Nicholas
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Statement of Environmental Effects

Proposed New Light Industrial/ Warehouse Facility, St Mary's

Lot 136 DP 31912
53 – 59 Christie Street
St Mary's NSW 2760

Document No: 1778 SEE

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- **Appendix C** **Architectural Drawings**
  Prepared by Nicholas Associates Architects
- **Appendix D** **Landscape Drawings**
  Prepared by HLS Pty Ltd
- **Appendix E** **Stormwater Management Plan + Erosion and Sediment Control Assessment**
  Prepared by Whipps Wood Consulting
- **Appendix F** **Geotechnical Report**
  Prepared by SMEC Testing Services Pty Ltd
- **Appendix G** **Soil Supplemented Stage 1 Preliminary Site Investigation**
  Prepared by DLA Environmental
- **Appendix H** **Flora and Fauna Assessment Report**
  Prepared by SLR Consulting Australia Pty Ltd
- **Appendix I** **Landscape Architect Design Statement**
  Prepared by HLS Pty Ltd
- **Appendix J** **Traffic Study**
  Prepared by Thompson Stanbury Associates
- **Appendix K** **Compliance with Penrith City Council: Development Control Plan 2010**
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1.0 Executive Summary

The application seeks development for:

- A new Warehouse/ Light Industrial Facility at St Mary's

The existing concrete batching plant will be demolished and replaced with a contemporary warehouse/ manufacturing facility. The proposed design is fit for purpose for the industrial zoning.

Earthworks within the site are necessary to provide a workable and accessible platform for the buildings and a surplus of fill will be required.

Key issues concerning Council have been addressed in the following manner:

- Assessment of the existing flora and fauna:
    - An independent Environmental Consultant has been engaged to perform an assessment of the existing site and give recommendations. The design takes into account the independent recommendations of the report
    - The findings of the Flora and Fauna Assessment report do not identify threatened fauna species and do not identify and Endangered Ecological Communities on the site on the site A Landscape Architect is engaged to ensure the re-establishment of species identified by Council, within the landscape of the development
    - An appropriate vegetation area has been set aside to provide protection of fauna and retain flora species identified by Council
- The occupation and fit-out of the premises is not being pursued in this application

In summary:

- The proposed works will not impact Endangered Ecological Communities or critical habitat
- The proposed designs are in accordance with recommendations from an independent Environmental Consultant
- Connectivity of the existing vegetation corridor is maintained beyond the rear boundary and is enhanced by the retention of a protected vegetation area on the boundary
- A landscape plan incorporated the plant species identified by Council
- Car parking complies and the site is accessible by a Heavy Rigid Vehicle
- The walls in the nil side setbacks will not require maintenance and will act as the bounding fences to the property, as is typical for similar developments
- The completion of the proposed development will result in an improved built streetscape that is "lifting the bar" for the immediate vicinity

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2.0 Introduction

This Statement of Environmental Effects (SEE) accompanies a development application submitted to Penrith City Council for a proposed New Light Industrial/ Warehouse Facility development.

2.1 Consent

Development Consent is sought for the development of a new Light Industrial/ Warehouse Facility at St Mary's.

This Statement of Environmental Effects has addressed the various operational and environmental consequences of the proposal and concludes that the proposal satisfies the relevant development requirements and their objectives.

2.2 Assessment of Statutory Controls

This SEE has been prepared to provide council with the necessary information to assess the environmental effects of the proposal pursuant to Section 79C (1) of the Environmental Planning & Assessment Act.

2.3 Pre-lodgement consultation

A 'pre-DA' meeting was held with Council on 8 August, 2013 and was attended by:

- Mr J Lethlean (Owner)
- James Harrison (Project Manager)
- Kate Isaacs (Architect)
- Gavin Cherry (Principal Planner)
- Mark Cremona (Engineer)
- Craig Squires (Supervisor Fire Safety)
- Jenna Hore (Senior Biodiversity Officer)
- Chris Martyn (Administration)

Council is generally supportive of development of the site. raised concerns regarding issues to be addressed, which were reconfirmed in pre-lodgement minutes issued by Gavin Cherry, on 13 August, 2013. All issues have been addressed in this application.

2.4 Supporting documentation

This Statement should be read in conjunction with the following drawings and supporting documentation:

▪ Appendix A	Deposited Plans
▪ Appendix B	Site Survey *Prepared by Mepstead and Associates*
▪ Appendix C	Architectural Drawings *Prepared by Nicholas Associates Architects*
▪ Appendix D	Landscape Drawings *Prepared by HLS Pty Ltd*
▪ Appendix E	Stormwater Management Plan + Erosion and Sediment Control Assessment *Prepared by Whipps Wood Consulting*

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- Appendix F — Geotechnical Report
  Prepared by SMEC Testing Services Pty Ltd
- Appendix G — Soil Supplemented Stage 1 Preliminary Site Investigation
  Prepared by DLA Environmental
- Appendix H — Flora and Fauna Assessment Report
  Prepared by SLR Consulting Australia Pty Ltd
- Appendix I — Landscape Architect Design Statement
  Prepared by HLS Pty Ltd
- Appendix J — Traffic Study
  Prepared by Thompson Stanbury Associates
- Appendix K — Compliance with Penrith City Council: Development Control Plan 2010
- Appendix L — Waste Management Plan
- Appendix M — Site Construction and Safety Management

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3.0 Site Analysis

3.1 Site location, access & context

This SEE relates to Lot 136 DP 31912, known as 53 – 59 Christie Street St Mary's, in the city of Penrith City – deposited plan attached, *refer Appendix A*.

The Christie Street site is centrally located within the St Mary's industrial subdivision. The western boundary joins an undeveloped industrial lot owned by the NSW State Government and the eastern boundary adjoins vacant industrial land owned by Penrith City Council. The northern boundary adjoins a decommissioned railway corridor which is privately owned. All neighbouring properties are zoned for industrial purposes. *Refer to Figure 1: Location Map*

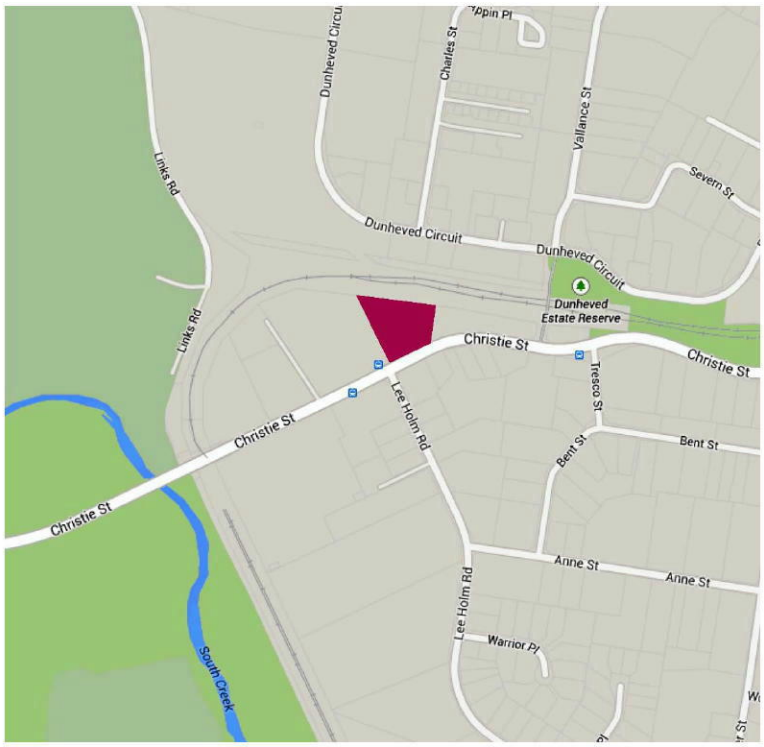

Figure 1: Location Map

The immediate locality is characterised industrial premises and vacant sites, with private recreation and residential zones flanking the extents of the industrial estate. *Refer to Figure 2: Aerial Image*

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Figure 2: Aerial Image. Dashed line indicates the extent of the industrial zoned land (image source - Goggle Earth, October 2013)

3.2 Site description

The site is irregular in shape in shape with an area of 1.695ha. The southern boundary of the site has an 84.9m frontage to Christie Street. To the northern boundary is an artificial earth mound associated with the previous as a railway corridor. The artificial mound extends part way into the subject site at the north-east corner. The southern portion of the site is currently fully fenced and not accessible to the public. The northern portion of the site is accessible via the neighbouring property to the west. *Refer to Appendix B – Site Survey.*

The subject site is currently occupied by a disused concrete batching plant, its associated buildings and infrastructure. The natural ground levels of the site have been significantly disturbed as a result of the construction of the batching plant, dumping of fill and debris, and the creation of the artificial mound associated with the decommissioned railway corridor.

A survey prepared by Mepstead and Associates accompanies this submission. *Refer to Appendix B – Site Survey.*

3.3 Easements & right of ways

The site is encumbered by a water easement on the north-west corner of the site. The proposed development will not encroach upon the easement. *Refer to Appendix B – Site Survey.*

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3.4 Relevant planning instruments

The following planning instruments are relevant to the site:

- Penrith Local Environment Plan 2010
- Penrith City Council: Development Control Plan 2010
- SEPP 64 Advertising Signage

3.5 Zoning

The site is zoned IN1 General Industrial under the Penrith City Council LEP 2010. The objectives of the zone are as follows:

- *To provide a wide range of industrial and warehouse land uses*
- *To encourage employment opportunities*
- *To minimise any adverse effect of industry on other land uses*
- *To support and protect industrial land for industrial uses*
- *To promote development that makes efficient use of industrial land*
- *To permit facilities that serve the daily recreation and convenience needs of persons working in industrial areas*

The proposed New Light Industrial/ Warehouse Facility meet the objectives of the zone.

3.6 Present & previous uses

Approximately half of the site was previously used as a concrete batching plant, operated by Boral. The buildings and infrastructure are still in place in a dilapidated condition and will be removed during the construction process. The remainder of the site that is accessible has been used to dump debris and fill. The artificial mound to the adjoining decommissioned railway corridor has been partially constructed on the subject site.

Image 1: Existing concrete batching plant.

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Image 2: Existing concrete batching plant.

Image 3: Existing landscape and artificial mound at the north-eastern corner of the site. (Photo taken from the concrete storage bays)

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4.0 The Proposal

4.1 Current situation

Our Client is proposing to develop a new Light Industrial/ Warehouse Facility on the existing dilapidated site at St Mary's.

4.2 Overview

The proposed new Light Industrial/ Warehouse Facility represents a strategic long term investment for local business in the area. Employing up to 30 staff, it will be an asset to the local community as well as the Penrith local government area.

The new development will be a clean warehouse and manufacturing facility, with tenants such as small to medium distribution or product assembly. The buildings have been designed to offer flexibility to its tenants; providing optimum employment, manufacturing and wholesaling opportunities into the future.

Image 4: Existing Factory/Warehouse Facility located opposite subject site. (Quality typical of the area)

4.3 Objectives

The objectives of the proposal are to provide a new Light Industrial/ Warehouse Facility located in St Mary's:

- Develop a contemporary facility that achieves maximum utilization of the site that is safe, built for purpose and embraces the principles of environmentally sensitive design
- Provide a quality street address to Christie Street, in terms of design and scale, within the industrial context

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- Integrate independent Flora and Fauna studies into the design of the facility, promote the establishment of new quality trees and re-establish significant flora species in a substantial area, visible from the public domain

- Undertake traffic studies to ensure the optimum traffic design strategy for car parking and larger vehicle access

- Minimise large external storage areas

.

4.4 Methodology

In order to achieve the prescribed objectives, approval is sought to construct a new Light Industrial/ Warehouse Facility.

4.5 Design Principles

The following design principles were established in the preparation of the brief. **(For details of the design resolution of these "Design Principles" refer to "Appendix K")**

- Design a facility that is –
    - Reflective of Penrith City Council's commitment to building a "Sustainable City" by embracing of the principles of environmentally sensitive design and land management practices while providing an economically efficient development that is fit for purpose
    - Quality in design and suitable for both warehouse/ distribution and manufacturing
    - Incorporates Universal Design
    - Low maintenance and hard wearing
    - Level access to single level warehouse space
    - Functional
    - Visually attractive
    - Incorporating current security and IT design

- Design buildings that include -
    - Large open plan warehouse space for flexibility of use/ internal layouts
    - Compliant and modern facilities suitable for warehouse/ factory workers
    - Office space and associated facilities
    - Flexibility in design for future partition/ combining of tenancies
    - Minimum 4 Green Star rating
    - Natural ventilation to the warehouse spaces
    - Quality thermal insulation
    - Natural day lighting
    - Quality internal spaces incorporating contemporary design, fixtures and fittings

- Responsive to the need to promote employment opportunities in the area

- Minimise impacts on neighbouring properties

- Design a substantial, high quality and well maintained landscaped area within the setback from Christie Street, including re-introducing significant vegetation as defined by Council guidelines. Provide trees to minimise the bulk of the development from the street and enhance the existing streetscape

- Provide an appropriate protected vegetation area that provides protection for flora and fauna of greatest biodiversity value

- Provide an associated car park suitable to the nature of the facility and it's users

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4.6 Project data

Site Area	– 1.069 ha
Gross Floor Area	– 5,868
Car Parking Spaces	– 75
Accessible spaces	– 2

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5.0 Assessment of Planning Issues

The following is an assessment of the environmental effects of the development described in the preceding sections. The assessment is issues-based and addresses the relevant considerations under Section 79C(1) of the Environmental Planning and Assessment Act 1979 (EP& A Act) notably:

- S.79C(1)(a) – Statutory considerations;
- S.79C(1)(b) – Environmental impacts;
- S.79C(1)(c) – Site suitability; and
- S.79C(1)(e) – Public interest.

5.1 Compliance with planning instruments and statutory controls

It is considered that the provisions of Penrith LEP 2010 have been attended to adequately and that the proposal respects the intent and requirements of these plans and is well suited to the desired outcomes for the area.

For full assessment of proposed development in relation to relevant requirements of Council's DCP, refer to "Appendix K".

The proposed works are to be compliant with the 'deemed to satisfy' provisions of the Building Code of Australia (BCA).

The proposed development is a Class 5 + 8, of Type B construction and must therefore comply with "BCA Specification 4 - Type B Fire Resisting Construction".

5.2 Land use and permissibility

The proposed building is located on the part of the site zoned "IN1 General Industrial" under the provisions of the Penrith LEP 2010. The proposed development is permissible within this zone.

5.3 Exempt or Complying Development

The subject development is not regarded as exempt or complying development

5.4 Minimum Subdivision Lot Size

The minimum lot size for the subject land is 1,000m2

5.5 Rural Subdivision

This clause is not applicable to the subject land

5.6 Height of Buildings

The height of any building within the proposed development does not exceed 12m; the height requirement indicated on the Height of Buildings Map.

5.7 Floor Space Ratio

This clause is not applicable to the subject land

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5.8 Exemptions to Development Standards

The proposed development does not require exemption to development standards

5.9 Relevant Acquisition Authority

The site is not subject to land acquisition

5.10 Development on Land Intended to be acquired for Public Purpose

The subject site is not listed as "to be acquired"

5.11 Classification and Reclassification of Public Land

This clause is not applicable to the subject land

5.12 Development near Zone Boundaries

This clause is not applicable to the subject land

5.13 Controls Relating to Miscellaneous and Permissible Uses

This clause is not applicable to the current Development Application

5.14 Development within the Coastal Zone

This clause has not been adopted by Penrith City Council

5.15 Architectural Roof Features

The proposed design does not incorporate architectural roof features that will cause the building to exceed height limits set out in Penrith LEP 2010, clause 4.3

5.16 Development Below Mean Water Mark

This clause has not been adopted by Penrith City Council

5.17 Conversion of Fire Alarms

This clause is not applicable to the subject development

5.18 Preservation of Trees or Vegetation

Refer to:

- *Appendix H Flora and Fauna Assessment Report*
- *Appendix D Landscape Drawings*
- *Appendix I Landscape Architect Statement*

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5.19 Heritage Conservation

The site is not listed as a Heritage Item on the Council's Heritage Map. The site is within the vicinity of land on which a heritage item, the Dunheved Fire Station is located.

The subject site is located approximately 100m west, and the opposite side of the road, of the listed heritage item at 50 Christie Street St Mary's. Neighbouring the heritage item is a warehouse/factory complex with uses such as engine reconditioning, with outdoor storage visible from the street.

The proposed development is considered to have minimal visual impact on the heritage item. *Refer to Images 5 – 7* indicating the relationship of the subject site to the heritage item.

Image 5: Relationship of subject site to listed heritage item (image source – Goggle Earth)

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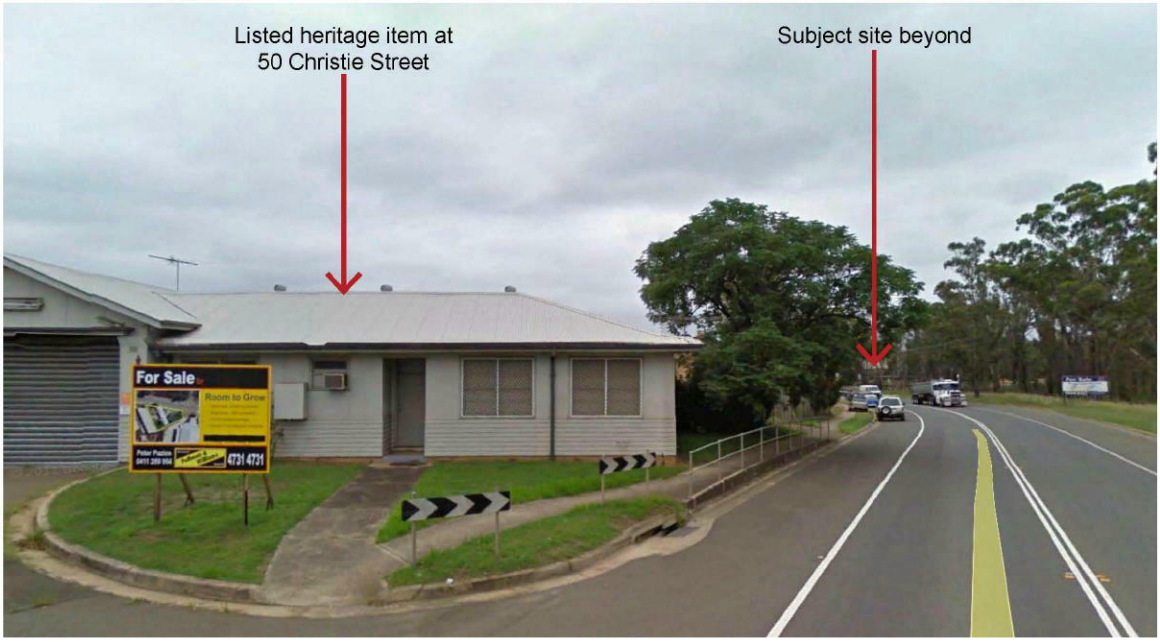

Image 6: View from listed heritage item to subject site (image source – Goggle Earth)

Image 7: View from subject site towards heritage item

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5.20 Bushfire Hazard Reduction

This clause is not applicable to the subject land

5.21 Infrastructure Development and use of Existing Buildings of the Crown

This clause is not applicable to the subject land

5.22 Eco-tourist facilities

This clause is not applicable to the subject land

5.23 Earthworks

"(1) The objectives of this clause are as follows:

(a) to ensure that any earthworks will not have a detrimental impact on environmental functions and processes, neighbouring uses or heritage items and features of the surrounding land,

The site and rear adjoining property have been subject to extensive cut and fill with areas showing no evidence of the original natural ground line. A Geotechnical engineering report/ investigation has been undertaken to assess the extent of the fill *(refer to Appendix F)*. In particular this report confirms fill of up to 2m in depth located on the north eastern portion of the site (refer to analysis/ results for Borehole No. 4).

The design endeavours to respect the natural ground line of the adjacent properties while providing an accessible path of travel to all finished floor levels of the proposed Light Industrial/ Warehouse development, within the existing site constraints.

Environmental functions such as drainage have been considered and form part of this development application. *Refer to Stormwater Management Plan* for details.

For erosion and sedimentation control measures refer to drawing Hydraulic Engineer's drawings.

5.24 Salinity

Salinity is not considered applicable to the development on the subject land

5.25 Flood Planning

The subject site is not shown as "Flood Planning Area" on the Council's Flood Planning Land Map

5.26 Development on Natural Resources Sensitive Land

The subject site is not shown as "Natural resources sensitive land" on the Natural Resources Sensitivity Land Map

5.27 Protection of Scenic Character and Landscape Values

The subject site is not shown as "Land with scenic and landscape values" on the Scenic and Landscape Values Map

5.28 Servicing

The development will be connected to a reticulated water supply, will be connected to a reticulated sewerage system

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5.29 Additional Local Provisions

Clauses 6.8 to 6.19 are not applicable to the subject site

5.30 Schedule 1 Additional permitted uses

This clause is not applicable to the subject site

5.31 Schedule 2 Exempt development

This clause is not applicable to the subject development

5.32 Schedule 3 Complying development

This clause is not applicable to the subject development

5.33 Schedule 4 Classification and reclassification of public land

This clause is not applicable to the subject land

5.34 Schedule 5 Environmental heritage

This clause is not applicable to the subject land.

A heritage item of local significance, the Dunheved Fire Station, is located at 50 Christie Street St Mary's. *Refer to 4.19 Heritage Conservation.*

5.35 SEPP 64 Advertising Signage

(1) This Policy aims:

(a) to ensure that signage (including advertising):

(i) is compatible with the desired amenity and visual character of an area, and
(ii) provides effective communication in suitable locations, and
(iii) is of high quality design and finish, and

The proposed signage will be a building and business identification sign located in the front setback and will integrate the street address and businesses within the one sign. The style is typical of contemporary developments of a similar nature, with a quality design and finish to complement the proposed building. The proposed signage complies with this regulation. *Refer to DAD 1.02 and DAD 1.05* for location and dimensions of signage.

23 Freestanding advertisements

(1) The consent authority may grant consent to the display of a freestanding advertisement only if the advertising structure on which the advertisement is displayed does not protrude above the dominant skyline, including any buildings, structures or tree canopies, when viewed from ground level within a visual catchment of 1 kilometre.

The proposed signage is under the permissible height limit and is under the canopy of the proposed surrounding trees. The signage complies with this regulation.

Christie Street is not listed as a Classified Road in the Schedule of Classified Roads and State Regional Roads (RTA), therefore is not required to be referred to the Roads and Traffic Authority.

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6.0 Conclusion

This SEE relates to the Development Application for the proposed New Light Industrial/ Warehouse Facility at Christie Street, St Mary's.

The proposal is permissible under the Penrith Local Environment Plan LEP 2010 and consistent with the planning intent and objectives of the locality having regard for the Penrith Development Control Plan 2010. *Refer to Appendix K – Compliance with Penrith City Council: Development Control Plan 2010*

Pursuant to the provisions of the Environmental Planning and Assessment Act & regulations, and specifically Section 79C(1) – Matters for consideration, we conclude the following:

- *S.79C(1)(a) – Statutory considerations;*

  The proposal is consistent with the intent and objectives of the LEP and interim policies applying to the land to which the development application relates;

- *S.79C(1)(b) – Environmental impacts;*

  The proposal does not detrimentally affect the existing natural or built environment but rather, as detailed in this statement, positively contributes to the amenity of the area by revitalising an existing degraded industrial site and providing positive employment opportunities for St Mary's;

- *S.79C(1)(c) – Site suitability;*

  The site is considered appropriate for the development because the proposed use is compatible with the intent & objectives of the Penrith City LEP & DCP. The site is of a sufficient size to accommodate the proposed works and the proposal enhances the character of the locality.

  The site is considered appropriate for the proposed development because:

  - The site is currently a disused and degraded industrial facility open
  - The new development will potentially improve the social and economic outcomes for the people of St Mary's by providing employment opportunities in a contemporary built for purpose facility

- *S.79C(1)(e) – Public interest;*

  The proposed works comply with all legislative and statutory requirements. The proposal is in the interest of the public because the proposed works will have a positive social & economic effect on both the property to which the development applies as well as the neighbouring properties with improved amenity through the revitalisation of a degraded site.

We trust this Statement provides the necessary rationale for Councils approval of this proposal.

We believe that this proposal is an appropriate design that will enhance the desired character of the local area.

For these reasons we recommend Councils favourable assessment of the application.

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Appendix 'A'

Deposited Plans

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PRD nationwide
COMMERCIAL

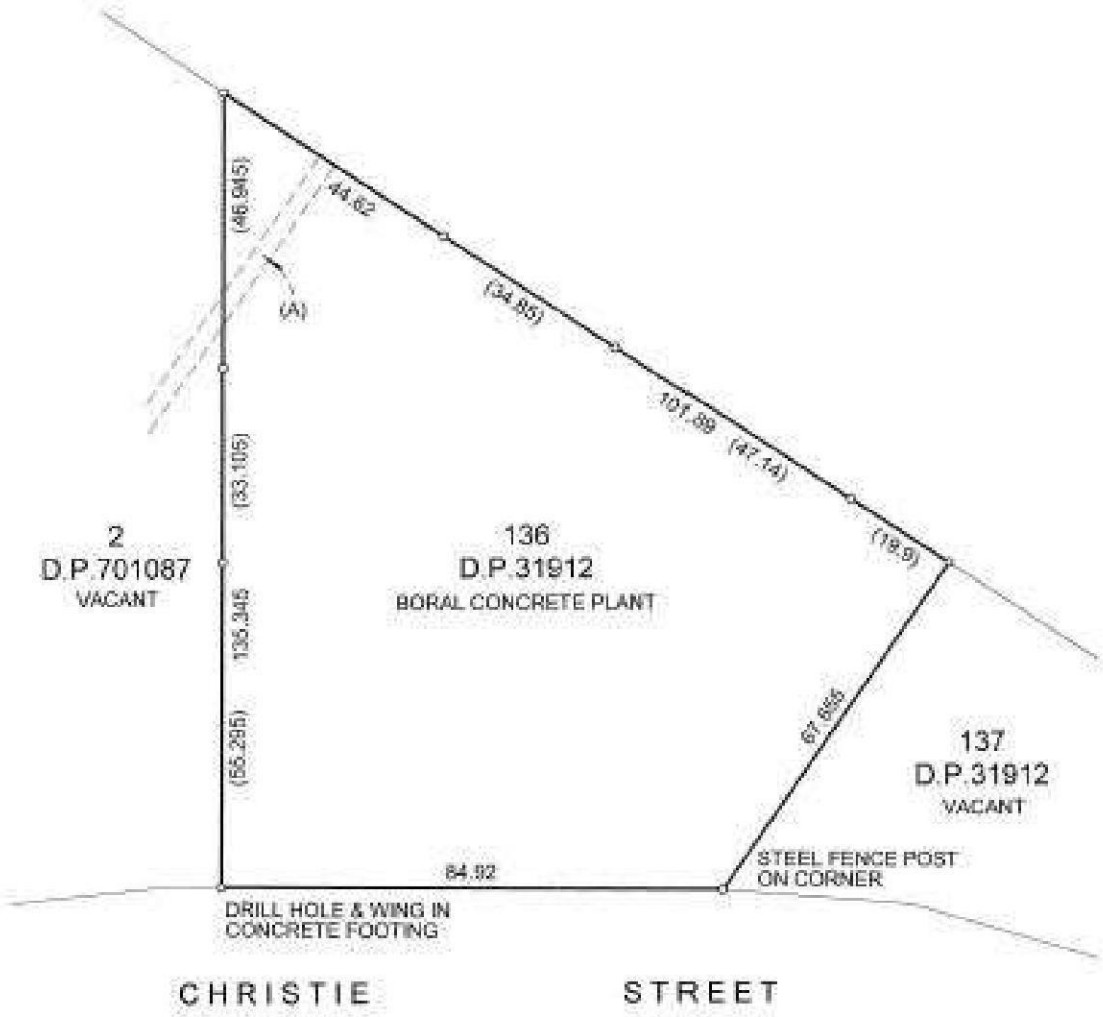
OUR REF: 5052

mepstead & ASSOCIATES

P.O. BOX 208 Pennant Hills 1715 A.B.N. 14 003 280 242

SURVEY SKETCH

FOR INSPECTION PURPOSES OVER LOT 136 IN D.P. 31912
BEING No. 53-69 CHRISTIE STREET, ST MARYS
Scale 1:1000



NOTES

- DENOTES PEG ON BOUNDARY UNLESS SHOWN OTHERWISE
(A) EASEMENT FOR WATER SUPPLY 3.06 WIDE(M63848)
ALL TITLE DIMENSIONS ARE BASED ON DEPOSITED PLAN No. 31912

WORK COMPLETED: MARK BOUNDARIES

DATE OF SURVEY: 3.12.12

SURVEYOR: S.H.

DWG No: 5052-SET1

DAVID ALLAN MEPSTEAD
SURVEYOR REGISTERED UNDER
THE SURVEYING AND SPATIAL
INFORMATION ACT, 2002
DATE: 4 · 12 · 12

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Appendix 'B'

Site Survey

Prepared by Mepstead & Associates

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T. N.

M. N.

DENSE SCRUB AND NUMEROUS SMALL TREES

(A)

THIS AREA CONTAINS DUMPED MATERIAL - ANY LEVELS SHOWN HEREIN DO NOT REPRESENT NATURAL SURFACE. CONTOURS SHOWN INDICATE APPROXIMATE NATURAL SURFACE.

DENSE SCRUB AND NUMEROUS SMALL TREES

POND

DENSE SCRUB AND NUMEROUS SMALL TREES

POND

DENSE SCRUB AND NUMEROUS SMALL TREES

136
D.P. 31912
1.070ha
DISUSED CONCRETE PLANT

137
D.P. 31912
VACANT

2
D.P. 701087
VACANT

STORAGE FACILITY (SILO)

BRICK OFFICE

BRICK SHED

CONCRETE PLANT

CONCRETE PLANT

TIMBER PERGOLA

DRIVEWAY

DRIVEWAY

BITUMEN

BITUMEN

DRIVEWAY

BLOCK RET. WALL

RETAINING WALL

CONVEYOR LINE

DUMP POINT FOR DRY MATERIALS

HOLDING PONDS

STORMWATER PIT IL 22.36

CHRISTIE STREET

BENCHMARK
NAIL IN KERB
RL. 24.65 (A.H.D.)

(A) EASEMENT FOR WATER SUPPLY 3.05 WIDE (M63846)

Scale 1:200 (A0) Scale 1:400 (A2)
0 4 8 12 16 20 metres

SYMBOL LEGEND

- BENCHMARK
- CLOTHES LINE
- ELECTRICAL PILLAR
- GAS MAIN MARKER
- GAS METER
- GAS VALVE
- HYDRANT POTABLE
- HYDRANT RECYCLE
- LIGHTPOLE
- POWER POLE
- SEWER INSPECTION POINT
- SEWER MANHOLE
- SEWER VENT
- SIGN
- STOP VALVE POTABLE
- STOP VALVE RECYCLE
- TELSTRA PILLAR
- TELSTRA PIT SINGLE
- TELSTRA PIT DOUBLE
- TRAFFIC LIGHTS
- TRAFFIC LIGHTS CONTROL BOX
- WATER AIR VALVE
- WATER METER
- SURVEY CONTROL MARK
- TOP OF GUTTER LEVEL
- RIDGE LEVEL
- FLOOR LEVEL
- CHIMNEY LEVEL
- PARAPET LEVEL
- OVERHEAD WIRE LEVEL
- PIPE INVERT 600 DIA.

