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Report on
Preliminary Site Investigation (Contamination)

Proposed Industrial Building
Proposed Lot 109 Aerospace Avenue, Williamtown
Part Lot 11, DP 1036501

Prepared for
EJE Architecture

Project 39728.28
September 2022

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

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Report on Preliminary Site Investigation (Contamination)
Proposed Industrial Building
Proposed Lot 109 Aerospace Avenue, Williamtown

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by EJE Architecture to complete this preliminary site investigation (PSI) undertaken for a proposed commercial building for the site at the Proposed Lot 109 Aerospace Avenue, Williamtown (the site), within Part Lot 11 DP 1036501. The site is shown on Drawing 1, Appendix B.

The Investigation was undertaken with reference to DP's proposal 39728.28.P.001.Rev1 dated 22 August 2022.

The objective of the PSI is to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/or management with regard to the proposed development. It is understood that the report will be used to support a development application for the proposed development.

Douglas Partners Pty Ltd (DP) has previously undertaken several assessments at the site including geotechnical assessments, and a previous preliminary contamination assessment for a greater site area which contained the subject site (DP, 2019). The purpose of the current assessment was to review existing site conditions against those previously described in DP (2019) and provide an updated preliminary site investigation (PSI) with respect to site contamination.

This report must be read in conjunction with all appendices including the notes provided in Appendix A.

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

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

2. Proposed Development

The subject site comprises the proposed Lot 109 with the Astra Aerolab Stage 1 subdivision. . The proposed Lot 109 is within the current lot known as Lot 11 DP 1036501.

The proposed development is outlined on the drawings (EJE Architecture and Astra Aerolab Industrial Building Concept Design 109/1 Revision E May 2022)) in Appendix B. At this stage, development of the 'Lot 109/1 facility is proposed, within the north-western portion of Lot 109.and the development generally comprises the following:

- A two-storey office and warehouse building with associated landscaping and pavements;

- The workshop / warehouse component is anticipated to be concrete precast panels to walls, supported by a steel portal frame;
- The building area will cover approximately 3280 m2 on a 6900 m2 site;
- It is noted that there are no basement levels in the proposed development.

3. Scope of Works

The scope of work for this PSI comprised:

- Brief review of previous investigations conducted by DP and others (Refer to Section 6 below) at the site and nearby sites for relevant / translatable findings;
- Brief site history review to assess potential contamination at the site comprising a review of historical aerial photograph records, search of registered groundwater bores in the area and NSW EPA notices search and Council search;
- A site inspection by a senior environmental engineer to identify areas of potential contamination and assess the current site condition;
- Preparation of a preliminary Conceptual Site Model (CSM); and
- Preparation of this report summarising the findings of the assessment and providing recommendation for further work.

4. Site Information

Site Address	Proposed Lot 109 Aerospace Avenue, Williamtown
Legal Description	Part Lot 11 Deposited Plan 1036501 (Proposed Lot 109)
Area	23,857 m^2
Zoning	Zone B7 Business Park
	Zone RU2 – Rural Landscape
Local Council Area	Port Stephens Council
Current Use	Vacant – proposed commercial subdivision
Surrounding Uses	North – Vacant commercial subdivision lots and commercial Airport East – Vacant commercial subdivision lots South – Rural residential West – Vacant grass land/open space

The approximate location of the proposed Lot 109 is shown in Figures 1 and 2 below.

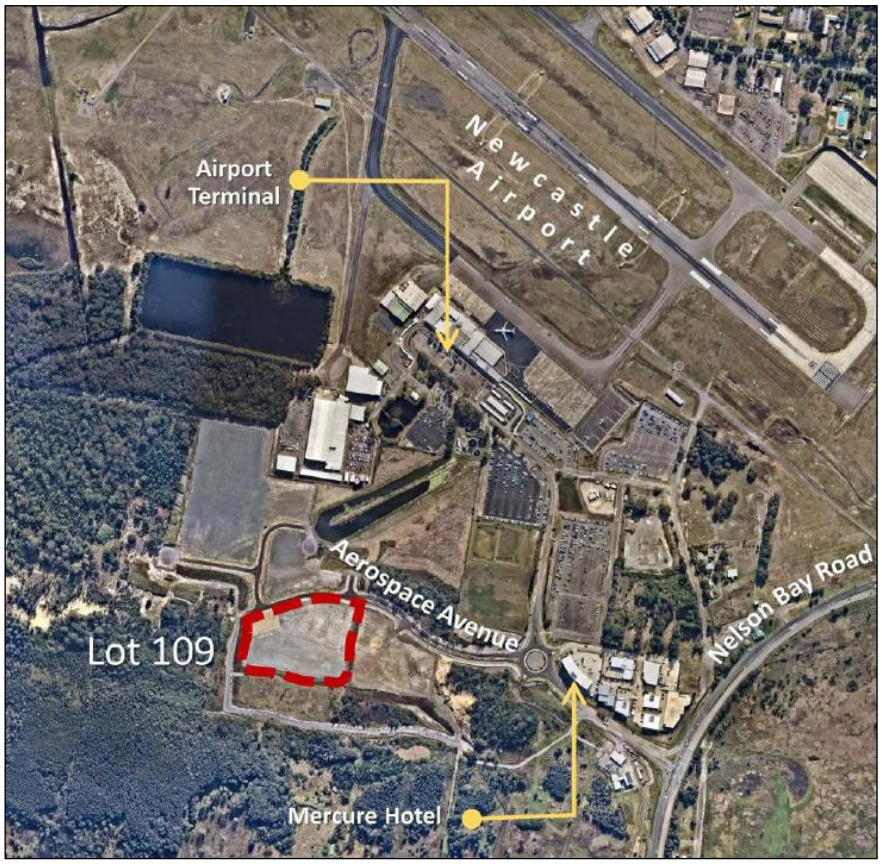


Figure 1: Location of proposed Lot 109 (red outline)

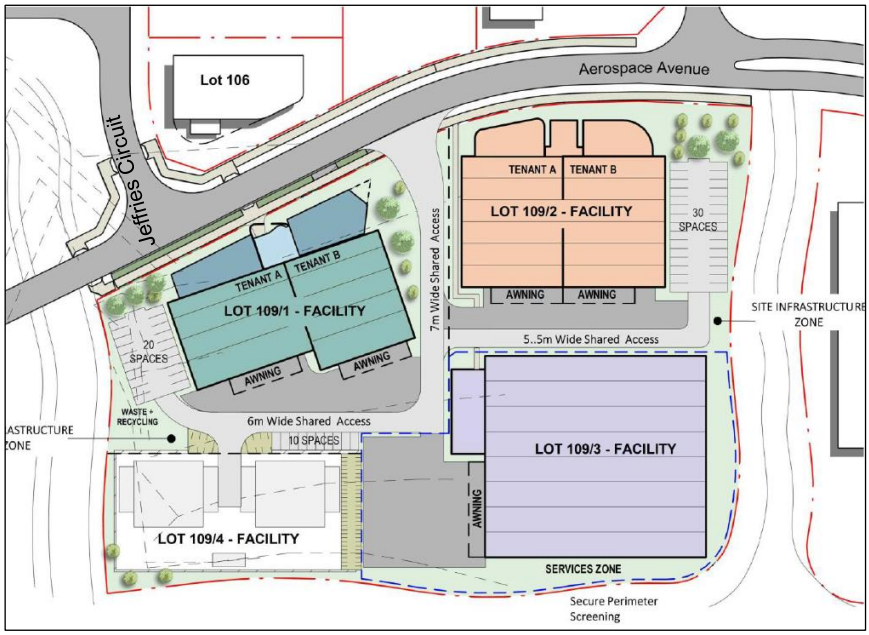


Figure 2: Site location (red outline), within the Astra Aerolab Stage 1 area

5. Published Data

5.1 Geology

Reference to the NSW Department of Primary Industries (DPI) NSW Coastal Quaternary Geology mapping indicates that a variety of Quaternary, (Pleistocene and Holocene) units are likely to be present on the site.

Figure 3 below shows the inferred DPI mapped geology overlaid on the site aerial photo, with an indicative location of proposed Lot 109.

The following table summarises the units that are mapped within Stage 1.

Table 1: Quaternary Alluvium Units Shown in Figure 3

Geological Symbol	Age	Unit	Lithology
Qhas	Holocene	Backswamp	Organic mud, peat, silt, clay
Qheb	Holocene	Estuarine in-channel bar and beach	Marine sand, silt, clay, shell, gravel
Qhem	Holocene	Estuarine basin and bay	Clay, silt, shell, fluvial or marine sand
Qhes	Holocene	Saline swamp	Organic mud, peat, clay, silt, marine sand, fluvial sand
Qpb	Pleistocene	Undifferentiated	Marine sand, indurated sand
Qpbd	Pleistocene	Dune	Marine sand, indurated sand
Qpbw	Pleistocene	Beach-ridge swale and dune deflation hollow	Marine sand, indurated sand, organic mud, peat

Proposed Lot 109 is partially located within geological unit ‘Qpbd’, which is Pleistocene aged dune sand in the north of the lot, including the proposed Lot 109/1 development area. The southern portion of proposed Lot 109 is within an area mapped as ‘Qheb’, which is Holocene aged Estuarine in-channel bar and beach generally comprising marine sand, silt, clay, shell and gravel.

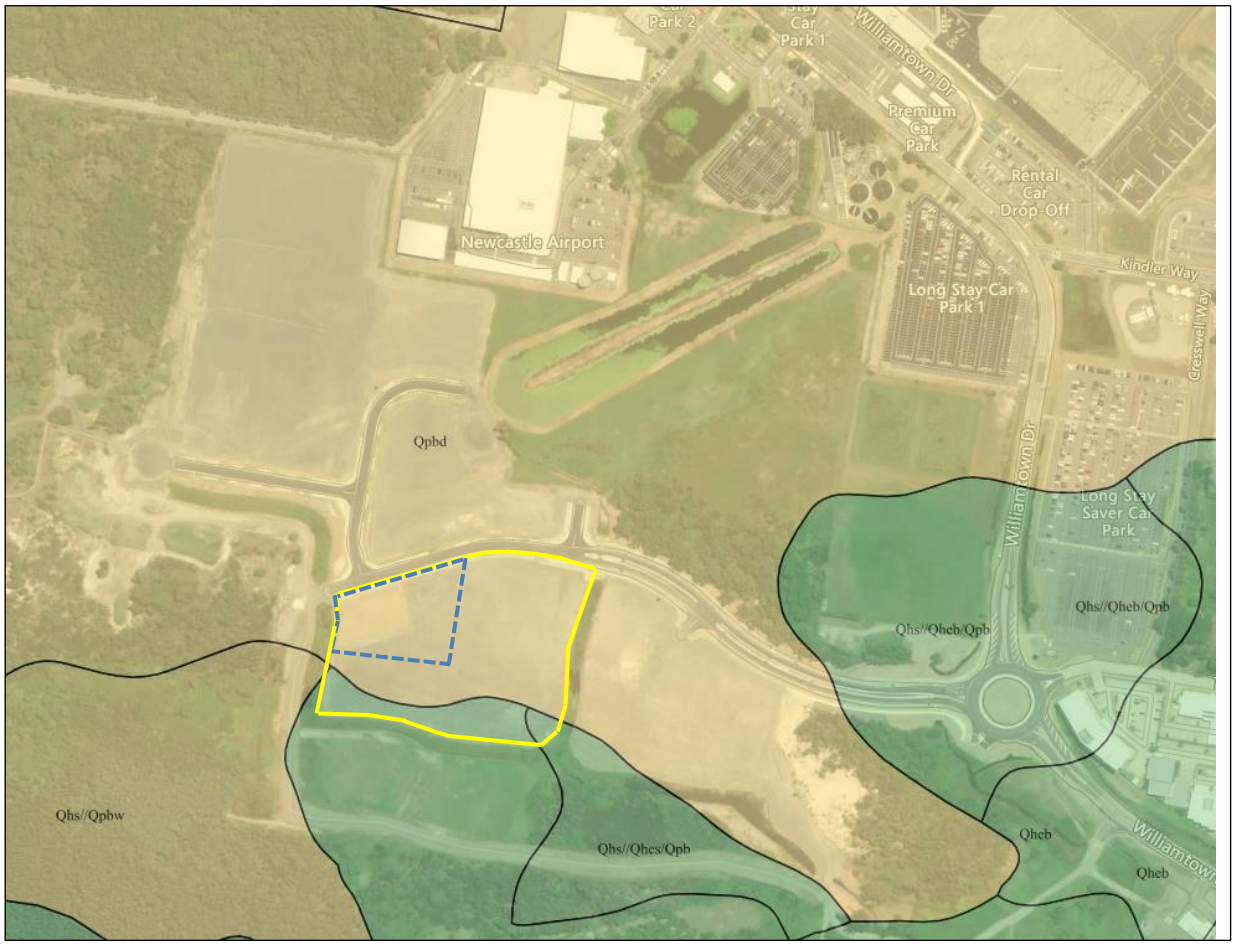


Figure 3: Quaternary Geology map for Astra Aerolab. Proposed Lot 109 in yellow, Lot 109/1 development area in blue dashed

5.2 Hydrogeology

Based on the regional topography and the inferred flow direction of nearby water courses, the anticipated flow direction of groundwater beneath the site is to the south to south-east, towards Tilligerry Creek and Fullerton Cove, the likely receiving surface water bodies for the groundwater flow path.

There is an effluent pond located approximately 100 m north of the site associated with the adjacent RAAF wastewater treatment works. There are several unnamed constructed and natural drains and creeks to the south of the Astra Aerolab area, generally draining to the south towards the Fourteen Foot Drain, located approximately 1.7 km south of the site which subsequently flows into Fullerton Cove, which is located approximately 2.3 km south-west of the site and is considered to be the nearest sensitive receptor

Groundwater is relatively shallow at the site, with recent subsurface investigation (DP, 2019) encountering groundwater at depths of between 0.0 m and 1.6 m below the natural ground surface. Groundwater levels are affected by factors such as soil permeability and the prevailing weather conditions and vary with time.

