	4.56	5375	9.9	Clear, slightly orange / brown, minor organic odour
MW5005	11.04.2018	307610.8555	6241019.867	16.166	11.034	5.132	23.9	6577	0.98	174.2	4.7	3.68	4368	11.5	Clear, minor brown sediment, no sheen, no odur
MW5006	11.04.2018	307740.1577	6240724.447	17.184	9.031	8.153	25.7	18950	3.09	187.9	5.54	11.07	12168	9.75	Clear, no sheen, no odour
MW5007	11.04.2018	307645.4289	6240773.834	15.765	9.329	6.436	22	17028	4.43	1860	4.93	10.7	11732.5	9.7	Clear, minor light brown sediment, no sheen, no odour
MW7003A	18.06.2018	307617.059	6240845.306	15.536	10.275	5.261	18.7	3610	3.11	158.5	5.19	1.91	2346.5	14.11	Clear / light brown, no sheen, no odour
MW7003B	18.06.2018	307615.406	6240843.667	15.631	10.416	5.215	20.3	30.8	6.02	117.8	5.7	0.02	20.15	20.1	Clear / light brown, no sheen, no odour
Minimum Value						3.751	18.7	30.8	0.98	117.8	4.7	0.02	20.15		
Maximum Value						8.153	27.6	18950	6.02	1860	5.7	11.07	12168		
Average						5.79	22.78	7961.53	3.24	355.26	5.12	4.64	5276.57		

Appendix G
CONSULTATION LOG

Consultation Log – Long Term Environmental Management Plan (LTEMP) – Lot 6, 7 and 12							
Item	**Original Version**	**Date**	**Stakeholder**	**Communication Method**	**Comments**	**Changes**	**Finalised Version**
1	-	12.03.2021	Qube / Tactical	N/A	Issued to Client (v1)	N/A	v1
2	v1	18.05.2021	Enviroview	*IA 301-2020-1_03 RE: Site Audit Interim Advice 03 – Review of the Woolworths Audit Area Long-Term Environmental Management Plan (LTEMP) and the revised Woolworths Audit Area Validation Summary reports,* dated 18 May 2021.	a) Site boundary confirmation. b) Section 4, Table 4. Enforcement. c) Appendix B – EMPs. d) Section 4.5 Reuse of PFAS Impacted Soils unlikely. e) Removal of sections not relevant to the proposed development.	a) Section 1.3 amended. b) Section 4 amended. c) Appendix B – EMPs amended. d) Section 4.5 amended. e) Amended.	v2
3	v1	04.06.2021	Tactical	*Email (04.06.2021)*	a) Removal of Woolworths b) Amendments to Table 4	a) Amended b) Amended	v2
4	v1	08.06.2021	Tactical	*Correspondence email – Qube/Auditor/MIC Catchup email summary (08.06.2021).*	a) Removal of masterplan from LTEMPs. b) Table 4 acceptance. c) Defined responsibilities.	a) Amended b) Noted c) Amended	v2
5	v1	18.06.2021	Qube / Tactical	N/A	Issued to Client (v2)	N/A	v2
6	v2	08.07.2021	Enviroview	*IA_301-2020-1_04R1_RE: Site Audit Interim Advice 03 – RE: Site Audit Interim Advice 04R1 – Review of the revised (v2) Woolworths Audit Area Long-Term Environmental Management Plan (LTEMP),* dated 8 July 2021.	a) Section 1.3 – Enforcement of LTEMP. b) Section 4, Table 4. Enforcement. c) Minor changes.	a) See Item 7 b) See Item 7. c) Amended.	v3

Consultation Log – Long Term Environmental Management Plan (LTEMP) – Lot 6, 7 and 12							
Item	**Original Version**	**Date**	**Stakeholder**	**Communication Method**	**Comments**	**Changes**	**Finalised Version**
7	v2	24.08.2021	Tactical	*Letter from Lawyers*	Letter on enforcement of the LTEMP.	Section 1 and Table 4 amended.	v3
8	v2	10.09.2021	Qube / Tactical	N/A	Issued to Client (v3)	N/A	v3
9	v3	05.10.2021	JBS&G	*Email – JBS&G email to Tactical (05.10.2021)*	Provision of Technical Memo: *JBS&G 51997 – 136836 (Rev 2),* dated 19 May 2021. Email: *"It is recommended that it be confirmed with the Auditor that the use of asphalt paving as a isolating layer/management measure is appropriate and consistent with the risk assessment, and that subsequently asphalt paving as an isolating layer be explicitly incorporated into future LTEMPs applying to MPW."*	Section 4.5.	v4
10	v3	22.10.2021	Tactical	*Email*	a) Remove Letter from Lawyers (Appendix G) and all references. b) Remove enforcement and reference to B172 in combined Section 1.3 and 1.4.	a) Removed b) Amended	v4
12	v4	09.11.2021	Qube /Tactical	N/A	Issued to Client (v4)	N/A	v4
13	v4	01.12.2021	Qube /Tactical	*Email*	Insert: *"This LTEMP will be implemented in compliance with Condition C39 of the MPW Stage 3 Consent (SSD 10431)."* Section 1.3 and 4.3	Section 1.3 and 4.3	v5
14	v5	08.12.2021	Qube /Tactical	N/A	Issued to Client (v5)	N/A	v5