TREE SCHEDULE

TREE No.	SPREAD/TRUNK DIA./HEIGHT	LEVEL	TREE No.	SPREAD/TRUNK DIA./HEIGHT	LEVEL	TREE No.	SPREAD/TRUNK DIA./HEIGHT	LEVEL
1	3/0.2/9	24.31	33	6/0.4/12	25.61	65	12/0.6/14	25.74
2	4/0.2/8	24.53	34	10/0.5/10	23.57	66	8/0.4/10	25.91
3	4/0.2/8	24.46	35	8/0.3/9	25.77	67	8/0.4/10	25.77
4	10/0.5/10	24.79	36	8/0.4/10	24.05	68	10/0.4/12	25.66
5	8/0.5/12	24.84	37	6/0.3/6	25.14	69	6/0.3/9	25.96
6	15/0.7/17	24.91	38	10/0.5/14	25.72	70	6/0.3/8	25.88
7	8/0.4/12	24.66	39	8/0.4/12	25.84	71	6/0.3/8	25.99
8	5/0.3/7	24.40	40	8/0.4/10	25.61	72	10/0.5/10	25.88
9	8/0.3/8	25.69	41	8/0.3/9	25.75	73	10/0.5/10	26.01
10	12/0.6/12	25.31	42	6/0.3/10	25.78	74	4/0.3/10	26.66
11	12/0.7/18	25.71	43	10/0.4/12	25.90	75	8/0.4/10	26.85
12	14/0.7/20	25.24	44	10/0.4/10	26.15	76	12/0.4/12	26.34
13	10/0.6/15	25.26	45	12/0.4/14	25.73	77	12/0.7/12	26.92
14	6/0.35/8	25.01	46	12/0.5/14	25.84	78	18/0.9/14	27.24
15	8/0.5/12	25.05	47	10/0.4/10	25.74	79	10/0.3/10	27.79
16	6/0.3/10	24.53	48	8/0.4/12	26.11	80	10/0.3/10	28.09
17	6/0.3/10	25.12	49	5/0.3/7	26.45	81	8/0.3/10	27.00
18	5/0.3/7	25.70	50	10/0.3/10	26.53	82	6/0.3/10	26.68
19	15/0.7/20	25.89	51	8/0.4/10	26.78	83	5/0.3/5	27.29
20	12/0.5/12	25.67	52	12/0.6/12	26.50	84	6/0.3/6	27.00
21	6/0.3/7	24.72	53	8/0.3/12	26.05	85	8/0.4/8	26.95
22	4/0.3/9	24.63	54	12/0.6/10	26.54	86	6/0.4/9	26.66
23	6/0.5/10	24.50	55	6/0.4/10	25.69	87	8/0.4/10	27.72
24	6/0.3/8	25.02	56	6/0.3/8	26.87	88	5/0.3/10	28.12
25	6/0.3/8	25.01	57	10/0.4/12	26.57	89	5/0.3/7	26.79
26	8/0.3/10	25.50	58	10/0.5/12	25.28	90	8/0.6/12	26.04
27	10/0.4/10	25.58	59	8/0.5/10	25.40	91	6/0.3/7	25.71
28	10/0.3/10	25.50	60	12/0.5/12	25.30	92	6/0.4/10	25.90
29	6/0.4/10	25.54	61	8/0.3/8	25.92	93	8/0.3/7	26.18
30	6/0.3/7	25.46	62	8/0.4/10	25.94	94	8/0.3/8	26.38
31	6/0.3/10	25.73	63	10/0.4/12	26.15	95	10/0.5/12	26.88
32	6/0.3/7	25.54	64	8/0.4/12	25.84	96	8/0.3/9	25.88

IMPORTANT NOTES

1 THE LEVELS AND DETAIL ON THIS PLAN HAVE BEEN DETERMINED BY TRIGONOMETRICAL METHODS AND ARE WITHIN THE GENERALLY ACCEPTED ACCURACY FOR SUCH A SURVEY.
2 THE RELATIONSHIP OF IMPROVEMENTS TO PROPERTY BOUNDARIES IS DIAGRAMMATIC ONLY. THE TRUE POSITIONS ARE SUBJECT TO FINAL SURVEY.
3 DIMENSIONS HAVE BEEN CALCULATED FROM INFORMATION SUPPLIED AND ARE SUBJECT TO FINAL SURVEY.
4 THE SERVICES AND DETAIL SHOWN ON THIS PLAN HAVE BEEN PREPARED FROM A COMBINATION OF FIELD SURVEY AND OFFICE CALCULATION. THE PLAN MAY NOT SHOW THE FULL EXTENT OF ABOVE GROUND STRUCTURES AND SUB SURFACE SERVICES. PRIOR TO ANY EXCAVATION OR CONSTRUCTION IT IS RECOMMENDED THAT THE LOCATION OF STRUCTURES AND SERVICES BE VERIFIED BY FIELD INSPECTION.
5 THE SPREAD OF THE CROWN OF THE TREES SHOWN ON THIS PLAN IS DIAGRAMMATIC ONLY, BASED ON THE AVERAGE SPREAD OBSERVED IN THE FIELD.
PRIOR TO ANY DEVELOPMENT PROPOSAL WHICH MIGHT BE AFFECTED BY TREES IT IS RECOMMENDED THAT THE TREE SPREADS BE VERIFIED BY FIELD INSPECTION.
6 ALL LEVELS MUST BE REFERRED BACK TO THE BENCHMARK NAIL IN KERB R.L. 24.65(A.H.D.).
THE ORIGIN OF THIS LEVEL IS S.S.M.78866 R.L. 23.507 (A.H.D.) LOCATED IN CHRISTIE STREET.
7 CONTOUR INTERVAL IN METRES: 0.5
8 IF ANY WORK IS PLANNED WHICH RELIES ON CRITICAL SETBACKS FROM THE STREET OR SIDE BOUNDARIES IT IS IMPERATIVE THAT FURTHER SURVEY WORK BE CARRIED OUT TO DETERMINE PROPERTY BOUNDARIES
9 THE BEARINGS SHOWN ON THIS PLAN HAVE BEEN COMPILED FROM PLANS SUPPLIED BY LAND & PROPERTY INFORMATION

ALL ABOVE NOTES ARE AN INTEGRAL PART OF THIS PLAN

mepstead & ASSOCIATES
REGISTERED SURVEYORS AND DEVELOPMENT CONSULTANTS

Sydney
10/4 Central Avenue, Thornleigh N.S.W. 2120
Phone 02 9875 4500 **Fax** 02 9875 4633

Postal
PO BOX 208, Pennant Hills N.S.W. 1715

Internet
mepstead@mepstead.com.au
www.mepstead.com.au

Designed:	Scale: 1:200	Principal:	ARTAZAN PROPERTY GROUP
Drawn: C.P.	Datum: A.H.D.	Project:	PLAN OF DETAIL AND LEVELS OVER LOT 136 IN D.P. 31912 BEING No. 53-59 CHRISTIE STREET ST MARYS
Checked: C.A.	Date: 11/07/13		
L.G.A: PENRITH	A0		

Drg. No. 5052-DET1
Sheet No. 1 of 1 sheets
Our Ref: 5052

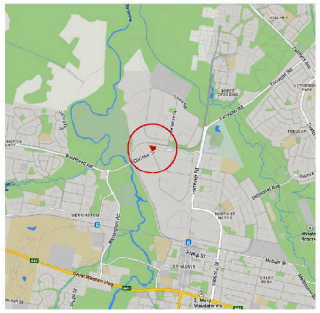
Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Appendix 'C'

Architectural Drawings

Prepared by Nicholas Associates Architects

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013



01 District Map

SITE AREA		10895m²	
	WAREHOUSE	OFFICE	TOTAL
UNIT 1	693m²	175m²	868m²
UNIT 2	719m²	211m²	930m²
UNIT 3	786m²	207m²	993m²
UNIT 4	814m²	262m²	1076m²
UNIT 5	1578m²	425m²	2001m²
TOTAL	4588m²	1280m²	5868m²
TOTAL GROSS FLOOR AREA OF BUILDINGS			5868m²

COUNCIL DCP GFA CALCULATIONS: TAKEN FROM INTERNAL FACE OF EXTERNAL WALLS. EXCLUDES LOADING BAYS AND VERTICAL CIRCULATION

02 Site Data

DRAWINGS SCHEDULE

DWG. NO.	DRAWING TITLE
SERIES 1 - PRIMARY PLANS, ELEVATIONS & SECTIONS	
DAD L01	COVER PAGE, LOCATION PLAN, SCHEDULES
DAD L02	EXTERNAL WORKS PLAN
DAD L03	GROUND FLOOR PLAN
DAD L04	FIRST FLOOR PLAN
DAD L05	ELEVATIONS AND SECTIONS
DAD L06	INDICATIVE EXTERNAL FINISHES
5052	SURVEY
L01	LANDSCAPE SITE PLAN
L02	LANDSCAPE PLANTING PLAN AND DETAILS
HDA01	HYDRAULIC SERVICES STREET LOCATION PLAN
HDA02	HYDRAULIC SERVICES SITE PLAN
HDA03	HYDRAULIC SERVICES FIRST FLOOR PLAN
HDA04	HYDRAULIC SERVICES STORMWATER DETAILS
SEE	STATEMENT OF ENVIRONMENTAL EFFECTS

IMAGE PROVIDED BY GOOGLE MAPS

03 Location Plan
1:1250

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PROJECT NORTH

FIGURED DIMENSIONS TO BE USED IN PREFERENCE TO SCALING FROM DRAWINGS. CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE & REPORT ANY DISCREPANCY TO THE PRINCIPAL OR REGISTRATE BEFORE PROCEEDING WITH WORK. ALL BOUNDARY DIMENSIONS & SCHEDULE TO BE VERIFIED BY LICENCED SURVEYOR PRIOR TO PROCEEDING WITH WORK.

DATE	CO-ORDINATION	BN	PA	PM	NOV
03.12.13	ISSUED FOR DEVELOPMENT APPLICATION				A

APG ARTAZAN PROPERTY GROUP

OWNER OF SURVEY:
HOPSTEAD + ASSOCIATES PO BOX 368, PENNANT HILLS, NSW 1715
Ph: 9872 1366 Fx: 9872 4931
SURVEY DWG REF NO. 5052

PROJECT
NEW LIGHT INDUSTRIAL/ WAREHOUSE FACILITY

Lot 136 DP 31912
530-059 Christie Street
St Mary's NSW 2760

TITLE
COVER PAGE
LOCATION PLAN
SCHEDULES

SCALE @ A1	1:200	DRAWN	APPROVED	AK	
SCALE @ A3	1:500	KTI	STATUS	DAD	CCT	WDB

PROJECT NO.	DRAWING NO.	REV.
1778:13	DAD 1.01	A

Nicholas Associates Architects Pty Ltd
Nominated Architect
LEVEL 21, TOWER BUILDING 9, BARANGAROO STREET
A.B.N. 69 073 774 671

FILE REF: T:\PROJECTS\1778-xx\Drawings\DAD\1778DAD.VWX drawing

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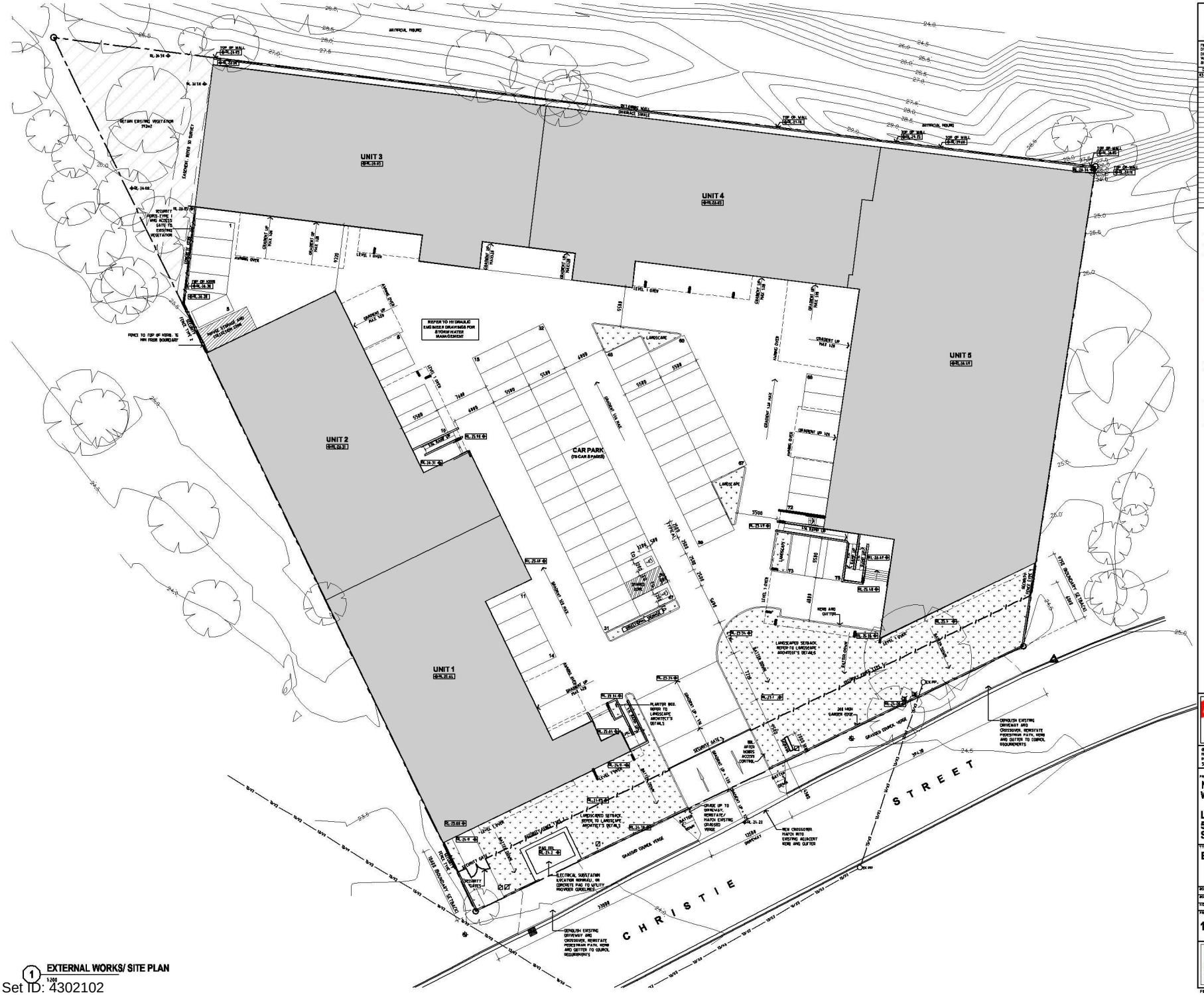
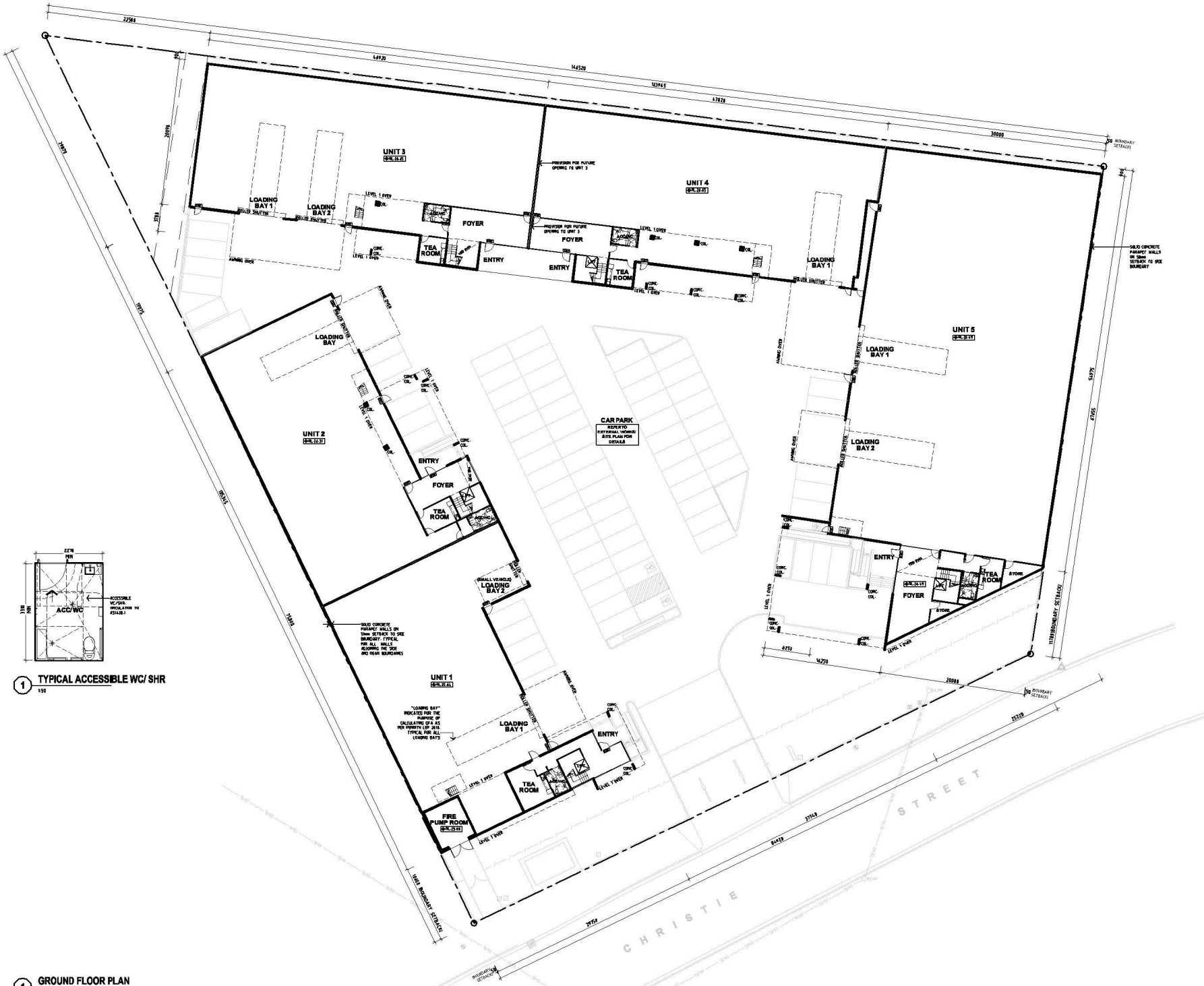
Version: 1, Version Date: 13/12/2013


UNIT 1
UNIT 2
UNIT 3
UNIT 4
UNIT 5
CAR PARK
(73 CAR SPACES)
CHRISTIE STREET
ARTIFICIAL MOUND
RETAIN EXISTING VEGETATION
REFER TO HYDRAULIC ENGINEER DRAWINGS FOR STORMWATER MANAGEMENT
LANDSCAPED SETBACK REFER TO LANDSCAPE ARCHITECT'S DETAILS
ELECTRICAL SUBSTATION (LOCATION NOMINAL, OR CONCRETE PAD TO UTILITY PROVIDER GUIDELINES)
DEMOLISH EXISTING DRIVEWAY AND CROSSOVER, REINSTATE PEDESTRIAN PATH, KERB AND GUTTER TO COUNCIL REQUIREMENTS
NEW CROSSOVER MATCH INTO EXISTING ADJACENT KERB AND GUTTER
GRADE UP TO DRIVEWAY, REINSTATE/ MATCH EXISTING GRASSED VERGE
SECURITY GATE
SECURITY GATES
PLANTER BED. REFER TO LANDSCAPE ARCHITECT'S DETAILS
NO AFTER HOURS ACCESS CONTROL
200 HIGH GARDEN EDGE
GRASSED COUNCIL VERGE
LANDSCAPE
LANDSCAPE SETBACK
AWNING OVER
GRADIENT UP MAX 1:20
GRADIENT 1:20 MAX
LEVEL 1 OVER
KERB AND GUTTER
EX. RETAINING WALL
EX. SEWER MH
EX. STORMWATER PIT
EX. GAS METER
EX. POWER POLE
EX. TELSTRA PIT
EX. OVERHEAD ELECTRICAL SUPPLY LINE
PROPERTY BOUNDARY
STREET KERB
MAIN BOUNDARY SETBACK
SECURITY FENCE TYPE 1 AND ACCESS GATE TO EXISTING VEGETATION
FENCE TO TOP OF KERB, 1m MIN FROM BOUNDARY
TOP OF WALL
TOP OF KERB
RL 24.14
RL 24.68
RL 24.80
RL 25.14
RL 25.47
RL 25.68
RL 25.44
RL 25.14
RL 25.67
RL 25.71
RL 25.71
RL 25.71



1 TYPICAL ACCESSIBLE WC/ SHR
1:50

1 GROUND FLOOR PLAN
1:200

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PROJECT NORTH

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DATE	CO-ORDINATION	BN	PA	PM	ISSUE
03.12.13	ISSUED FOR DEVELOPMENT APPLICATION				A

LEGEND:

GENERAL:

DENOTES BOUNDARY

DENOTES EXTENT OF NEW BUILDING

AL.	ALUMINIUM	BOL.	BOLLARD
COL.	COLUMN	CONC.	CONCRETE
EX.	EXISTING	FFL	FINISHED FLOOR LEVEL
R.CONC.	REINFORCED CONCRETE	PT	PAINT FINISH
SS	STAINLESS STEEL	STF	STEEL TROWEL FINISH
		TIMB.	TIMBER
		KERB DRAIN	BCA REQUIRES EXIT CLEAR OPENING

EX. LEVEL TO REMAIN

PROPOSED LEVEL

WALLS:

NEW WALL

AL. FRAMED GLAZING

SERVICES:
SERVICES SHOWN ARE APPROXIMATE ONLY. TO BE VERIFIED ON SITE REFER TO SURVEY FOR EXISTING SERVICES

REFER TO HYDRAULIC ENGINEER DRAWINGS FOR PROPOSED SERVICES

APG ARTAZAN PROPERTY GROUP

DESIGN OF SURVEY
ADDRESS: PO BOX 364, PENRITH NSW 1775
PH: 9673 1966 FX: 9673 4933
SURVEY DWG REF NO. 5852

PROJECT
NEW LIGHT INDUSTRIAL/ WAREHOUSE FACILITY

Lot 136 DP 31912
530-059 Christie Street
St Mary's NSW 2760

TITLE
GROUND FLOOR PLAN

SCALE @ A1	1:200	DRAWN	APPROVED	AK	
SCALE @ A3	1:500	KTI	STATUS	DAD	CCT WDS

YOUR REF/ ARCHITECT — NOTE ISSUE — YOUR REF NO.

PROJECT NO.	DRAWING NO.	REV.
1778:13	DAD 1.03	A

Nicholas Associates Architects Pty Ltd
Nominated Architect
LEVEL 21, TOWER BUILDING 9, BARANGAROO STREET
A.B.N. 89 073 774 621

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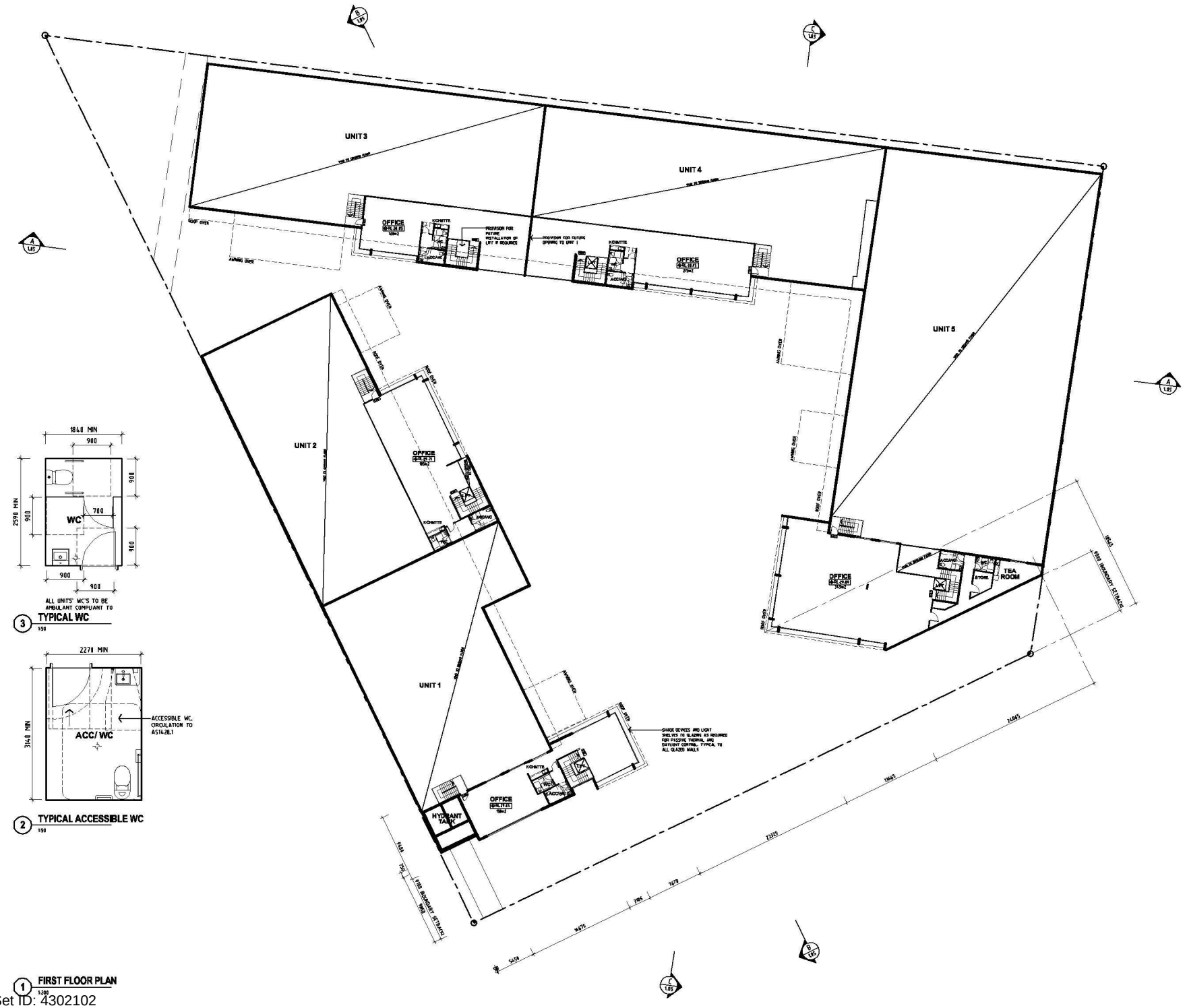
Version: 1, Version Date: 13/12/2013



LEGEND:

GENERAL:

DENOTES BOUNDARY

DENOTES EXTENT OF NEW BUILDING

AL.	ALUMINIUM	BOL.	BOLLARD
COL.	COLUMN	CONC.	CONCRETE
EX.	EXISTING	FFL	FINISHED FLOOR LEVEL
R.CONC.	REINFORCED CONCRETE	PT	PAINT FINISH
SS	STAINLESS STEEL	STF	STEEL TROWEL FINISH
		TMB.	TIMBER
		FIRE DOOR	BCA REQUIRES EXIT CLEAR OPENING

EX. LEVEL TO REMAIN

PROPOSED LEVEL

WALLS:

NEW WALL

AL. FRAMED GLAZING

SERVICES:

SERVICES SHOWN ARE APPROXIMATE ONLY. TO BE VERIFIED ON SITE PRIOR TO SURVEY FOR EXISTING SERVICES

REFER TO HYDRAULIC ENGINEER DRAWINGS FOR PROPOSED SERVICES

DATE	CO-ORDINATION	BN	PA	PM	NOV
03.12.13	ISSUED FOR DEVELOPMENT APPLICATION				A

APG ARTAZAN PROPERTY GROUP

OWNER OF SURVEY
HOPSTEAD + ASSOCIATES PO BOX 366, PENRIHT HILLS, NSW 1715
Ph: 9673 1366 Fx: 9673 4933
SURVEY DWG REF NO. 5852

PROJECT
NEW LIGHT INDUSTRIAL/ WAREHOUSE FACILITY

Lot 136 DP 31912
530-059 Christie Street
St Mary's NSW 2760

TITLE
FIRST FLOOR PLAN

SCALE @ A1	1:200	DRAWN	APPROVED	AK	
SCALE @ A3	1:500	KTI	STATUS	DAD	CCT	WDB

YOUR REF/ ARCHITECT

NOTE ISSUE

YOUR REF/ NO.

PROJECT NO.
1778:13

DRAWING NO.
DAD 1.04

REV.
A

Nicholas Associates Architects Pty Ltd
Nicholas Associates Architects
LEVEL 21, TOWER BUILDING 9, BRADFIELD STREET
A.B.N. 69 073 774 621

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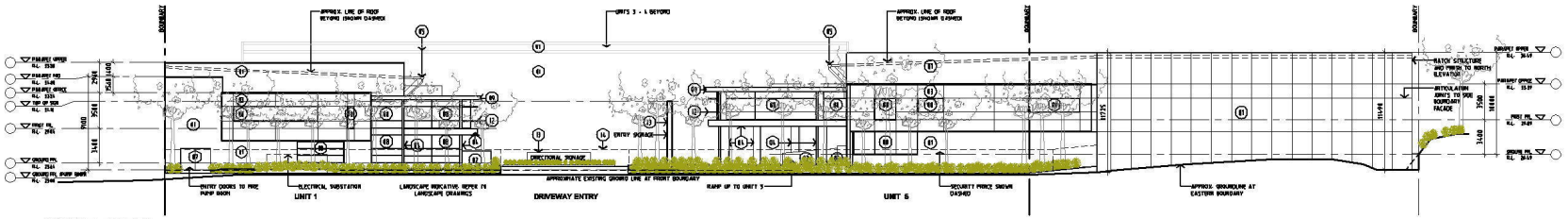
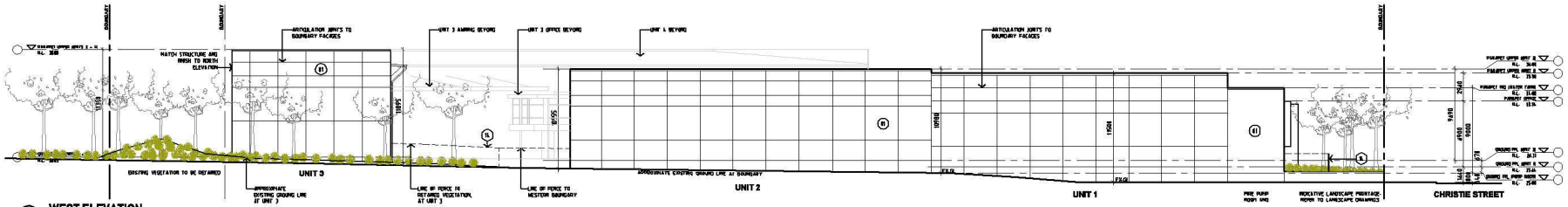
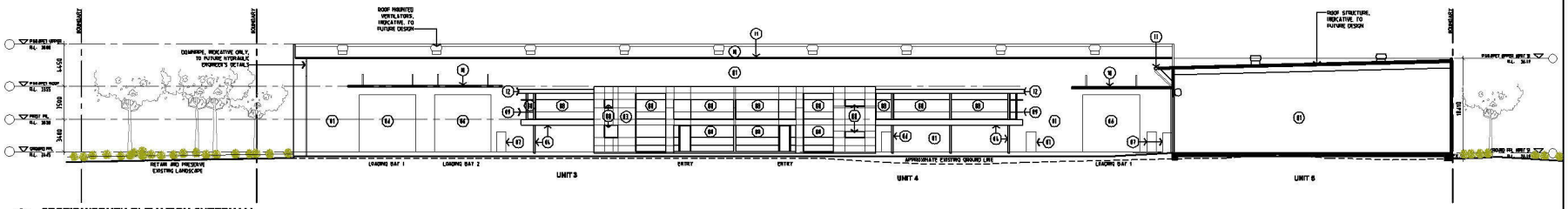
Version: 1, Version Date: 13/12/2013



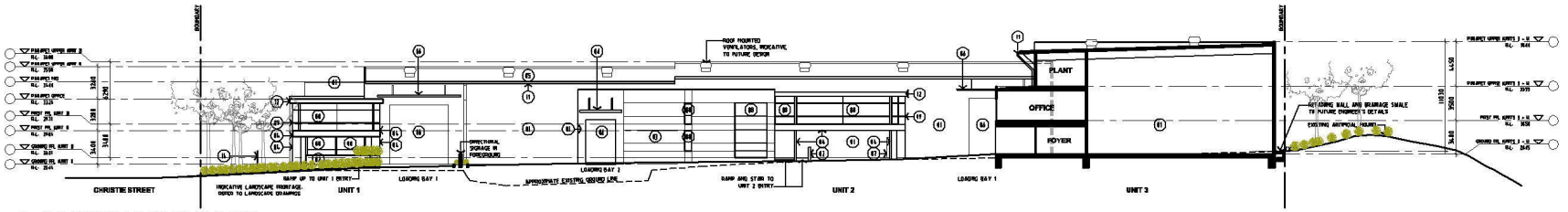
1 **SOUTH ELEVATION**
1:200 - VIEW FROM CHRISTIE STREET



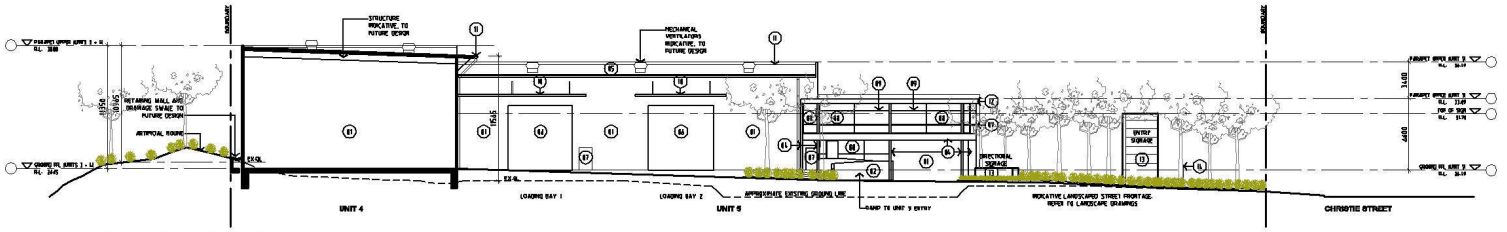
2 **WEST ELEVATION**
1:200



A **SECTION/SOUTH ELEVATION (INTERNAL)**
1:200 - VIEWED FROM PROPOSED INTERNAL CAR PARK



B **SECTION/EAST ELEVATION (INTERNAL)**
1:200 - VIEWED FROM PROPOSED INTERNAL CAR PARK



C **SECTION/WEST ELEVATION (INTERNAL)**
1:200 - VIEWED FROM PROPOSED INTERNAL CAR PARK

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PROJECT NORTH

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DATE	CODE	NOTES	DR	PA	PM	REV
03.12.13	ISSUED FOR DEVELOPMENT APPLICATION					A