Three registered groundwater bores are located between approximately 400 m and 600 m east-south-east of the proposed Lot 109 and are registered as monitoring bores. Standing water level in the wells is 0.6 m below ground level.

Based on previous investigations in the vicinity of the site, the regional groundwater flow regime is believed to be to the south/south-west of the site, towards Fullerton Cove.

5.3 Soil Landscape

Proposed Lot 109 is partially located within the 'Shoal Bay' Soil landscape area, generally comprising Pleistocene sand sheets and low dunes on the Tomago Coastal Plain. This soil landscaped approximately mirrors the Pleistocene aged dune sand in the mapped geology. Limitations to this soil landscape type include wind erosion hazard, ground water pollution hazard, steep slopes (localised), foundation hazard (localised, swamps), permanent waterlogging (localised, swamps), permanent high water tables (localised, swampy depressions) and seasonal waterlogging.

The southern portion of Lot 109 is mapped within the 'Bobs Farm' soil type, generally comprising Deep (>300cm), very poorly drained Humic Gleys (i.e. waterlogged soils). Limitations of this soil type include Permanently high water tables, seasonal waterlogging, foundation hazard, flood hazard and potential acid sulfate soils.

5.4 Acid Sulfate Soils

Reference to the NSW Acid Sulfate Soil (ASS) Risk map indicates that the majority of Lot 109, including the proposed Lot 109/1 development area, is within an area mapped as a low probability of occurrence of ASS at depths greater than 3 m below the ground surface (orange shading in Figure 4).

The southern portion of Lot 109 is within an area mapped as a high probability of occurrence of ASS at depths between 1 m and 3 m below the natural ground surface (red shading in Figure 4). An extract of the ASS map for the area is provided in Figure 4 below.

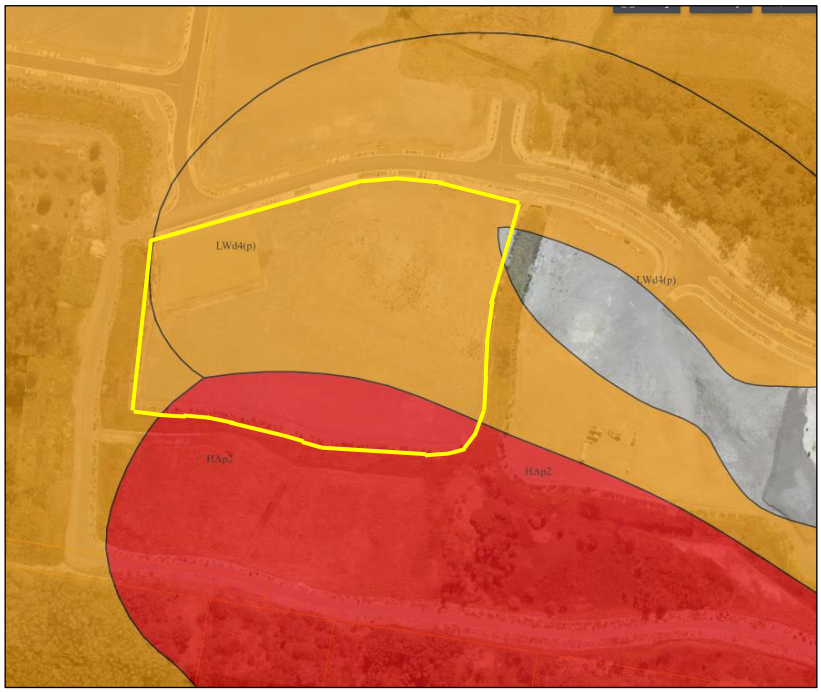


Figure 4: ASS soil map, with Lot 109 in yellow

6. Previous Reports

6.1 Pre-Subdivision Documents

DP has carried out a number of investigations within the general area of the site. The investigations carried out are summarised below, along with one investigation completed by another consultant.

DP (2009)

DP conducted a Preliminary site investigation for contamination for the proposed 'DAREZ' development, which included the current site area. The scope of work comprised the following:

- Discussion with landowners;
- Review of Council records, historical aerial photos, NSW EPA records, NSW WorkCover Dangerous Goods Search and published data;
- Site inspection;
- Preparation of a report which discussed the findings of the assessment.

The results of the site history review and site inspection suggested the general absence of gross contamination across the greater investigation area. Previous site uses included agricultural site use and a sand quarry. The gathered site history information from DP (2009) is presented in Section 7 below.

Identified sources of potential contamination within the current Astra Aerolab Stage 1 area were generally limited to localised imported filling, rubbish stockpiles, the presence of fibro fragments possibly containing asbestos and the adjacent effluent ponds to the north-east.

The site was considered generally suitable for the proposed commercial / industrial development from a contamination perspective, provided that the potential localised contamination was assessed.

DP (2019a)

A preliminary site investigation was conducted in 2019 by DP to provide a preliminary assessment of contamination at the Astra Aerolab Stage 1 site. The subject site is located within the Aerolab Stage 1 site. The assessment utilised the gathered site history information from DP (2009) and provided additional site history information. The site history information from DP (2019a) is also provided in Section 7 below. The site history review suggested the general absence of gross contamination at the Astra Aerolab Stage 1 site apart from PFAS in groundwater, plus the identified localised rubbish dumping, imported fill and possible asbestos-containing material (ACM). Limited groundwater testing was conducted in which PFAS was identified to be exceeding the adopted screening levels. The results also indicated concentrations of heavy metals (chromium, copper, nickel and zinc) in groundwater exceeding the default guideline values in ANZG (2018) for 95% level of protection in aquatic ecosystems.

The site was considered to be suitable for the proposed light industrial / business park development from a contamination perspective, provided that the potential localised contamination is assessed, remediated and validated in accordance with a site-specific remediation action plan (RAP), which contains an unexpected finds protocol (UFP) for management during earthworks. It was also recommended that the proposed site development should account for the short-term (i.e. construction) and long-term management of PFAS impacted soil, surface water and groundwater.

DP (2019b)

A RAP was prepared by DP for the Astra Aerolab Stage 1 area. Remediation methodologies provided in this RAP include the excavation and removal of localised near-surface impacted soils followed by validation testing, and on-site management of impacted soils via capping, subject to the type and extent of impact and the potential to cause human health or environmental harm. Based on the results of DP (2019a), the extent of remediation was generally limited to localised areas of impact such as dumped rubbish, dumped car bodies, surface ACM impacts and fill stockpiles of unknown origin. Based on the results of the previous assessments, there are some areas of the site where the requirement for remediation may be more extensive, particularly in areas where existing potentially PFAS-impacted soils will remain exposed to site users.

Port Stephens Council DA Determination Consent 16-2009-324-3 (Determination Date 23 March 2022)

With regards to contamination for construction of the Astra Aerolab subdivision, the following conditions were noted in the above consent:

73A. A plan for the remediation of the effluent ponds as identified in the "Stage 1 Preliminary Contamination Assessment" prepared by Douglass Partners in April 2009, is to be prepared and submitted to Council and Certifying Authority prior to the commencement of work within the easement for the effluent ponds.

74A. At the completion of remediation of the effluent ponds, the applicant is to provide Council and Certifying Authority with appropriate certification, which confirms that contaminated areas have been remediated to a level which allows for the construction and occupation of industrial premises and associated works in the effluent ponds area.
74.1 Prior to the issue of a Subdivision Works Certificate for each stage, a Construction Management Plan is to be prepared and include the following actions to manage interaction with PFAS contamination during construction:

a. An investigation must be undertaken to characterise the potential for PFAS contamination, taking into account the EPA's Williamtown Management Area Maps and identify any potential contact with PFAS affected substances and exposure pathways which will need to be managed during construction activities. PFAS sampling is to be undertaken with the PFAS National Environmental Management Plan.

b. Where potential for PFAS contamination exists, it must be identified whether any construction activities will disturb soils above or below the groundwater table or interact/intercept groundwater. Where construction activities have the potential to disturb soils above or below the groundwater table or interact/intercept groundwater, soil sampling for PFAS must be undertaken to identify its presence and concentration (or otherwise), classify the soil in accordance with the EPA's Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste (https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste) and identify lawful reuse, treatment and/or disposal options. The discharge of PFAS contaminated ground water to the environment is not permitted.

c. Any soils and groundwater that is to be excavated or removed from the premises must be fully quantified in tonnes (soil) and litres (groundwater).

d. Where potential for PFAS contamination exists, suitable mitigation measures must be identified to prevent or limit, as far as possible, PFAS contact and exposure (for both human and environmental health) including appropriate measures to prevent unlawful offsite releases.

e. Where potential for PFAS contamination exists, an erosion and sediment control plan must be developed in accordance with the EPA endorsed publication "Managing Urban Stormwater – Soils and Construction, 4th Edition" (Landcom, 2004) (or any revision) and any relevant EPA produced addendum publications.

6.2 Subdivision Documents

DP (2019c)

DP conducted an assessment of materials proposed to be imported to the Astra Aerolab Stage 1 site from a development in Mayfield. DP was provided a copy of a Virgin Excavated Natural Material (VENM) assessment report by Qualtest on the materials that were imported from the Mayfield site. The VENM report indicated that the natural materials from the Mayfield development were suitable for classification as VENM and could be reused on another site.

DP also inspected the materials at the source site and inspected the materials at the Astra Aerolab Stage 1 area following receipt from the source site.

Information regarding tracking of the imported materials from Mayfield to the Astra Aerolab site was provided as part of record-keeping for the Astra site. Review of the tracking records as part of DP (2019c) suggested that all material loads leaving the source site at Mayfield arrived at the receipt site at Astra Aerolab Stage 1.

DP (2019d)

Additional documentation (DP, 2019d) for proposed imported materials was provided at the time of subdivision construction, indicating that materials from Karuah Quarry and Karuah East Quarry was also proposed to be utilised as bulk fill for the Astra Aerolab Stage 1 area. Information provided from the quarry indicated that the proposed fill materials were Virgin Excavated Natural Materials (VENM). DP conducted an inspection at the source site to confirm material types and sources. The material was excavated rock quarry materials. DP was not involved in the tracking of quarry materials from the Karuah quarry to the Astra Aerolab site.

DP (2019e)

Acid Sulfate Soil Management Plan (ASSMP), Astra Aerolab Stage 1. This report presents a summary of ASS conditions encountered within the Stage 1 site from previous investigations, plus procedures for management and monitoring of ASS at the site. For the current assessment, the southern portion of proposed Lot 109 is within an area mapped as a high probability of occurrence of ASS at depths between 1 m and 3 m below the natural ground surface.

The ASSMP noted that based on the existing data, all natural soils within Stage 1, with the exception of dunal sand and surficial topsoil, should be considered potential acid sulfate soils, and treated accordingly, unless field screening indicates otherwise.

Valley Civilab (2020a)

Valley Civilab report, dated 25 March 2020 (Ref: P1938-L1R-001-Rev0) reported on geotechnical Level 1 inspection and testing for fill placement in selected areas of Stage 1 of Astra Aerolab.

As noted in the report, The Level 1 Inspection and testing was undertaken by Valley Civilab, as directed by the client (KCE Pty Ltd, the earthworks contractor for early works at Astra Aerolab) between 25 October 2019 and 12 November 2019 at the following locations:

- Access Road (including additional 1.5 m of surcharge fill as required);
- Site Compound; and
- Stockpile areas.

The approximate location of the areas subject to filling and testing in Valley Civilab (2020) is provided in Figure 5 below.

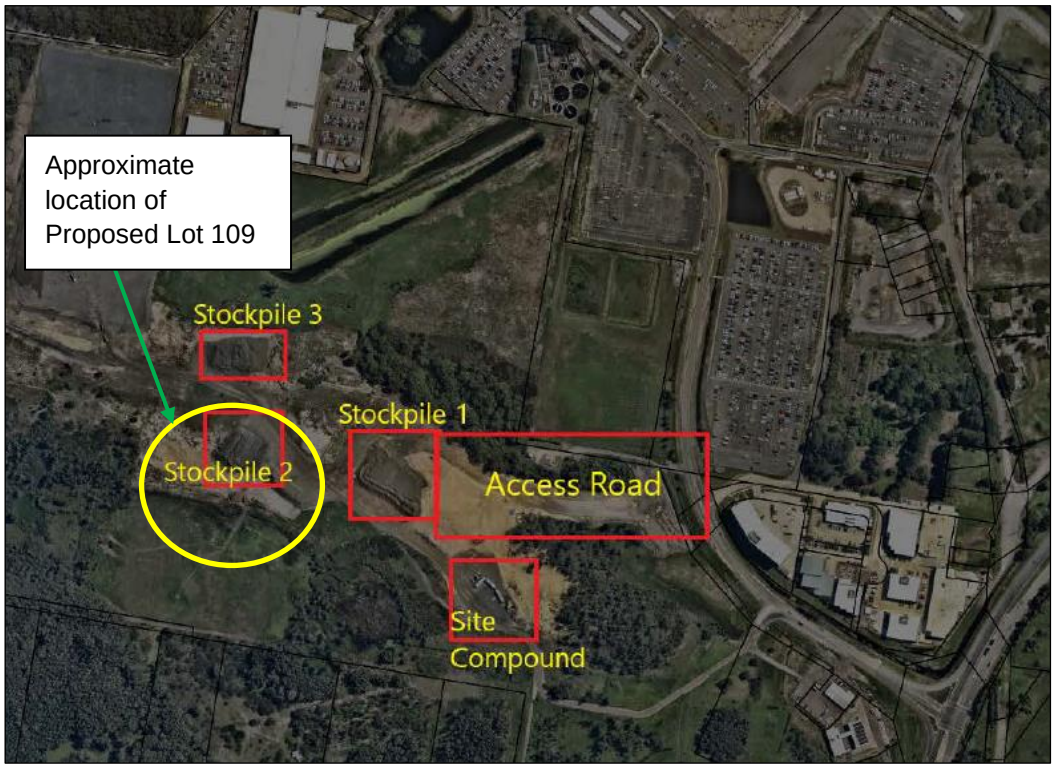


Figure 5: Approximate areas of fill and testing, Valley Civilab (2020)

It is noted, however, that the testing results provided in the report do not appear to cover all of the above areas, particularly Stockpile 2 and Stockpile 3 areas as indicated above. It is noted that the Stockpile 2 area appears to be within the current subject site (ie proposed Lot 109).

The general scope of work as reported in Valley Civilab (2020) was as follows:

- Subgrade inspections and proof rolling at the above locations prior to fill placement;
- Imported material for fill placement comprised fine crushed rock from Karuah East Quarry;
- Field density testing was undertaken progressively on the compacted fill layers;
- Based on observations made by Valley Civilab and the results of field and laboratory tests, Valley Civilab concluded that the fill placed for the bulk earthworks for the proposed industrial development met the requirements of controlled fill as per the Australian Standard 3798-2007 'Guidelines for Earthworks for Commercial and Residential Developments' specifications.

Valley Civilab (2020b)

An investigation was conducted by Valley Civilab to assess the presence of PFAS within near-surface soils within the Astra Aerolab Stage 1 development area. Thirteen soil samples were collected from in-situ material from shallow surface depths across the site. Samples were analysed for the presence of PFAS. Results of the laboratory analysis indicated the material concentrations were below the PFAS NEMP 2.0 human health screening criteria for commercial land use. Valley Civilab concluded that "*material is suitable to remain in-situ during future development and no marker layer is required*".

It is noted that the fieldwork for the PFAS testing was conducted on 17 March 2020, following placement of fill as reported in Valley Civilab (2020a), and following commencement of fill placement by Daracon as per the dates supplied in Qualtest (2020). It is not known if the samples collected for this assessment comprised imported materials or existing near-surface materials prior to the placement of fill.

The sample locations for the PFAS assessment, as indicated in Valley Civilab (2020b), were collected in the southern and eastern portions of Astra Aerolab Stage 1, including within and in the vicinity of the proposed Lot 109.

Qualtest (2020)

Qualtest report, dated 12 November 2020 (Ref: NEW20P-0020-AB) reported on geotechnical Level 1 inspection and testing for fill placement in selected areas of Stage 1 of Astra Aerolab between the periods 15 February 2020 and 16 October 2020.

Qualtest (2020) included a plan showing the areas of regrading and testing conducted. The plan also shows the approximate extent of existing uncontrolled fill material previously placed by others, and left in place, as instructed by Newcastle Airport. The plan extract in Figure 6 indicates that existing fill was left in place within proposed Lot 109.

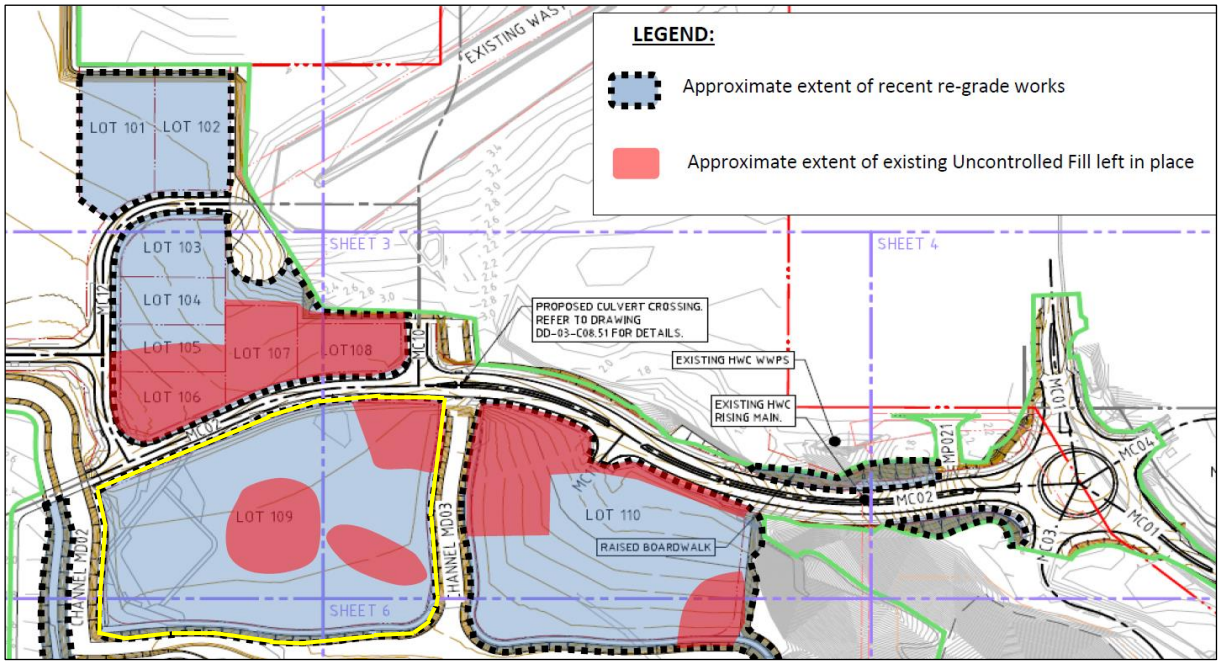


Figure 6: Approximate extent of Level 1 inspections and testing (blue) and areas where previously placed fill remained (red). Proposed Lot 109 in yellow

Re-grade works then consisted of filling with approved fill to proposed finish design levels. Filling was performed using either site sand material won from excavations cut from around the site, previously placed Uncontrolled Fill material removed and re-conditioned and approved prior to use (generally described as mixtures of sandy gravel and clayey gravel of low plasticity) or suitable and approved imported material sourced from a local quarry at Karuah (crusher dust or fine crushed rock).

It was noted in Qualtest (2020) that fill was placed within the proposed Lot 109 to a maximum thickness of 0.6 m.

Qualtest (2020) reported that all tests conducted exceeded the site-specific required Density Ratio of 100% Standard Compaction (or equivalent), either initially or after re-working, re-compaction and re-testing, and were generally within a suitable moisture content for the material used.

The Qualtest (2020) report also indicates the approximate fill/cut for the site prior to and following regrading works. An extract of the plan for the proposed Lot 109 is provided in Figure 7 below.

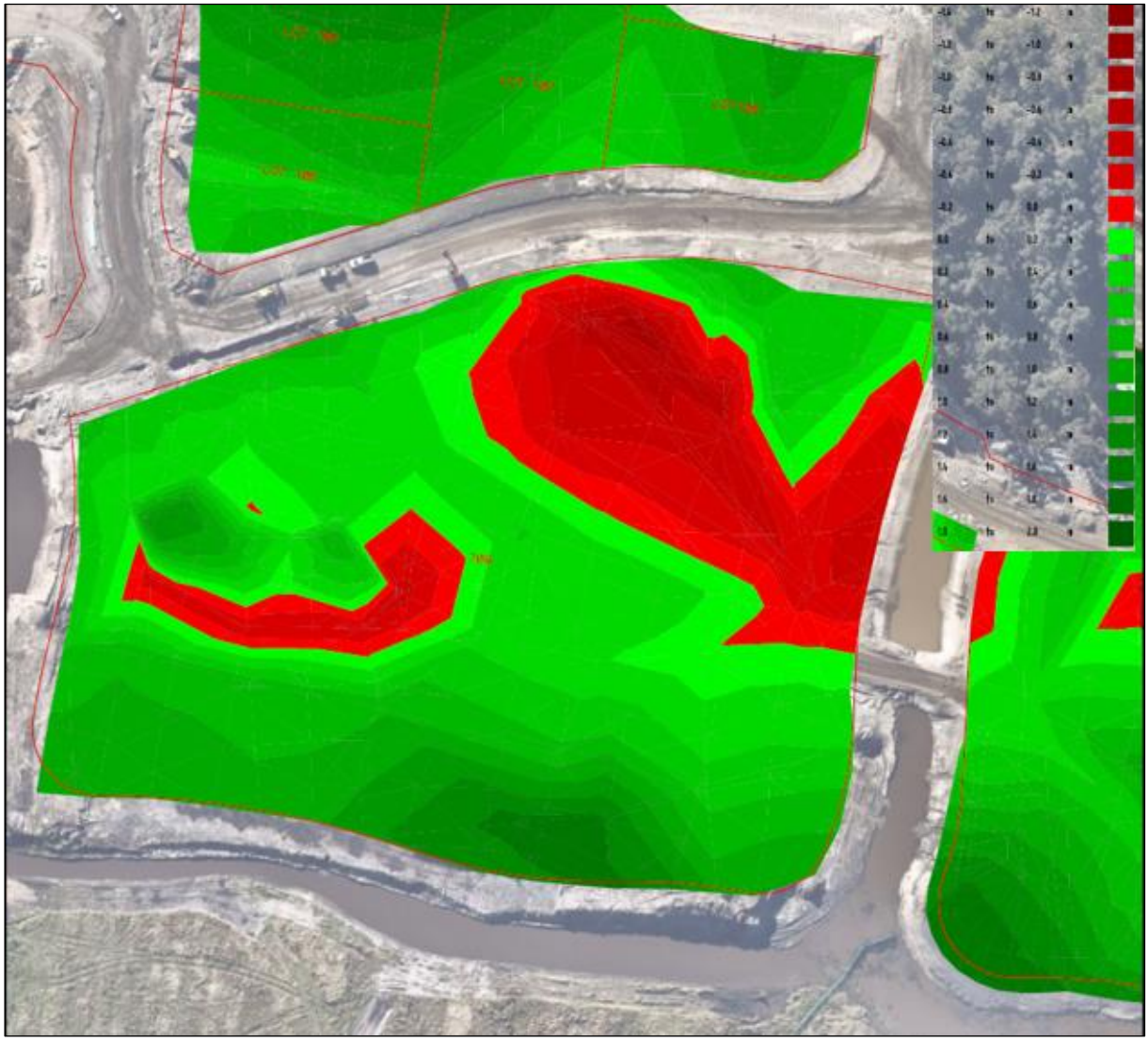


Figure 7: Approximate extent of fill/cut on proposed Lot 109 (see legend insert)

Qualtest (2020) stated that bulk filling and cutting performed for the re-grade areas was carried out to Level 1 criteria as defined in Clause 8.2 – Section 8, of AS3798-2007, "Guidelines on Earthworks for Commercial and Residential Developments". The report stated that "The earthworks carried out are generally considered to be fit for purpose and suitable for their intended use, (i.e. as foundations for buildings, basin walls, supporting road embankments etc.), as part of the GNAPL Astra Aerolab development". However, the report noted that for areas where uncontrolled fill was left in place, suitability for intended use will be dependent on any site-specific geotechnical constraints and/or design advice provided.

Daracon (2020)

Daracon provided a letter dated 20 December 2020 titled *Astra Aerolab Civil Works Stage 1 - RAP Compliance*, indicating that Daracon have undertaken the works in accordance with the Remediation Action Plan prepared by Douglas Partners dated November 2019.

Details of the works conducted are presented in Table 2 below.

Table 2: Summary of 'RAP Compliance' as provided in Daracon (2020)

Identified Scope	Treatment Details	Record
Localised opportunistic Dumping	Site rubbish removed prior to Daracon commencement onsite. No treatment required.	Nearmaps high-resolution aerial image dated 11/2/2020 depicting absence of dumped rubbish and car bodies.
Additional Assessment of PFAS impacts	Additional assessment/ investigation undertaken in the form of PFAS testing by GNAPL. Results of testing indicate no requirement for barrier layer of capping, per RAP requirements.	Valley Civilab Report ref P-R-002-ESA-Rev0, and related email correspondence.
On-site Management of PFAS Impacts	Not required based on above testing.	N/A
On-site management of impacts associated with effluent ponds	Not applicable to Daracon Scope of Work.	N/A
Sediments and Groundwater associated with effluent pond	Not Applicable to Daracon Scope of Works	N/A
Classification of imported materials for on-site reuse	Earthworks fill imported by GNAPL.	N/A
Unexpected Find – White Crystaline Material within excavated earthworks material	Material separated and stockpiled. Material testing undertaken by Qualtest. Material assessed as suitable for onsite reuse. No Treatment Required.	Qualtest Report NEW20P-0020-AC
Unexpected Find – bonded asbestos sheet fragments in Sand dune east of Lot 110	TBC – pending further direction from GNAPL	Material Test Result Report 763097-AID Clearance Certificate to be included when completed

Notes to Table 2:

The table has been extracted directly from Daracon (2020)

Daracon indicated the following with respect to contamination:

- Upon mobilisation, Daracon did not observe any car wrecks or significant dumped rubbish. It was noted that another contractor had recently completed some earthworks at the site and may have disposed of some dumped materials;
- Near-surface testing (Valley Civilab 2020b) conducted at the site prior to Daracon commencing earthworks indicated that PFAS concentrations at the test locations either below detection limits or well within the adopted assessment criteria for commercial land use. As a result, no active management of PFAS in soil was conducted as part of earthworks;
- The effluent ponds were outside the area of Daracon works, with no disturbance of effluent ponds required as part of Astra Aerolab Stage 1 works.

7. Site History

7.1 Extent of Site History Review

A brief review of site history was undertaken as part of DP (2009) for the Astra Aerolab area and other surrounding lots. The site history information was also collated in DP (2019a) for the Stage 1 Astra Aerolab extents. Updated searches have been conducted as part of the current assessment, where relevant, with the results included in the following sections. The brief site history review comprised the following:

- Port Stephens Council (PSC) records search;
- Discussions with the owner of the majority of the site at the time of the DP (2009) assessment (Mr Barrie Ellison);
- Review of historical aerial photos;
- Historical Titles search (from DP, 2009);
- Searches with the NSW EPA;
- NSW WorkCover (now SafeWork NSW) Dangerous Goods Licence Search.