LEGEND:

GENERAL:

DENOTES BOUNDARY

ELEVATION ELEMENTS:

E1	CONCRETE WALL - PAINT FINISH
E2	MASONRY WALL - PAINT FINISH, OR FACE MASONRY
E3	FC CLADDING - PAINT FINISH
E4	CONCRETE STRUCTURE - PAINT FINISH
E5	PROFILED STEEL ROOF SHEETING WITH MATCHING RIBS - COLORBOND FINISH
E6	ROLLER SHUTTER DOOR - POWDERCOAT FINISH
E7	SOLID CORE DOOR - PAINT FINISH
E8	AL. FRAMED GLAZING - POWDERCOAT FINISH TO FRAMING
E9	AL. SUN SHADING LOUVRES
E10	METAL AWNING
E11	METAL GUTTER, COLORBOND FINISH
E12	METAL TRIMS AND SHADING ELEMENTS, COLORBOND FINISH
E13	SIGNAGE
E14	SECURITY FENCE

APG ARTAZAN PROPERTY GROUP

PROJECT
NEW LIGHT INDUSTRIAL/ WAREHOUSE FACILITY

Lot 136 DP 31912
530-059 Christie Street
St Mary's NSW 2760

TITLE
ELEVATIONS + SECTION

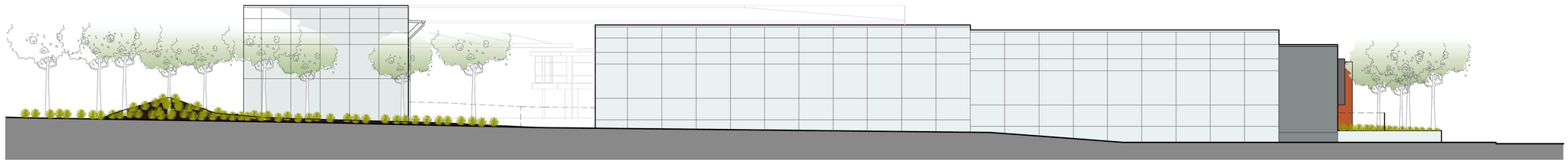
SCALE @ A1	1:200	DRAWN	APPROVED	AK	
SCALE @ A3	1:500	KTI	STATUS	DAD	CCT WDB

PROJECT NO. **1778:13** | DRAWING NO. **DAD 1.05** | REV. **A**

Nicholas Associates Architects Pty Ltd
Nominated Architect
LEVEL 21, TOWER BUILDING II, BARANGAROO STREET

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

1 **SOUTH ELEVATION**
1:200 - VIEW FROM CHRISTIE STREET



2 **WEST ELEVATION**
1:200

A **SECTION/SOUTH ELEVATION (INTERNAL)**
1:200 - VIEWED FROM PROPOSED INTERNAL CAR PARK

B **SECTION/EAST ELEVATION (INTERNAL)**
1:200 - VIEWED FROM PROPOSED INTERNAL CAR PARK

C **SECTION/WEST ELEVATION (INTERNAL)**
1:200 - VIEWED FROM PROPOSED INTERNAL CAR PARK

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

PROJECT NORTH

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DATE	CODE/NOTES	SA	PA	PM	REV
03.12.13	ISSUED FOR DEVELOPMENT APPLICATION				A

ARTAZAN PROPERTY GROUP

PROJECT
NEW LIGHT INDUSTRIAL/ WAREHOUSE FACILITY

Lot 136 DP 31912
530-059 Christie Street
St Mary's NSW 2760

TITLE
INDICATIVE EXTERNAL FINISHES

SCALE @ B1	1:200	DRAWN	APPROVED	AK		
SCALE @ A3	1:500	KTI	STATUS	DAD	CCT	WDS
NOM. RESP. ARCHITECT	KATE ISAACS		NSW REG.NO.	8281		

PROJECT NO.	DRAWING NO.	REV.
1778:13	DAD 1.06	A

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FILE REF: Y:\PROJECTS\1778-stm\Drawings\DAD\1778 DAD 1.05 ElevSect.dwg

Appendix 'D'

Landscape Drawings

Prepared by HLS Pty Ltd

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

A 2 .12.2013 DA ISSUE
ISSUE

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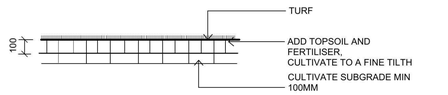
Landscape Site Plan

SCALE
1:200 @ B1
1:500 @ A3

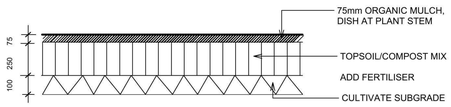
ISSUE
DA

L01

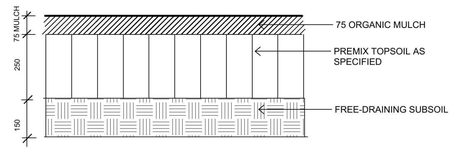
Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013



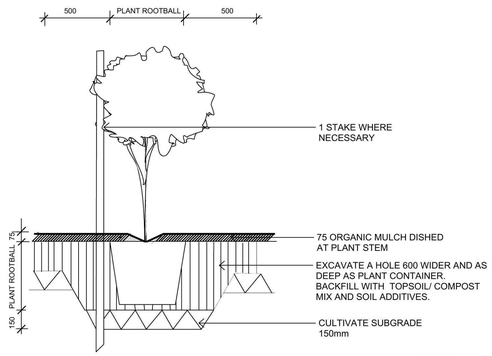
1 TURF — SECTION SCALE 1:20



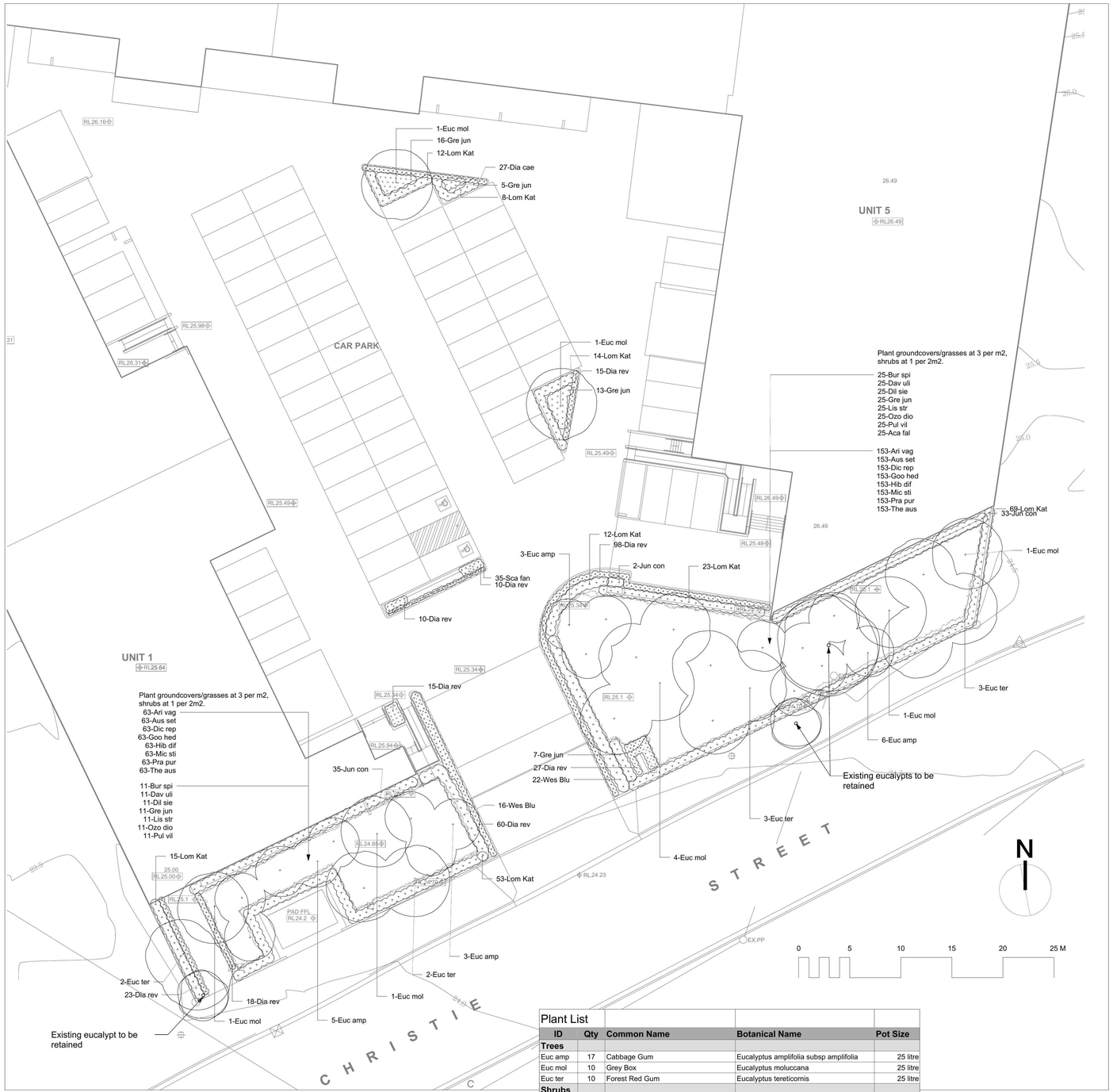
2 MASS PLANTING PREPARATION — SECTION SCALE 1:20



3 RAISED PLANTING BED (450 & 900 HIGH) — SECTION SCALE 1:10



6 MATURE TREE PLANTING in mass planting bed — SECTION SCALE 1:20



PLANTING PLAN scale 1:200@B1

Plant List				
ID	**Qty**	**Common Name**	**Botanical Name**	**Pot Size**
Trees				
Euc amp	17	Cabbage Gum	Eucalyptus amplifolia subsp amplifolia	25 litre
Euc mol	10	Grey Box	Eucalyptus moluccana	25 litre
Euc ter	10	Forest Red Gum	Eucalyptus tereticornis	25 litre
Shrubs				
Aca fal	25	Sickle Wattle	Acacia falcata	150mm
Bur spi	36	Blackthorn, Sweet Bursaria	Bursaria spinosa	5 litre
Dav uli	36	Gorse Bitter Pea	Daviesia ulicifolia	150mm
Dia rev	276	Blue Flax Lily	Dianella revoluta	150mm
Dil sie	36	Prickly Parrot Pea, Juniper Pea Bush	Dillwynia sieberi	150mm
Gre jun	77	Prickly Grevillea	Grevillea juniperina	5 litre
Hib dif	216	Wedge Guinea Flower	Hibbertia diffusa	150mm
Lis str	36	Peach heath	Lissanthe strigosa	150mm
Ozo dio	36	Rice Flower, White Dogwood,	Ozothamnus diosmifolius	150mm
Pul vil	36	Hairy Bush Pea	Pultenaea villosa	150mm
Wes Blu	38	Coastal Rosemary	Westringia fruticosa blue gem	5 litre
Ground Covers				
Dic rep	216	Kidney Weed	Dichondra repens	150mm
Jun con	70	Shore Juniper	Juniperus conferta	150mm
Pra pur	216	White root	Pratia purpurascens	150mm
Sca fan	35	Fanflower	Scaevola aemula Purple Fanfare	150mm
Grasses				
Ari vag	216	Three-awn Speargrass	Aristida vagans	150mm
Aus set	216	Small flowered Wallaby Grass	Austrodanthonia setacea	150mm
Dia cae	27	Paroo Lily, Blue Flax-lily	Dianella caerulea	150mm
Lom Kat	206	Mat-rush	Lomandra hystrix 'Katie Belle'	150mm
Mic sti	216	Weeping Grass, Meadow Rice Grass	Microlaena stipoides subs stipoides	150mm
The aus	216	Kangaroo Grass	Themeda australis	150mm
Total	**2519**			

PRELIMINARY

A 2 .12.2013 DA ISSUE
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Landscape Planting Plan and Details

SCALE		ISSUE	
1:200 @ B1 1:500 @ A3		DA	**L02**

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Appendix 'E'

Stormwater Management Plan + Erosion and Sediment Control

Prepared by Whipps-Wood Consulting

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

STREET LOCATION PLAN
1:500

53-59 CHRISTIE STREET ST MARYS

whipps-wood CONSULTING
Engineers in Hydraulic, Civil & Fire Protection Design

HYDRAULIC SERVICES

LEGEND

E27.00	EXISTING/NATURAL CONTOUR
SW	STORMWATER
RW	RAINWATER DRAINAGE
	SUBSOIL
S	AUTHORITY SEWER MAIN
W	AUTHORITY WATER MAIN
	SEDIMENT FENCE
	LARGE EXISTING STORMWATER

D1 / H01 DETAIL NOT TO SCALE	DETAIL NUMBER / DRAWING NUMBER FOR LOCATION OF DETAIL
	PIPE PENETRATING SLAB
	PIPE NOT PENETRATING SLAB
	OFFSET PENETRATING SLAB
	OFFSET NOT PENETRATING SLAB
	TEE DROPPER PENETRATING SLAB
	TEE DROPPER NOT PENETRATING SLAB
	OFFSET IN WALL
	PIPE BREAK
	CAPPED OFF SERVICE
	CONNECT TO EXISTING PIPE
	SERVICE CONNECTION
H	STREET HYDRANT
	SPREADER
	OVERLAND FLOW PATH

CO	CLEAROUT
Ø	DIAMETER
DP	DOWNPIPE
DWG	DRAWING
e	EXISTING
FRC	FIBRE REINFORCED CONCRETE
GTD	GRATED TRENCH DRAIN
IL	INVERT LEVEL
L	LITRES
m	METRES
m/s	METRES PER SECOND
mm	MILLIMETRES
NOM	NOMINAL
PVC	UNPLASTICIZED POLYVINYL CHLORIDE
RL	REDUCED LEVEL
SAC	SEWER ACCESS CHAMBER
SWP	STORMWATER PIT
UNO	UNLESS NOTED OTHERWISE

NOTE:
THIS DRAWING IS DIAGRAMMATIC ONLY AND HAS BEEN PREPARED FOR THE PURPOSE OF INDICATING THE DESIGN INTENT AND SCOPE OF WORKS OF THE HYDRAULIC AND FIRE PROTECTION SERVICES INSTALLATION AND SHOULD NOT BE INTERPRETED AS BEING DEFINITIVE.
IT IS THE RESPONSIBILITY OF THE BUILDER AND/OR PLUMBING SUBCONTRACTOR TO INVESTIGATE AND COORDINATE BEFORE AND DURING THE CONSTRUCTION PHASE ALL EXISTING SERVICES AND STRUCTURE WHICH WILL AFFECT THE INSTALLATION OF THESE SERVICES. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE HYDRAULIC AND FIRE SERVICES SPECIFICATION. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT CODES AND STANDARDS.
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ARCHITECTURAL	DAO 1-02	EMAIL 14.11.13	P7 P8
STRUCTURAL			
MECHANICAL			
ELECTRICAL			
CIVIL			
LANDSCAPE			
OTHER			

CORPORATE MEMBER
AHSCA
The Association of Hydraulic Services Consultants Australia (NSW)

No.	Date	Details
P2	14.11.13	REVISED FOR APPROVAL
P1	31.10.13	FOR APPROVAL

Amendments

0 10 20 30 40 50mm

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Light Industrial Development
53-59 Christie St ST MARYS
(Penrith Council)

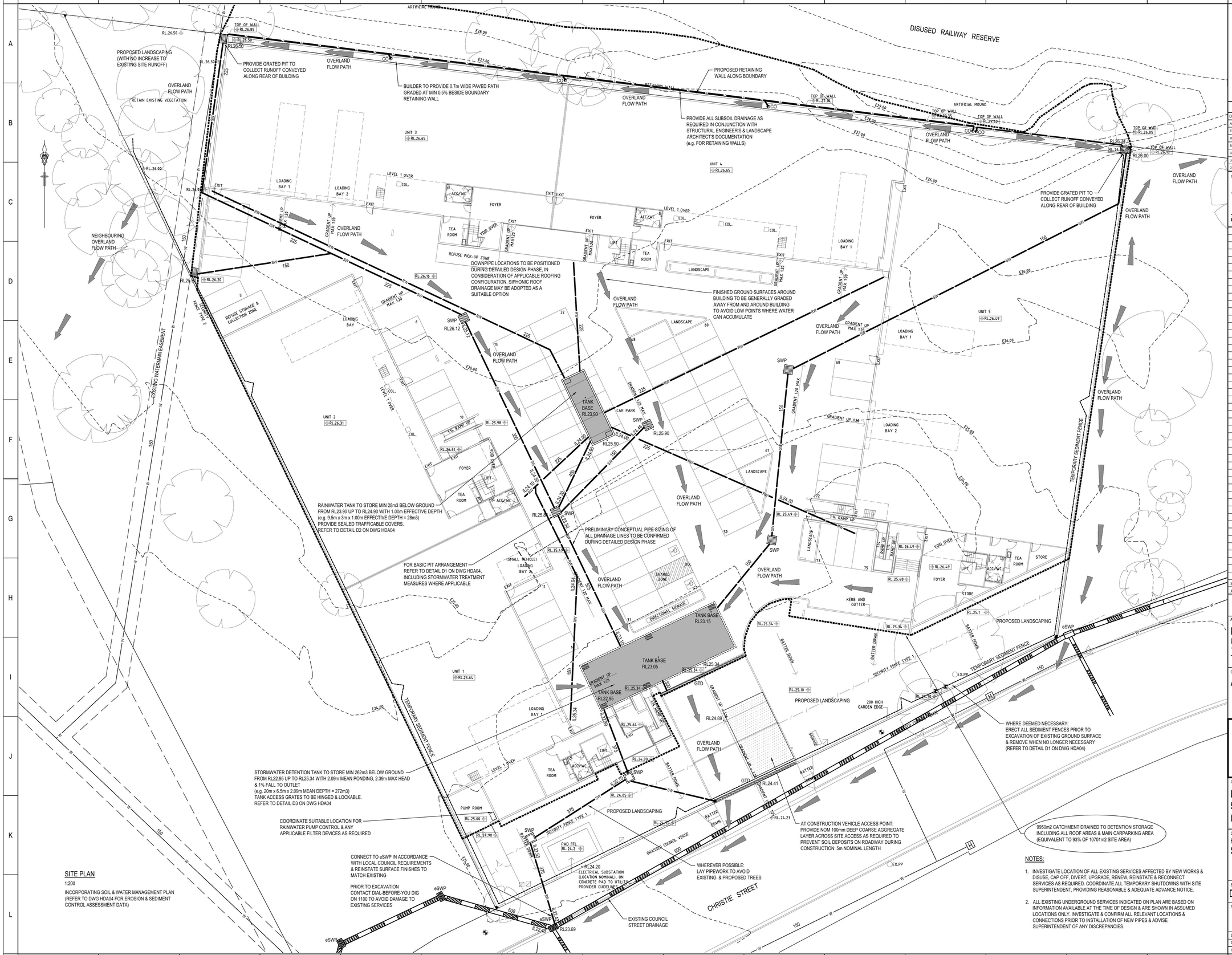
Drawing
HYDRAULIC SERVICES
STREET LOCATION PLAN

Status
DEVELOPMENT APPLICATION: NOT FOR CONSTRUCTION

Project No.	Drawing No.
2013-0277	HDA01 / P2
Drawn: IY	Date: OCT 2013
Design: IY	Scale: 1:500
Verified:	No in set: 4

53-59 Christie St ST MARYS 2013-0277 - HDA01

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013



SITE PLAN

1:200

INCORPORATING SOIL & WATER MANAGEMENT PLAN (REFER TO DWG HDA04 FOR EROSION & SEDIMENT CONTROL ASSESSMENT DATA)

NOTES:

1. INVESTIGATE LOCATION OF ALL EXISTING SERVICES AFFECTED BY NEW WORKS & DISUSE, CAP OFF, DIVERT, UPGRADE, RENEW, REINSTATE & RECONNECT SERVICES AS REQUIRED. COORDINATE ALL TEMPORARY SHUTDOWNS WITH SITE SUPERINTENDENT, PROVIDING REASONABLE & ADEQUATE ADVANCE NOTICE.
2. ALL EXISTING UNDERGROUND SERVICES INDICATED ON PLAN ARE BASED ON INFORMATION AVAILABLE AT THE TIME OF DESIGN & ARE SHOWN IN ASSUMED LOCATIONS ONLY. INVESTIGATE & CONFIRM ALL RELEVANT LOCATIONS & CONNECTIONS PRIOR TO INSTALLATION OF NEW PIPES & ADVISE SUPERINTENDENT OF ANY DISCREPANCIES.

NOTE:
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Discipline	Dwg. No.	Date	Revisions
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STRUCTURAL			
MECHANICAL			
ELECTRICAL			
CIVIL			
LANDSCAPE			
OTHER			

CORPORATE MEMBER
AHSCA
The Association of Hydraulic Services Consultants Australia (NSW)

No.	Date	Details
P3	03.12.13	REVISED FOR APPROVAL
P2	14.11.13	REVISED FOR APPROVAL
P1	31.10.13	FOR APPROVAL

Amendments

0 10 20 30 40 50mm

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Light Industrial Development
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(Penrith Council)

Drawing
HYDRAULIC SERVICES
SITE PLAN

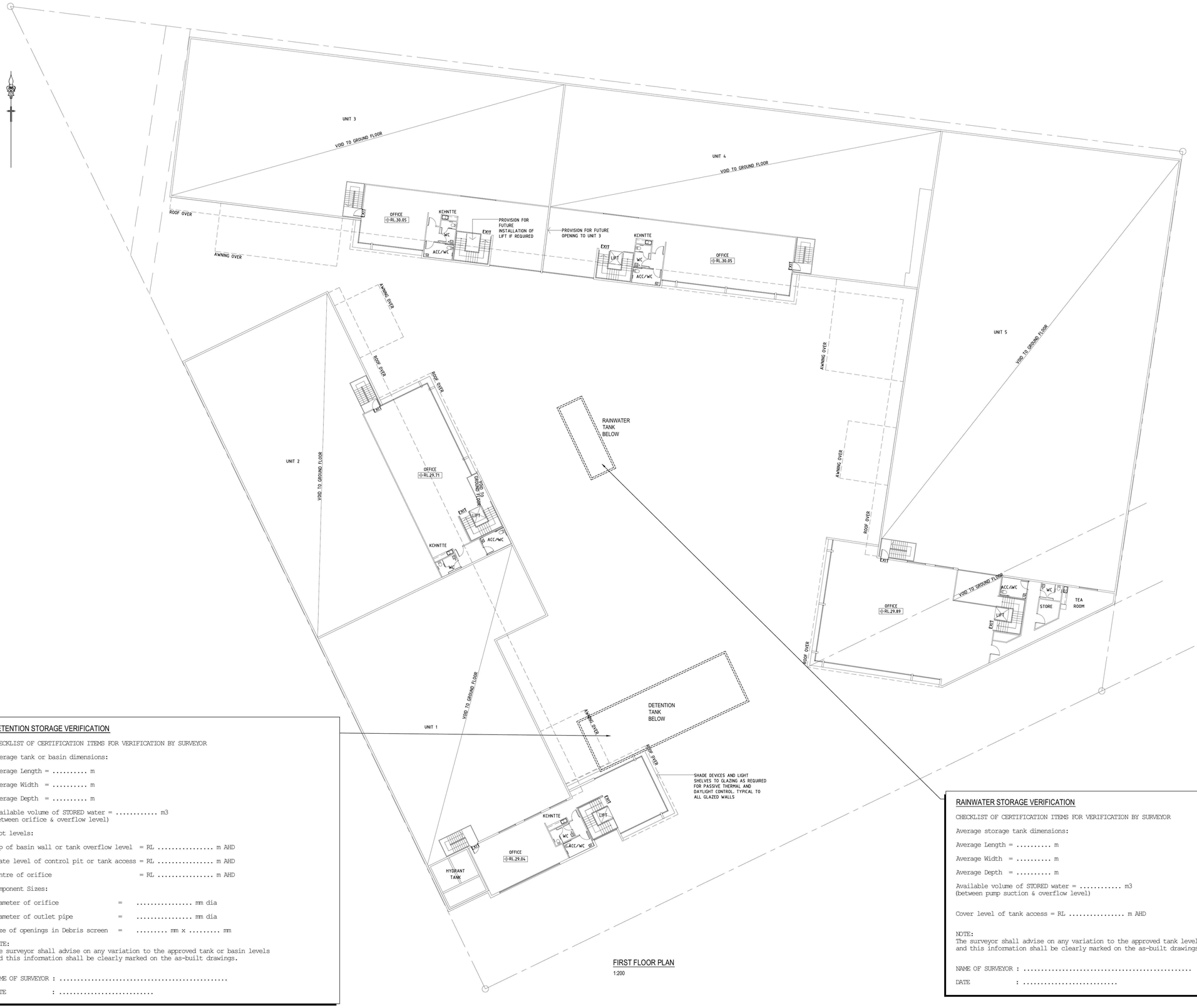
Status
DEVELOPMENT APPLICATION: NOT FOR CONSTRUCTION

Project No.	Drawing No.
2013-0277	HDA02 / P3

Drawn:	IY	Date:	OCT 2013
Design:	IY	Scale:	1:200
Verified:		No in set:	4

53-59 Christie St ST MARYS 2013-0277 - HDA02

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013



FIRST FLOOR PLAN
1:200

DETENTION STORAGE VERIFICATION

CHECKLIST OF CERTIFICATION ITEMS FOR VERIFICATION BY SURVEYOR

Average tank or basin dimensions:

Average Length = ... m

Average Width = ... m

Average Depth = ... m

Available volume of STORED water = ... m3
(between orifice & overflow level)

Spot levels:

Top of basin wall or tank overflow level = RL ..... m AHD

Grate level of control pit or tank access = RL ..... m AHD

Centre of orifice = RL ..... m AHD

Component Sizes:

Diameter of orifice = ... mm dia

Diameter of outlet pipe = ... mm dia

Size of openings in Debris screen = ... mm x ..... mm

NOTE:
The surveyor shall advise on any variation to the approved tank or basin levels and this information shall be clearly marked on the as-built drawings.

NAME OF SURVEYOR : .....

DATE : .....

RAINWATER STORAGE VERIFICATION

CHECKLIST OF CERTIFICATION ITEMS FOR VERIFICATION BY SURVEYOR

Average storage tank dimensions:

Average Length = ... m

Average Width = ... m

Average Depth = ... m

Available volume of STORED water = ... m3
(between pump suction & overflow level)

Cover level of tank access = RL ..... m AHD

NOTE:
The surveyor shall advise on any variation to the approved tank levels and this information shall be clearly marked on the as-built drawings.

NAME OF SURVEYOR : .....

DATE : .....

NOTE:
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Discipline	Dwg. No.	Date	Revisions
ARCHITECTURAL	DAD 1:04	EWAL 02.12.13	P5 P7
STRUCTURAL			
MECHANICAL			
ELECTRICAL			
CIVIL			
LANDSCAPE			
OTHER			

CORPORATE MEMBER

AHSCA
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No.	Date	Details
P2	03.12.13	REVISED FOR APPROVAL
P1	31.10.13	FOR APPROVAL

Amendments

0 10 20 30 40 50mm

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Project
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Drawing
HYDRAULIC SERVICES
FIRST FLOOR PLAN

Status
DEVELOPMENT APPLICATION: NOT FOR CONSTRUCTION

Project No.	Drawing No.
2013-0277	HDA03 / P2

Drawn:	IY	Date:	OCT 2013
Design:	IY	Scale:	1:200
Verified:		No in set:	4

53-59 Christie St ST MARYS 2013-0277 - HDA03

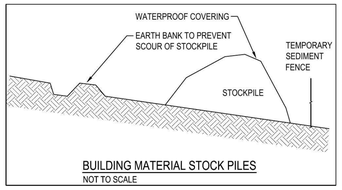
Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

NOTE:
ALL CALCULATION & REPORT DATA RELATING TO STORMWATER DRAINAGE MATTERS ARE INCLUDED ON THESE STORMWATER CONCEPT DRAWINGS INSTEAD OF BEING REFERENCED IN A SEPARATE A4 REPORT FORMAT

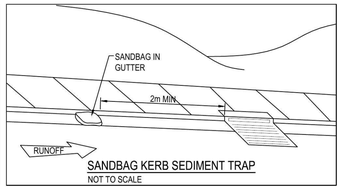
EROSION & SEDIMENT CONTROL ASSESSMENT

BASED ON SOILS & CONSTRUCTION : MANAGING URBAN STORMWATER 4TH EDITION, MARCH 2004
AVAILABLE FROM LANDCOM

ASSUMED AREA OF SOIL DISTURBANCE = APPROX 10000m2
TAKE RAINFALL ERODSIVITY FACTOR R = 2300 FOR ST MARYS (FROM APPENDIX B: MAP 10 ON PAGE B-12)
TAKE SITE SLOPE = 5%
INDICATIVE EROSION HAZARD IS LOW (BASED ON SECTION 4.4.1 FIGURE 4.6 ON PAGE 4-10)
USE REVISED UNIVERSAL SOIL LOSS EQUATION (RUSLE) TO CHECK:
TAKE SOIL ERODIBILITY FACTOR K = 0.038 (FROM APPENDIX C: TABLE 20 FOR BLACKTOWN ON PAGE C-104)
TAKE SLOPE LENGTHGRADIENT FACTOR LS = 1.19 (FROM APPENDIX A: USING 80m LENGTH IN TABLE A1 ON PAGE A-9)
TAKE EROSION CONTROL PRACTICE FACTOR P = 1.3 (FROM APPENDIX A: TABLE A2 ON PAGE A-11)
TAKE GROUND COVER & MANAGEMENT FACTOR C = 1.0 (FROM APPENDIX A: FIGURE A5 ON PAGE A-12)
SOIL LOSS = 2300 x 0.038 x 1.19 x 1.3 x 1.0 = 135t/ha/yr
SOIL LOSS CLASS = 1 (BETWEEN 0 & 150t/ha/yr) (BASED ON SECTION 4.4.2 TABLE 4.2 ON PAGE 4-13)
EROSION HAZARD IS THEREFORE VERY LOW & THERE ARE NO SEASONAL RESTRICTIONS ON SITE ACTIVITY FOR A SOIL DENSITY OF 1.0t/m3 AVERAGE ANNUAL SOIL LOSS = 135m3/yr
SINCE THIS IS LESS THAN 150m3/yr, A SEDIMENT BASIN IS NOT CONSIDERED NECESSARY (REFER TO SECTION 6.3.2(d) ON PAGE 6-8)
FOR THE AREA TO BE DISTURBED ON THIS SITE, SEDIMENT FENCES ARE CONSIDERED SATISFACTORY (REFER TO SECTION 2.1 ON PAGE 2-1, SECTION 4.4.1(a) ON PAGE 4-9 & SECTION 4.3.2(h)(iv) ON PAGE 4-4)
LENGTHS OF SEDIMENT FENCING SHOULD BE ARRANGED TO LIMIT SUBCATCHMENT FLOWS TO 50L/s (REFER TO SECTION 6.3.7(e) ON PAGE 6-34 & SECTION 2.3.1(e) ON PAGE 2-4)
FOR 10yr 5min INTENSITY = 142.78mm/h & 10yr 1hr INTENSITY = 43.43mm/h A FULLY PERVIOUS AREA OF UP TO 3600m2 CAN BE ACCOMMODATED BY ONE LENGTH OF SEDIMENT FENCING (REFER TO FIGURE 6-10 ON PAGE 6-34)



BUILDING MATERIAL STOCK PILES
NOT TO SCALE



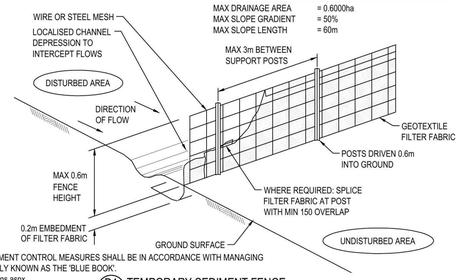
SANDBAG KERB SEDIMENT TRAP
NOT TO SCALE

SOIL & WATER MANAGEMENT NOTES

1. REFER TO DETAIL FOR CONSTRUCTION OF TEMPORARY SEDIMENT FENCE.
2. ALL PITS & PIPEWORK ASSOCIATED WITH PROPOSED DRAINAGE SYSTEMS SHALL BE KEPT FREE OF SOIL, WATER & DEBRIS FOR THE DURATION OF THE CONSTRUCTION WORKS.
3. ALL LOOSE IMPORTED FILL & EXCAVATED MATERIAL SHALL BE STOCKPILED AS FAR AS POSSIBLE FROM SEDIMENT FENCES PRIOR TO FINAL PLACEMENT, COMPACTION OR REMOVAL FROM SITE.
4. EXCESSIVE SEDIMENT BUILDUP SHALL BE AVOIDED BY REGULAR MAINTENANCE OF SEDIMENT FENCES.
5. WHERE APPLICABLE, APPROVED LANDSCAPING & REVEGETATION OF DISTURBED AREAS SHALL COMMENCE AT THE EARLIEST OPPORTUNITY AFTER COMPLETION OF EARTHWORKS OPERATIONS.