Details from the previous searches that are considered relevant to the current Stage 1 area (i.e. Part Lot 11, DP 1036501) are summarised in the following sections.

7.2 Council Records Search

Review of individual Section 149 Planning Certificates for the site in 2009, indicated that the site had no matters arising under the Contaminated Land Management Act 1997.

An updated list of development applications for Lot 11, DP 1036501 (i.e. the current lot designation for the Astra Aerolab site), summarised from the Port Stephens Council website, is presented below:

- DA 16-2009-324-1, 22 May 2009: 103 lot subdivision (defence and airport related employment development);
- DA 16-2009-414-1, 23 June 2009: 11 lot subdivision;

- Section 96 16-2009-324-2, 20 February 2019: Section 4.55 (1A) Modification to approved subdivision – amend conditions to reflect staging;
- Section 96 16-2009-324-3, 28 June 2021: Section 4.55(2) Modification to approved 103 lot subdivision (Defence and Airport Related Development) – Amend lot layout reducing the number of lots to 101, road network, stage boundaries, stormwater management and conditions;
- DA 16-2021-1153-1, 13 January 2022: Extension of an existing carpark, including 175 new short stay car parks and 905 long stay car parks, earthworks, installation of new hardstand and stormwater drainage, installation of landscaping, pedestrian pathways, fencing and lighting and tree removal;
- DA 16-2022-366-1, 20 June 2022: Fencing and Signage;
- DA 16-2022-367-1, 20 June 2022: Fencing and Signage;
- DA 16-2022-379-1, 20 June 2022: Fencing and Signage;
- DA 16-2022-663-1, 23 August 2022: Industrial development - warehouse (building 1), site works and establishment of building footprints. This DA is for the subject site development on Lot 109, with determination still pending.

7.3 Historical Title Deeds Search (2009)

A historical title deeds search was used to obtain ownership and occupancy information including company names and the occupations of individuals. The title information can assist in the identification of previous land uses by the company names or the site owners and can, therefore, assist in establishing whether there were potentially contaminating activities occurring at the site.

A search of historical title deeds was undertaken for DP (2009) by Peter S Hopley Legal Searchers. The results of the search that relate to the Stage 1 Astra Aerolab site (i.e. Part Lot 11) are summarised in Table 3 below. It is noted that the subject site is located within the Astra Stage 1 site and therefore within Lot 11, DP 1036501).

Table 3: Summary of Title Deeds Search (2009)

Lot	Summary of Title Holders
Lot 11 DP 1036501	1900-1928 George Sansom (Farmer) (The Elder), 1928-1957 George Sansom (Farmer) (The Younger), 1957-1965 Mabel Annie Sansom (Widow), 1965-1970 Percy Sansom (Retired Farmer), 1970-1993 Neville Maxwell Sansom & Rayley Anne Sansom, 1989/1993-present B & M Ellison Pty Ltd
Part Portion 11 DP 1036501 (central portion of current Lot 11)	1909-1932 Henry Slade (Farmer), 1932(?)-1931 Edmund Whitworth Hodges (Blacksmith) and Samuel John Cox (Farmer), 1931-1957 Alfred Henry Slade (Contractor), 1957-1957 Doris Irene Slade (Widow) and Keith Aubrey Slade (Farmer), 1957 Doris Irene Slade (Widow), 1957-present same as Lot 11 DP 1036501
Part Portion 102 DP 1036501 (central portion of current Lot 11)	1904-1932 Henry Slade (Farmer), 1932(?)-1931 Edmund Whitworth Hodges (Blacksmith) and Samuel John Cox (Farmer), 1931-1957 Alfred Henry Slade (Contractor), 1957-1957 Doris Irene Slade (Widow) and Keith Aubrey Slade (Farmer), 1957 Doris Irene Slade (Widow), 1957-present same as Lot 11 DP 1036501
Part Portion 65 DP 1036501 (currently south-eastern portion of Lot 11)	1884-1932(?) Henry Slade (Farmer), 1932(?)-1931 Edmund Whitworth Hodges (Blacksmith) & Samuel John Cox (Farmer), 1931-1957 Alfred Hendry Slade (Contractor), 1957 Doris Irene Slade (Widow)
Part Portion 66, DP 1036501 (currently the eastern portion of Lot 11 and other lots)	1884-1932(?) Henry Slade (Farmer), 1932(?)-1931 Edmund Whitworth Hodges (Blacksmith) & Samuel John Cox (Farmer), 1931-1957 Alfred Hendry Slade (Contractor), 1957 Doris Irene Slade (Widow)

7.4 Interview with Site Owner (Lot 11 DP 1036501)

Brief discussions were held with Mr Barrie Ellison as part of the previous preliminary contamination assessment report (DP, 2009). Mr Ellison had owned majority of the site (Lot 11 DP 1036501) and other surrounding lots for over 30 years. The following information was collected:

- The larger 2009 investigation area (which include Lot 11) had historically been used for cattle grazing. There were no grazing activities being undertaken on Mr Ellison's properties at the time of the 2009 report;
- Quarrying of sand materials was undertaken on Lot 11, with the sand used at the adjacent RAAF base;
- The sand quarrying was undertaken by Mr Ellison's own company;
- Mr Ellison was not aware of any soil materials that had been imported to his properties;
- Mr Ellison was not aware of any buildings or infrastructure built on Lot 11 as part of sand quarrying works.

7.5 Historical Aerial Photography

Several historical aerial photographs were obtained from public databases. A summary of key features observed for the site and surrounding land is presented in Table 4.

Table 4: Summary of Historical Aerial Photographs

Year	Site	Surrounding Land Use
1954	The overall Astra Aerolab Stage 1 area appears to be mainly covered by undisturbed vegetation. There is no evidence of any prior developments or structures on the site.	There appears to be some roads / tracks to the north of the greater Aerolab area; Infrastructure including roads and some small buildings, likely to be associated with the Williamtown Airport / tarmac appear to be established to the north-east of the greater Aerolab area. A possible small creek / drainage channel is evident to the south east of the greater Aerolab area. There are a few houses and grazing properties to the south and east of the investigation area, along Cabbage Tree Road and Nelson Bay Road respectively.
1966	There are no apparent changes to the site.	There are no apparent changes to the site, although the southern boundary of the 2009 investigation area appears to have been further cleared.
1974	Site is relatively unchanged. Construction of the wastewater ponds to the north of the current site area is underway	Wastewater treatment facility to the north of the site. Expansion of RAAF infrastructure and buildings to the north and east
1984	There are no apparent changes to the site.	Similar to previous photos although there appears to be further development of the Williamtown Airport (and associated infrastructure) including the effluent ponds
1993	Cleared vegetation and exposed soils (possible sand?) across the surface, including in the current subject lot area	Vacant grassed areas to the east/north-east (former RAAF infrastructure areas) and to the south
1994	The vegetation on the site has been cleared and the site is now relatively flat grassland. There is no evidence of any structures on the site. Possible fill in areas where vegetation has been cleared to level out the site. A possible road has been added within and adjacent to the site.	There is now more building structures and developments north of the site. Possibly the current Newcastle Airport Terminal building and associated buildings.
2001	There are no apparent changes to the layout of the site. There is a road running distinctly within the site.	There are no apparent changes to the site.
2007	There are no apparent changes to the site.	Some additional development has occurred associated with the airport. There have been new car parks added to the airport, to the north-east of the subject site.
2016	There are no apparent changes to the site.	There have been more new car parks added to the airport, to the north-east of the subject site.
2021	The site is within an area of cleared land (possibly filled), with construction of roads having occurred. The site appears to be consistent with the current site layout (i.e. construction of the subdivision, including fill placement, roads, etc).	The surrounding land use appears to be consistent with the current layout.

7.6 Public Registers and Planning Records

EPA Notices available under Section 58 of the Contaminated Lands Management Act (CLM Act) Database searched 31/08/2022	There were no records issued to the site or adjacent sites.
Sites notified to EPA under Section 60 of the CLM Act Database searched 31/08/2022	There was 1 record of notices for the site or adjacent sites. Hunter Land Effluent Pond – 38 Cabbage Tree Road (North) – one current notice – other industry - regulation under the CLM Act not required.
Licences listed under Section 308 of the Protection of the Environment Operations Act 1997 (POEO Act) Database searched 31/08/2022	There were 16 records issued within a 5 km radius to the site. • See Table 5 below.
NSW EPA PFAS	The site is located within the NSW EPA PFAS Primary Management Zone

Table 5: Licences listed under Section 308 of the Protection of the Environment Operations Act 1997 (POEO Act)

Location	Type	Status	Issued date	Distance
Lavis Lane, Williamtown, NSW 2318	POEO licence	Surrendered	2-Aug-02	~ 3.7 km
Lavis Lane, Williamtown, NSW 2318	Compliance Audit	Complete	2-Nov-12	~ 3.7 km
Lavis Lane, Williamtown, NSW 2318	s.58 Licence Variation	Issued	17-Sep-15	~ 3.7 km
Lavis Lane, Williamtown, NSW 2318	s.58 Licence Variation	Issued	4-Aug-16	~ 3.7 km
Lavis Lane, Williamtown, NSW 2318	Penalty Notice	Issued	26-Apr-18	~ 3.7 km
Lavis Lane, Williamtown, NSW 2318	s.80 Surrender of a Licence	Issued	25-Jul-19	~ 3.7 km
Off Lavis Lane, Williamtown, NSW 2318	POEO licence	Surrendered	5-Oct-00	~ 3.7 km
Off Lavis Lane, Williamtown, NSW 2318	s.58 Licence Variation	Issued	19-May-01	~ 3.7 km
Off Lavis Lane, Williamtown, NSW 2318	s.58 Licence Variation	Issued	31-Oct-02	~ 3.7 km
Off Lavis Lane, Williamtown, NSW 2318	s.80 Surrender of a Licence	Issued	10-Jun-04	~ 3.7 km
2170 Nelsons Bay Road, Williamtown, NSW 2318	s.91 Clean Up Notice	Issued	2-May-12	~ 3 km
Off 77 Cabbage Tree Road, Williamtown, NSW 2318	POEO licence	Surrendered	27-Sep-00	~ 1 km
Off 77 Cabbage Tree Road, Williamtown, NSW 2318	s.80 Surrender of a Licence	Issued	15-Apr-03	~ 1 km
To Tilligerry Creek and Fullerton Cove Within The Boundary Of Rmb 2456, Steele Street, Williamtown, NSW 2318	POEO licence	Surrendered	28-Aug-00	~ 2.6 km
To Tilligerry Creek and Fullerton Cove Within The Boundary Of Rmb 2456, Steele Street, Williamtown, NSW 2318	s.80 Surrender of a Licence	Issued	25-Sep-01	~ 2.6 km
298 Cabbage Tree Road, Williamtown, NSW 2318	POEO licence	Issued	31-Jul-19	~ 2 km

7.7 Site History Integrity Assessment

The information used to establish the history of the site was sourced from reputable and reliable reference documents, many of which were official records held by Government departments/agencies. The databases maintained by various Government agencies potentially can contain high quality information, but some of these do not contain any data at all.

Aerial photographs can provide information that is generally independent of memory or documentation. They are only available at intervals of several years, so some gaps exist in the information from this source. The observed site features are open to different interpretations and can be affected by the time of day and/or year at which they were taken, as well as specific events, such as flooding.

7.8 Summary of Updated Site History (2022)

With reference to the site history described in DP (2009) and DP (2019), and summarised above, a brief update to the site history is made as follows:

- A review of available google earth and near map aerial images between about 2007 and 2021 indicates that there has been very little change to site conditions, with the following exceptions:
    - The sand quarrying activity discussed by Mr Ellison in DP (2009) is evident in an aerial photo of the site dated June 2010.
    - The sand quarrying activities are no longer evident in an aerial photo dated November 2010. A stockpile of soil is visible in the general area of the previous sand quarrying activity.
    - The same stockpile is still evident in photos dated July 2014 and February 2019, however, now includes some vegetation cover.
    - The wastewater pumping station that is now located immediately north of the Astra Aerolab development was constructed around late 2013 / early 2014.
    - Possible construction activity is evident along the access track from Cabbage Tree Road, with small buildings (possible site sheds) present at the northern end of the access track on several dates in late 2013 to early 2014. This activity corresponds with construction activity at the wastewater pumping station site, hence is considered likely to be associated with the construction of a rising main from Cabbage Tree Road to the wastewater pumping station.
- It is understood that Mr Barrie Ellison was the owner of the site up until the time that Newcastle Airport Pty Ltd took control of the site in 2019;
- There are no records on the contaminated land register either within or adjacent to the site;
- A search of the NSW EPA list of sites that have been notified to the EPA includes 38 Cabbage Tree Road, Williamtown for “Hunter Land Effluent Pond”, and that Regulation under the CLM Act is not required;
- The site is located within the NSW EPA Williamtown Primary Management Zone with respect to PFAS contamination;
- It is understood that earthworks on the Stage 1 Astra Aerolab site (which includes the subject site) was completed in Late 2020 or early 2021. Some details relating to the earthworks (ie procedures, importation and placement of fill, management of unexpected finds etc) were provided for the current assessment, as summarised in Section 6.2 above.

8. Site Walkover

8.1 Observations

A site walkover was undertaken by a senior environmental engineer on 15 September 2022 for the current assessment. The site layout appears to have remained unchanged from the 2021 aerial photograph.

At the time of the inspection, proposed Lot 109 was vacant. The north-western corner of the lot was grassed (Figure 8), with sporadic vegetation at the surface of the remainder of the site (Figure 9). The site was generally flat, with a minor fall to the south.

Surface soils generally comprised sand and coarse sand to medium gravel sized gravel (igneous rock – possibly quarry source) (Figure 9). The site was observed to contain fill at the surface and had been raised compared to the conditions observed during previous investigations by DP that were conducted prior to subdivision construction.

Some localised rutting and erosion were noted adjacent to the southern site boundary (Figure 10).

Landscaping, plus kerb and gutter had been installed adjacent to the northern site boundary as part of subdivision works.

Surface water drains were observed adjacent to the western, southern and eastern boundaries of proposed Lot 109 (Figure 11).

Areas to the north and east of the subject lot were in a similar condition to the subject lot, with similar materials observed at the surface.

Figure 8: Lot 109, looking south-east from the north-western corner (15 September 2022)

Figure 9: Lot 109, looking north from the southern boundary (15 September 2022)

Figure 10: Localised erosion in the southern portion of the site (15 September 2022)

Figure 11: Surface water drain adjacent to the southern boundary of Lot 109

9. Potential Contaminants

Based on the available site history information, the identified principal sources of potential contamination associated with the Astra Aerolab Stage 1 site (which includes the subject site) were considered to be:

- Fill materials on unpaved tracks within the Astra Aerolab Stage 1 area and in fill stockpiles (source unknown) which may contain a range of contaminants including hydrocarbons, heavy metals, PAHs, pesticides, PCBs, asbestos etc;
- Stockpile of remnant asphalt which may contain elevated PAHs, hydrocarbons, heavy metals and coal tar;
- Effluent ponds located in the north-eastern portion of the site, which may be a source of elevated nutrient, heavy metal, hydrocarbon and microbiological concentrations in soil, surface water and groundwater;
- Localised dumped rubbish / anthropogenic materials. Some of the anthropogenic materials observed are indicative of potential hazardous building materials (HBM) which can include ACM;

- Dumped / burned car bodies, which can be a source of TRH, BTEX, heavy metals, asbestos and acids. Burning of materials can indicate areas of potential elevated PAHs and heavy metals, depending on what may have been burned;
- PFAS contamination in soil, surface water and groundwater, due to the site being located within the NSW EPA Williamtown Primary Management Zone.

Some documentation has been provided (see section 6.2 above) suggesting that the previously identified contamination sources had been removed from the site (e.g. car wrecks, rubbish) prior to earthworks construction for the subdivision by Daracon. with reference to the RAP as part of the earthworks construction activities. It is noted that a validation report, prepared with reference to NSW EPA (2020) or the RAP for the previously identified contamination sources has not been provided for review.

Therefore, the above potential contaminants as provided in DP (2019) are considered to be valid for the proposed Lot 109.

It is understood that Limited PFAS testing was conducted on surface soils by Valley Civilab. This testing was conducted following commencement of site filling for subdivision construction (filling occurred between October 2019 and October 2020), with some samples collected within the subject site (i.e. proposed Lot 109). Deeper soils sample or groundwater assessment does not appear to have been conducted for PFAS assessment.

Daracon's RAP compliance letter dated 20 December 2020 also reported a bonded asbestos unexpected find in a sand dune east of Lot 110 which is pending a clearance certificate. It is not known if this occurrence has implications (if any) to the subject proposed Lot 109.

Visual inspection of the proposed Lot 109, conducted on 15 September 2022 following completion of subdivision construction and fill placement, suggested the general absence of gross contamination at the surface of the inspected area (ie absence of gross staining, odours or anthropogenic materials).

10. Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

Potential Sources

Based on the current investigation, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified.

- S1; Localised dumped rubbish, opportunistic dumping etc
  - COPC include TRH, BTEX, PAH, metals, pesticides, PCB, asbestos.
- S2: Fill: Associated with access tracks, observed stockpiles, and imported fill for earthworks.

  - COPC include metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP) and asbestos.
- S3: Possible former agricultural activities and chemical application.
  - COPC include OCP, OPP, metals, TRH.
- S4: Demolition of former buildings / structures at or adjacent to the site.
  - COPC include asbestos, synthetic mineral fibres (SMF), lead and PCB.
- S5: On-site and adjacent site uses (Williamtown Airport, RAAF, wastewater treatment works, sand quarry);
  - COPC include heavy metals, TRH, BTEX, PAH, VOC, OCP, OPP, PFAS.
- S6: Effluent Ponds, located to the north-north-east of Proposed Lot 109.
  - COPC include TRH, BTEX, PAH, metals, pesticides, PCB, Nutrients, biological, PFAS.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users (the site is currently vacant, so not applicable at the time of reporting);
- R2: Construction and maintenance workers;
- R3: End users (workers); and
- R4: Adjacent site users (workers).

The following potential environmental receptors have been identified:

- R5: Surface water (including recently constructed drains, downstream drains/creeks, Fullerton Cove);
- R6: Groundwater; and
- R7: Terrestrial ecosystems.

Potential Pathways

The following potential pathways in relation to human receptors have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and/or vapours.

The following potential pathways in relation to the environmental receptors have been identified:

- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Inhalation, ingestion and absorption.

Summary of Potentially Complete Exposure Pathways

A ‘source–pathway–receptor’ approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S6) and receptors (R1 to R7) are provided in Table 6 below.

Table 6: Conceptual Site Model

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Localised dumped rubbish, TRH, BTEX, PAH, metals, pesticides, PCB, asbestos	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Inhalation, ingestion and absorption	R2: Construction and maintenance workers R3: End users (workers) R4: Adjacent site users (workers). R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	Appropriate documentation (approved by the regulator) is provided to indicate the remediation/management and validation of the identified contamination has occurred with reference to the remediation action plan for the Astra Aerolab Stage 1 development. Some information has been provided, however, it has not been prepared with reference to NSW EPA (2020) Alternatively, a site-specific intrusive investigation is recommended to assess possible contamination including testing of the soils and groundwater.
S2: Fill (access tracks, stockpiles, imported fill for earthworks), Metals, TRH, BTEX, PAH, OCP and asbestos	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Inhalation, ingestion and absorption	R2: Construction and maintenance workers R3: End users (workers) R4: Adjacent site users (workers). R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	
S3: Possible former agricultural activities and chemical application - OCP, OPP, metals, TRH	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Inhalation, ingestion and absorption	R2: Construction and maintenance workers R3: End users (workers) R4: Adjacent site users (workers) R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	
S4: Demolition of former buildings / structures at or adjacent to the site: ACM asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P6: Inhalation, ingestion and absorption	R2: Construction and maintenance workers R3: End users (workers) R4: Adjacent site users (workers).	
S5: On-site and adjacent site uses (Williamtown Airport, RAAF, wastewater treatment works, sand quarry); heavy metals, TRH, BTEX, PAH, VOC, OCP, OPP, PFAS	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Inhalation, ingestion and absorption	R2: Construction and maintenance workers R3: End users (workers) R4: Adjacent site users (workers). R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	
S6: Effluent Ponds: TRH, BTEX, PAH, metals, pesticides, PCB, Nutrients, biological, PFAS.	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Inhalation, ingestion and absorption	R1: Current users (residents) R2: Construction and maintenance workers R3: End users (residents) R4: Adjacent site users (residents) R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	

11. Conclusions and Recommendations

11.1 Overview - Contamination

The results of the site history review, together with recent and previous site inspections by DP generally suggests a low potential for gross contamination across the site, with the exception of previously identified PFAS contamination, particularly in groundwater, which is known to be a regional issue.

As indicated in Section 9 and 10 above, sources of potential contamination are generally limited to those observations from previous investigation, conducted prior to the filling and subdivision works including localised imported filling, rubbish stockpiles, the presence of fibro fragments possibly containing asbestos, localised impact under burned car bodies and possible impacts in the vicinity of the effluent ponds. There is some information suggesting that the previously observed potential sources of contamination were removed prior to subdivision construction, however, a validation report for the Astra Aerolab Stage 1 area has not been provided for this assessment.

The potential PFAS contamination is expected to be more widespread, and could impact the soil, surface water and groundwater within the greater project area, and therefore soils and groundwater underlying the subject site. Limited testing for PFAS was conducted on surface soils within the Stage 1 Astra area, including some soil samples within the subject site (Valley Civilab 2020b). It is not known whether additional groundwater investigation has been conducted relevant to the subject site.

A remediation action plan (DP, 2019b) was previously prepared for the Astra Aerolab Stage 1 development, which presented procedures, methodologies and responsibilities for the remediation/management and validation of the previously identified impacts. It is recommended that appropriate documentation (approved by the regulator) is sought to demonstrate the following:

- Implementation of the RAP as part of subdivision works;
- Remediation/management and validation of identified contamination for the site; and/or
- The absence of contamination within the Lot 109 area.

The validation report should be conducted with reference to NSW EPA contaminated land reporting guidelines (EPA 2020) and include a statement relating to the suitability of the subject site for the intended use with respect to site contamination. In the absence of the above documentation, pre-construction subsurface investigation is recommended for Lot 109 to confirm the contamination status of the site and the potential for human health impacts for site users and potential ecological impacts. There may also be short-term and long-term site management requirements to manage soil, groundwater or surface water potentially impacted by PFAS (i.e. short term and long-term environmental management plans for both construction and ongoing site use).

11.2 Acid Sulfate Soils

Previous assessment at the site has indicated the presence of potential acid sulfate soils within natural soils within the Astra Aerolab Stage 1 subdivision.

It is recommended that management of any disturbance of ASS within Lot 109 should be conducted with reference to the existing ASSMP prepared for Stage 1 of the subdivision (DP 2019e).

The requirements for ASS management at the site will be dependent on the location and depth of soil disturbance (i.e. via excavation or dewatering), type of development and construction methods used (e.g. footing types, requirements for dewatering etc).

12. References

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

DP. (2009). *Report on Stage 1 Preliminary Contamination Assessment, DAREZ Development, Williamtown.* Ref 39728.03: Douglas Partners Pty Ltd.

DP. (2011). *Report on Geotechnical Investigation, Williamtown Aerospace Park – Stage 1A Williamtown Drive, Williamtown.* 39728.06: Douglas Partners Pty Ltd.

DP. (2015). *Report on Geotechnical Investigation, Williamtown Aerospace Park – Building D Technology Drive, off Williamtown Drive, Williamtown.* 39728.14.R.001.Rev0: Douglas Partners Pty Ltd.

DP. (2016). *Report on Geotechnical Investigation, Williamtown Aerospace Centre – Building E Technology Place, off Williamtown Drive, Williamtown.* 39728.15.R.001.Rev0: Douglas Partners Pty Ltd.

DP. (2017). *Report on Geotechnical Investigation, Williamtown Aerospace Centre – Building F Technology Place, off Williamtown Drive, Williamtown.* 39728.16.R.001.Rev0: Douglas Partners Pty Ltd.

DP. (2019a). *Report on Preliminary Site Investigation (Contamination), Astra AeroLab Stage 1 Williamtown Drive, Williamtown.* 39728.20.R.002.Rev0: Douglas Partners Pty Ltd.

DP. (2019b). *Remediation Action Plan, Astra AeroLab Stage 1 Williamtown Drive, Williamtown.* 39728.20.R.004.Rev0: Douglas Partners Pty Ltd.

DP. (2019c). *Fill Material Assessment, Williamtown Drive, Williamtown.* 39728.21.R.001.Rev0: Douglas Partners Pty Ltd.

DP. (2019d). *Fill Material Assessment, Hunter Quarries.* 39728.21: Douglas Partners Pty Ltd.

DP. (2019e). *Acid Sulfate Soil Management Plan, Astra Aerolab Stage 1, Williamtown Drive Williamtown.* 39728.19: Dogulas Partners Pty Ltd .

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

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

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

Valley Civilab. (2020). *PFAS Investigation, Astra AeroLab Stage 1 - Newcastle Airport.* P-R-002-ESA-Rev0: Valley Civilab.

13. Limitations

Douglas Partners (DP) has prepared this report for this project at proposed Lot 109 Williamtown Drive Williamtown with reference to DP's proposal dated 22 August 2022 and acceptance received from EJE Architecture dated 26 August 2022. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of EJE Architecture for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents. DP has not conducted a detailed review of the reports or information by others and provides no warranty nor accepts any responsibility for the information, interpretation or conclusions provided by others for the site.

The results provided in the report are indicative of the conditions on the site only at the time the work was carried out. Site conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's inspections and testing has been completed.

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

A detailed validation report indicating compliance with the RAP with reference to EPA 2020 guidelines or development consent requirements was not provided for the current assessment.

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

Asbestos has not been detected by observation on the surface of the subject site following earthworks construction and site filling. Building demolition materials including fibro fragments, were, however, previously observed at the surface in the greater Astra Aerolab Stage 1 area, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, and hence no warranty can be given that asbestos is not present.

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

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

Douglas Partners Pty Ltd

Appendix A

About this Report

About this Report

Douglas Partners

Introduction

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

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

Copyright

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Appendix B

Drawing 1 – Site Plan and Previous Test Locations
EJE Architecture and Astra Aerolab Industrial Building Concept Design
109/1 Revision E May 2022

Figure 5: Lot 109 Proposed Building Footprints

Site Location

Legend

Lot 109-1 Site Area

0 10 20 30 40 m

Drawing adapted from Metromap Image dated 19.9.2022.