DESIGN PARAMETERS FOR SEDIMENT FENCE

MAX DRAINAGE AREA = 0.6000ha
MAX SLOPE GRADIENT = 50%
MAX SLOPE LENGTH = 60m



CONSTRUCTION OF SEDIMENT FENCE & ANY OTHER SEDIMENT CONTROL MEASURES SHALL BE IN ACCORDANCE WITH MANAGING URBAN STORMWATER: SOILS & CONSTRUCTION COMMONLY KNOWN AS THE 'BLUE BOOK'.
INTERNET REFERENCE: http://www.landcom.com.au/publications.aspx

D1 TEMPORARY SEDIMENT FENCE
NOT TO SCALE

BUILDER TO COORDINATE APPROPRIATE CONSTRUCTION SEQUENCE WITH CONSIDERATION FOR MATERIAL STORAGE AND ANTICIPATED SEDIMENT MOVEMENT DURING CONSTRUCTION

ON-SITE STORMWATER DETENTION CALCULATION SUMMARY

AREA
CATCHMENT DRAINED = 11022m2 (INCLUDING UPSTREAM EMBANKMENT) BEING LESS THAN 5 HECTARES
PREDEVELOPED IMPERVIOUS AREA = 3508m2 = 32% OF CATCHMENT
POSTDEVELOPED IMPERVIOUS AREA = 9336m2 = 85% OF CATCHMENT
AREA DRAINED TO DETENTION = 9950m2 = 90% OF CATCHMENT = 93% OF 10701m2 SITE

DISCHARGE & STORAGE
VOLUME CALCULATED USING DRAINS SOFTWARE DISTRIBUTED BY WATERCOM (DUE TO SITE AREA BEING GREATER THAN 5000m2)

STAGE-STORAGE-DISCHARGE TABLE

ORIFICE DIAMETER = 220 mm
ORIFICE COEFFICIENT = 0.6
GRAVITATIONAL ACCELERATION = 9.81 m/s2
PI = 3.141592654
EMERGENCY OVERFLOW WEIR CREST = 25.34 m
EMERGENCY OVERFLOW WEIR LENGTH = 12.0 m
WEIR COEFFICIENT = 1.6
INTERNAL TANK AREA = 125.000 m2

STAGE m	DEPTH m	STORAGE m3	ORIFICE DISCHARGE m3/s	WEIR DISCHARGE m3/s
22.95	0.00	0.0	0.0000	
23.15	0.20	12.5	0.0452	
24.00	1.05	118.8	0.1035	
25.00	2.05	243.8	0.1446	
25.14	2.19	261.3	0.1495	
25.15	2.20	261.3	0.1498	
25.34	2.39	261.6	0.1562	0.0000
25.39	2.44	264.2	0.1578	0.2147
25.44	2.49	266.8	0.1594	0.6072
25.49	2.54	269.5	0.1610	1.1154

WATER MANAGEMENT PLAN SUMMARY

FOR THE PROPOSED LIGHT INDUSTRIAL WAREHOUSE LAND USE

a) REFER TO WATER BALANCING CALCULATIONS FOR ESTIMATED ROOF CATCHMENT ALLOWANCE AND ANTICIPATED NON-POTABLE IRRIGATION WATER DEMAND (TO SUPPLY A RELATIVELY SMALL PROPORTION OF THE SITE AREA). PROPOSED RAINWATER STORAGE VOLUME IS 28m3. THE STANDARD RECOMMENDED VOLUME REQUIREMENT OF 100m3 IS NOT CONSIDERED APPLICABLE WHERE NON-POTABLE WATER DEMAND IS LIMITED.

b) IN ADDITION TO RAINWATER STORAGE, DETENTION STORAGE IS PROPOSED TO RESTRICT SITE DISCHARGE TO PREDEVELOPMENT VALUES. REFER TO ON-SITE STORMWATER DETENTION CALCULATION SUMMARY FOR CATCHMENT, FLOW & STORAGE DATA.

c) ROOF GARDENS ARE NOT CONSIDERED SUITABLE OR DESIRABLE FOR THE DEVELOPMENT. REFER TO SEPARATE DEVELOPMENT APPLICATION DOCUMENTATION FOR FURTHER DETAILS.

WATER EFFICIENT FIXTURES & APPLIANCES ARE INTENDED TO BE INSTALLED IN WET AREAS. PROPOSED TOTAL WATER DEMAND IS ANTICIPATED TO BE IN A SIMILAR CATEGORYTO THE EXISTING CONCRETE PLANT FACILITY (LIGHT INDUSTRIAL) & WOULD NOT BE EXPECTED TO GENERATE AN EXCESSIVE WATER DEMAND ON EXISTING INFRASTRUCTURE

ON-SITE DETENTION RESULT SUMMARY

MAXIMUM STORAGE LEVEL = RL25.34

STORM DURATION	5 YEAR AVERAGE RECURRENCE INTERVAL						20 YEAR AVERAGE RECURRENCE INTERVAL						100 YEAR AVERAGE RECURRENCE INTERVAL					
	EXISTING FLOW	DETAINED + BYPASS FLOW	OVERFLOW		TOTAL FLOW	WATER LEVEL RL	EXISTING FLOW	DETAINED + BYPASS FLOW	OVERFLOW		TOTAL FLOW	WATER LEVEL RL	EXISTING FLOW	DETAINED + BYPASS FLOW	OVERFLOW		TOTAL FLOW	WATER LEVEL RL
	L/s	L/s	L/s		L/s	m	L/s	L/s	L/s		L/s	m	L/s	L/s	L/s		L/s	m
10 min	195	88		15	103	23.79	269	106		23	129	24.13	411	127		29	156	24.62
15 min	224	95		19	114	23.91	395	115		27	142	24.32	515	138		31	169	24.89
20 min	195	101		18	119	24.04	346	121		27	148	24.47	501	143		32	175	25.05
25 min	289	103		23	126	24.08	410	124		28	152	24.55	503	144		32	176	25.08
30 min	262	101		22	123	24.03	375	121		27	148	24.48	465	145		31	176	25.09
45 min	159	99		14	113	24.00	292	122		25	147	24.50	423	155	44	29	228	25.36
1 hour	261	104		22	126	24.10	370	129		27	156	24.66	470	155	64	30	249	25.36
1.5 hour	290	108		25	133	24.17	402	130		27	157	24.70	512	156	321	31	508	25.41
2 hour	218	106		20	126	24.13	389	129		27	156	24.66	487	156	183	32	371	25.38

IF DRAINS SOFTWARE FILES REQUIRED FOR CHECKING PLEASE EMAIL iyip@wwc.net.au

FREEBOARD
MIN FLOOR LEVEL = RL25.64
MAX WATER LEVEL = RL25.34
FREEBOARD = 25.64 - 25.34 = 0.300m (= 0.300m AS REQUIRED)

IMPORTANT - FOR PRINCIPAL CONTRACTOR

TO ENABLE THE ISSUE OF STORMWATER CERTIFICATION PERMITTING OCCUPATION IN ALIGNMENT WITH COUNCIL LEGISLATION, SITE INSPECTIONS MUST OCCUR. THE PRINCIPAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL STORMWATER INSPECTIONS. ABSENCE OF INSPECTION WILL PREVENT ISSUE OF STORMWATER CERTIFICATION. SITE INSPECTIONS ARE TO BE COMPLETED BY WHIPPS-WOOD CONSULTING (WWC) AS FOLLOWS:

INSPECTION NO.	STORMWATER INSPECTION REQUIREMENTS	WWC REPRESENTATIVE NAME	WWC REPRESENTATIVE SIGNATURE	INSPECTION DATE	PASS TICK / N/A	FAIL OR
1	INSPECTION OF INGROUND STORMWATER DRAINAGE PRIOR TO BACKFILL (MANDATORY)					
2	INSPECTION OF ANY INGROUND STORMWATER DRAINAGE NOT VIEWED AT INSPECTION NO. 1 (OPTIONAL)					
3	INSPECTION OF INFILTRATION PIT / TANK / TRENCH PRIOR TO BACKFILL (JOB SPECIFIC)					
4	FINAL INSPECTION* ON COMPLETION OF ALL LANDSCAPING & POST COMMISSIONING OF THE STORMWATER SYSTEM (MANDATORY)					

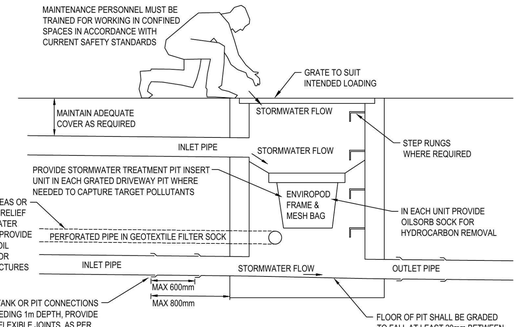
*SURVEY OF RAINWATER & ON-SITE DETENTION STORAGE & WORKS-AS-EXECUTED STORMWATER DRAWINGS (MANDATORY) TO BE PROVIDED TO WWC PRIOR TO INSPECTION

MINIMUM PRIOR NOTICE OF TWO WORKING DAYS (& PREFERABLY AT LEAST A WEEK) SHOULD BE PROVIDED IN ORDER TO ARRANGE A SITE INSPECTION BY WWC WITHIN THE SYDNEY METROPOLITAN AREA

WHERE APPLICABLE (FOR ALL PITS & TANKS):
PROVIDE VISIBLE SIGNAGE NEAR ACCESS POINT
(MADE OF METAL OR DURABLE SYNTHETIC MATERIAL):

DANGER
CONFINED SPACE
NO ENTRY WITHOUT CONFINED SPACE TRAINING

1. PITS TO BE REINFORCED CONCRETE IN ACCORDANCE WITH AS3500.3 CLAUSE 8.6.5
2. ANY PROPOSED CAST INSITU REINFORCED CONCRETE TANKS SHALL BE TO STRUCTURAL ENGINEER'S DOCUMENTATION (INCLUDING ANY NECESSARY WATERPROOFING MEASURES OR MODIFIED BASE TO RESIST HYDROSTATIC UPLIFT)
3. GRATES GENERALLY TO BE HINGED GALVANISED MILD STEEL EQUAL TO MASCOT ENGINEERING (TEL 9644 1044) OR CAST IRON WHERE REQUIRED BY REQUIRED LOAD CLASS
4. FALL BASE OF TRENCH DRAINS TO OUTLET AT MIN 1%
5. GENERALLY GRADE SURROUNDING SURFACES TO GRATES
6. PROVIDE STEP RUNGS WHERE PIT DEPTH EXCEEDS 1200
7. WHERE APPLICABLE, DETENTION TANK ACCESS GRATES TO BE HINGED & LOCKABLE



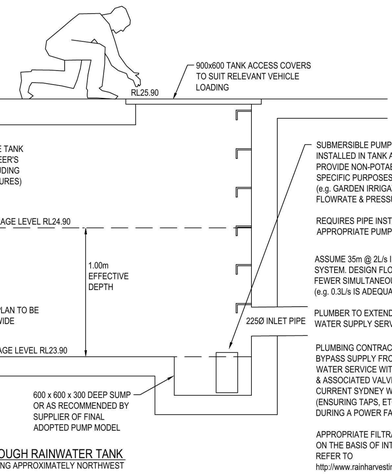
WHERE APPLICABLE:
IN LOW LYING LANDSCAPED AREAS OR DEEP EXCAVATION REQUIRING RELIEF OF ADJACENT SUBSURFACE WATER PRESSURE BESIDE FOOTINGS, PROVIDE MIN 3m LENGTH OF 100Ø SUBSOIL DRAINAGE, OR AS REQUIRED FOR LENGTH OF ASSOCIATED STRUCTURES

FOR TANK OR PIT CONNECTIONS EXCEEDING 1m DEPTH, PROVIDE TWO FLEXIBLE JOINTS AS PER AS3500.3 CLAUSE 7.3.3

D1 (HDA02) BASIC STORMWATER PIT DETAIL
NOT TO SCALE

INCLUDING STORMWATER TREATMENT MEASURES TO COLLECT GROSS POLLUTANTS, FINE SEDIMENT & FREE OILS & GREASE

PROVIDE VISIBLE WARNING SIGNAGE AT ALL RAINWATER TANK OUTLETS (e.g. GARDEN HOSE TAPS) IN ACCORDANCE WITH SYDNEY WATER REQUIREMENTS & AS1319



SUBMERSIBLE PUMP SYSTEM TO BE INSTALLED IN TANK AS REQUIRED TO PROVIDE NON-POTABLE WATER FOR SPECIFIC PURPOSES OF DEVELOPMENT (e.g. GARDEN IRRIGATION, etc) AT SUITABLE FLOWRATE & PRESSURE.

REQUIRES PIPE INSTALLATION DETAILS FOR APPROPRIATE PUMP SELECTION

ASSUME 35m @ 2L/s IF NO AUTOMATIC IRRIGATION SYSTEM. DESIGN FLOW CAN BE REDUCED FOR FEWER SIMULTANEOUS DRAWOFF POINTS (e.g. 0.3L/s IS ADEQUATE FOR SINGLE GARDEN TAP)

PLUMBER TO EXTEND DOMESTIC NON-POTABLE WATER SUPPLY SERVICE TO AS3500.1 AS REQUIRED

PLUMBING CONTRACTOR TO PROVIDE TANK BYPASS SUPPLY FROM POTABLE DOMESTIC WATER SERVICE WITH BACKFLOW PREVENTION & ASSOCIATED VALVING IN ACCORDANCE WITH CURRENT SYDNEY WATER REQUIREMENTS (ENSURING TAPS, ETC WILL STILL FUNCTION DURING A POWER FAILURE)

APPROPRIATE FILTRATION MEASURES MAY BE SELECTED ON THE BASIS OF INTENDED NON-POTABLE WATER USAGE. REFER TO http://www.rainharvesting.com.au/rain_filters.asp

D2 (HDA02) INDICATIVE SECTION THROUGH RAINWATER TANK
APPROX 1:20 LOOKING APPROXIMATELY NORTHWEST

WATER BALANCING CALCULATIONS

ADOPTING MIN 28m3 RAINWATER TANK TO PROVIDE ADEQUATE NON-POTABLE IRRIGATION SUPPLY FOR AT LEAST 76% OF THE TIME

WATER REUSE TANK CALCULATION (based on Bureau of Meteorology rainfall records over 20 years = 7305 days from 1983 - 2002)

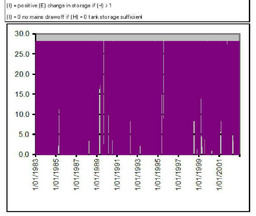
20yr Runoff Coefficient = **0.94** based on **100** % impervious proportion of drained area
Area drained to tank = **6000** m2 (= 56 % of **10701** m2 site)
Irrigation demand = **4.30** mm/day = 30.10 mm/week for summer/spring (Sep-Feb)
2.15 mm/day = 15.05 mm/week for winter/autumn (Mar-Aug)
Irrigation area = **1300** m2 (= 12 % of 10701 m2 site)
Any additional demand = **0** m3/day (e.g. laundry, toilets, car washing for NON-POTABLE USE ONLY)
Tank Storage = **28** m3 (Initial storage taken as **0** m3 at start of year)
Non-potable w ater demand = 30549.3 m3 over 7305 days
Water from main needed for 1751 days out of 7305 days = 24 % of the time (w ater is draw n from the mains supply)
Water draw n from main = 7931.7 m3 or kL Rate of w ater reuse = 76 % of the time (the rainw ater tank has sufficient w ater for reuse)
Water reused from tank = 22617.6 m3 over 7305 days
Rate of w ater reuse = 74 % of non-potable demand supplied by tank storage
Runoff from all storms = 124230.6 m3 (Non-potable demand is 25 % of this volume)

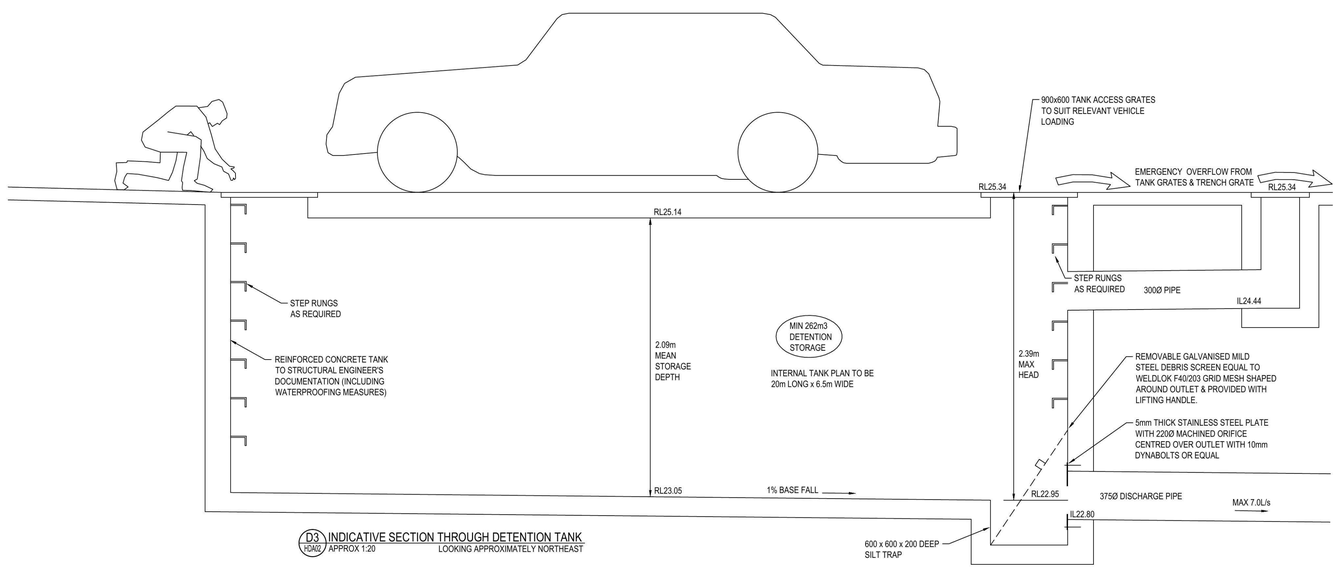
Proportion of TOTAL rainfall runoff volume drained :
81 % of drained runoff overflow s from tank
19 % of drained runoff captured for reuse

Max overflow volume in a day = 1213.8 m3
Storms usually peak between 2pm & 6 pm due to daily heating of the earth's surface by the sun, which is a maximum during the afternoon (see w ww.bom.gov.au/ weather/nsw/ sevcol/ about. shtml)
Mean overflow rate for a 4 hour duration = 84 L/s

CALCULATION NOTES
(A) = date
(B) = rainfall
(C) = runoff coeff * (B) / 1000 * area drained to tank
(D) = seasonal irrigation demand/ 1000 * irrigation area + any additional non-potable demand
(E) = (C) - (D)
(F) = tank capacity if ["previous (F)" storage + (E) change in storage] exceeds capacity
(F) = 0 empty tank if ["previous (F)" storage + (E) change in storage] < 0
(F) = ["previous (F)" storage + (E) change in storage] if capacity is sufficient to store
(G) = overflow difference if ["previous (F)" storage + (E) change in storage] exceeds capacity
(G) = 0 overflow if ["previous (F)" storage + (E) change in storage] is within capacity
(H) = 1 if (F) = 0 no water stored in tank
(I) = positive (E) change in storage if (-I) > 1
(I) = 0 no mains drawoff if (H) = 0 tank storage sufficient

Date	Sydney Airport Rainfall mm (B)	Runoff to tank m3 (C)	Water Demand m3 (D)	Change in storage m3 (E)	Residual Tank Storage m3 (F)	Overflow from Tank m3 (G)	Days to fill from main (H)	Water from main m3 (I)
					0.0			
1-Jan-83	1.8	10.2	5.6	4.6	4.6	0.0	0	0.0
2-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
3-Jan-83	19.3	108.9	5.6	103.3	28.0	75.3	0	0.0
4-Jan-83	0.2	1.1	5.6	-4.5	23.5	0.0	0	0.0
5-Jan-83	0	0.0	5.6	-5.6	17.9	0.0	0	0.0
6-Jan-83	0	0.0	5.6	-5.6	12.4	0.0	0	0.0
7-Jan-83	0	0.0	5.6	-5.6	6.8	0.0	0	0.0
8-Jan-83	0	0.0	5.6	-5.6	1.2	0.0	0	0.0
9-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
10-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
11-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
12-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
13-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
14-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
15-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
16-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
17-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
18-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
19-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
20-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
21-Jan-83	0	0.0	5.6	-5.6	0.0	0.0	1	5.6
22-Jan-83	2.8	15.8	5.6	10.2	10.2	0.0	0	0.0





D3 (HDA02) INDICATIVE SECTION THROUGH DETENTION TANK
APPROX 1:20 LOOKING APPROXIMATELY NORTHEAST

NOTE:
THIS DRAWING IS DIAGRAMATIC ONLY AND HAS BEEN PREPARED FOR THE PURPOSE OF INDICATING THE DESIGN INTENT AND SCOPE OF WORKS OF THE HYDRAULIC AND FIRE PROTECTION SERVICES INSTALLATION AND SHOULD NOT BE INTERPRETED AS BEING DEFINITIVE.
IT IS THE RESPONSIBILITY OF THE BUILDER AND/OR PLUMBING SUBCONTRACTOR TO INVESTIGATE AND COORDINATE BEFORE AND DURING THE CONSTRUCTION PHASE ALL EXISTING SERVICES AND STRUCTURE WHICH WILL AFFECT THE INSTALLATION OF THESE SERVICES. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE HYDRAULIC AND FIRE SERVICES SPECIFICATION. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT CODES AND STANDARDS.
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THIS DRAWING HAS BEEN PREPARED IN CONJUNCTION WITH THE FOLLOWING DRAWINGS:

Discipline	Dwg. No.	Date	Revisions
ARCHITECTURAL	-	-	-
STRUCTURAL			
MECHANICAL			
ELECTRICAL			
CIVIL			
LANDSCAPE			
OTHER			

CORPORATE MEMBER
AHSCA
The Association of Hydraulic Services Consultants Australia (NSW)

No.	Date	Details
P2	14.11.13	REVISED FOR APPROVAL
P1	31.10.13	FOR APPROVAL

Amendments

0 10 20 30 40 50mm

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Project
Light Industrial Development
53-59 Christie St ST MARYS
(Penrith Council)

Drawing
HYDRAULIC SERVICES
STORMWATER DETAILS

Status
DEVELOPMENT APPLICATION: NOT FOR CONSTRUCTION

Project No.	Drawing No.
2013-0277	HDA04 / P2

Drawn: IY	Date: OCT 2013
Design: IY	Scale: -
Verified:	No in set: 4

53-59 Christie St ST MARYS 2013-0277 - HDA04

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Appendix 'F'

Geotechnical Report

Prepared by SMEC Testing Services Pty Ltd

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

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GEOTECHNICAL INVESTIGATION
53 – 59 CHRISTIE STREET, ST MARYS

FOR

MR J K LETHLEAN C/- MR JAMES HARRISON

PROJECT NO. 19253/3238C **AUGUST 2013**
REPORT NO. 13/1264

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Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

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DRAWING NO. 13/1264: BOREHOLE & PENETROMETER LOCATIONS

NOTES RELATING TO GEOTECHNICAL REPORTS

APPENDIX A : BOREHOLE LOGS & EXPLANATION SHEETS

APPENDIX B: LABORATORY TEST RESULTS

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

1. INTRODUCTION

This report presents the results of a geotechnical investigation undertaken by SMEC Testing Services Pty Limited (STS) for a potential commercial / industrial development at 53 – 59 Christie Street, St Marys. We understand the development is likely to require the provision of pavement design. In this matter we have assumed that the pavement would have to satisfy B-Double truck movements and 3.5t forklifts.

The purpose of the investigation was to:

- determine the subsurface conditions over the site,
- classify the site in accordance with AS2870,
- provide recommendations regarding the appropriate foundation system for the site including design parameters,
- provide recommendations on soil aggressiveness to buried steel and concrete,
- provide retaining wall design parameters and comment of temporary and permanent support of excavations,
- give safe batter slopes,
- if required comment on vibration control during rock excavation,
- pavement design for flexible and ridged pavement, and
- comment on site regrading.

The work was carried out at the request of Mr. James Harrison on behalf of Mr J K Lethlean.

Our scope of work did not include a contamination assessment of the site.

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Version: 1, Version Date: 13/12/2013

2. METHOD OF INVESTIGATION

2.1 Fieldwork

The fieldwork consisted of the drilling of six (6) boreholes numbered BH1 to BH6 inclusive, at the locations shown on Drawing No. 13/1264. Due to restricted site access BH7 and BH8 could not be drilled. The borehole locations were nominated by the client. The boreholes were drilled using an Edson RP70 drilling rig, owned and operated by STS and were advanced using solid flight augers. In order to determine soil strengths, Dynamic cone penetrometer (DCP) tests were carried out at each borehole location. Drilling operations were carried out by one of STS's experienced senior geologists who also logged the subsurface conditions encountered.

The subsurface conditions observed are recorded on the borehole logs in Appendix A. An explanation of the terms used on the logs is also given in Appendix A. Notes relating to geotechnical reports are also attached.

2.2 Laboratory Testing

In order to determine the pavement thickness, the California Bearing Ratio (CBR) of the pavement subgrade material was determined. The tests were carried out on samples compacted to a density ratio of 100% of the Standard maximum dry density.

In order to the soils for their aggressiveness selected representative soil samples were tested to determine the following:

- pH
- sulphate and chloride content

The detailed test reports are given in Appendix B.

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3. GEOLOGY AND SITE CONDITIONS

The Penrith geological series sheet at a scale of 1:100,000 shows Tertiary Age Alluvial Soils underlie the site. These soils typically comprise clays and sands. The site is located close to a geological boundary with the Triassic Age Bringelly Shale of the Wianamatta. Rocks within this formation comprise shale, claystone and laminite.

At the time of the fieldwork, the site comprised a disused concrete batch plant surrounded by densely vegetated bush land. Industrial buildings are present immediately adjacent to the site. Site vegetation comprised grass, trees and weeds.

The groundsurface falls about 0.5 metres towards the west.

4. SUBSURFACE CONDITIONS

When making an assessment of the subsurface conditions across a site from a limited number of boreholes there is the possibility that variations may occur between test locations. The data derived from the site investigation programme are extrapolated across the site to form a geological model and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. The actual conditions at the site may differ from those inferred, since no subsurface exploration programme, no matter how comprehensive, can reveal all subsurface details and anomalies.

The subsurface conditions generally consist of AC, concrete and fill overlying silty clays and weathered shale. AC was encountered across the site with thicknesses varying from 50mm to 150mm. Concrete was encountered underlying the fill in BH6 to a depth of 0.5 metres. Typically the fill was observed to depths of 0.2 to 0.3 metres, however in BH4 the fill was encountered to depth of 2.0 metres with strengths that range between soft and stiff. Underlying the fill are natural silty clays, gravelly clays and silty sandy clays to depths of 5.0 to greater than 6.0 metres. The strength of these materials varies between firm and very stiff. Weathered shale was present across the site underlying the natural clays to the depth of drilling, 6.0 metres.

No groundwater was observed in the boreholes during the fieldwork.

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5. DISCUSSION

5.1 Site Classification

The classification has been prepared in accordance with the guidelines set out in the "Residential Slabs and Footings" Code, AS2870 – 2011.

Because there is an existing pavement present, abnormal moisture conditions (AMC) prevail at the site (Refer to Section 1.3.3 of AS2870).

Because of the AMC and fill present, the site is classified *a problem site (P)*. Provided the recommendations given below are adopted, and foundations bear in the underlying natural clays the site may be reclassified *highly reactive (H1)*.

Foundation design and construction consistent with this classification shall be adopted as specified in the above referenced standard and in accordance with the following design details.

5.2 Foundation Design

The fill does not appear to have been placed in a controlled manner, unless the fill is rectified (see Section 5.4) it cannot be relied upon for support. Strip footings that bear in firm to stiff natural clays may be proportioned using an allowable bearing pressure of 100 kPa. This value may be increased to 150 kPa and 300 kPa in stiff and very stiff materials, respectively. If the fill is rectified, and allowable bearing pressure of 150 kPa may be used to proportion footings that bear in the fill.

If a higher load carrying capacity is required, piers can be used. Piers founded in the very stiff materials may be proportioned using an allowable end bearing pressure of 450 kPa, provided their depth to diameter ratio exceeds a value of 4. An adhesion value of 20 kPa may be used for the portion of the shaft in natural soils. Piers founded in the weathered shale may be proportioned using an allowable end bearing pressure of 700 kPa. An adhesion value of 70 kPa may be used for the portion of the shaft in the shale. Where piers are founded in rock the adhesion of the overlying soils must be ignored.

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In order to ensure the bearing values given can be achieved, care should be taken to ensure the base of the excavations are free of all loose material. All excavations should be concreted as soon as possible, preferably immediately after excavation, cleaning, inspection and approval. Due regard must be given to possible water inflow into pier excavations. Pier excavations should not be left open overnight.

During construction it is recommended that the founding level be inspected by a geotechnical engineer to assess adequate bearing has been achieved.

5.3 Pavement Design & Construction

a) Concrete Pavement

The concrete pavement thickness has been determined using the procedures given in Australian Roads Research Board (ARRB) "Sealed Local Roads Manual."

The laboratory testing carried out indicated the existing subgrade has a CBR value of 3%. The design traffic volume is difficult to determine for this type of development. In the absence of design traffic loadings, we have adopted a design traffic loading of 5 x 10^5 Commercial Vehicle Axle Group (CVAGs). Using the above data the suggested pavement thickness is as follows:

28 day Concrete Compressive Strength (MPa)	Concrete Base Thickness (mm)	Subbase Thickness (mm)
32	180	100
40	160	100

b) Flexible Pavement

The flexible pavement thicknesses have been determined using the procedures given in Australian Roads Research Board (ARRB) "Sealed Local Roads Manual.". We have assumed a 90% confidence level that the pavement will perform satisfactorily during its design life. A design traffic loading of 1 x 10^6 is considered appropriate for the site. For a subgrade CBR value of 3%, the suggested pavement thickness is a recommended minimum of 460 mm, made up as follows:

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Material Type	Minimum thickness (mm)
AC	50
Base Course	125
Subbase	285
Total	460

c) Construction

The designs given above assume adequate provisions have been made for both surface and subsurface water.

The clayey site soils, which will make up the pavement subgrade are reactive. They will therefore be susceptible to shrinkage and swelling due to moisture content changes. If these subgrade soils are allowed to dry following compaction, it is probably that shrinkage will occur resulting in cracking. After placement of the pavement materials, the subgrade soils will moisten, resulting in swelling and partial loss of strength. It is therefore recommended that the subgrade be covered as soon as possible after completion of compaction in order to minimise the potential for evaporation and shrinkage to occur.