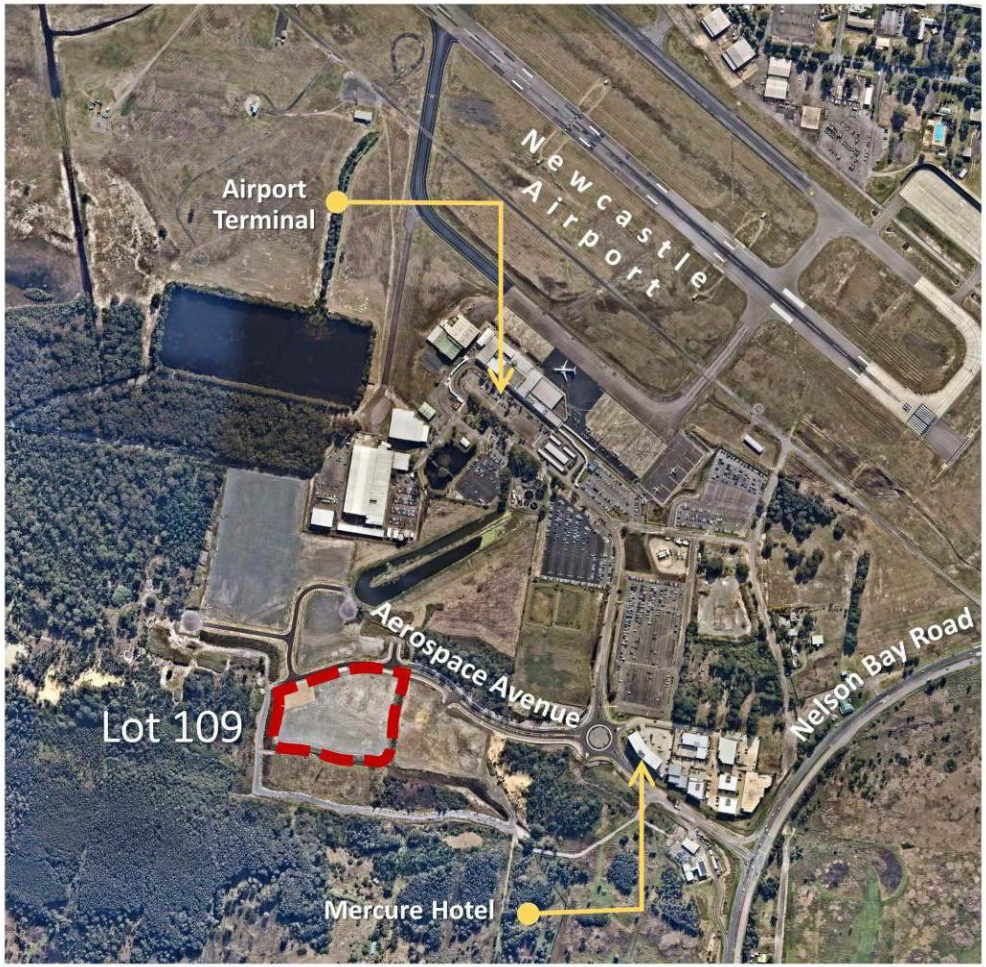
Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: EJE Architecture Pty Ltd		
OFFICE: Newcastle	DRAWN BY: PLH	
SCALE: 1:1,000 @ A3	DATE: 13.September.2022	

TITLE: **Site Plan and Previous Test Locations**
Proposed Industrial Building
Lot 109 Aerospace Avenue, Williamtown

N

PROJECT No:	81728.28
DRAWING No:	1
REVISION:	0



Industrial Building
Concept Design
Lot 109/1

Revision E
May 2022

ASTRA AEROLAB

EJE architecture

Newcastle Airport

ASTRA AEROLAB

ASTRA AEROLAB

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Lot 109/1 – Facility

Lot 109 Precedents

EJE architecture

Newcastle Airport

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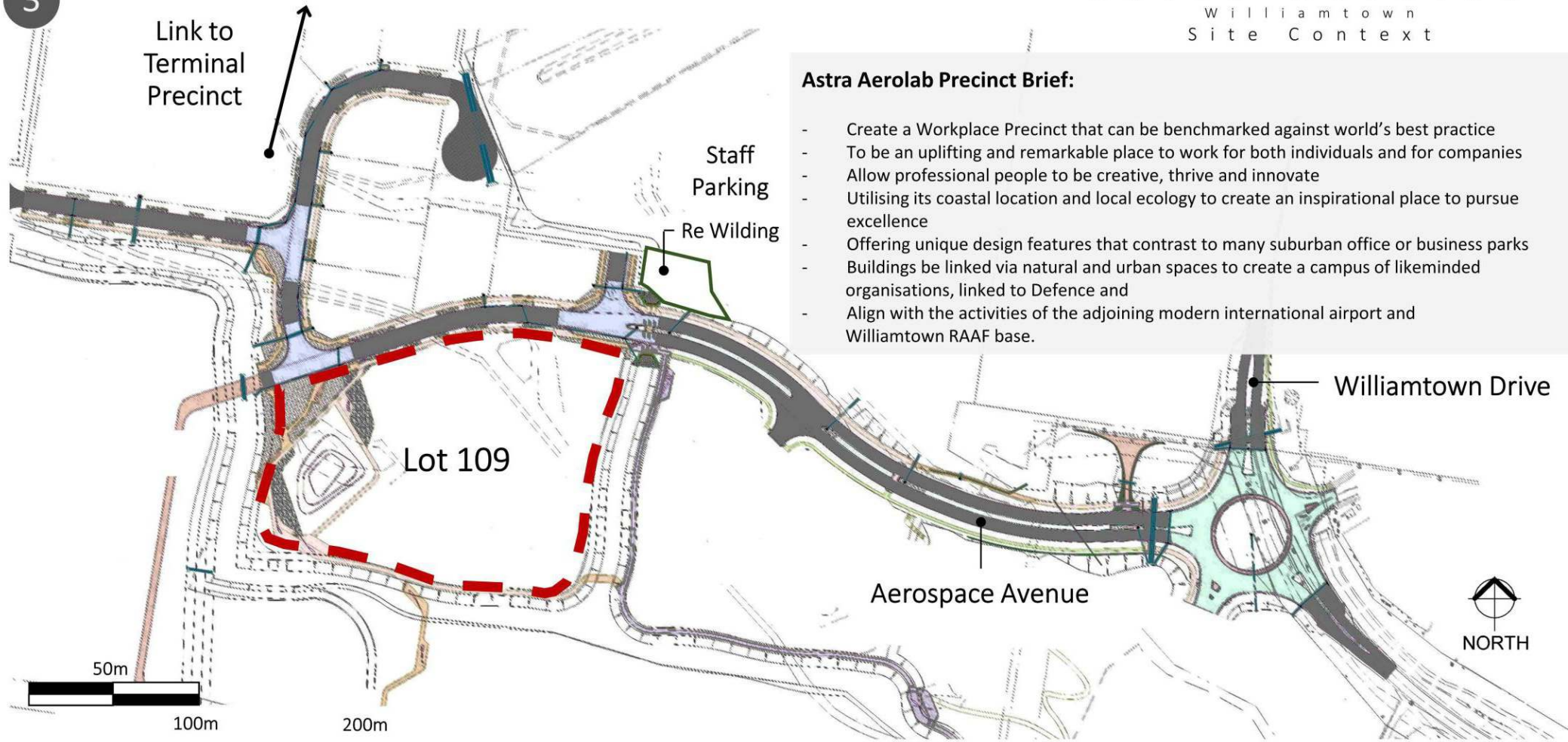
Williamtown
Site Context



Astra Aerolab Precinct Brief:

- Create a Workplace Precinct that can be benchmarked against world's best practice
- To be an uplifting and remarkable place to work for both individuals and for companies
- Allow professional people to be creative, thrive and innovate
- Utilising its coastal location and local ecology to create an inspirational place to pursue excellence
- Offering unique design features that contrast to many suburban office or business parks
- Buildings be linked via natural and urban spaces to create a campus of likeminded organisations, linked to Defence and
- Align with the activities of the adjoining modern international airport and Williamtown RAAF base.

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Astra Aerolab
Williamtown
Lot 109/1 Facility

Industrial Precinct Built Environment Brief:

- Adaptable space to enhance the workplace environment
- Provide visual connectivity between the office and industrial functions
- Provide linkages to the Central Hub zone across Aerospace Avenue.
  Unique and interesting ground plane, enhanced to provide an amenity unattainable within industrial or business park estates outside capital cities.
- Truck access with back of house loading/unloading operations carefully arranged to blend and co-exist with commercial office positioning.
- Expressed workplace and building innovation – achieved in the building architecture including enhanced and interesting warehouse rooflines, high quality office facades.
- Buildings designed to relate to each other, with the opportunity for connectivity that promotes knowledge transfer, communication, collaboration and high productivity.
- Environmentally sustainable industrial design – passive and visual, delivering world's best practice environment and energy.
- Two level office space that are regular and flexible, yielding high levels of efficiency and easily accessible from warehouse zones.
- Column free warehouse space that can be configured for multiple industrial tenants with internal relocatable full height partition walls.

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Astra Aerolab
Williamtown

Lot 109 Site Plan

Lot 109/1 - Facility

Site Area	7,290m²
Building Area	3,280m²
Vehicle Movement	2,695m²

Lot 109/2 - Facility

Site Area	6,396m²
Building Area	2,900m²
Vehicle Movement	1,551m²

Lot 109/3 - Facility

Site Area	7,217m²
Building Area	4,300m²
Vehicle Movement	1,310m²

Lot 109/4 -Facility

Site Area	2,954m²
Building Area	
Vehicle Movement	

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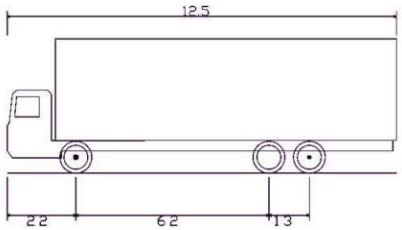
Lot 109/1

Truck Turning Diagram



Single Unit Truck/Bus (12.5 m)	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.490m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

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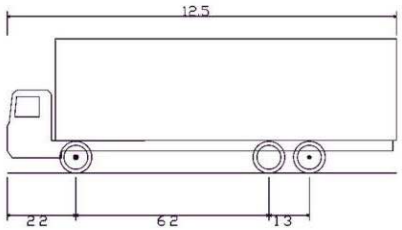
Williamtown
Lot 109/2
Truck Turning Diagram



Single Unit Truck/Bus (12.5 m)	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.490m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

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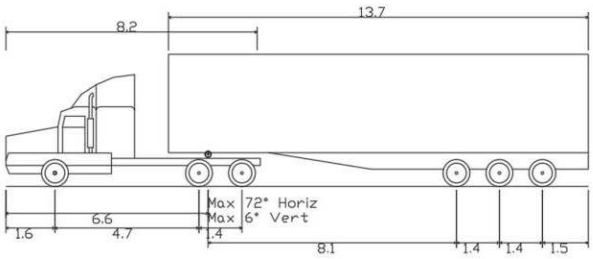
Williamtown