The subgrade materials should be compacted to a minimum density ratio of 100% of the Standard maximum dry density. Compaction should be verify by proof rolling and insitu density tests. Base and subbase course materials should be compacted and tested to a minimum density ratio of 98% of the Modified maximum dry density. The level of compaction should be verified by Insitu density testing.

All pavement materials used should comply with the local council requirements.

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5.4 *Site Preparation*

The existing fill does not appear to have been placed in a controlled manor. It is therefore necessary to remove and replace the fill with controlled engineered.

The performance of the slabs and pavements cannot be guaranteed unless the following procedures are adopted during the site earthworks:

- Remove any vegetation, topsoil and fill present. The exposed subgrade should be inspected by a geotechnical engineer who may wish to proof roll the exposed subgrade with a heavy, non-vibrating roller to detect soft or wet areas. These areas should be excavated to competent material and then filled as detailed below.

- Fill the site to the underside of slab or pavement level, in layers not exceeding 200 mm loose thickness, compacted to achieve a minimum density ratio in the range of 98% to 102% of the Standard maximum dry density, at a moisture content within the range of -2% to +2% of the optimum for the material adopted.

The onsite silty clays can become untrafficable during periods of wet weather.

A subbase layer of 100 mm fine crushed rock or crushed sandstone compacted to a minimum density ratio of 98% of the Modified maximum dry density placed under the floor slabs will improve floor performance for loads up to 20 kPa.

5.5 *Safe Batter Slopes*

In the short term, dry cut slopes should remain stable at an angle of 1 to 1. In the long term dry cut slopes formed at an angle of 2(H) to 1(V) should remain stable. Slopes cut at this angle would be subject to erosion unless protected by topsoil and diversion drains at the crest of the slopes. In order to use mowers to maintain cut slopes, an angle of 4(H) to 1(V) or flatter should be used.

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5.6 *Retaining Walls*

The parameters used to proportion the retaining walls depend on whether the walls can be permitted to deflect. For walls, which cannot be permitted to deflect, the "at rest" (K_o) conditions should be adopted. A value of 0.6 should be adopted. For walls that can be allowed to deflect, an active earth pressure coefficient (K_a) of 0.4 should be adopted. A passive earth pressure coefficient (K_p) of 2.5 may be used for the clays. A bulk density of 20 kN/m^3 may be used.

As with all retaining walls, the above coefficient must be adjusted for groundsurface slope, groundwater and external loads, such as buildings and vehicles.

5.7 *Soil Aggressiveness*

The aggressiveness or erosion potential of an environment in building materials, particularly concrete and steel is dependent on the levels of soil pH and the types of salts present, generally sulphates and chlorides. In order to determine the degree of aggressiveness, the test values obtained are compared to Tables 6.4.2 (C) and 6.5.2 (C) in AS2159 – 2009 Piling – Design and Installation. The test results are summarised in the table below.

Sample No.	Location	Depth (m)	Chloride (mg/kg)	pH	Sulfate (mg/kg)
S1	BH1	1.0	840	5.2	330
S2	BH2	2.0	100	11.9	110
S3	BH3	3.0	840	6.7	210

The report results range between:

- pH - 5.2 to 11.9
- soluble SO_4 - 110 to 330 mg/kg (ppm)
- soluble chloride - 100 to 840 mg/kg (ppm)

The soils on the site consist of low permeability silty clays. Therefore, the soil conditions B are considered appropriate.

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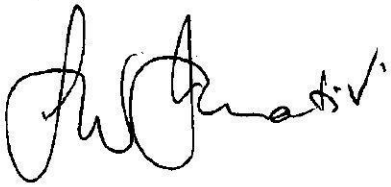
A review of the durability aspects indicates that:

- pH : minimum value of 5.5
- SO_4 : maximum value of 330 mg/kg (ppm) < 5000 ppm
- C1 : maximum value of840 mg/kg (ppm) < 5000 ppm

The exposure classification for the onsite soils is non-aggressive for steel and mildly aggressive for concrete.

6. FINAL COMMENTS

During construction should the subsurface conditions vary to those inferred in this report, a suitably experienced geotechnical engineer should review the design and recommendations given above to determine if any alterations are required.



Matt Green BSC Hons
Engineering Geologist

Laurie Ihnativ, BE, MEngSc, MBA, FIE Aust.
Manager, SMEC Testing Services Pty Limited

Document Set ID: 4302102
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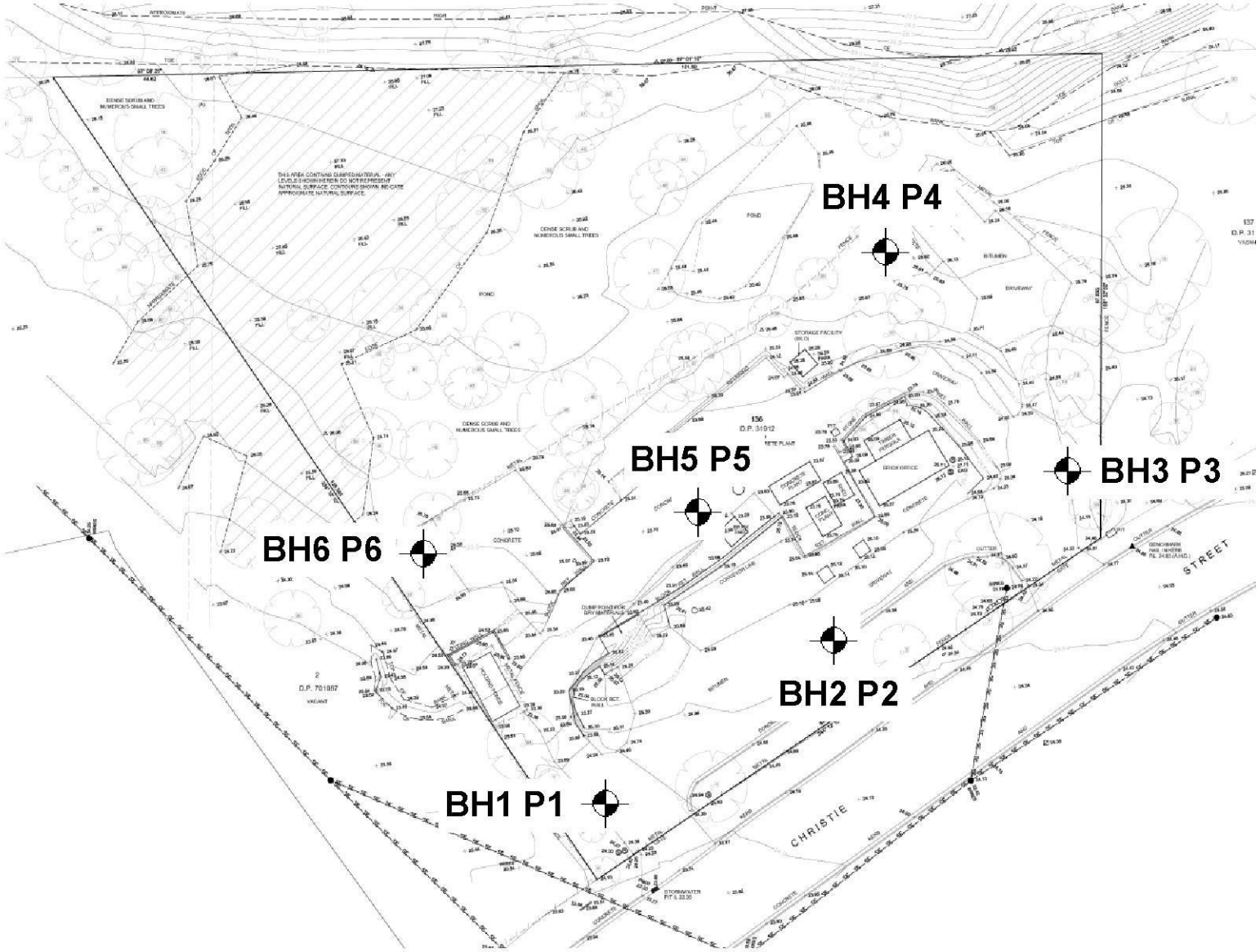

SMEC TESTING SERVICES Pty. Ltd.	Scale: Unknown	Date: August 2013
Client: J. LETHLEAN C/- JAMES HARRISON		
GEOTECHNICAL INVESTIGATION **53-59 CHRISTIE STREET, ST. MARYS** **BOREHOLE AND PENETROMETER LOCATIONS**	Project No. 19253/3238C	
	Drawing No: 13/1264	

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

NOTES RELATING TO GEOTECHNICAL REPORTS

Introduction

These notes have been provided to outline the methodology and limitations inherent in geotechnical reporting. The issues discussed are not relevant to all reports and further advice should be sought if there are any queries regarding any advice or report.

When copies of reports are made, they should be reproduced in full.

Geotechnical Reports

Geotechnical reports are prepared by qualified personnel on the information supplied or obtained and are based on current engineering standards of interpretation and analysis.

Information may be gained from limited subsurface testing, surface observations, previous work and is supplemented by knowledge of the local geology and experience of the range of properties that may be exhibited by the materials present. For this reason, geotechnical reports should be regarded as interpretative rather than factual documents, limited to some extent by the scope of information on which they rely.

Where the report has been prepared for a specific purpose (eg. design of a three-storey building), the information and interpretation may not be appropriate if the design is changed (eg. a twenty storey building). In such cases, the report and the sufficiency of the existing work should be reviewed by SMEC Testing Services Pty Limited in the light of the new proposal.

Every care is taken with the report content, however, it is not always possible to anticipate or assume responsibility for the following conditions:

- Unexpected variations in ground conditions. The potential for this depends on the amount of investigative work undertaken.
- Changes in policy or interpretation by statutory authorities.
- The actions of contractors responding to commercial pressures.

If these occur, SMEC Testing Services Pty Limited would be pleased to resolve the matter through further investigation, analysis or advice.

Unforeseen Conditions

Should conditions encountered on site differ markedly from those anticipated from the information contained in the report, SMEC Testing Services Pty Limited should be notified immediately. Early identification of site anomalies generally results in any problems being more readily resolved and allows re-interpretation and assessment of the implications for future work.

Subsurface Information

Logs of a borehole, recovered core, test pit, excavated face or cone penetration test are an engineering and/or geological interpretation of the subsurface conditions. The reliability of the logged information depends on the drilling/testing method, sampling and/or observation spacings and the ground conditions. It is not always possible or economic to obtain continuous high quality data. It should also be recognised that the volume or material observed or tested is only a fraction of the total subsurface profile.

Interpretation of subsurface information and application to design and construction must take into consideration the spacing of the test locations, the frequency of observations and testing, and the possibility that geological boundaries may vary between observation points.

Groundwater observations and measurements outside of specially designed and constructed piezometers should be treated with care for the following reasons:

- In low permeability soils groundwater may not seep into an excavation or bore in the short time it is left open.
- A localised perched water table may not represent the true water table.
- Groundwater levels vary according to rainfall events or season.
- Some drilling and testing procedures mask or prevent groundwater inflow.

The installation of piezometers and long term monitoring of groundwater levels may be required to adequately identify groundwater conditions.

Supply of Geotechnical Information or Tendering Purposes

It is recommended tenderers are provided with as much geological and geotechnical information that is available and that where there are uncertainties regarding the ground conditions, prospective tenders should be provided with comments discussing the range of likely conditions in addition to the investigation data.

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APPENDIX A

BOREHOLE LOGS & EXPLANATION SHEETS

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Mr J K Lethlean C/- James Harrison
Project: 53-59 Christie Street, St Marys
Location: Refer to Drawing No. 13/1264

Project No.: 19253/3238C
Date : 22 July 2013
Logged: JK

BOREHOLE NO.: BH 1

Sheet 1 of 1

WATER	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			ASPHALTIC CONCRETE: (50 mm thick)			
			SILTY CLAY: dark brown with orange brown, medium plasticity, occasional gravel	CL	FIRM TO STIFF	M
					STIFF	
	S1 @ 1.0 m B	1.0	SILTY CLAY: light grey with orange brown, medium to high plasticity	CL/CH	STIFF	M
					VERY STIFF	
		2.0				
			SILTY CLAY: red brown with light grey, medium to high plasticity	CL/CH	VERY STIFF	M
		3.0				
		4.0				
		5.0				
			SHALE: dark grey with orange brown and light grey, clayey seams		EXTREMELY LOW STRENGTH	D
			BOREHOLE DISCONTINUED AT 6.0 M ON WEATHERED SHALE			

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Mr J K Lethlean C/- James Harrison
Project: 53-59 Christie Street, St Marys
Location: Refer to Drawing No. 13/1264

Project No.: 19253/3238C
Date : 22 July 2013
Logged: JK

BOREHOLE NO.: BH 2

Sheet 1 of 1

WATER	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			SILTY SANDY CLAY: dark brown, fine grained, low plasticity, trace of gravel	CL	FIRM	M
		1.0			FIRM TO STIFF	
			SILTY CLAY: orange brown with light grey, medium to high plasticity	CL/CH	FIRM TO STIFF	M
					STIFF	
					VERY STIFF	
		2.0				
		3.0				
			SILTY CLAY: yellow brown with occasional light grey, medium to high plasticity, trace of gravel	CL/CH	VERY STIFF	M
		4.0				
		5.0				
			BOREHOLE DISCONTINUED AT 6.0 M			

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Mr J K Lethlean C/- James Harrison
Project: 53-59 Christie Street, St Marys
Location: Refer to Drawing No. 13/1264

Project No.: 19253/3238C
Date : 22 July 2013
Logged: JK

BOREHOLE NO.: BH 3

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			ASPHALT/SANDY GRAVEL: dark grey, fine to medium grained, dark grey gravel FILL	GW		D
			GRAVELLY SILTY CLAY: orange brown with dark brown, medium plasticity, gravel	CL		M
			SILTY CLAY: orange brown with yellow brown and light grey, medium to high plasticity	CL/CH	STIFF TO VERY STIFF	M
	B	1.0	SILTY CLAY: light grey with orange brown, low plasticity, trace of fine sand	CL	STIFF TO VERY STIFF	M
		2.0	SILTY CLAY: orange brown with light grey, medium to high plasticity	CL/CH	VERY STIFF	M
		3.0				
		4.0				
		5.0	SHALE: dark grey with occasional light grey, clayey seams		EXTREMELY LOW STRENGTH	M/D
			BOREHOLE DISCONTINUED AT 6.0 M ON WEATHERED SHALE			

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Mr J K Lethlean C/- James Harrison
Project: 53-59 Christie Street, St Marys
Location: Refer to Drawing No. 13/1264

Project No.: 19253/3238C
Date : 22 July 2013
Logged: JK

BOREHOLE NO.: BH 4

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			GRAVELLY SILTY CLAY: light grey with occasional red brown and dark brown, fine grained, low plasticity FILL	CL	SOFT	M
			GRAVELLY CLAY: light grey with occasional red brown, medium plasticity, gravel	CL	SOFT	M-VM
		1.0			STIFF	
	S2 @ 2.0 m	2.0	FILL GRAVELLY CLAY: red brown/orange brown, medium plasticity, gravel (sub-well rounded)	CL	STIFF TO VERY STIFF	M
		3.0			VERY STIFF	
		4.0				
		5.0	SILTY CLAY: orange brown with light grey, medium plasticity	CL	VERY STIFF	M
			BOREHOLE DISCONTINUED AT 6.0 M			

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Mr J K Lethlean C/- James Harrison
Project: 53-59 Christie Street, St Marys
Location: Refer to Drawing No. 13/1264

Project No.: 19253/3238C
Date : 22 July 2013
Logged: JK

BOREHOLE NO.: BH 5

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			ASHPALTIC CONCRETE: (150 mm thick)			
			SILTY CLAY: dark grey with occasional dark brown and orange brown, low plasticity, trace of fine sand, trace of gravel FILL	CL		M
			SILTY CLAY: light grey with occasional orange brown, medium to high plasticity	CL/CH	FIRM TO STIFF	M
		1.0			STIFF	
			SILTY CLAY: orange brown with light grey, medium to high plasticity	CL/CH	VERY STIFF	M
		2.0				
			GRAVELLY CLAY: orange brown, medium plasticity, gravel (sub-well rounded)	CL	VERY STIFF	M
	S3 @ 3.0 m	3.0				
		4.0				
		5.0				
			SHALE: dark grey with occasional light grey, clayey seams		EXTREMELY LOW STRENGTH	D
			BOREHOLE DISCONTINUED AT 6.0 M ON WEATHERED SHALE			

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

SMEC Testing Services Pty Ltd

GEOTECHNICAL LOG - NON CORE BOREHOLE

Client: Mr J K Lethlean C/- James Harrison
Project: 53-59 Christie Street, St Marys
Location: Refer to Drawing No. 13/1264

Project No.: 19253/3238C
Date : 22 July 2013
Logged: JK

BOREHOLE NO.: BH 6

Sheet 1 of 1

WATER TABLE	SAMPLES	DEPTH (m)	DESCRIPTION OF DRILLED PRODUCT (Soil type, colour, grain size, plasticity, minor components, observations)	SYMBOL	CONSISTENCY (cohesive soils) or RELATIVE DENSITY (sands and gravels)	MOISTURE
			CLAYEY SILTY SAND: dark brown, fine to medium grained, trace of gravel FILL	SC		M-D
			CONCRETE			
			SILTY CLAY: orange brown with light grey and occasional re brown, medium to high plasticity	CL/CH	FIRM TO STIFF	M
		1.0			STIFF	
					VERY STIFF	
		2.0				
		3.0				
			SILTY CLAY: orange brown, medium plasticity, trace of gravel	CL	VERY STIFF	M
		4.0				
		5.0				
			SILTY CLAY: light grey with orange brown, medium to high plasticity	CL/CH	VERY STIFF	M
			BOREHOLE DISCONTINUED AT 6.0 M			

NOTES: D - disturbed sample U - undisturbed tube sample B - bulk sample
WT - level of water table or free water N - Standard Penetration Test (SPT)

See explanation sheets for meaning of all descriptive terms and symbols

Contractor: STS
Equipment: Edson RP70
Hole Diameter (mm): 100
Angle from Vertical (°) 0

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

SMEC Testing Services Pty Ltd
14/1 Cowpasture Place, Wetherill Park NSW 2164
Phone: (02)9756 2166 Fax: (02)9756 1137 Email: enquiries@smectesting.com.au

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Dynamic Cone Penetrometer Test Report

Project: 53-59 Christie Street, St Marys
Client: Mr J D Lethlean C/- James Harrison
Address: Suite 2, 4/6 Tilley Lane, Frenchs Forest
Test Method: AS 1289.6.3.2

Project No.: 19253/3238C
Report No.: 13/1264
Report Date: 26/07/2013
Page: 1 of 2

Site No.	P1	P2	P3	P4		P1	P2	P3	P4
Location	Refer to Drawing No. 13/1264	Refer to Drawing No. 13/1264	Refer to Drawing No. 13/1264	Refer to Drawing No. 13/1264					
Starting Level	Surface Level	Surface Level	Surface Level	Surface Level					
Depth (m)	Penetration Resistance (blows / 150mm)				Depth (m)	Penetration Resistance (blows / 150mm)			
0.00 - 0.15	*	1	*	2	3.00 - 3.15	6	*	17	8
0.15 - 0.30	*	2	*	1	3.15 - 3.30	8	*	22	10
0.30 - 0.45	3	2	*	1	3.30 - 3.45	10	*	R	13
0.45 - 0.60	4	3	6	1	3.45 - 3.60	12	*		19
0.60 - 0.75	5	2	8	2	3.60 - 3.75	14	*		22
0.75 - 0.90	5	2	12	1	3.75 - 3.90	22	*		R
0.90 - 1.05	8	3	22	1	3.90 - 4.05	R	*		
1.05 - 1.20	10	4	R	2	4.05 - 4.20		8		
1.20 - 1.35	12	6	*	22	4.20 - 4.35		10		
1.35 - 1.50	15	8	*	R	4.35 - 4.50		13		
1.50 - 1.65	19	9	*	*	4.50 - 4.65		15		
1.65 - 1.80	21	10	*	*	4.65 - 4.80		19		
1.80 - 1.95	R	14	*	*	4.80 - 4.95		22		
1.95 - 2.10	*	17	6	*	4.95 - 5.10		R		
2.10 - 2.25	*	22	8	*	5.10 - 5.25				
2.25 - 2.40	*	R	10	*	5.25 - 5.40				
2.40 - 2.55	*	*	13	*	5.40 - 5.55				
2.55 - 2.70	*	*	13	*	5.55 - 5.70				
2.70 - 2.85	*	*	14	*	5.70 - 5.85				
2.85 - 3.00	*	*	12	*	5.85 - 6.00				

Remarks: * = Pre-drilled hole prior to testing

Approved Signatory.....
Technician: JK
Laurie Ihnativ - Manager

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

SMEC Testing Services Pty Ltd
14/1 Cowpasture Place, Wetherill Park NSW 2164
Phone: (02)9756 2166 Fax: (02)9756 1137 Email: enquiries@smectesting.com.au

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Dynamic Cone Penetrometer Test Report

Project: 53-59 Christie Street, St Marys
Client: Mr J D Lethlean C/- James Harrison
Address: Suite 2, 4/6 Tilley Lane, Frenchs Forest
Test Method: AS 1289.6.3.2

Project No.: 19253/3238C
Report No.: 13/1264
Report Date: 26/07/2013

Site No.	P5	P6							
Location	Refer to Drawing No. 13/1264	Refer to Drawing No. 13/1264							
Starting Level	Surface Level	Surface Level							
Depth (m)	Penetration Resistance (blows / 150mm)				Depth (m)	Penetration Resistance (blows / 150mm)			
0.00 - 0.15	*	*			3.00 - 3.15				
0.15 - 0.30	*	*			3.15 - 3.30				
0.30 - 0.45	2	*			3.30 - 3.45				
0.45 - 0.60	3	*			3.45 - 3.60				
0.60 - 0.75	5	2			3.60 - 3.75				
0.75 - 0.90	6	3			3.75 - 3.90				
0.90 - 1.05	10	4			3.90 - 4.05				
1.05 - 1.20	8	7			4.05 - 4.20				
1.20 - 1.35	9	8			4.20 - 4.35				
1.35 - 1.50	12	11			4.35 - 4.50				
1.50 - 1.65	13	12			4.50 - 4.65				
1.65 - 1.80	18	13			4.65 - 4.80				
1.80 - 1.95	22	13			4.80 - 4.95				
1.95 - 2.10	R	15			4.95 - 5.10				
2.10 - 2.25		18			5.10 - 5.25				
2.25 - 2.40		22			5.25 - 5.40				
2.40 - 2.55		R			5.40 - 5.55				
2.55 - 2.70					5.55 - 5.70				
2.70 - 2.85					5.70 - 5.85				
2.85 - 3.00					5.85 - 6.00				

Remarks: * = Pre-drilled hole prior to testing

Approved Signatory.....
Technician: JK
Laurie Ihnativ - Manager

Document Set ID: 4302102
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E1. CLASSIFICATION OF SOILS

E1.1 Soil Classification and the Unified System

An assessment of the site conditions usually includes an appraisal of the data available by combining values of engineering properties obtained by the site investigation with descriptions, from visual observation of the materials present on site.

The system used by SMEC in the identification of soil is the Unified Soil Classification system (USC) which was developed by the US Army Corps of Engineers during World War II and has since gained international acceptance and has been adopted in its metricated form by the Standards Association of Australia.

The Australian Site Investigation Code (AS1726-1981, Appendix D) recommends that the description of a soil includes the USC group symbols which are an integral component of the system.

The soil description should contain the following information in order:

Soil composition

- SOIL NAME and USC classification symbol (IN BLOCK LETTERS)
- plasticity or particle characteristics
- colour
- secondary and minor constituents (name estimated proportion, plasticity or particle characteristics, colour

Soil condition

- moisture condition
- consistency or density index

Soil structure

- structure (zoning, defects, cementing)

Soil origin

interpretation based on observation eg FILL, TOPSOIL, RESIDUAL, ALLUVIUM.

E1.2 Soil Composition

(a) Soil Name and Classification Symbol

The USC system is summarized in Figure E1.2.1. The primary division separates soil types on the basis of particle size into:

- Coarse grained soils - more than 50% of the material less than 60 mm is larger than 0.06 mm (60 μm).
- Fine grained soils - more than 50% of the material less than 60 mm is smaller than 0.06 mm (60 μm).

Initial classification is by particle size as shown in Table E1.2.1. Further classification of fine grained soils is based on plasticity.

TABLE E1.2.1 - CLASSIFICATION BY PARTICLE SIZE

NAME	SUB-DIVISION	SIZE
Clay (1)		< 2 μm
Silt (2)		2 μm to 60 μm
Sand	Fine Medium Coarse	60 μm to 200 μm 200 μm to 600 μm 600 μm to 2 mm
Gravel (3)	Fine Medium Coarse	2 mm to 6 mm 6 mm to 20 mm 20 mm to 60 mm
Cobbles (3)		60 mm to 200 mm
Boulders (3)		> 200 mm

Where a soil contains an appropriate amount of secondary material, the name includes each of the secondary components (greater than 12%) in increasing order of significance, eg sandy silty clay.

Minor components of a soil are included in the description by means of the terms "some" and "trace" as defined in Table E1.2.2.

TABLE E1.2.2 - MINOR SOIL COMPONENTS

TERM	DESCRIPTION	APPROXIMATE PROPORTION (%)
Trace	presence just detectable, little or no influence on soil properties	0-5
Some	presence easily detectable, little influence on soil properties	5-12

The USC group symbols should be included with each soil description as shown in Table E1.2.3

TABLE E1.2.3 - SOIL GROUP SYMBOLS

SOIL TYPE	PREFIX
Gravel	G
Sand	S
Silt	M
Clay	C
Organic	O
Peat	Pt

The group symbols are combined with qualifiers which indicate grading, plasticity or secondary components as shown on Table E1.2.4

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TABLE E1.2.4 - SOIL GROUP QUALIFIERS

SUBGROUP	SUFFIX
Well graded	W
Poorly Graded	P
Silty	M
Clayey	C
Liquid Limit <50% - low to medium plasticity	L
Liquid Limit >50% - low to medium plasticity	H

(b) Grading

"Well graded" Good representation of all particle sizes from the largest to the smallest.

"Poorly graded" One or more intermediate sizes poorly represented

"Gap graded" One or more intermediate sizes absent

"Uniformly graded" Essentially single size material.

(c) Particle shape and texture

The shape and surface texture of the coarse grained particles should be described.

Angularity may be expressed as "rounded", "sub-rounded", "sub-angular" or "angular".

Particle **form** can be "equidimensional", "flat" or elongate".

Surface texture can be "glassy", "smooth", "rough", pitted" or striated".

(d) Colour

The colour of the soil should be described in the moist condition using simple terms such as:

Black White Grey Red
Brown Orange Yellow Green
Blue

These may be modified as necessary by "light" or "dark". Borderline colours may be described as a combination of two colours, eg. red-brown.

For soils that contain more than one colour terms such as:

- Speckled Very small (<10 mm dia) patches
- Mottled Irregular
- Blotched Large irregular (>75 mm dia)
- Streaked Randomly oriented streaks

(e) Minor Components

Secondary and minor components should be individually described in a similar manner to the dominant component.

*E1.3 **Soil Condition***

(a) Moisture

Soil moisture condition is described as "dry", "moist" or "wet".

The moisture categories are defined as:
Dry (D) - Little or no moisture evident. Soils are running.
Moist (M) - Darkened in colour with cool feel. Granular soil particles tend to adhere. No free water evident upon remoulding of cohesive soils.

In addition the moisture content of cohesive soils can be estimated in relation to their liquid or plastic limit.

(b) Consistency

Estimates of the consistency of a clay or silt soil may be made from manual examination, hand penetrometer test, SPT results or from laboratory tests to determine undrained shear or unconfined compressive strengths. The classification of consistency is defined in Table E1.3.1.

TABLE E1.3.1 - CONSISTENCY OF FINE-GRAINED SOILS

TERM	UNCONFINED STRENGTH (kPa)	FIELD IDENTIFICATION
Very Soft	<25	Easily penetrated by fist. Sample exudes between fingers when squeezed in the fist.
Soft	25 – 50	Easily moulded in fingers. Easily penetrated 50 mm by thumb.
Firm	50 – 100	Can be moulded by strong pressure in the fingers. Penetrated only with great effort.
Stiff	100 – 200	Cannot be moulded in fingers. Indented by thumb but penetrated only with great effort.
Very Stiff	200 – 400	Very tough. Difficult to cut with knife. Readily indented with thumb nail.
Hard	>400	Brittle, can just be scratched with thumb nail. Tends to break into fragments.

Unconfined compressive strength as derived by a hand penetrometer can be taken as approximately double the undrained shear strength ($q_u = 2\ c_u$).

(c) Density Index

The insitu density index of granular soils can be assessed from the results of SPT or cone penetrometer tests. Density index should not be estimated visually.

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TABLE E1.3.2 - DENSITY OF GRANULAR SOILS

TERM	SPT N VALUE	STATIC CONE VALUE q_c (MPa)	DENSITY INDEX (%)
Very Loose	0 – 3	0 - 2	0 - 15
Loose	3 – 8	2 - 5	15 - 35
Medium Dense	8 – 25	5 - 15	35 - 65
Dense	25 – 42	15 - 20	65 - 85
Very Dense	>42	>20	>85

E1.4 Soil Structure

(a) Zoning

A sample may consist of several zones differing in colour, grain size or other properties. Terms to classify these zones are:

Layer - continuous across exposure or sample
Lens - discontinuous with lenticular shape
Pocket - irregular inclusion
Each zone should be described, their distinguishing features, and the nature of the interzone boundaries.

(b) Defects

Defects which are present in the sample can include:

- fissures
- roots (containing organic matter)
- tubes (hollow)
- casts (infilled)

Defects should be described giving details of dimensions and frequency. Fissure orientation, planarity, surface condition and infilling should be noted. If there is a tendency to break into blocks, block dimensions should be recorded

E1.5 Soil Origin

Information which may be interpretative but which may contribute to the usefulness of the material description should be included. The most common interpreted feature is the origin of the soil. The assessment of the probable origin is based on the soil material description, soil structure and its relationship to other soil and rock materials.

Common terms used are:

"Residual Soil" - Material which appears to have been derived by weathering from the underlying rock. There is no evidence of transport.

"Colluvium" - Material which appears to have been transported from its original location. The method of movement is usually the combination of gravity and erosion.

"Landslide Debris" - An extreme form of colluvium where the soil has been transported by mass movement. The material is obviously distributed and contains distinct defects related to the slope failure.

"Alluvium" - Material which has been transported essentially by water. Usually associated with former stream activity.

"Fill" - Material which has been transported and placed by man. This can range from natural soils which have been placed in a controlled manner in engineering construction to dumped waste material. A description of the constituents should include an assessment of the method of placement.

E1.6 Fine Grained Soils

The physical properties of fine grained soils are dominated by silts and clays.

The definition of clay and silt soils is governed by their Atterberg Limits. Clay soils are characterised by the properties of cohesion and plasticity with cohesion defines as the ability to deform without rupture. Silts exhibit cohesion but have low plasticity or are non-plastic.

The field characteristics of clay soils include:

- dry lumps have appreciable dry strength and cannot be powdered
- volume changes occur with moisture content variation
- feels smooth when moist with a greasy appearance when cut.

The field characteristics of silt soils include:

- dry lumps have negligible dry strength and can be powdered easily
- dilatancy - an increase in volume due to shearing - is indicted by the presence of a shiny film of water after a hand sample is shaken. The water disappears upon remoulding. Very fine grained sands may also exhibit dilatancy.
- low plasticity index
- feels gritty to the teeth

E1.7 Organic Soils

Organic soils are distinguished from other soils by their appreciable content of vegetable matter, usually derived from plant remains.

The soil usually has a distinctive smell and low bulk density.

The USC system uses the symbol Pt for partly decomposed organic material. The O symbol is combined with suffixes "O" or "H" depending on plasticity.

Where roots or root fibres are present their frequency and the depth to which they are encountered should be recorded. The presence of roots or root fibres does not necessarily mean the material is an "organic material" by classification.

Coal and lignite should be described as such and not simply as organic matter.

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APPENDIX B

LABORATORY TEST RESULTS

SMEC Testing Services Pty Ltd
14/1 Cowpasture Place, Wetherill Park NSW 2164
Phone: (02)9756 2166 Fax: (02)9756 1137 Email: enquiries@smectesting.com.au

NATA Accredited Laboratory Number: 2750
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California Bearing Ratio Determination Report

Project: 53-59 Christie Street, St Marys
Client: Mr J D Lethlean C/- James Harrison
Address: Suite 2, 4/6 Tilley Lane, Frenchs Forest
Test Method: AS 1289.6.1.1, 2.1.1
No. of Days Soaked: 4

Project No.: 19253
Report No.: 13/1312
Report Date: 31/07/2013
Page: 1 of 1
Compactive Effort: Standard
Target Compaction (%): 100
Surcharge (Kg): 4.5

Sampling Proceedure: AS 1289.1.2.1 Clause 6.5.3 - Power Auger Drilling (Not covered under NATA Scope of Accreditation)

STS / Sample No.		3238C/1	3238C/2				
Sample Location		Borehole 1	Borehole 3				
Material Description		SILTY CLAY: light grey with orange brown	SILTY CLAY: light grey with orange brown				
Depth of Sample (m)		0.8 - 1.3	0.8 - 1.3				
Sample Date		22/07/2013	22/07/2013				
Oversize on Wet Basis +19mm (%)		Nil	Nil				
Field Moisture Content (%)		14.0	11.2				
Optimum Moisture Content (%)		15.6	13.1				
Maximum Dry Density (t/m³)		1.812	1.95				
Dry Density (t/m³)	Before Soaking	1.805	1.945				
	After Soaking	1.751	1.903				
Relative Compaction (%)	Before Soaking	99.6	99.7				
	After Soaking	96.6	97.6				
Moisture Content (%)	Before Soaking	16.0	13.3				
	After Soaking	18.1	16.0				
Moisture Ratio Before Soaking (%)		102.8	101.8				
Moisture Content after test (%)	Top 30mm	22.8	18.9				
	Entire Depth	16.4	14.5				
Swell after Soaking (%)		3.1	2.2				
CBR Value (%)		**3.0**	**4.5**				
Penetration (mm)		**2.5**	**2.5**				

Remarks: +19mm material excluded from test

Approved Signatory.....

Technician: OM, LC

Orlando Mendoza - Lab Manager

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1316624**	Page	: 1 of 3
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: LAURIE IHNATIV	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: laurie@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 97561137	Facsimile	: +61-2-8784 8500
Project	: ST MARY 19253 3238C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 10289		
C-O-C number	: 158766	Date Samples Received	: 24-JUL-2013
Sampler	: JH	Issue Date	: 30-JUL-2013
Site	: ----		
		No. of samples received	: 3
Quote number	: EN/025/13	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	S1	S2	S3	----	----
			Client sampling date / time	22-JUL-2013 15:00	22-JUL-2013 15:00	22-JUL-2013 15:00	----	----
Compound	CAS Number	LOR	Unit	ES1316624-001	ES1316624-002	ES1316624-003	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	5.2	11.9	6.7	----	----
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	553	2450	645	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	13.5	55.0	7.9	----	----
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	330	110	210	----	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	10	mg/kg	840	100	840	----	----

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **ES1316624**	Page	: 1 of 4
Client	: **SMEC TESTING SERVICES PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: LAURIE IHNATIV	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: laurie@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 97561137	Facsimile	: +61-2-8784 8500
Project	: ST MARY 19253 3238C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: 158766	Date Samples Received	: 24-JUL-2013
Sampler	: JH	Issue Date	: 30-JUL-2013
Order number	: 10289		
		No. of samples received	: 3
Quote number	: EN/025/13	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ashesh Patel	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Nanthini Coilparampil	Laboratory Manager - Inorganics	Sydney Inorganics

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils) (QC Lot: 2983176)									
ES1316622-028	Anonymous	EA002: pH Value	----	0.1	pH Unit	7.8	7.7	0.0	0% - 20%
EA010: Conductivity (QC Lot: 2983175)									
ES1316622-018	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	431	430	0.2	0% - 20%
ES1316622-028	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	166	167	0.7	0% - 20%
EA055: Moisture Content (QC Lot: 2983629)									
ES1316622-023	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	6.0	5.4	12.2	No Limit
ES1316624-003	S3	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	7.9	12.5	45.3	0% - 50%
ED040S: Soluble Major Anions (QC Lot: 2983177)									
EW1302131-001	Anonymous	ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	60	70	0.0	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 2983174)									
ES1316622-010	Anonymous	ED045G: Chloride	16887-00-6	10	mg/kg	340	470	30.8	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA010: Conductivity (QCLot: 2983175)								
EA010: Electrical Conductivity @ 25°C	---	1	µS/cm	<1	1412 µS/cm	100	70	130
ED040S: Soluble Major Anions (QCLot: 2983177)								
ED040S: Sulfate as SO4 2-	14808-79-8	10	mg/kg	<10	750 mg/kg	91.8	84	112
ED045G: Chloride by Discrete Analyser (QCLot: 2983174)								
ED045G: Chloride	16887-00-6	10	mg/kg	<10	5000 mg/kg	95.6	79	125

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 2983174)							
ES1316622-010	Anonymous	ED045G: Chloride	16887-00-6	1250 mg/kg	80.6	70	130

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

The quality control term Matrix Spike (MS) and Matrix Spike Duplicate (MSD) refers to intralaboratory split samples spiked with a representative set of target analytes. The purpose of these QC parameters are to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
ED045G: Chloride by Discrete Analyser (QCLot: 2983174)										
ES1316622-010	Anonymous	ED045G: Chloride	16887-00-6	1250 mg/kg	80.6	---	70	130	---	---

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **ES1316624**	Page	: 1 of 5
Client	: SMEC TESTING SERVICES PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: LAURIE IHNATIV	Contact	: Client Services
Address	: P O BOX 6989 WETHERILL PARK NSW, AUSTRALIA 2164	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: laurie@smectesting.com.au	E-mail	: sydney@alsglobal.com
Telephone	: +61 02 9756 2166	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 97561137	Facsimile	: +61-2-8784 8500
Project	: ST MARY 19253 3238C	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Site	: ----		
C-O-C number	: 158766	Date Samples Received	: 24-JUL-2013
Sampler	: JH	Issue Date	: 30-JUL-2013
Order number	: 10289		
		No. of samples received	: 3
Quote number	: EN/025/13	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (2013). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non -volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002)							
S1, S2, S3	**22-JUL-2013**	**25-JUL-2013**	29-JUL-2013	✓	**25-JUL-2013**	26-JUL-2013	✓
EA010: Conductivity							
Soil Glass Jar - Unpreserved (EA010)							
S1, S2, S3	**22-JUL-2013**	**25-JUL-2013**	29-JUL-2013	✓	**25-JUL-2013**	22-AUG-2013	✓
EA055: Moisture Content							
Soil Glass Jar - Unpreserved (EA055-103)							
S1, S2, S3	**22-JUL-2013**	**----**	----	----	**25-JUL-2013**	05-AUG-2013	✓
ED040S : Soluble Sulfate by ICPAES							
Soil Glass Jar - Unpreserved (ED040S)							
S1, S2, S3	**22-JUL-2013**	**25-JUL-2013**	29-JUL-2013	✓	**26-JUL-2013**	22-AUG-2013	✓
ED045G: Chloride Discrete analyser							
Soil Glass Jar - Unpreserved (ED045G)							
S1, S2, S3	**22-JUL-2013**	**25-JUL-2013**	29-JUL-2013	✓	**26-JUL-2013**	22-AUG-2013	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*	
Laboratory Duplicates (DUP)							
Chloride Soluble By Discrete Analyser	ED045G	1	7	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	2	17	**11.8**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	4	**25.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	2	20	**10.0**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	1	7	**14.3**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Chloride Soluble By Discrete Analyser	ED045G	2	7	**28.6**	**10.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Chloride Soluble By Discrete Analyser	ED045G	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Electrical Conductivity (1:5)	EA010	1	17	**5.9**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Major Anions - Soluble	ED040S	1	4	**25.0**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride Soluble By Discrete Analyser	ED045G	1	7	**14.3**	**5.0**	✓	NEPM 2013 Schedule B(3) and ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	(APHA 21st ed., 2510) Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Major Anions - Soluble	ED040S	SOIL	In-house. Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Chloride Soluble By Discrete Analyser	ED045G	SOIL	APHA 21st edition 4500-Cl- E. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm. Analysis is performed on a 1:5 soil / water leachate.

Preparation Methods	Method	Matrix	Method Descriptions
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW 846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**
- **For all matrices, no Laboratory Control outliers occur.**
- **For all matrices, no Matrix Spike outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- **No Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

CHAIN OF CUSTODY

ALS Environmental

ALS Laboratory: please tick →

- ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsenviro.com
- BRISBANE 32 Shand Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
- GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 4971 5600 E: gladstone@alsglobal.com
- MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: makay@alsglobal.com
- MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsenviro.com
- MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
- NEWCASTLE 5 Rosegum Road Warabrook NSW 2304 Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com
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- PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
- SYDNEY 277 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsenviro.com
- TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: townsville.environmental@alsenviro.com
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CLIENT: SMEC Testing Services

OFFICE: Wetherill Park

PROJECT: Ft Mary's 19253/32380

PURCHASE ORDER NUMBER: 10289

PROJECT MANAGER: L. Wu

CONTACT PH: 9756 2188

SAMPLER: JH

SAMPLER MOBILE: 0409 036 035

COC emailed to ALS? (YES / NO)

EDD FORMAT (or default):

Email Reports to (will default to PM if no other addresses are listed):

Email Invoice to (will default to PM if no other addresses are listed):

TURNAROUND REQUIREMENTS: (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

- ☒ Standard TAT (List due date): 1/8/13
- ☐ Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

COC SEQUENCE NUMBER (Circle)

COC: 1 2 3 4 5 6 7

OF: 2 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comment:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
JH	[signature]		
DATE/TIME: 24/7	DATE/TIME: 24/7/13 1445	DATE/TIME:	DATE/TIME:

COMMENTS/ SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX - SOLID (S), WATER (W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE/ TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	pH	EC	SG	CL					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	S1	22/7/13	S	Jar / Tub		✓	✓	✓	✓					
2	S2													
3	S3													
				TOTAL										

Environmental Division Sydney

Work Order

ES1316624

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Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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Appendix 'G'

Soil Supplemented Stage 1 Preliminary Site Investigation

Prepared by DLA Environmental

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Soil Supplemented Stage 1 Preliminary Site Investigation

53-59 Christie St

St Marys NSW 2760

Lot 136 DP31912

Prepared for

Artazan Property Group Pty Ltd

Suite 2-4, 6 Tilley Lane

Aurora Business Centre

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Prepared by

DLA Environmental

DL3136_S000872

August 2013

Revision 00

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Quality Information

Document	**Soil Supplemented Stage 1 Preliminary Site Investigation**	
Job Reference	DL3136_S000872	
Date	28th August 2013	
Prepared by	Edward Milne	Author
Reviewed by	Anthony Richard	DLA Reviewer

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1	**DLA Environmental** On File

Authorisation

Revision	Revision Date	Details	Authorised	
			Name/Position	**Signature**
R00	28th August 2013	53-59 Christie Street, St Marys, NSW 2760	**Richard Bolton** Sydney Regional Manager	

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

EXECUTIVE SUMMARY

DLA Environmental (DLA) was commissioned by Mr James Harrison of Artazan Property Group Pty Ltd to prepare a Soil Supplemented Phase 1 Preliminary Site Investigation on the property identified as Lot 136 DP 31912 at 53-59 Christie Street, St Marys, NSW, 2760 (the Site). It is proposed that the Site be reconfigured from a disused concrete plant into commercial/industrial buildings.

Soils sampled across the Site by DLA were assessed against the Health Investigation Levels (HILs) provided by the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) to the NEPM 1999 guidelines *Table 1A(1) – Commercial/Industrial D*, as applicable to the intended land use of the Site. The Investigation chemically evaluated soil contaminant levels and involved both visual and historical investigation of the potential environmental impacts on the Site in accordance with SEPP-55 guidelines and The National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1).

The sampling regime and subsequent assessment and reporting of the Site is considered to be adequate to determine land use suitability. All current and historical activities observed during the Investigation were found to pose a very low risk of contamination to the Site. No staining or odours were encountered during the field investigation. Asbestos-containing material (roof sheeting and power-board backing material) from the small shed between the concrete plant and the brick office (labelled 'Shed' on the Site survey) will need to be removed in accordance with Workcover requirements and clearance certification obtained prior to demolition if redevelopment occurs in the future.

DLA submitted eighteen (18) soil samples from across the Site for laboratory analysis and no evidence can be found to infer soil contamination in exceedance of the adopted site criteria. No asbestos was detected in eight (8) soil samples submitted for laboratory analysis. All concentrations of heavy metals, BTEX, PAH, TRH, OC/OP pesticides and PCBs in soil samples obtained by DLA from within the Site boundary were below the NSW EPA Provisional Phytotoxicity Health Investigation Levels (HILs), as well as the HILs in the NEPM 1999 Schedule B1 Guideline on the Investigation Levels for Soil and Groundwater from the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) *Table 1A(1) – Commercial/Industrial D*. All soil analytical results therefore satisfy the adopted site criteria.

The completion of this report concludes that the Soil Supplemented Stage 1 Preliminary Site Investigation objectives, according to the adopted site criteria, have been achieved. **The Site is suitable for land use consistent with the NEPM 1999 National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) Table 1A(1) – Commercial/Industrial D.** Should the land use be changed in the future, this report should be reviewed to ensure compliance with suitable soil investigation levels for the appropriate end land use or zoning.

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ATTACHMENTS

Attachment 1 Unexpected Findings Protocol

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1.0 INTRODUCTION

1.1 General

DLA Environmental (DLA) was commissioned by Mr James Harrison of Artazan Property Group Pty Ltd to prepare a Soil Supplemented Phase 1 Preliminary Site Investigation on the property identified as Lot 136 DP 31912 at 53-59 Christie Street, St Marys, NSW, 2760 (the Site). It is proposed that the Site be reconfigured from a disused concrete plant into commercial/industrial buildings.

Refer to **Figure 1** – Site Location, **Figure 2** – Site Layout and **Appendix G** – Site Survey

The Investigation was conducted in accordance with State Environmental Planning Policy (SEPP) 55 - *Remediation of Land* and the NSW Environment Protection Authority's *Guidelines for Consultants Reporting on Contaminated Sites (2011)* as part of due diligence to determine if any previous land uses have contaminated the Site. Soils sampled across the Site by DLA were assessed against the Health Investigation Levels (HILs) provided by the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1).

1.2 Objectives of the Assessment

The objectives of the Investigation were to:

- Identify all past and potentially contaminating activities;
- Identify potential contamination types;
- Discuss the Site condition;
- Provide a basic assessment of Site contamination (if any); and,
- Assess the need (if any) for remediation and/or further investigations.

The proposed investigation program and site investigation were designed to be suitable for due diligence purposes so the document can be incorporated in sales contracts, for redevelopment purposes, or the ongoing management of the Site. It is suitable for review by the NSW EPA, Department of Natural Resources (DNR) and Penrith City Council. In particular the document meets the requirements of SEPP55 (Environmental Planning & Assessment Act, 1979).

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1.3 Data Quality Objectives

The National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM) and Australian Standard (AS) 4482.1-2005 recommends that data quality objectives (DQOs) be implemented during the investigation of potentially contaminated sites. The DQO process described in AS 4482.1-2005 *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil Part 1: Non-Volatile and Semi-Volatile Compounds* outlines seven (7) distinct steps to outline the project goals, decisions, constraints and an assessment of the project uncertainties and how to address these when they arise. They define the quality and quantity of data needed to support decisions relating to the environmental condition of a site. They also outline the defining criteria that a data collection design should satisfy, including when, where, how and how many samples to be collected.

The DQOs for the Investigation were to:

State the Problem.

Determine, from a contamination point of view, if the land is suitable for residential land use in accordance with the requirements of *State Environmental Planning Policy No. 55* and the *Environmental Planning and Assessment Act. 1979*. This includes researching previous Site investigations, historical searches (titles, land use of site and adjacent sites, and aerial photographs), identification of chemicals of concern, media they inhabit and possible migration pathways (to and from the Site), potential exposures to human and/or environmental receptors, and concerns with the potential clean-up and desired future land use of the property.

- Investigations into the Site need to determine if contamination has potential to be present from previous land use activities or off-site sources. Therefore presenting an unacceptable risk to human health or the environment and prevent the site being suitable for the intended future land use.

Identify the Decision.

The decisions to be made on the contamination and the new environmental data required includes considering relevant contamination sources to the Site. This will be undertaken from a desktop study of site history, potential contamination sources and supplementary soil sampling.

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A Site under investigation is assumed to be contaminated until statistically proven otherwise (eg: H_o= Analyte 95% UCL exceeds the SAC), therefore two types of error are possible; Type 1 error (α or false negative), where the Site is assessed to be uncontaminated when it is actually is, and Type 2 error (β or false positive), when the Site is assessed to be contaminated though is actually not.

- The more severe consequence is with Type 1 errors (α) since the risk of jeopardising human or environmental health outweighs the consequences of additional remediation costs. Therefore to achieve appropriate confidence in the data probabilities are set at 5% for Type 1 error, whilst Type 2 errors are set at a 20% probability limit.

Field and laboratory quality controls are implemented to avoid error and to ensure the action levels exceed the measurement detection limits for Contaminants of Concern (COC). This is achieved by analysing concentrations detected in field blanks, rinsate blanks, volatile-spiked trip samples and laboratory method blanks. The performance of decision making inputs will be enhanced through the application of Data Quality Indicators (DQIs), defined as follows:

Precision A quantitative measure of the variability (or reproducibility) of data;

Accuracy A quantitative measure of the closeness of reported data to the "true" value;

Representativeness The confidence (expressed qualitatively) that data are representative of each media present on the Site.

Completeness A measure of the amount of useable data from a data collection activity;

Comparability The confidence (expressed qualitatively) that data can be considered equivalent for each sampling and analytical event.

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DLA adopted the following methods to satisfy all DQIs:

Data Precision and Accuracy	
Adequate Sampling Density	Sampling carried out in accordance with procedure B of the NSW EPA Contaminated Sites: Sampling Design Guidelines, 1995;
	Use of analytical laboratories with adequately trained and experienced testing staff experienced in the analyses undertaken, with appropriate NATA certification.
Acceptable field and laboratory Relative Percentage Difference (RPD) for duplicate comparison	>10 x LOR: 30% inorganics; 50% organics (Field) <10 x LOR: Assessed on individual basis (Field) >5 x LOR: 50% (Laboratory) <5 x LOR: No Limit (Laboratory)
In accordance with AS4482.1 – 2005 field duplicate RPD criteria is increased with organic analytes and for low concentrations. These criteria cannot reasonably exceed the laboratory's precision, therefore laboratory criteria have been adopted.	
Trip Blanks/ Rinsate Blanks	No Detection above LOR
Trip Spikes	Recoverable concentrations of volatiles between 60 – 140%
Adequate laboratory performance	Based on acceptance criteria of laboratory as specified on certificate of analysis: includes: blank samples, matrix spikes, control samples, and surrogate spike samples
Data Representativeness	
Sample and analysis selection	Representativeness of all potential contaminants
Trip Blanks/ Rinsate Blanks	No Detection above LOR
Trip Spikes	Recoverable concentrations of volatiles between 60 – 140%
Duplicate Samples	Adequate duplicate, split, rinsate and trip blank sample numbers
Laboratory selection	Adequate laboratory internal quality control and quality assurance methods, complying with the NEPM.

Documentation Completeness	
Chain of Custody records	Laboratory sample receipt information received confirming receipt of samples intact and appropriate chain of custody
	NATA registered laboratory results certificates provided
Data Completeness	
	Analysis for all potential contaminants of concern
	Field duplicate sample numbers complying with NEPM
	Rinsate samples recovered regularly
	Trip spike samples prepared and sent with field samples regularly
Comparability	
	Use of NATA registered laboratories
	Test methods consistent for each sample in accordance with the Sampling Analysis and Quality Plan
	Detailed logs of all sample locations to be recorded
	Test methods comparable between primary and secondary laboratory
	Acceptable RPDs between original samples and field duplicates and inter-laboratory triplicate samples.

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Identify Inputs to Decision.

This step requires the identification of the factors that may, or may not have influenced the Site to make it unsuitable for the intended future land use. Inputs include:

- Determine the lateral extents of the site under investigation
- Undertake appropriate searches of the site to determine any recorded history of detrimental effects on the site
- Undertaking a review of historical aerial photographs to identify previous land use activities on site
- Reviewing potential off-site sources of contamination which may impact the site
- Undertake supplementary soil sampling to determine potential on-site contamination sources

Define the Study Boundaries.

Specify the spatial and temporal aspects of the environmental media that the data must represent to support decision. To identify the boundaries (both spatial and temporal) of the investigation and to identify any restrictions that may hinder the assessment process. This includes on- and off-site inspections and discussions with informed individuals. The physical study will focus on any fill materials, natural soils and groundwater encountered within the confines of the Site boundary.

Refer to **2.0** – Site Description, **Figure 2** - Site Layout with Sampling Locations.

Develop a Decision Rule.

To define the parameter(s) of interest, specify the action level and provide a logical basis for choosing additional actions.

Specify Limits on Decision Errors.

Specify the decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data. Incorrect decisions are

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caused by using data that is not representative of site conditions because of sampling or analytical error.

Optimise the Design for Obtaining Data.

Identify a resource-effective sampling and analysis design for data collection that satisfies the DQOs. The sampling and analytical plan is designed to avoid Type 1 and Type 2 errors and includes defining minimum sample numbers required to detect contamination as determined with procedures provided in the NSW EPA 1995 Sampling Design Guidelines and AS 4482.1 - 2005 and appropriate quality control procedures.

1.4 Statutory Framework

The environmental planning statutes in New South Wales, which most likely apply are:

- Contaminated Land Management Act 1997;
- Protection of the Environment Operations Act 1997;
- Dangerous Goods Act 1975;
- Ozone Protection Act 1989;
- Waste Minimisation and Management Act 1995;
- Environmental Planning and Assessment Act 1979; and,
- Local Government Act 1993.

In addition, regulations and planning instruments made under these Acts may also apply.

The *Protection of the Environment Operations Act* (POEO), 1997 commenced operation on 1st July 1999 and has repealed the following Acts:

- The Clean Waters Act 1970;
- The Clean Air Act 1961;
- The Noise Control Act 1975;
- The Environmental Offences and Penalties Act 1989: and,
- The Pollution Control Act 1970.

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The Act also incorporates the major regulatory provisions of *the Waste Minimisation and Management Act* 1995. The repealed Acts are incorporated into the POEO Act. Thus, regulations made under the repealed Acts are now regulations under the POEO Act or until otherwise amended and licences issued under the repealed Acts are deemed to be licences under the POEO Act. The POEO Act provides a common licence to cover emissions to all environmental media. The Act lists certain "scheduled activities" which have to be licensed.
The *Contaminated Land Management Act*, 1997 specifies the legal requirements for the registration, investigation and remediation of contaminated land, and for the registration and accreditation of site auditors. It repeals the requirements of the *Environmentally Hazardous Chemicals Act*, 1985 in relation to audits and the accreditation of site auditors.

The *Environmental Planning and Assessment Act*, 1989 gives local authorities the power to regulate development within their areas of responsibility and to impose specific consent conditions, which cover environmental issues. In addition, the *Local Government Act* 1993 requires approval from Council for certain works/activities to be obtained.

1.5 Scope of Work

The Investigation was conducted using the following methods:

- Search and review of records and Site plans available locally and from State Regulatory Authorities, including WorkCover, Department of Lands and OEH;
- Review of historical aerial photographs available from the Land Information Centre;
- Reviewing all environmental conditions of the Site including the geology and hydrogeology;
- Providing a comprehensive overview of the Sites past and current land uses and potential contamination issues; and,
- Investigation of soil chemical concentrations relative to the NEPM 1999 HILs in the 2013 amendment.

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The Investigation has been conducted in accordance with the following:

- The National Environment Protection (Assessment of Site Contamination) Measure (NEPM), National Environment Protection Council 1999;
- NSW OEH Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, August 2011;
- NSW EPA Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, second edition 2006;
- NSW EPA Guidelines for Assessing Service Station Sites, 1994;
- The Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council (NHMRC), January 1992; and,
- NSW DECCW Waste Classification Guidelines, 2009.

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2.0 SITE DESCRIPTION

2.1 Site Identification

The Site is located approximately forty (40) kilometres north-west of the Sydney CBD at 53-59 Christie Street, St Marys NSW, 2760. The Site is located within the Penrith City Council Local Government Area. The Site (Lot 136 DP 31912) consists of an irregular shape of approximately one (1) hectare of land, roughly divided into northern and southern halves by a wire fence running east to west. The Lot is zoned 'IN1 General Industrial' within the Penrith Local Environment Plan 2010.

Refer to **Figure 1** – Site Location

2.2 Proposed Future Land Use

The Site has been assessed in order that it meet the criteria for land use as per the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) *Tables 1A(1), 1A(3), Table 1B(6) and 1B(7) – Commercial/Industrial D,* consistent with the proposed redevelopment of the Site into commercial/industrial buildings.

Refer to **Appendix G** – Site Survey

2.3 Environmental Setting

2.3.1 Boundaries and Surrounding Land Use

The Site is irregularly shaped and four-sided. The Site boundaries consist of:

- An industrial/commercial site to the west (Better Springs spring manufacture and design). A wire fence runs approximately half way along the western boundary, after which the boundary line is unfenced.
- Slightly raised earth bank along the northern boundary, separating the Site from a disused railway corridor running adjacent to the northern boundary
- Cleared grassland and disturbed forest to the east.
- Christie Street at the southern boundary with a commercial site opposite (Pitt Tooling Services precision toolmakers).

For more detail regarding surrounding land use refer to **Section 4.1.2** – Off-Site Observations.

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2.3.2 Site Geology and Soils

The Site lies within the Cumberland Lowlands physio-geographic regions on the Wianamatta Soil Landscape – *Soil Landscapes of Penrith 1:100000 Sheet* (1990). The Site is located with the South Creek fluvial landscape consisting of floodplains, valley flats and drainage depressions on the Cumberland Plain. The landscape is flat to gently sloping alluvial plain with occasional terraces or levees providing relief. Slopes are less than 5% with local relief less than 10m. The driller's logs for groundwater monitoring wells within 1km of the Site indicated heavy orange/red/brown clays at shallow depths, consistent with soils encountered during bore drilling and hand-augering for the Investigation.

2.3.3 Site Topography and Hydrology

The Site is roughly divided into northern and southern halves. The northern, unfenced portion of the Site is predominantly flat bushland, with an embankment at the northern boundary which separates the Site from the disused railway corridor running adjacent to the northern boundary. Surface flow in the northern portion of the Site is expected to follow the natural topography and/or infiltrate into the soil. Groundwater is expected eventually to to join a small tributary of South Creek ~200m to the north-west, or South Creek itself ~500m to the west.

The southern half of the Lot is contained by a wire fence and comprises the paved concrete processing plant area, as well as the former entry and exit gates from Christie Street. At the southern boundary, the Site is level with Christie Street and this level is maintained approximately 25 meters north into the Site. The level drops approximately 1.5m to the access road running along the rear of the plant. The access road begins to the east of the plant, arcs down approximately 1.5m around to the rear of the plant and rises up again around the west side of the plant. Surface flow interacting with the access road is expected to follow the paved surfaces into observed stormwater drains.

The north-eastern and north-western corners of the southern portion of the Site rise up from the access road to the same level as the northern portion of the Lot. The north-western corner is a grassed area currently used for scrap metal storage. The north-eastern corner contains two (2) concrete storage bays. Some ponding may be expected to the north of the concrete storage bays, beyond the fence within the northern portion of the Lot – this area is noted as a pond on the site survey in **Appendix G**, but was observed to be dry during the sampling event.

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A search of the NSW DECCW groundwater works database indicated there are eight (8) registered bores within one (1) kilometre of the Site. Available information on four (4) of these bores indicated that each was for monitoring purposes, with standing water levels between 2.4 and 6.7 metres. No salinity levels were listed.

Refer to **Appendix B** – Groundwater Works Database Search

2.3.4 Acid Sulphate Soils

A search of the NSW Natural Resources Atlas indicated that there are no Acid Sulphate Soils to be present in the immediate vicinity of the Site.

2.3.5 Soil Salinity and Aggressivity

The New South Wales Natural Resources Atlas indicated no evidence of salinity hazards or dryland salinity indicators within the Site boundaries or land surrounding the Site. The Site is located in an area described as 'moderate salinity potential' in the *DIPNR Salinity Potential in Western Sydney 2002 Map*. The associated *Guidelines to accompany Map of Salinity Potential in Western Sydney 2002* indicate that areas most likely affected are 'lower slopes and drainage systems where water accumulation is high'. As such, the likelihood of aggressive corrosion is mild and the Site is considered unlikely to be impacted by salinity.

2.4 Development Controls

2.4.1 Penrith City Council Section 149 Planning Certificate

A Planning Certificate obtained from Penrith City Council under Section 149 of the Environmental Planning and Assessment Act, 1979 stated:

- The land does not include or comprises critical habitat;
- The land is not located in a Conservation Area;
- Any item of Environmental Heritage is not situated on the land;
- The land is not affected by any road widening or road realignment under Division 2 of Part 3 of the Roads Act 1993, any environmental planning instrument or any resolution of the council;

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- The land is not affected by the operation Sections 38 or 39 of the Coastal Protection Act, 1979;
- The land has not been proclaimed to be within a mine subsidence district;
- The land is not included in Council identified bush fire prone lands; and,
- The land is not affected by a Tree Preservation Order.

Refer to **Appendix C** – Section 149 Planning Certificate.

2.4.2 WorkCover Dangerous Goods License

A WorkCover Dangerous Goods search in their Stored Chemical Information Database indicated that three (3) Dangerous Goods Licenses are held for the Site. Details are summarised in **Table 2.1** below. There was no visual evidence for the potential USTs (Depot 1 and Depot 2) at the time the field investigation of the Site and the above-ground tank (Depot 3) was not present.

Table 2.1 – Workcover Dangerous Goods Search summary

Name	Goods	Location
Depot 1	Flammable Liquids (20,000L)	Under grass verge within southern Site boundary
Depot 2	Flammable Liquids (4000L)	Under grass verge within southern Site boundary
Depot 3	Flammable Gases (4000L)	Above-ground between the aggregate bin and the former receiving hopper area

Refer to **Appendix E** – Workcover Dangerous Goods Search.

2.4.3 Contaminated Land Record Search

A search was conducted of all records pertaining to section 58 of the Contaminated Land Management Act 1997 and revealed that the Site is not encumbered by any notices from the NSW DECCW with regard to contaminated land.

2.4.1 Heritage / Archaeological Items

No heritage or archaeological significance was noted either from the historical review or site inspection.

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2.5 Site History

2.5.1 Aerial Photograph Review

Aerial photographs from 1947 to 2005, available from the NSW Lands Department, were reviewed by DLA with relevant observations being summarised in **Table 2.2** below.

Table 2.2 – Aerial Photograph Review

Aerial Photograph	Description
1947	The Site is mostly cleared vacant land with several tracks crossing through. The future internal access road arcing around from the Christie Street entrance behind the cement plant and back to the Christie Street exit appears as a public road. Blocks immediately adjacent are either undeveloped or low density industrial/commercial. Railway corridor to the north is operational.
1961	Vegetation more dense, otherwise no visible change.
1970	Vegetation more dense, otherwise no visible change.
1982	Property adjacent to the west has slightly higher density of buildings. Southern portion of Site is partially cleared to accommodate what appears to be the present day, paved cement processing plant area. No fence is evident around the southern portion of the Site. A strip of land in the north-western corner of the present day Lot has been cleared and the present day fill material and small rubbish stockpiles are evident.
1994	Properties immediately opposite on Christie Street developed into commercial/industrial sites. Rail corridor to the north no longer operational. Southern portion of Site now appears fenced. Holding ponds at western boundary now present.
2005	No visible change.

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2.5.2 Historical Title Search

A review of the Historical Title reveals the ownership of the Site since 1943 – details are listed in **Table 2.3** below.