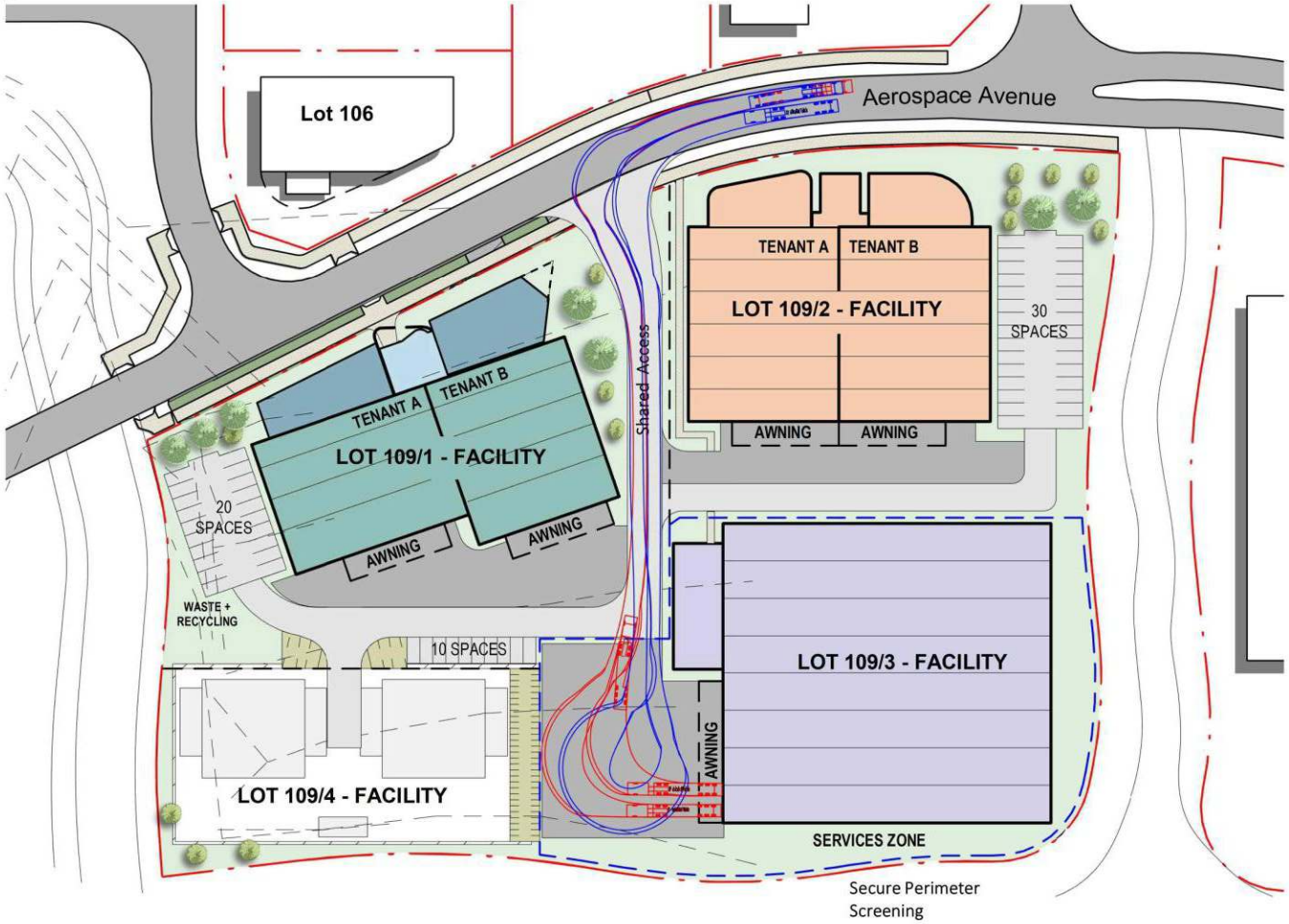
Lot 109/3

Truck Turning Diagram



AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



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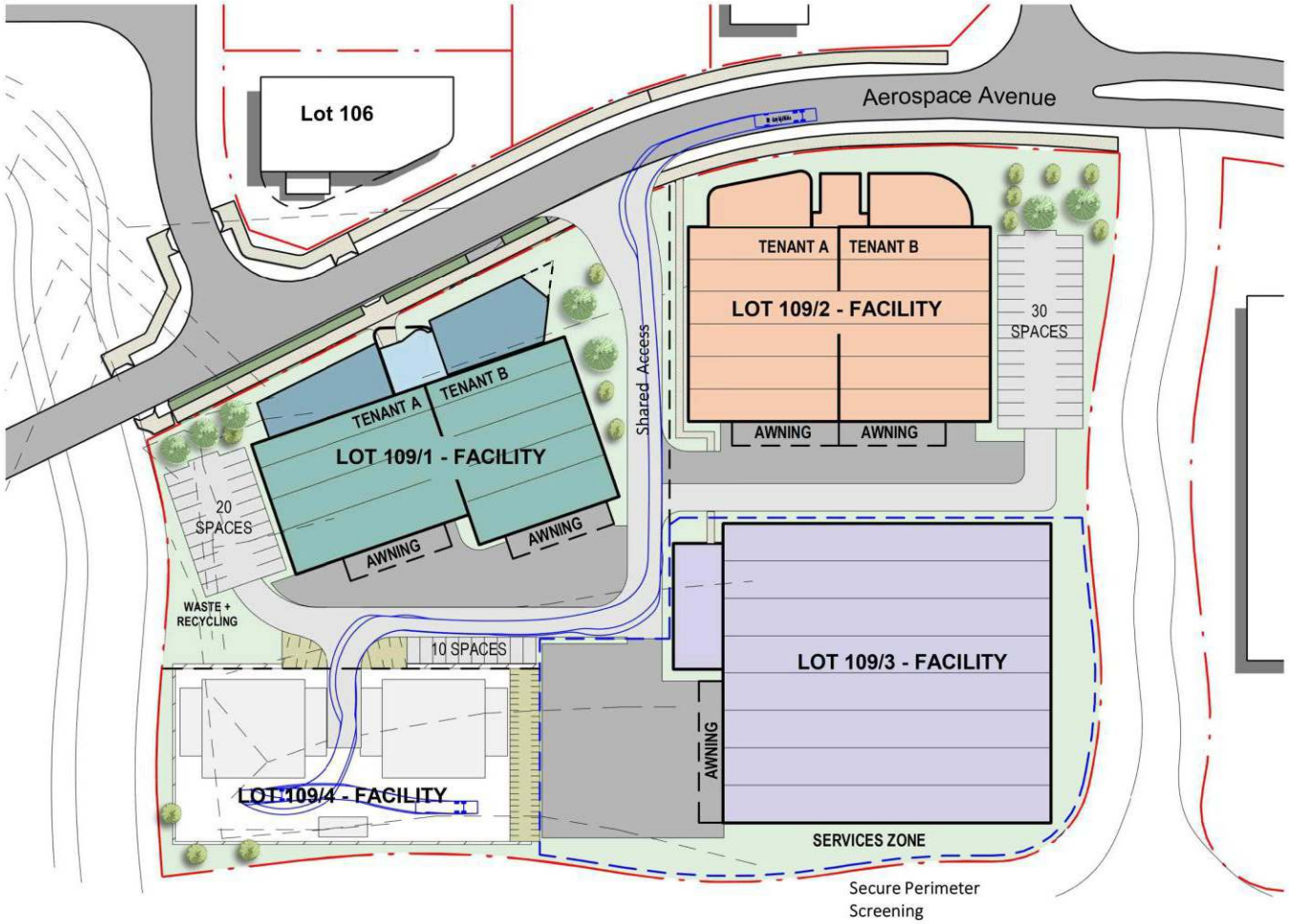
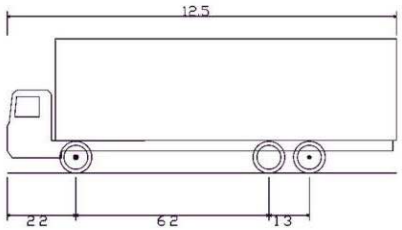
Lot 109/4

Truck Turning Diagram





Single Unit Truck/Bus (12.5 m)	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.490m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

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Williamtown

Lot 109/1 - Facility Overall Plan

Site Area	6,900m²
Building Area	3,280m²
Vehicle Movement	2,695m²

Office
2 Tenancies with 2 Levels Each
+ Shared Foyer

Workshop
2 Tenancies at
1000m² each

Loading Bay
Potential Loading Bay Location
With 5-metre-deep cantilevered awnings

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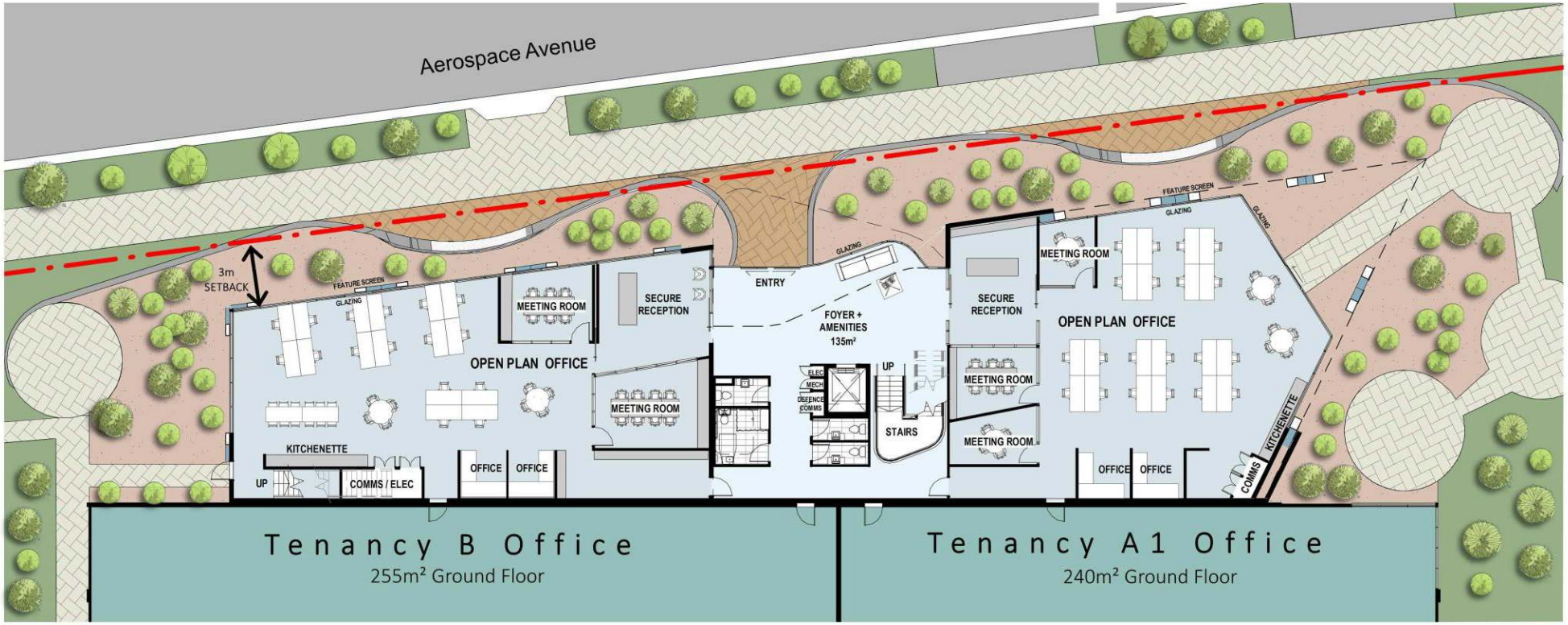
Williamtown
Lot 109/1 - Facility
Ground Floor Plan



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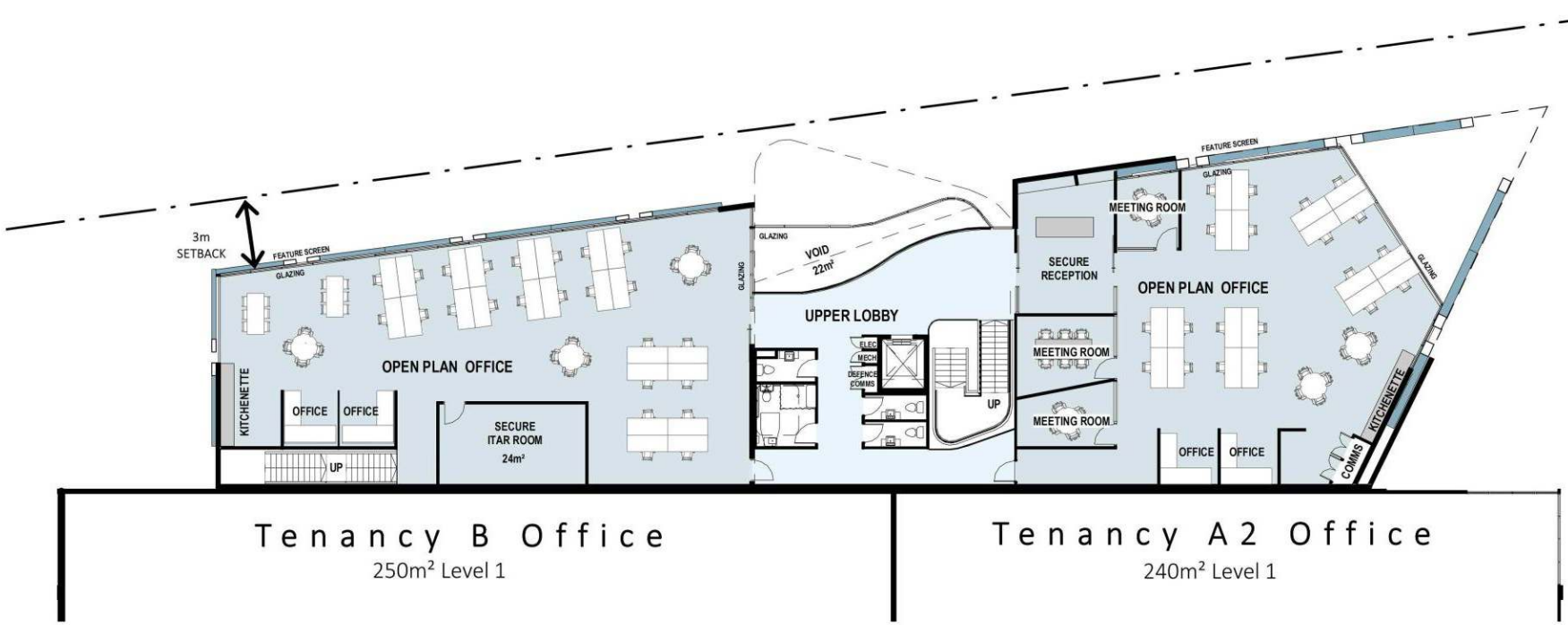
Williamtown
Lot 109/1 - Facility
Level 1 Plan



Tenancy B Office
250m² Level 1

Tenancy A2 Office
240m² Level 1

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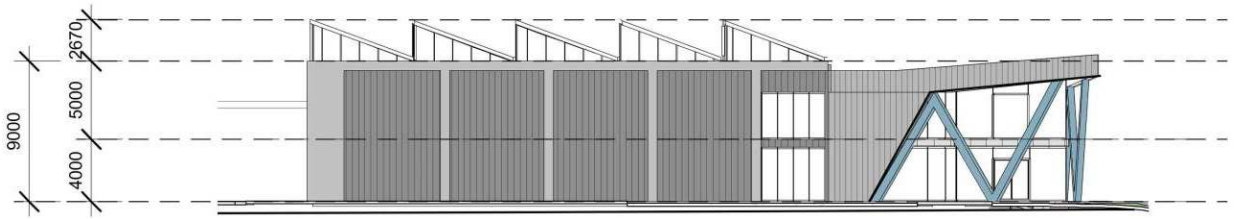
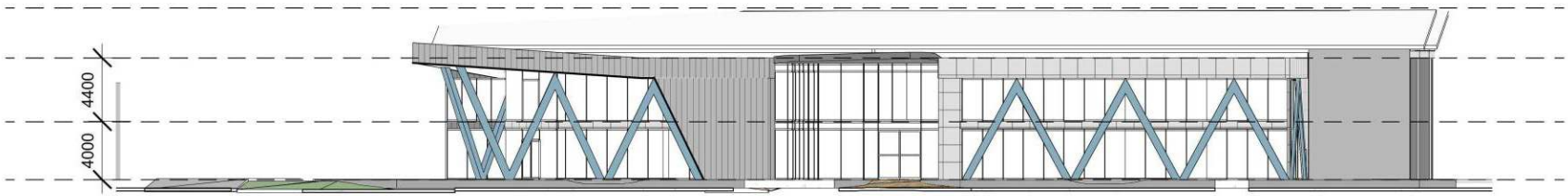
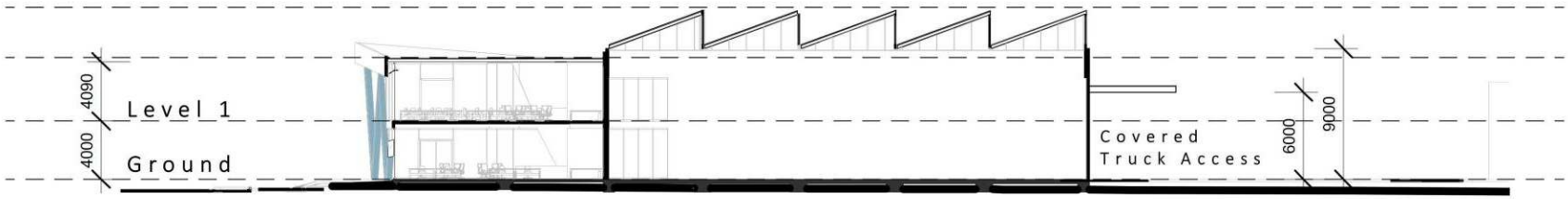
Lot 109/1 - Facility Elevations / Section