Table 2.3 – Title Search Summary

	Date	Owner	Land Use
V.9043 F.128 & Lot136 DP319912	1988-present	Boral Resources (NSW) Pty Limited	Concrete Processing
V.9043 F.128	1976-1988	Ready Mixed Concrete Industries Limited	Concrete Processing
Acquisitions	1943-1976	The Commonwealth of Australia	Not listed

Refer to **Appendix E** – Historical Title Search

2.5.1 Site History Summary

The Site has had two (2) owners since the Commonwealth released it in 1976 – both used the Site for concrete processing. The southern portion of the Site has been operational as a concrete processing plant since at least 1982. The northern portion of the Site appeared as predominantly cleared land in 1947, in an area being developed for industrial/commercial activity - vegetation has since steadily revered the area. The exceptions are the strip of cleared land containing fill material and small rubbish stockpiles, evident since 1982 in the aerial imagery analysed, as well as the area subject to ponding north of the concrete storage bays. Two (2) potential USTs are registered as having been present at the southern Site boundary adjacent to Christie Street.

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3.0 SITE INVESTIGATION PLAN

3.1 Field Investigation Procedure

The field investigation by DLA was undertaken on 22nd July 2013 and comprised the following:

- Inspection of the Site and identification of appropriate sampling locations prior to the commencement of work based on a review of Site history and aerial photographs;
- A judgemental sampling strategy to target areas of potential contamination;
- Sampling in accordance with the NSW EPA Sampling Design Guidelines and National Environmental Protection (Assessment of Site Contamination) Measure 1999; and,
- Collection of eighteen (18) primary soil samples from the Site.

Refer to **Figure 2** – Site Layout with Sampling Locations

3.1.1 Soil Collection

Samples from BH1-BH6 were obtained using a truck mounted drill rig with a solid flight auger. Samples from BH7-BH11 were obtained by using a hand auger and decontaminated trowel. Soils were placed into non-preserved glass containers with a Teflon-lined threaded cap to be transported to the laboratory. Soil samples obtained for chemical analysis were collected in accordance with the NSW EPA Samples Guidelines 1994, NEPM 1999 and AS4482.1-2005.

DLA Environmental employees are specifically trained in hazardous waste field investigation techniques and health and safety procedures. All techniques used are specified in the DLA Environmental Field Manual for Contaminated Sites and are based on methods specified by the United States Environment Protection Agency (US EPA) and The National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1).

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The justification of the sampling point regime for the Investigation was based on the investigator's knowledge, operational requirements, experience and history of the Site. All historical investigations and anecdotal evidence supported the sampling approach adopted and provided for samples to be collected in an unbiased manner.

3.1.2 Data Quality Control Measures

During the assessment of sites the integrity of data collected is considered paramount. For the Investigation of the Site, a number of measures were taken to ensure the quality of the data:

Sample Containers

Soil samples collected during the Investigation were placed immediately into laboratory prepared glass jars with Teflon lid inserts. Standard identification labels were adhered to each individual container and labelled according to depth, date, sampling team and media collected.

Decontamination

All equipment used in the sampling program, which includes a stainless steel trowel and a mixing bowl, was decontaminated prior to use and between samples to prevent cross contamination. Decontamination of equipment involved the following procedures:

- Cleaning equipment in potable water to remove gross contamination;
- Cleaning in a solution of 'Decon 90';
- Rinsing in clean demineralised water then wiping with clean lint free cloths.

Sample Tracking and Identification

All samples were identified with a unique sample number and all sampling details were included on the sample label and were reproduced on the field sample log and chain of custody records.

Refer to **Appendix A** for Chain of Custody details.

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Sample Transport

All soil samples were packed with ice from the time of collection and were transported under chain of custody from the Site to the NATA registered laboratory identified as Envirolab Services Pty Ltd of Chatswood. During the Investigation, the laboratory reported that all the samples arrived intact, with appropriate preservation medium and were analysed within their relative holding times for the respective analytes. All Trip Spike and Trip Blank results were within acceptance criteria providing validation that the transport procedures were satisfactory.

Refer to **Appendix A** for Chain of Custody and Sample Receipts.

Trip Spike

The Trip Spike is an assessment of the sample transport and handling procedures. Trip Spike samples were obtained from the laboratory prior to conducting field sampling. The results for percentage recovery were within acceptable levels of between 60% - 140% and ranged between 101% - 108%, validating the handling technique of the samples in the field and in transit. Results for the Trip Spike are included in **Table 3.1** below.

Table 3.2 – Trip Spike Analytical Results

Analyte	Percentage Recovery
Benzene	108%
Toluene	107%
Ethyl-Benzene	100%
Xylene	101%
4 -BFB (Surr. @ 100 µg/l)	101%

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Trip Blank

A Trip Blank accompanied the sampling for the sampling process and was not separated from the sample collection and transportation process. The purpose of the Trip Blank is to identify whether cross-contamination is occurring during the sample collection and transport process. The results of the analysis indicated no cross contamination was evident between sample containers and supports the representativeness of the data collected. The results for the Trip Blank collected are included in Table 3.2 below.

Table 3.2 – Trip Blank Analytical Results

Analyte	Result (µg/l)
Benzene	<1
Toluene	<1
Ethyl Benzene	<1
Meta- and para-xylene	<2
Ortho-xylene	<1
Total xylene	No detect
4 -BFB (Surr. @ 100 µg/l)	94%

Field Duplicates

Field duplicates provide an indication of the precision for the whole investigation process, that is; the sampling process, sample preparation and chemical analysis. Field duplicate soil samples are generally prepared through the following process:

- A larger than normal quantity of soil is recovered from the sample location selected for duplication;
- Soil is placed directly into two non-preserved glass jars;
- The laboratory supplied 250ml glass jars are sealed with an airtight, Teflon screw top lid and labelled; and,
- The fully filled jars are immediately placed in a chilled esky.

Duplicate samples were prepared on the basis of the number of primary samples obtained during the field work. The duplicate sample frequency was computed using the total number of samples analysed as part of the Investigation. The duplicate sample frequencies are shown below:

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Investigative samples

18 primary samples:	2 intra-laboratory duplicates	=	~11.1%
	1 inter-laboratory duplicate	=	~5.6%

Comparisons were made between the laboratory test results for the duplicate samples and the original samples. The Relative Percentage Difference (RPD) is calculated as Difference / Average in order to assess the accuracy of the sampling and laboratory test procedures. The comparisons between the duplicates and original samples indicate acceptable RPDs when they comply with criteria which are commonly set at:

- less than 30% for inorganics and 50% for organics;
- less than five (5) times the laboratory limit of recording (LOR); and,
- less than 5% of the relevant Health Investigation Level (HIL) concentration.

The RPD was calculated for each sample with heavy metal readings above the laboratory LOR – all TRH, BTEX, PAH, OCP, OPP and PCB values were below the laboratory LOR.

Refer to **Table 3.3** below for RPD calculations.

Table 3.3 – Calculated inter- and intra-laboratory RPDs for soil samples

Duplicate	Heavy Metals							
	As	Cd	Cr	Cu	Pb	Hg	Ni	Zn
BH3-1.0	5.0	<0.4	18.0	9.0	8.0	<0.1	5.0	7.0
BH3-1.0a	<4	<0.4	9.0	7.0	6.0	<0.1	3.0	7.0
RPD	**86%**	0%	**67%**	25%	29%	0%	50%	0%
BH6-2.0	4.0	<0.4	10.0	11.0	7.0	<0.1	2.0	13.0
BH6-2.0a	<4	<0.4	5.0	8.0	5.0	<0.1	2.0	8.0
RPD	**67%**	0%	**67%**	**32%**	**33%**	0%	0%	**48%**
BH3-1.0	5	<0.4	18	9	8	<0.1	5.0	7
BH3-1.0b	5.0	<0.3	20.0	8.1	9.0	<0.01	4.8	7.5
RPD	0%	0%	11%	11%	12%	0%	4%	7%
Acceptable Criteria	**30%**	**30%**	**30%**	**30%**	**30%**	**30%**	**30%**	**30%**

Between BH3-1.0 and BH3-1.0a the RPDs for As (86%) and Cr (67%) are greater than the acceptable criteria of 30%. However, the As and Cr concentration values were less than five (5) times the laboratory Limit of Reporting (LOR) and/or less than 5% of the relevant Health Investigation Level (HIL) concentration and therefore satisfy the adopted site criteria.

Between BH3-1.0 and BH3-1.0b all RPD values are less than the acceptable criteria of 30%.

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Between BH6-2.0 and BH6-2.0a the RPD for As (67%), Cr (67%), Cu (32%), Pb (33%) and Zn (48%) are greater than the acceptable criteria of 30%. However, the As, Cr, Cu, Pb and Zn concentration values were less than five (5) times the laboratory Limit of Reporting (LOR) and/or less than 5% of the relevant Health Investigation Level (HIL) concentration and therefore satisfy the adopted site criteria.

3.2 Analytical Strategy

Samples were analysed for a range of contaminant indicators that may be associated with past and present land uses. Soil samples collected by DLA were analysed by Envirolab Services Pty Ltd of Chatswood, Australian Safer Environment and Technology Pty Ltd (ASET) of Hornsby and SGS Australia Pty Ltd of Alexandria for the following parameters:

Inorganic

- Heavy metals: arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni), and zinc (Zn), in twelve (12) primary samples; and,
- Asbestos in eight (8) samples.

Organic

- Total Recoverable Hydrocarbons (TRH), in twelve (12) samples;
- Monocyclic aromatic hydrocarbons (BTEX), in eleven (11) samples;
- Organochlorine (OC) Pesticides, in eleven (11) samples;
- Organophosphorus (OP) Pesticides, in eleven (11) samples;
- Polycyclic Aromatic Hydrocarbons (PAH), in eighteen (18) samples; and,
- Polychlorinated Biphenyls (PCBs), in eleven (11) samples.

Results of contaminant concentrations were assessed with reference to the relevant Health Investigation Levels (HILs) prior to reporting and making recommendations.

Refer to **Appendix A** – NATA Certified Analytical Data.

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3.2.1 Investigation Data

The Site was assessed through eleven (11) investigation sampling locations. This plan was developed in accordance with EPA sampling design guidelines. The Decision Making Process for assessing urban redevelopment sites, presented in Appendix 1 of the NSW EPA Guidelines for the NSW Site Auditor Scheme, 2nd Edition 2006, was reviewed prior to undertaking assessment of the Site, as were the associated Health Investigation Levels (HILs). The most appropriate assessment criteria, with respect to the intended land use at the Site, were selected from the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) *Table 1A(1) – Commercial/Industrial D.*

3.3 Soil Criteria

3.3.1 Rationale for the Selection of Assessment Criteria

The criteria selected have been chosen in accordance with current Australian and NSW EPA guidelines. Australian Guidelines have been used in preference to international guidelines where available. These criteria are the most current and widely accepted guidelines in use at present in Australia and have generally been developed using a risk-based approach. Therefore, the general selected guidelines provide a satisfactory framework for the Investigation.

The general site adopted statistical criteria are:

- The arithmetic mean using 95% UCL does not exceed the HIL;
- The individual contaminant concentration should not exceed the HIL by more than 250%; and,
- The standard deviation of individual contaminants should not exceed 50% of the HIL.

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3.3.2 Soil Criteria

The adopted site criteria for assessing the Site were derived from the following publications:

- NEPM 1999 Schedule B1 Guideline on the Investigation Levels for Soil and Groundwater from the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1);
- NSW EPA Guidelines for Assessing Service Station Sites 1994; and,
- NSW EPA Guidelines for the NSW Site Auditor Scheme, second edition 2006.

Refer to **Table 3.4** and **Table 3.5** below for a summary of the Site soil criteria.

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Table 3.4 – Adopted Site Criteria for Soils

Analytes	Thresholds (mg/kg dry wt)	Source
Benzene Toluene Ethylbenzene Xylene (total)	1 130[a] 50[b] 25[b]	NSW Service Station Guidelines 1994
TRH: C_6-C_{10} TRH: C_{10}-C_{16} TRH: C_{16}-C_{34} TRH: C_{34}-C_{40}	See notes[c]	NEPM 1999 Schedule B1 Amendment Measure 2013 (No.1) Tables 1A(3), 1B(6) & 1B(7)
Arsenic Cadmium Chromium Copper Lead Mercury Nickel Zinc	3000 900 3600 240000 1500 730 6000 400000	NEPM 1999 Schedule B1 Amendment Measure 2013 (No.1) Table 1A(1) – Commercial/Industrial D
B(a)P Total PAHs	40 4000	
PCBs Aldrin/Dieldrin Chlordane DDT+DDE+DDD	7 45 530 3600	
Odours	No odours	NSW EPA
Asbestos	No visible asbestos for surface soil 0.05% w/w Bonded Asbestos-Containing Material 0.001% w/w FA and AF (friable asbestos)	NEPM 1999 Schedule B1 Amendment Measure 2013 (No.1) Table 7 - Health Screening Levels for asbestos contamination in soil

[a] The toluene threshold concentration is the Netherlands Maximum Permissible Concentration (MPC) to protect terrestrial organisms in soil. This value was obtained by applying the US EPA assessment factor to terrestrial chronic No Observed Effect Concentration (NOEC) data. The MPC is an "indicative" value (Van de Plassche et al 1993: Van de Plassche and Bockting 1993).

[b] Human health and ecological based protection level for toluene. The threshold concentration presented here is the Netherlands intervention value for the protection of terrestrial organisms. Other considerations such as odours and the protection of groundwater may require a lower remediation criterion.

[c] Geometric mean values are calculated for sample concentrations within each hydrocarbon fraction and compared against Health Screening Levels (HSLs), Ecological Screening Levels (ESLs) and Management Limits values which alter depending upon the combination of proposed land use, soil type and sample depth.

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Table 3.5 – NSW EPA Provisional Phytotoxicity – Metals (mg/kg)

Heavy Metals	NSW EPA Provisional Phytotoxicity (mg/kg)
Arsenic	20
Cadmium	3
Chromium	400
Copper	100
Lead	600
Mercury	1
Nickel	60
Zinc	200

Phytotoxicity (i.e. toxicity to plants) is used as the indicative environmental effect to be dealt with in the context of land redevelopment. The use of single number criteria for all ecosystems has significant limitations as biological responses to the chronic or acute effects of toxicity vary significantly between species. Bioavailability depends on soil conditions, geography, climate and species behaviour, which govern exposure pathways and need to be factored into any assessment. The provisional phytotoxicity-based investigation levels are criteria that are intended for use as a screen guide only.

3.3.3 Limitations of the Assessment Criteria

All criteria have limitations. Not all chemical analytes are covered by each set of guidelines, requiring some criteria to be sourced from elsewhere. This is particularly relevant to the Dutch guidelines, which provide a guideline for assessment for some analytes not covered by the Australian guidelines. Only criteria relevant to Australia have been used in the interpretation of analytical data on the Site.

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4.0 RESULTS

4.1 Field observations

4.1.1 On-Site Observations

Observations will be with reference to **Figure 2** – Site Layout and Sample Locations and **Appendix G** – Site Survey. No staining or odours were encountered during the field investigation.

On the southern side of the conveyor line, between the concrete plant and the dump point for dry materials (refer to Appendix X – Site Survey) a small stockpile of material was observed and a sample (SP1) was obtained for laboratory analysis. The stockpile contained potentially bituminous material, concrete, steel and timber.

Refer to Print 1 in **Appendix H** - Print Gallery

In the north-eastern corner of the southern portion of the Site, two (2) concrete storage bays were noted to have influenced the area to the west through overflow of concrete material. The overflow of material has filled the adjacent drain and moved onto the adjacent grassed area where much of the soil profile sampled (Bore Hole 4) was concentrated with concrete material.

Refer to Print 2 in **Appendix H** - Print Gallery

The site survey notes a "Storage Facility (Silo)" positioned approximately at the centre of the northern boundary of the southern portion of the Lot. Several metres to the west of the silo, at the base of the block retaining wall, several small containers of brake cleaner and engine oil were noted to be on the paved concrete surface. No leaking or staining was evident.

Refer to Print 3 in **Appendix H** - Print Gallery

Two (2) suspected asbestos-containing material samples (a piece of roof sheeting and a piece of power-board backing material) from the small shed between the concrete plant and the brick office were submitted for laboratory analysis. Both were positively identified as containing asbestos.

Refer to Print 4 in **Appendix H** - Print Gallery

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Four (4) storage tanks were identified to the north of the conveyor line, between the brick shed and the concrete plant. All the tanks were above concrete bunding with no staining or odours observed. The identity of the chemicals present and volumes of the tanks were not identifiable during field observations, excepting a ten (10) litre tank labelled 'Glenium 27'.

Refer to Print 5 in **Appendix H** - Print Gallery

The large area of fill material located in the north-western corner of the Lot contains numerous small stockpiles of general rubbish including concrete, metal, plastic, tyres and an old car.

Refer to Prints 6, 7 and 8 in **Appendix H** - Print Gallery

4.1.2 Off-Site Observations

No activity on properties in the vicinity of the Site was observed to have the potential to contaminate the Site.

4.2 Soil Analysis Results

Eighteen (18) primary soil samples were obtained by DLA from eleven (11) separate locations across the Site and submitted for laboratory analysis.

Refer to **Figure 2** – Site Layout with Sampling Locations

All analytical results from samples collected by DLA were compared against the adopted site criteria Health Investigation Levels (HILs). The sampling regime involved the collection of representative soil samples, based upon access. Eighteen (18) soil samples were submitted EnviroLab Pty Ltd for a range of laboratory analyses. The results of the soil analyses are summarised below.

Asbestos

Asbestos was not detected in any of the eight (8) soil samples submitted to the laboratory for asbestos analysis and therefore the adopted site criteria are satisfied.

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Aromatic Hydrocarbons (BTEX)

Eleven (11) samples were analysed for Monocyclic Aromatic Hydrocarbons which include benzene, toluene, ethylbenzene and xylenes (commonly referred to together as BTEX), associated with petrol contamination. No concentrations of BTEX fractions were recorded above the Laboratory Limit of Reporting (LOR) and hence all results satisfy the adopted site criteria.

Total Recoverable Hydrocarbons (TRH)

Twelve (12) samples were analysed for TRH and compared against The National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) guidelines, which provide Health Screening Levels (HSLs), Ecological Screening Levels (ESLs) and Management Limits for TRH fractions in soil and groundwater based on concerns regarding ecological impacts, inhalation of vapours and direct contact with contaminant sources. The geometric mean, median or 95% Upper Confidence Limit of the TRH values for each Fraction Number (ie hydrocarbon compound range) is calculated and compared against the prescribed HSL, ESL and Management Limit values. HSLs, ESLs and Management Limits take into consideration:

- Carbon number range, indicated by a Fraction Number (F1, F2, F3 or F4);
- Type of soil (sand, silt or clay);
- Depth to the source of contamination; and,
- Intended land use (High density residential [HSL A & HSL B], Recreational/Open Space [HSL C] or Commercial/Industrial [HSL D])

The geometric mean of TRH results was used; the intended land use is Commercial/Industrial; and the soil type was clay within a depth range of 0-1.0m. The results are summarised in Table 4.1 below.

Evaluation of Compliance with Adopted Site Criteria for TRH

Health Screening Levels (HSLs)

In the F1 fraction, no concentrations were recorded above the laboratory LOR therefore the geometric mean value was 'non detect' (nd). With regard to the F2 fraction, in clay within this depth range this fraction of hydrocarbon compounds is regarded as 'Not Limiting', which is defined as meaning the soil vapour concentration for a petroleum mixture could not exceed a

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level that would result in the maximum allowable vapour risk for the given scenario (in this case, clay at a depth range of 0-1.0m with an intended Commercial/Industrial land use). With regard to the F3 and F4 fractions, despite BH2-0.1 and BH3-0.1 both returning a low level of 200mg/kg in the F3 fraction, HSLs are not applicable (N/A) as these heavier fractions are not volatile and hence are not of concern for vapour intrusion.

Ecological Screening Levels (ESLs)

The geometric mean concentrations are lower than the ESL values for the F1, F2, F3 and F4 fractions and therefore satisfy the adopted site criteria.

Management Limits

Table 4.1 shows that the geometric mean concentration for the each of the hydrocarbon fractions does not exceed the associated TRH Management Limit value and therefore the adopted site assessment criteria are satisfied.

In conclusion the results of laboratory analysis for TRH concentrations, compared with the HSLs, ESLs and Management Limits as per The National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) satisfy the adopted site criteria.

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Table 4.1 – Geometric Mean (GM) of semi-volatile TRH detections in soil (mg/kg) compared with The National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) TRH criteria

	Fraction Numbers			
	F1 (C_6-C_{10})	**F2 (C_{10}-C_{16})**	**F3 (C_{16}-C_{34})**	**F4 (C_{34}-C_{40})**
BH2-0.1	nd	nd	200	nd
BH3-0.1	nd	nd	200	nd
Geometric Mean	nd	nd	200	nd
HSL D[1] (clay at 0-1.0m)	310	NL	N/A	N/A
ESL[2] (Fine*)	215	170	2500	6600
Management Limits[3] (Fine*)	800	1000	5000	10000

Notes:

nd = No detect
NL = Not Limiting (ie The soil vapour concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario)
N/A = Not applicable as these fractions are not volatile and hence are not of concern for vapour intrusion
* 'Fine' refers to the soil texture grading as per NEPM 1999
[1] NEPM 1999 *Table 1A(3) – Soil HSLs for vapour intrusion*
[2] NEPM 1999 *Table 1B(6) – ESLs for TPH fractions, BTEX and benzo(a)pyrene in soil*
[3] NEPM 1999 *Table 1B(7) – Management Limits for TPH fractions F1-F4 in soil*

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Polycyclic Aromatic Hydrocarbons (PAH)

Eighteen (18) samples were analysed for Polycyclic Aromatic Hydrocarbons (PAH). Eight (8) samples had minor concentrations above the LOR, however no concentrations exceeded the HILs and thus all results satisfy the adopted site criteria. The results are summarised in Table 4.2 below.

Table 4.2 – PAH detections in soil samples (mg/kg)

Sample ID	B(a)P	Total PAH
BH1-0.1	<0.5	2.3
BH2-0.1	3	18
BH3-0.1	3	16
BH3-1.0	1	4.5
BH5-0.1	<0.5	0.84
BH5-0.5	<0.5	3.8
BH9-0.3	<0.5	1.4
SP1	<0.5	0.14
HIL	**40**	**4000**

Polychlorinated Biphenyls (PCBs)

Eleven (11) samples were submitted for PCB analysis. No samples had concentrations above the LOR and therefore all results satisfy the adopted site criteria.

Pesticides

Eleven (11) samples were submitted for Organochlorine (OC) Pesticides and Organophosphorous (OP) Pesticides analysis. There were no concentrations of pesticides recorded above the LOR and therefore none above the HILs.

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Heavy Metals

Eighteen (18) primary samples were submitted for analysis of all eight (8) heavy metals as recommended by the NSW OEH. No sample concentration of any tested metal exceeded the relevant HIL and the results are summarised in Table 4.3 below.

Table 4.3 – Heavy metal detections in soil (mg/kg)

Sample ID and depth (m)	Heavy Metals							
	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
BH1-0.1	<4	<0.4	15	7	7	<0.1	4	<4
BH1-0.8	<4	<0.4	4	7	4	<0.1	1	<4
BH2-0.1	6	0.5	39	26	33	<0.1	21	6
BH2-0.9	<4	<0.4	21	25	44	<0.1	9	<4
BH3-0.1	8	0.5	39	5	13	<0.1	4	8
BH3-1.0	5	<0.4	18	9	8	<0.1	5	5
BH4-0.1	5	<0.4	15	9	10	<0.1	7	5
BH4-2.0	5	<0.4	30	20	11	<0.1	10	5
BH4-4.0	7	<0.4	25	11	20	<0.1	6	7
BH5-0.1	<4	<0.4	14	12	8	<0.1	3	<4
BH5-0.5	<4	<0.4	12	7	7	<0.1	2	<4
BH6-0.4	4	<0.4	10	11	7	<0.1	2	4
BH6-2.0	5	<0.4	15	9	10	<0.1	7	5
BH7-0.3	<4	<0.4	7	7	6	<0.1	1	<4
BH8-0.3	<4	<0.4	11	11	14	<0.1	2	<4
BH9-0.3	5	0.7	16	74	100	<0.1	9	5
BH10-0.3	<4	<0.4	8	4	4	<0.1	4	<4
BH11-0.3	8	0.4	39	11	46	<0.1	5	8
SP1	5	<0.4	68	24	8	<0.1	56	5
HIL	**3000**	**900**	**3600**	**240000**	**1500**	**730**	**6000**	**400000**
EIL	**20**	**3**	**400**	**100**	**600**	**1**	**60**	**200**

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5.0 DISCUSSION

All concentrations of heavy metals, BTEX, PAH, TRH, OC/OP pesticides and PCBs in soil samples obtained by DLA from within the Site boundary were below the NSW EPA Provisional Phytotoxicity HILs, as well the HILs for commercial/industrial land use as per the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) *Table 1A(1) – Commercial/Industrial D*. All soil analytical results therefore satisfy the adopted site criteria.

The desktop search did not reveal any contaminated land notices nor any heritage or archaeological significance. The New South Wales Natural Resources Atlas indicated no evidence of salinity hazards or dryland salinity indicators within the Site boundaries or land surrounding the Site. The Site is considered unlikely to be impacted by salinity therefore soil salinity and aggressivity is not a concern for the intended land use of the Site and salinity and aggressivity analysis of soils at the Site is not believed to be necessary.

A Workcover Dangerous Goods search on the property indicated that licences exist for two (2) under-ground storage tanks (USTs) of flammable liquids and one (1) above-ground storage tank for flammable gases. The above-ground storage tank was not present. There was no evidence for the USTs but given that there is no evidence they have been removed it is as assumed that both tanks remain present. If present, any future redevelopment will require removal, decommissioning or abandonment of the USTs, with any associated potential remediation undertaken.

The small containers to the west of the on-site storage silo labelled as brake cleaner and engine oil were situated on the paved concrete surface. No leaking or staining was evident. The above-ground storage tanks identified to the north of the conveyor line, between the brick shed and the concrete plant, appear secure with concrete bunding in place. No staining or leaking was evident. The contents of one (1) tank could be identified - a ten (10) litre tank of 'Glenium 27'. The Material Safety Data Sheet for Glenium 27 indicates that it is not hazardous according to the criteria of the NOHSC, with no risk phrase or safety phrase allocated.

Two (2) suspected asbestos-containing material samples (a piece of roof sheeting and a piece of power-board backing material) from the small shed between the concrete plant and the brick office (labelled 'Shed' on the Site survey) were submitted for laboratory analysis and both were positively identified as containing asbestos. Asbestos-containing material will

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need to be removed in accordance with Workcover requirements and clearance certification obtained prior to demolition if redevelopment occurs in the future.

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6.0 CONCLUSION

This Stage 1 Preliminary Site Investigation chemically evaluated the levels of potential soil contaminants and involved both visual and historical investigation of the potential environmental impacts on the Site in accordance with SEPP-55 Remediation of Land and the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1).

Laboratory analytical results for soil samples obtained by DLA were incorporated into this Investigation. The sampling regime and subsequent assessment and reporting of the Site is considered to be adequate to determine land use suitability. All current and historical activities observed during the Investigation were found to pose a very low risk of contamination to the Site. No staining or odours were encountered during the field investigation.

Asbestos-containing material (roof sheeting and power-board backing material) from the small shed between the concrete plant and the brick office (labelled 'Shed' on the Site survey) will need to be removed in accordance with Workcover requirements and clearance certification obtained prior to demolition if redevelopment occurs in the future.

DLA submitted eighteen (18) soil samples from across the Site for laboratory analysis and no evidence can be found to infer soil contamination in exceedance of the adopted site criteria. No asbestos was detected in eight (8) soil samples submitted for laboratory analysis. All concentrations of heavy metals, BTEX, PAH, TRH, OC/OP pesticides and PCBs in soil samples obtained by DLA from within the Site boundary were below the NSW EPA Provisional Phytotoxicity Health Investigation Levels (HILs), as well as the HILs in the NEPM 1999 Schedule B1 Guideline on the Investigation Levels for Soil and Groundwater from the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) *Table 1A(1) – Commercial/Industrial D.* All soil analytical results therefore satisfy the adopted site criteria.

As with sites of this nature, containing potential uncontrolled fill materials and general rubbish, during redevelopment it would be beneficial to have an Unexpected Findings Protocol, provided as **Attachment 1** within this report.

The completion of this report concludes that the Soil Supplemented Stage 1 Preliminary Site Investigation objectives, according to the adopted site criteria, have been achieved. **The Site is suitable for land use consistent with the NEPM 1999 National Environment**

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Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) Table 1A(1) – Commercial/industrial D. Should the land use be changed in the future, this report should be reviewed to ensure compliance with suitable soil investigation levels for the appropriate end land use or zoning.