East Elevation



North Elevation from Aerospace Avenue



Section Through Tenancy B

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Williamtown

Lot 109/1

Ground Floor Foyer

Astra Aerolab

Williamtown

Lot 109/1

Level 1 Foyer

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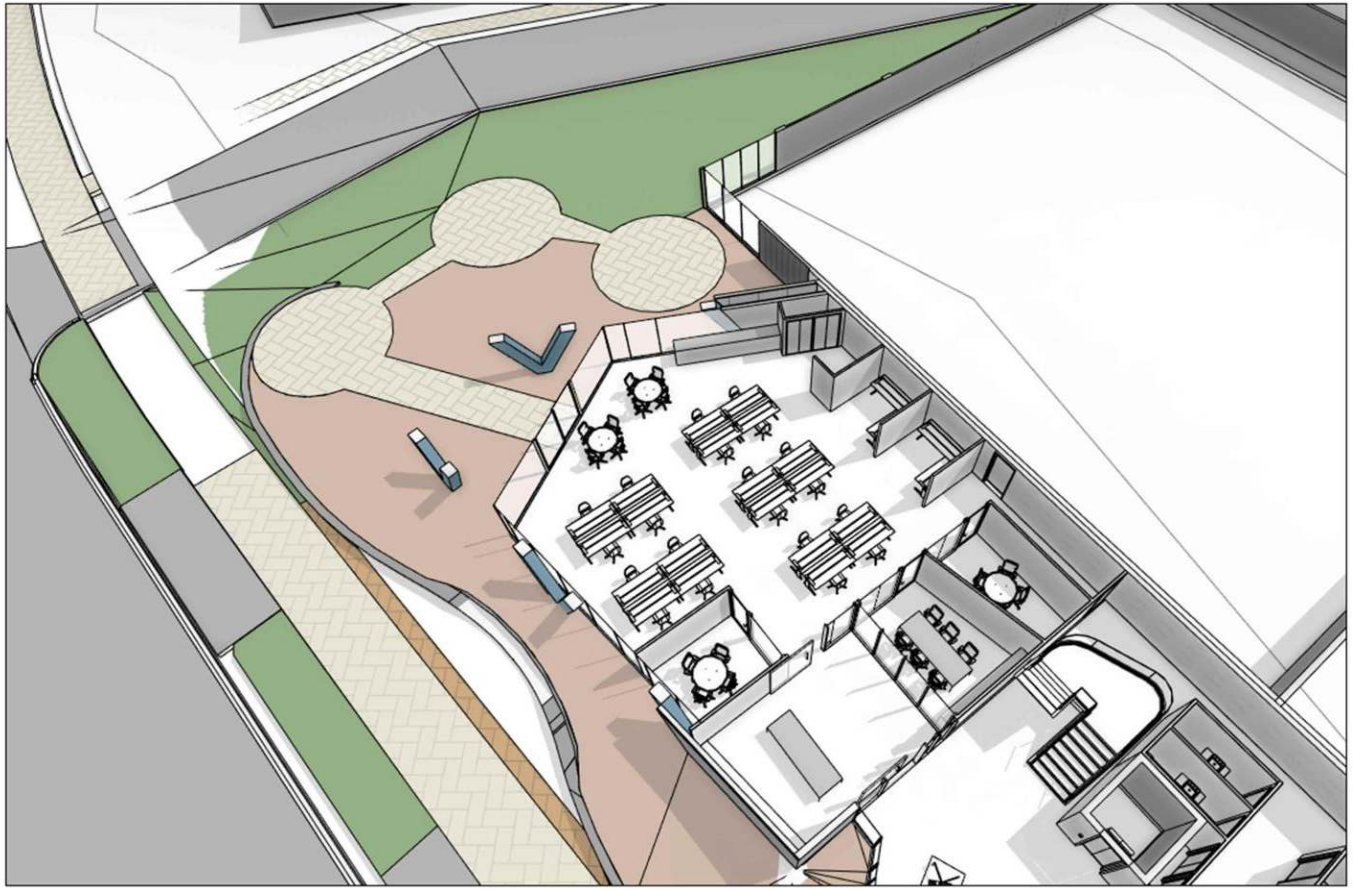
Williamtown
Lot 109/1 – Facility
Ground Floor
Tenancy A1
Render



Astra Aerolab
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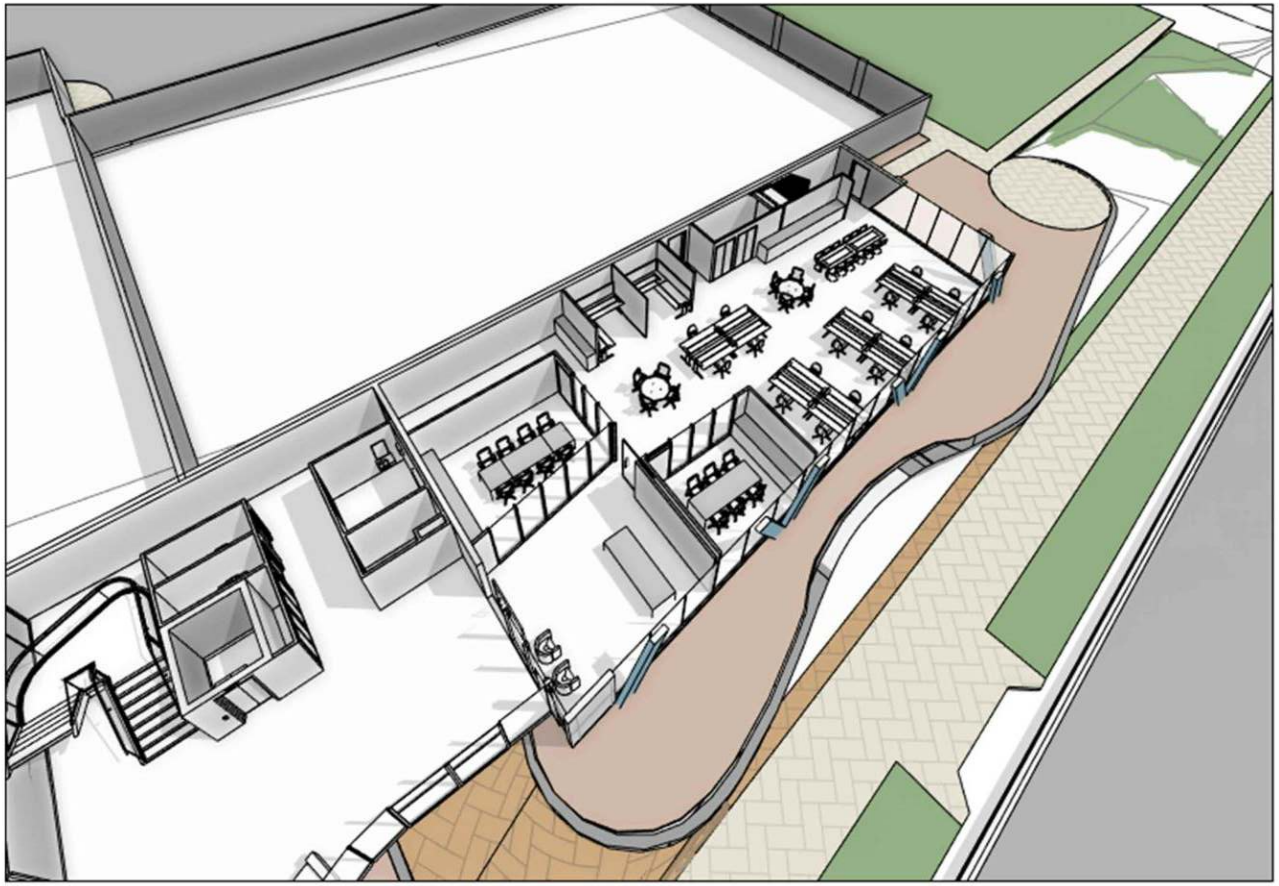
Lot 109/1 – Facility
Level 1
Tenancy A2
Render

Astra Aerolab
Williamtown
Lot 109/1 – Facility
Ground Floor
Tenancy B
Render



Astra Aerolab
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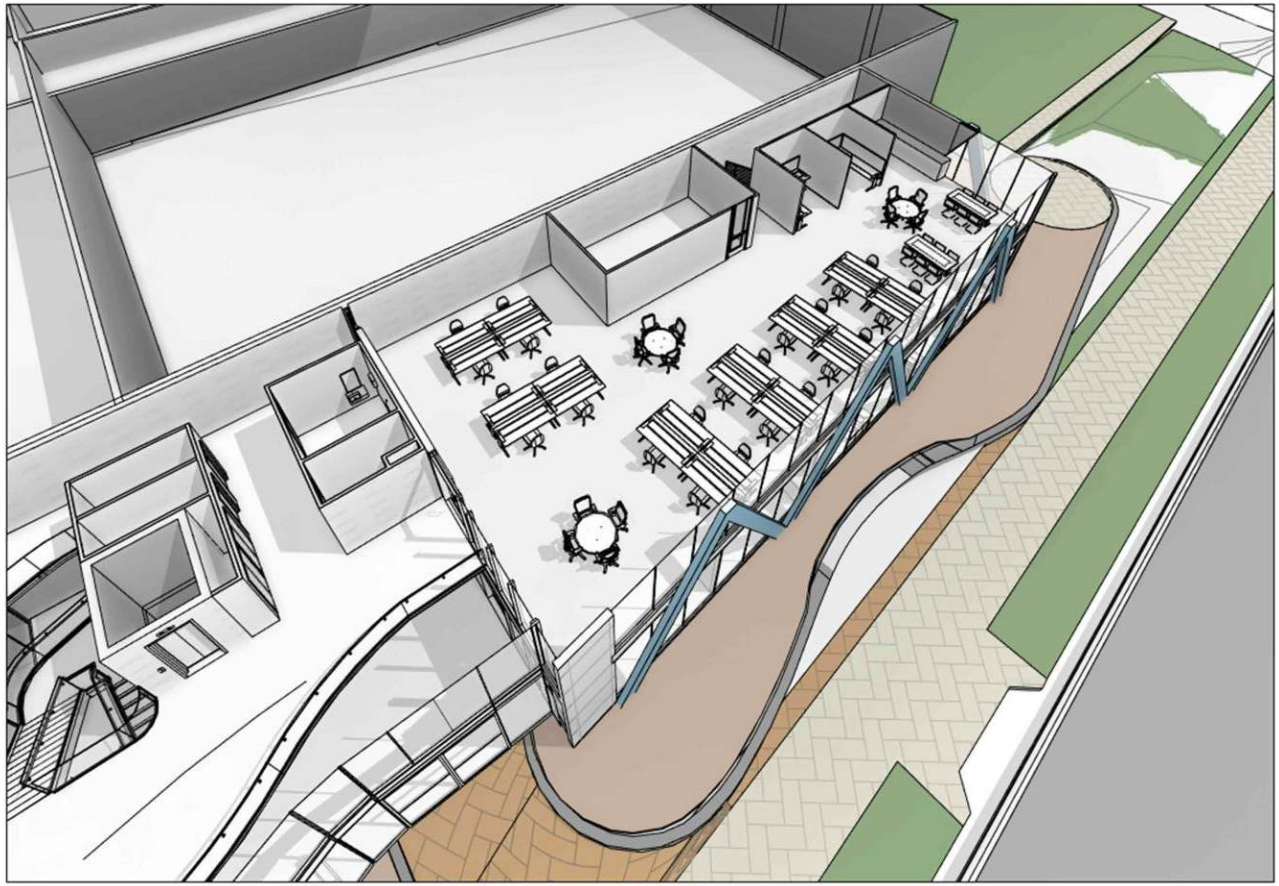
Lot 109/1 – Facility
Level 1
Tenancy B
Render



Astra Aerolab
Williamtown
Lot 109
Landscape Precedents

Fluid Landscape

Landscape concept for the front of house and precinct of Lot 109

1. DUNES

3. INDIGENOUS HERITAGE

4. ECOLOGY

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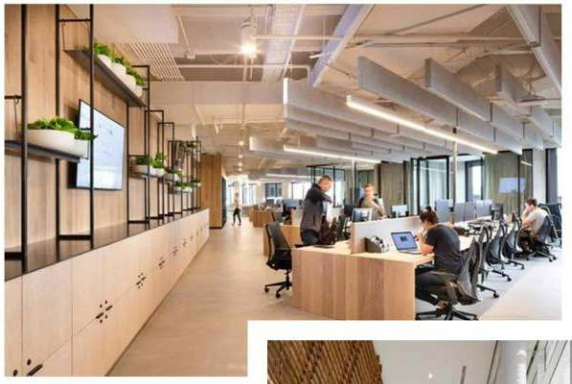
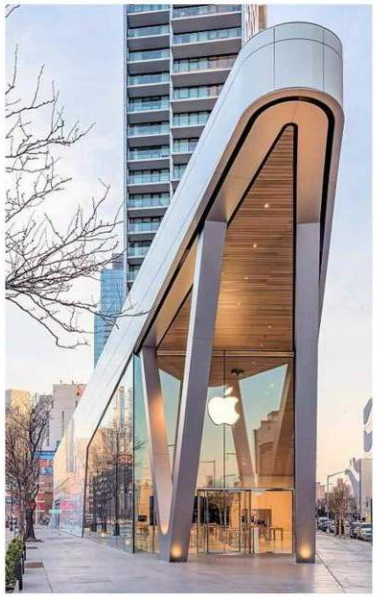
Lot 109
Building Precedents



Internally



Entry Node

A distinguished entry to the precinct

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