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Figure 1

Site Location

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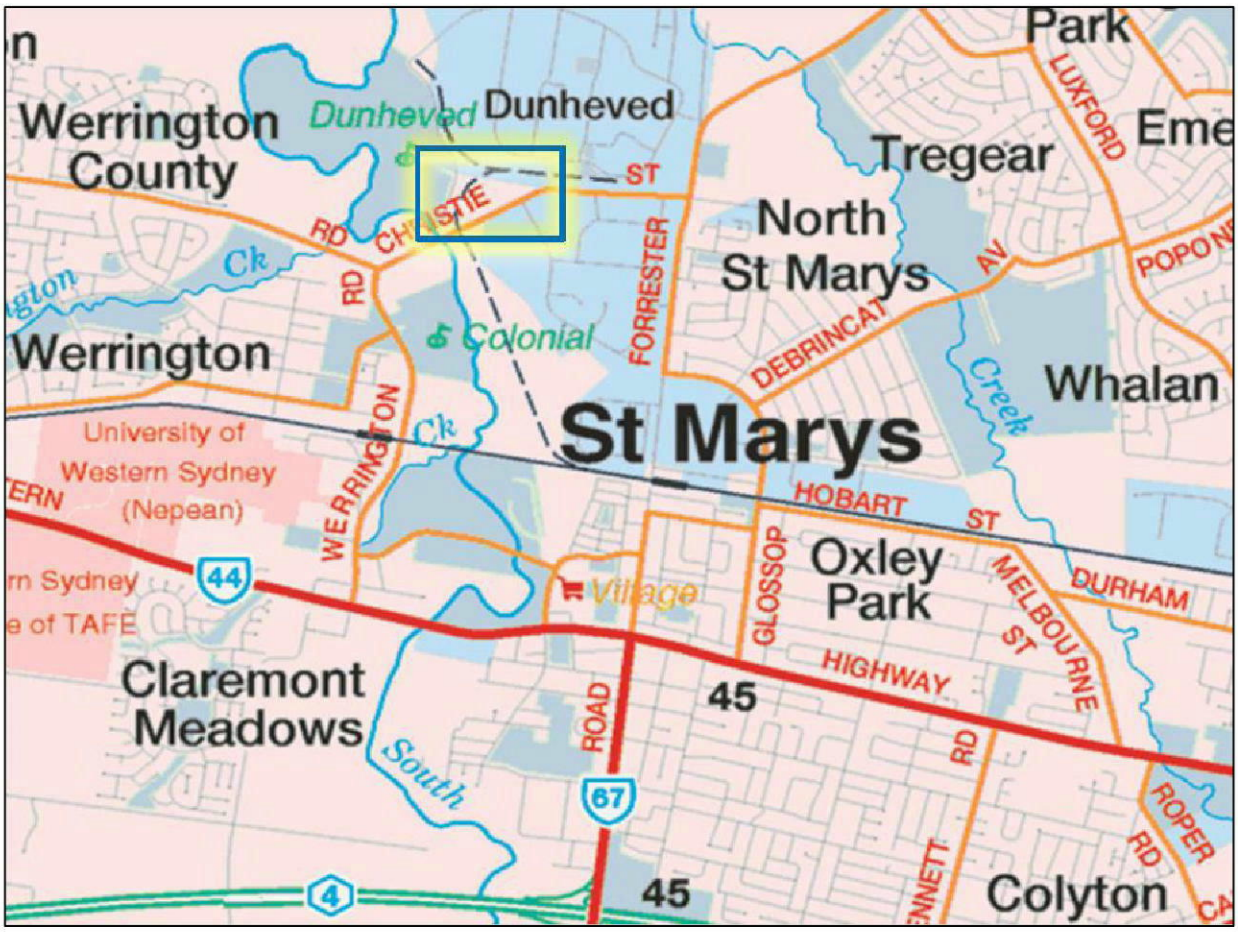

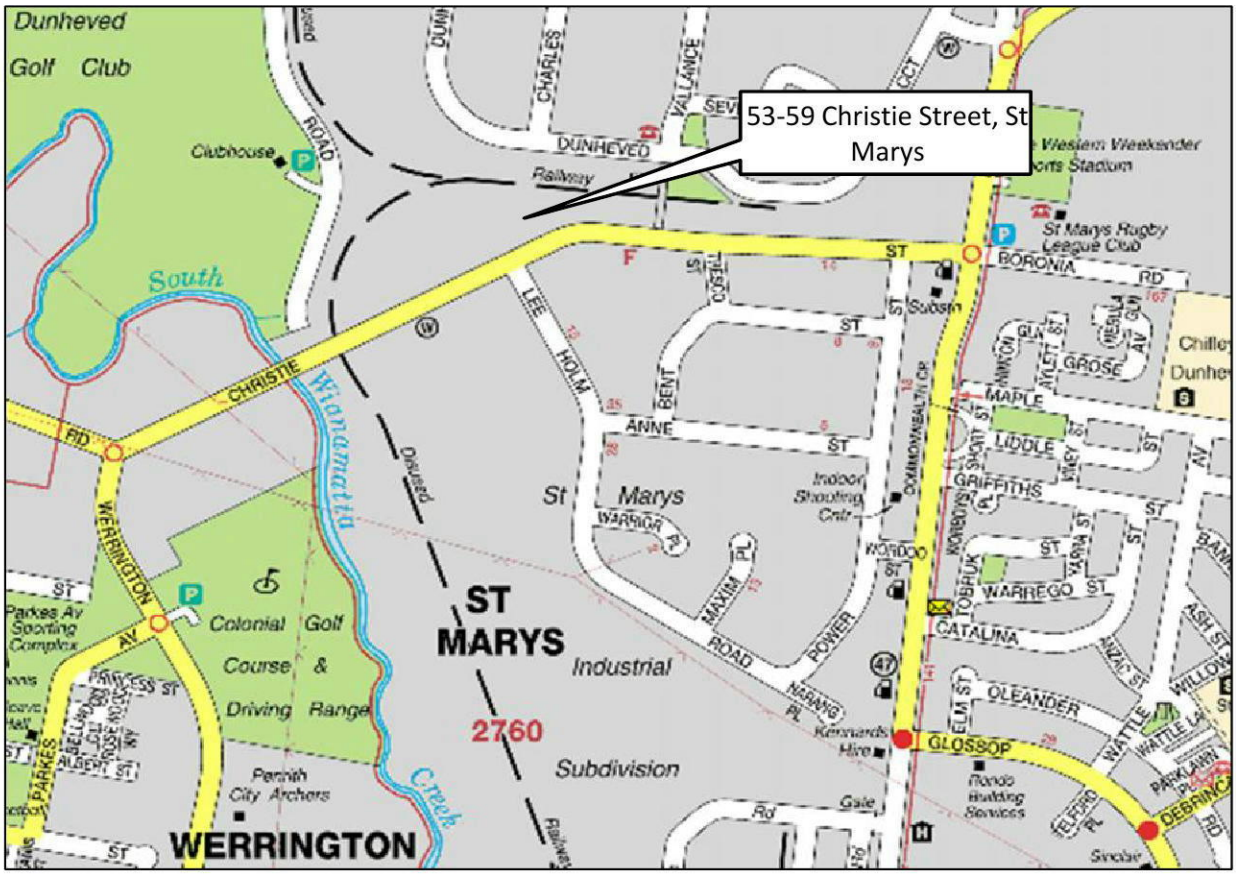

DLA environmental Unit 2b/30 Leighton Place Hornsby, NSW 2077	**DESIGNED:** DLA	SITE LOCATION	
	COMPILED: EM	**CLIENT:** Artazan Property Group Pty Ltd	**DRAWING:** 1/08/2013
	PROJ. No. DL3136	**LOCATION:** 53-59 Christie Street St Marys NSW, 2760	**FIGURE:** 1

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Figure 2

Site Layout with Sampling Locations

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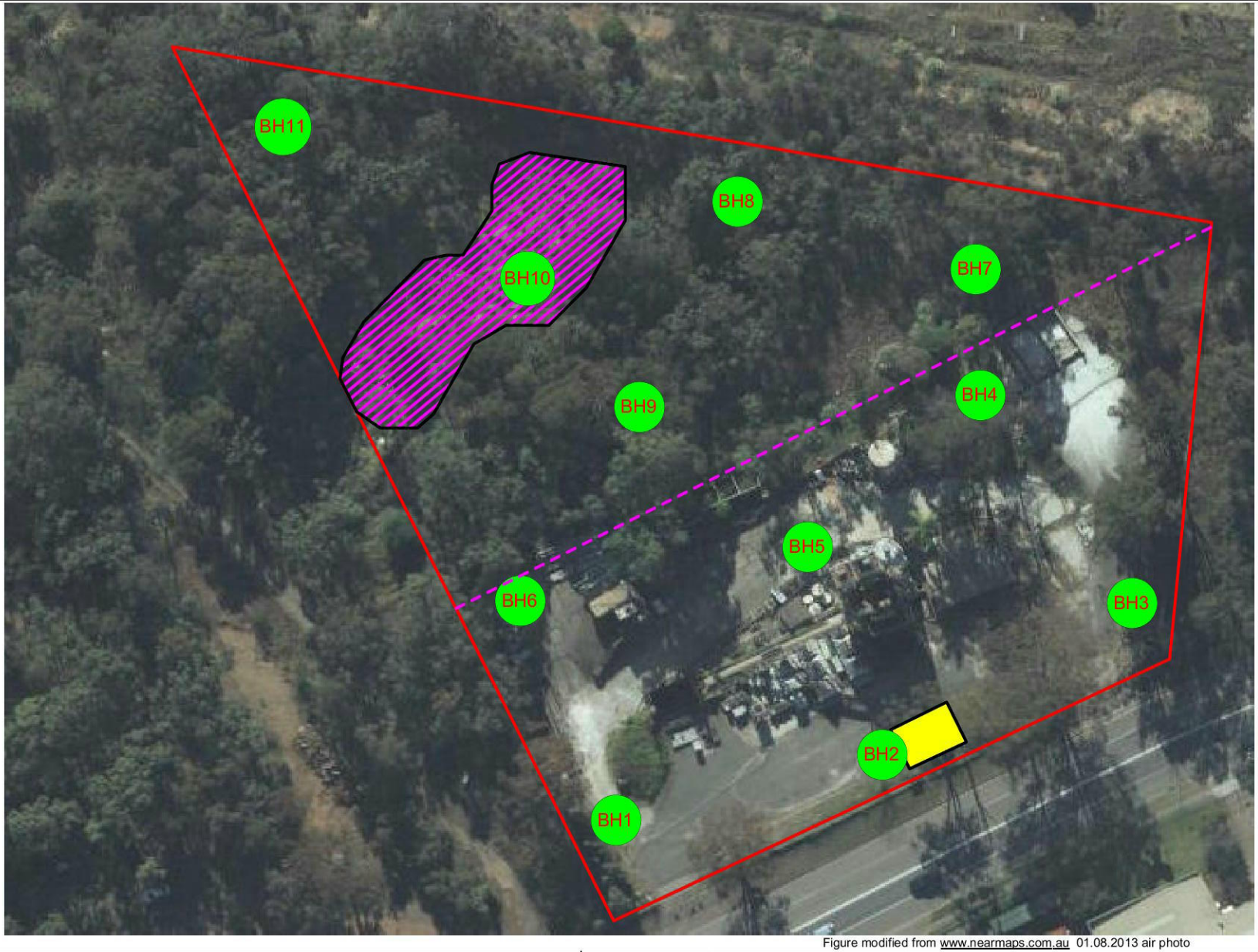

Figure modified from www.nearmaps.com.au 01.08.2013 air photo

Legend

- Site Boundary
- Sample Location & ID
- Approximate area of fill material and small stockpiles of rubbish
- Potential USTs
- Fence line

Scale
0 5 10 15
(metres)

N

DLA environmental
Unit 2b/30 Leighton Place
Hornsby, NSW 2077

Newcastle Office
Phone (02) 4938 3800
Fax (02) 4938 3811

Sydney Office
Phone (02) 9476 1765
Fax (02) 9476 1557

Title:	Site Layout with Sample Locations			
Client: Artazan Property Group Pty Ltd	Job No: DL3136	Figure No: 2	Date: 01/08/2013	
	Scale: As Shown	Sheet: 1 of 1	Revision: R00	

Appendix A

NATA Certified Analytical Results

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Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

David Lane Associates
2B, 30 Leighton Pl
Hornsby NSW 2077

ph: 02 9476 1765
Fax: 02 9476 1557

Attention: Ed Milne

Sample log in details:

Your reference:	**DL3136 - St Marys**
Envirolab Reference:	**94304**
Date received:	23/07/13
Date results expected to be reported:	**31/07/13**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	23 soils, 2 water
Turnaround time requested:	Standard
Temperature on receipt	8.7
Cooling Method:	Ice
Sampling Date Provided:	YES

Comments:

Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

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CHAIN OF CUSTODY - Client

20323

ENVIROLAB GROUP - National phone number 1300 42 43 44

SYDNEY LAB - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

PERTH LAB - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

MELBOURNE LAB - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

BRISBANE OFFICE - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

ADELAIDE OFFICE - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 08 8369 0722/ 0406 350 706
adelaide@envirolab.com.au

Client: DLA

Contact Person: Ed

Project Manager:

Sampler:

Address:

Phone: 9476 M65 **Mobile:**

Email: dlaenvironmental@bigpond.com

Client Project Name / Number / Site *(ie report title)*: DL3136 - St Marys

PO No.:

Envirolab Quote No. :

Date results required: ____/____/____

Or choose: standard / same day / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Report format: esdat / equis /

Lab Comments:

Sample Information

Envirolab Sample ID	Client Sample ID or information	Depth (m)	Date Sampled	Type of Sample
1	BH1 - 0.1	0.1	22/7	Soil
2	BH1 - 0.8	0.8		
3	BH1 - 0.8a	0.8		
4	BH2 - 0.1	0.1		
5	BH2 - 0.9	0.9		
6	BH3 - 0.1	0.1		
7	BH3 - 1.0	1.0		
8	BH3 - 1.0a	1.0		
9	~~BH4 - 1.0~~ BH4 - 0.1 D.F	1.0		
10	BH4 - 2.0	2.0		
11	BH4 - 4.0	4.0		
12	BH5 - 0.1	0.1		
13	BH5 - 0.5	0.5		

Tests Required

On Hold
✓

Comments

Provide as much information about the sample as you can

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 94304

Date Received: 23-7-13
Time Received: 16:00
Received by: D.F
Temp: Cool/Ambient (8.7°C)
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by *(Company)*: DLA

Print Name: Ed Milne

Date & Time: 23/7/13 1:00

Signature:

Received by *(Company)*: ELS

Print Name: Daniel Ford

Date & Time: 23-7-13 16:00

Signature:

Lab use only:

Samples Received: Cool / Ambient *(circle one)*

Temperature Received at: _____ *(if applicable)*

Transported by: Hand delivered / courier *(circle one)*

WHITE - LAB COPY / BLUE - CLIENT COPY / PINK - RETAIN IN BOOK

Document Set ID: 4402102
Version: 1, Version Date: 13/12/2013

CHAIN OF CUSTODY - Client

20324

ENVIROLAB GROUP - National phone number 1300 42 43 44

SYDNEY LAB - Envirolab Services
12 Ashley St, Chatswood, NSW 2067
Ph 02 9910 6200 / sydney@envirolab.com.au

PERTH LAB - MPL Laboratories
16-18 Hayden Crt Myaree, WA 6154
Ph 08 9317 2505 / lab@mpl.com.au

MELBOURNE LAB - Envirolab Services
1A Dalmore Drive Scoresby VIC 3179
Ph 03 9763 2500 / melbourne@envirolab.com.au

BRISBANE OFFICE - Envirolab Services
20a, 10-20 Depot St, Banyo, QLD 4014
Ph 07 3266 9532 / brisbane@envirolab.com.au

ADELAIDE OFFICE - Envirolab Services
7a The Parade, Norwood, SA 5067
Ph 08 8369 0722/ 0406 350 706
adelaide@envirolab.com.au

Client: DLA

Contact Person: ED

Project Manager:

Sampler:

Address:

Phone: 94761765 **Mobile:**

Email: dlaenvironmental@bigpond.com

Client Project Name / Number / Site *(ie report title)*: DL3136 - St Marys

PO No.:

Envirolab Quote No. :

Date results required: ____/____/____

Or choose: standard / same day / 1 day / 2 day / 3 day
Note: Inform lab in advance if urgent turnaround is required - surcharges apply

Report format: esdat / equis /

Lab Comments:

Sample Information

Envirolab Sample ID	Client Sample ID or information	Depth	Date Sampled	Type of Sample
14	BH6 - 0.4	0.4	22/7	Soil
15	BH6 - 2.0	2.0		
16	BH6 - 2.0a	2.0		
17	BH7 - 0.3	0.3		
18	BH8 - 0.3	0.3		
19	BH9 - 0.3	0.3		
20	BH10 - 0.3	0.3		
21	BH11 - 0.3	0.3		
22	BH12 - 0.3	0.3		
23	SP1			
24 D.F.	TB		19/7	water
25	Ts			

Tests Required

On Hold
✓

Comments

Provide as much information about the sample as you can

Relinquished by *(Company)*: DLA

Print Name: ED MILNE

Date & Time: 22/7/13 1:00

Signature:

Received by *(Company)*: ES

Print Name: Daniel Ford

Date & Time: 23-7-13 08:00

Signature:

Lab use only:

Samples Received: Cool / Ambient *(circle one)*

Temperature Received at: _____ *(if applicable)*

Transported by: Hand delivered / courier *(circle one)*

WHITE - LAB COPY / BLUE - CLIENT COPY / PINK - RETAIN IN BOOK

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 94304

Client:
David Lane Associates
2B, 30 Leighton Pl
Hornsby
NSW 2077

Attention: Ed Milne

Sample log in details:

Your Reference:	**DL3136 - St Marys**
No. of samples:	23 soils, 2 water
Date samples received / completed instructions received	23/07/13 / 24/07/13

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

Report Details:

Date results requested by: / Issue Date:	31/07/13 / 31/07/13
Date of Preliminary Report:	Not issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

ACCREDITED FOR TECHNICAL COMPETENCE

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vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	94304-1	94304-4	94304-6	94304-9	94304-10
Your Reference	----------	BH1	BH2	BH3	BH4	BH4
Depth	----------	0.1	0.1	0.1	0.1	2.0
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	27/07/2013	27/07/2013	27/07/2013	27/07/2013	27/07/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	[NA]
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	[NA]
Ethylbenzene	mg/kg	<1	<1	<1	<1	[NA]
m+p-xylene	mg/kg	<2	<2	<2	<2	[NA]
o-Xylene	mg/kg	<1	<1	<1	<1	[NA]
naphthalene	mg/kg	<1	<1	<1	<1	[NA]
Surrogate aaa-Trifluorotoluene	%	105	104	105	97	88

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	94304-12	94304-14	94304-17	94304-18	94304-19
Your Reference	----------	BH5	BH6	BH7	BH8	BH9
Depth	----------	0.1	0.4	0.3	0.3	0.3
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	27/07/2013	27/07/2013	27/07/2013	27/07/2013	27/07/2013
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	103	102	103	101	107

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vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	94304-20	94304-21
Your Reference	----------	BH10	BH11
Depth	----------	0.3	0.3
Date Sampled		22/07/2013	22/07/2013
Type of sample		Soil	Soil
Date extracted	-	25/07/2013	25/07/2013
Date analysed	-	27/07/2013	27/07/2013
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	96	107

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Version: 1, Version Date: 13/12/2013

svTRH(C10-C40)in Soil						
Our Reference:	UNITS	94304-1	94304-4	94304-6	94304-9	94304-10
Your Reference	----------	BH1	BH2	BH3	BH4	BH4
Depth	----------	0.1	0.1	0.1	0.1	2.0
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	26/07/2013	26/07/2013	26/07/2013	26/07/2013	26/07/2013
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	100	130	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	120	110	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	[NA]
TRH >C_{16}-C_{34}	mg/kg	<100	200	220	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	101	102	105	96	98

svTRH(C10-C40)in Soil						
Our Reference:	UNITS	94304-12	94304-14	94304-17	94304-18	94304-19
Your Reference	----------	BH5	BH6	BH7	BH8	BH9
Depth	----------	0.1	0.4	0.3	0.3	0.3
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	26/07/2013	26/07/2013	26/07/2013	26/07/2013	26/07/2013
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	99	94	93	95	96

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svTRH (C10-C40) in Soil			
Our Reference:	UNITS	94304-20	94304-21
Your Reference	----------	BH10	BH11
Depth	----------	0.3	0.3
Date Sampled		22/07/2013	22/07/2013
Type of sample		Soil	Soil
Date extracted	-	25/07/2013	25/07/2013
Date analysed	-	26/07/2013	26/07/2013
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH >C_{10}-C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16}-C_{34}	mg/kg	<100	<100
TRH >C_{34}-C_{40}	mg/kg	<100	<100
Surrogate o-Terphenyl	%	96	96

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PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	94304-1 BH1 0.1 22/07/2013 Soil	94304-2 BH1 0.8 22/07/2013 Soil	94304-4 BH2 0.1 22/07/2013 Soil	94304-5 BH2 0.9 22/07/2013 Soil	94304-6 BH3 0.1 22/07/2013 Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.5	<0.1	1.2	<0.1	0.4
Anthracene	mg/kg	<0.1	<0.1	0.3	<0.1	0.3
Fluoranthene	mg/kg	0.6	<0.1	2.9	<0.1	2.2
Pyrene	mg/kg	0.5	<0.1	2.9	<0.1	3.3
Benzo(a)anthracene	mg/kg	0.1	<0.1	1.4	<0.1	1.3
Chrysene	mg/kg	0.2	<0.1	1.3	<0.1	1.3
Benzo(b+k)fluoranthene	mg/kg	0.2	<0.2	2.9	<0.2	2.8
Benzo(a)pyrene	mg/kg	0.16	<0.05	2.1	<0.05	1.9
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	1.5	<0.1	1.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.2	<0.1	0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	1.4	<0.1	0.9
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	3.0	<0.5	3.0
Total +ve PAH's	mg/kg	2.3	NIL (+)VE	18	NIL (+)VE	16
Surrogate p-Terphenyl-d14	%	109	95	106	116	99

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PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	94304-7 BH3 1.0 22/07/2013 Soil	94304-8 BH3 1.0a 22/07/2013 Soil	94304-9 BH4 0.1 22/07/2013 Soil	94304-10 BH4 2.0 22/07/2013 Soil	94304-12 BH5 0.1 22/07/2013 Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	<0.1	<0.1	<0.1	0.3
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.7	0.1	<0.1	<0.1	0.2
Pyrene	mg/kg	1.0	0.2	<0.1	<0.1	0.2
Benzo(a)anthracene	mg/kg	0.4	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.4	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.8	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.49	0.06	<0.05	<0.05	0.08
Indeno(1,2,3-c,d)pyrene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	1	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	4.5	0.33	NIL (+)VE	NIL (+)VE	0.84
Surrogate p-Terphenyl-d14	%	109	112	99	107	107

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PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	94304-13 BH5 0.5 22/07/2013 Soil	94304-14 BH6 0.4 22/07/2013 Soil	94304-15 BH6 2.0 22/07/2013 Soil	94304-16 BH6 2.0a 22/07/2013 Soil	94304-17 BH7 0.3 22/07/2013 Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.9	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.8	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.4	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.24	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	3.8	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	109	103	103	105	99

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PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	94304-18 BH8 0.3 22/07/2013 Soil	94304-19 BH9 0.3 22/07/2013 Soil	94304-20 BH10 0.3 22/07/2013 Soil	94304-21 BH11 0.3 22/07/2013 Soil	94304-23 SP1 - 22/07/2013 Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.2	<0.1	<0.1	0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.09	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ NEPM B1	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	NIL (+)VE	1.4	NIL (+)VE	NIL (+)VE	0.14
Surrogate p-Terphenyl-d14	%	115	113	105	108	100

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Organochlorine Pesticides in soil						
Our Reference:	UNITS	94304-1	94304-4	94304-6	94304-9	94304-12
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.1	0.1	0.1	0.1	0.1
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	28/07/2013	28/07/2013	28/07/2013	28/07/2013	28/07/2013
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	105	101	103	103

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Organochlorine Pesticides in soil						
Our Reference:	UNITS	94304-14	94304-17	94304-18	94304-19	94304-20
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.4	0.3	0.3	0.3	0.3
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	28/07/2013	28/07/2013	28/07/2013	28/07/2013	28/07/2013
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	99	100	99	99

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Organochlorine Pesticides in soil		
Our Reference:	UNITS	94304-21
Your Reference	----------	BH11
Depth	----------	0.3
Date Sampled		22/07/2013
Type of sample		Soil
Date extracted	-	25/07/2013
Date analysed	-	28/07/2013
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCMX	%	101

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Organophosphorus Pesticides						
Our Reference:	UNITS	94304-1	94304-4	94304-6	94304-9	94304-12
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.1	0.1	0.1	0.1	0.1
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	28/07/2013	28/07/2013	28/07/2013	28/07/2013	28/07/2013
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	105	105	101	103	103

Organophosphorus Pesticides						
Our Reference:	UNITS	94304-14	94304-17	94304-18	94304-19	94304-20
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.4	0.3	0.3	0.3	0.3
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	28/07/2013	28/07/2013	28/07/2013	28/07/2013	28/07/2013
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	100	99	100	99	99

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Organophosphorus Pesticides		
Our Reference:	UNITS	94304-21
Your Reference	----------	BH11
Depth	----------	0.3
Date Sampled		22/07/2013
Type of sample		Soil
Date extracted	-	25/07/2013
Date analysed	-	28/07/2013
Diazinon	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Surrogate TCMX	%	101

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PCBs in Soil						
Our Reference:	UNITS	94304-1	94304-4	94304-6	94304-9	94304-12
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.1	0.1	0.1	0.1	0.1
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	28/07/2013	28/07/2013	28/07/2013	28/07/2013	28/07/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	105	105	101	103	103

PCBs in Soil						
Our Reference:	UNITS	94304-14	94304-17	94304-18	94304-19	94304-20
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.4	0.3	0.3	0.3	0.3
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	28/07/2013	28/07/2013	28/07/2013	28/07/2013	28/07/2013
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	100	99	100	99	99

PCBs in Soil		
Our Reference:	UNITS	94304-21
Your Reference	----------	BH11
Depth	----------	0.3
Date Sampled		22/07/2013
Type of sample		Soil
Date extracted	-	25/07/2013
Date analysed	-	28/07/2013
Arochlor 1016	mg/kg	<0.1
Arochlor 1221	mg/kg	<0.1
Arochlor 1232	mg/kg	<0.1
Arochlor 1242	mg/kg	<0.1
Arochlor 1248	mg/kg	<0.1
Arochlor 1254	mg/kg	<0.1
Arochlor 1260	mg/kg	<0.1
Surrogate TCLMX	%	101

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Acid Extractable metals in soil						
Our Reference:	UNITS	94304-1	94304-2	94304-4	94304-5	94304-6
Your Reference	----------	BH1	BH1	BH2	BH2	BH3
Depth	----------	0.1	0.8	0.1	0.9	0.1
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	25/7/2013	25/7/2013	25/7/2013	25/7/2013	25/7/2013
Date analysed	-	25/7/2013	25/7/2013	25/7/2013	25/7/2013	25/7/2013
Arsenic	mg/kg	<4	<4	6	<4	8
Cadmium	mg/kg	<0.4	<0.4	0.5	<0.4	0.5
Chromium	mg/kg	15	4	39	21	39
Copper	mg/kg	7	7	26	25	5
Lead	mg/kg	7	4	33	44	13
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	4	1	21	9	4
Zinc	mg/kg	7	5	140	220	7

Acid Extractable metals in soil						
Our Reference:	UNITS	94304-7	94304-8	94304-9	94304-10	94304-12
Your Reference	----------	BH3	BH3	BH4	BH4	BH5
Depth	----------	1.0	1.0a	0.1	2.0	0.1
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	25/7/2013	25/7/2013	25/7/2013	25/7/2013	25/7/2013
Date analysed	-	25/7/2013	25/7/2013	25/7/2013	25/7/2013	25/7/2013
Arsenic	mg/kg	5	<4	5	5	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	18	9	15	30	25
Copper	mg/kg	9	7	9	20	11
Lead	mg/kg	8	6	10	11	20
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	3	7	10	6
Zinc	mg/kg	7	7	34	25	17

Acid Extractable metals in soil						
Our Reference:	UNITS	94304-13	94304-14	94304-15	94304-16	94304-17
Your Reference	----------	BH5	BH6	BH6	BH6	BH7
Depth	----------	0.5	0.4	2.0	2.0a	0.3
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	25/7/2013	25/7/2013	25/7/2013	25/7/2013	25/7/2013
Date analysed	-	25/7/2013	25/7/2013	25/7/2013	25/7/2013	25/7/2013
Arsenic	mg/kg	<4	<4	4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	14	12	10	5	7
Copper	mg/kg	12	7	11	8	7
Lead	mg/kg	8	7	7	5	6
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	2	2	2	1
Zinc	mg/kg	12	8	13	8	16

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Acid Extractable metals in soil						
Our Reference:	UNITS	94304-18	94304-19	94304-20	94304-21	94304-23
Your Reference	----------	BH8	BH9	BH10	BH11	SP1
Depth	----------	0.3	0.3	0.3	0.3	-
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	25/7/2013	25/7/2013	25/7/2013	25/7/2013	25/7/2013
Date analysed	-	25/7/2013	25/7/2013	25/7/2013	25/7/2013	25/7/2013
Arsenic	mg/kg	<4	5	<4	8	5
Cadmium	mg/kg	<0.4	0.7	<0.4	0.4	<0.4
Chromium	mg/kg	11	16	8	39	68
Copper	mg/kg	11	74	4	11	24
Lead	mg/kg	14	100	4	46	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	9	4	5	56
Zinc	mg/kg	29	190	14	73	37

Acid Extractable metals in soil		
Our Reference:	UNITS	94304-26
Your Reference	----------	BH1 - TRIPLICATE
Depth	----------	0.1
Date Sampled		22/07/2013
Type of sample		Soil
Date digested	-	25/7/2013
Date analysed	-	25/7/2013
Arsenic	mg/kg	6
Cadmium	mg/kg	<0.4
Chromium	mg/kg	23
Copper	mg/kg	10
Lead	mg/kg	10
Mercury	mg/kg	<0.1
Nickel	mg/kg	8
Zinc	mg/kg	11

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Moisture						
Our Reference:	UNITS	94304-1	94304-2	94304-4	94304-5	94304-6
Your Reference	----------	BH1	BH1	BH2	BH2	BH3
Depth	----------	0.1	0.8	0.1	0.9	0.1
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	26/07/2013	26/07/2013	26/07/2013	26/07/2013	26/07/2013
Moisture	%	14	14	8.9	16	7.7

Moisture						
Our Reference:	UNITS	94304-7	94304-8	94304-9	94304-10	94304-12
Your Reference	----------	BH3	BH3	BH4	BH4	BH5
Depth	----------	1.0	1.0a	0.1	2.0	0.1
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	26/07/2013	26/07/2013	26/07/2013	26/07/2013	26/07/2013
Moisture	%	12	12	37	55	16

Moisture						
Our Reference:	UNITS	94304-13	94304-14	94304-15	94304-16	94304-17
Your Reference	----------	BH5	BH6	BH6	BH6	BH7
Depth	----------	0.5	0.4	2.0	2.0a	0.3
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	26/07/2013	26/07/2013	26/07/2013	26/07/2013	26/07/2013
Moisture	%	14	14	14	15	12

Moisture						
Our Reference:	UNITS	94304-18	94304-19	94304-20	94304-21	94304-23
Your Reference	----------	BH8	BH9	BH10	BH11	SP1
Depth	----------	0.3	0.3	0.3	0.3	-
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/07/2013	25/07/2013	25/07/2013	25/07/2013	25/07/2013
Date analysed	-	26/07/2013	26/07/2013	26/07/2013	26/07/2013	26/07/2013
Moisture	%	9.6	9.7	12	7.7	5.7

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Asbestos ID - soils						
Our Reference:	UNITS	94304-1	94304-6	94304-9	94304-12	94304-14
Your Reference	----------	BH1	BH3	BH4	BH5	BH6
Depth	----------	0.1	0.1	0.1	0.1	0.4
Date Sampled		22/07/2013	22/07/2013	22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	30/07/2013	30/07/2013	30/07/2013	30/07/2013	30/07/2013
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Dark brown fine-grained soil & rocks	Dark brown fine-grained soil & rocks	Light grey fine-grained soil	Dark brown fine-grained soil & rocks	Dark brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

Asbestos ID - soils				
Our Reference:	UNITS	94304-19	94304-20	94304-21
Your Reference	----------	BH9	BH10	BH11
Depth	----------	0.3	0.3	0.3
Date Sampled		22/07/2013	22/07/2013	22/07/2013
Type of sample		Soil	Soil	Soil
Date analysed	-	30/07/2013	30/07/2013	30/07/2013
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Dark brown fine-grained soil & rocks	Light brown fine-grained soil & rocks	Dark brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
Trace Analysis	-	No respirable fibres detected	No respirable fibres detected	No respirable fibres detected

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vTRH(C6-C10)/BTEXN in Water			
Our Reference:	UNITS	94304-24	94304-25
Your Reference	----------	TB	TS
Depth	----------	-	-
Date Sampled		22/07/2013	22/07/2013
Type of sample		water	water
Date extracted	-	25/07/2013	25/07/2013
Date analysed	-	25/07/2013	25/07/2013
TRH C_6 - C_9	µg/L	<10	[NA]
TRH C_6 - C_{10}	µg/L	<10	[NA]
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	[NA]
Benzene	µg/L	<1	108%
Toluene	µg/L	<1	107%
Ethylbenzene	µg/L	<1	100%
m+p-xylene	µg/L	<2	101%
o-xylene	µg/L	<1	101%
Naphthalene	µg/L	<1	[NA]
Surrogate Dibromofluoromethane	%	107	102
Surrogate toluene-d8	%	102	101
Surrogate 4-BFB	%	95	101

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Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Org-013	Water samples are analysed directly by purge and trap GC-MS.

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QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/07/2013	94304-1	25/07/2013 || 25/07/2013	LCS-6	25/07/2013
Date analysed	-			27/07/2013	94304-1	27/07/2013 || 27/07/2013	LCS-6	27/07/2013
TRH C_6 - C_9	mg/kg	25	Org-016	<25	94304-1	<25 || <25	LCS-6	99%
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	94304-1	<25 || <25	LCS-6	99%
Benzene	mg/kg	0.2	Org-016	<0.2	94304-1	<0.2 || <0.2	LCS-6	108%
Toluene	mg/kg	0.5	Org-016	<0.5	94304-1	<0.5 || <0.5	LCS-6	96%
Ethylbenzene	mg/kg	1	Org-016	<1	94304-1	<1 || <1	LCS-6	102%
m+p-xylene	mg/kg	2	Org-016	<2	94304-1	<2 || <2	LCS-6	99%
o-Xylene	mg/kg	1	Org-016	<1	94304-1	<1 || <1	LCS-6	92%
naphthalene	mg/kg	1	Org-014	<1	94304-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	99	94304-1	105 || 100 || RPD: 5	LCS-6	108%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/07/2013	94304-1	25/07/2013 || 25/07/2013	LCS-6	25/07/2013
Date analysed	-			26/07/2013	94304-1	26/07/2013 || 26/07/2013	LCS-6	26/07/2013
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	94304-1	<50 || <50	LCS-6	105%
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	94304-1	<100 || <100	LCS-6	108%
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	94304-1	<100 || <100	LCS-6	103%
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	94304-1	<50 || <50	LCS-6	105%
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	94304-1	<100 || <100	LCS-6	108%
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	94304-1	<100 || <100	LCS-6	103%
Surrogate o-Terphenyl	%		Org-003	93	94304-1	101 || 93 || RPD: 8	LCS-6	122%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/07/2013	94304-1	25/07/2013 || 25/07/2013	LCS-6	25/07/2013
Date analysed	-			25/07/2013	94304-1	25/07/2013 || 25/07/2013	LCS-6	25/07/2013
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	<0.1 || <0.1	LCS-6	73%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	<0.1 || <0.1	LCS-6	92%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	0.5 || <0.1	LCS-6	87%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	0.6 || <0.1	LCS-6	81%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	0.5 || <0.1	LCS-6	84%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	0.2 || <0.1	LCS-6	84%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	94304-1	0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	94304-1	0.16 || <0.05	LCS-6	91%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	102	94304-1	109 || 99 || RPD: 10	LCS-6	96%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/07/2013	94304-1	25/07/2013 || 25/07/2013	LCS-6	25/07/2013
Date analysed	-			28/07/2013	94304-1	28/07/2013 || 28/07/2013	LCS-6	28/07/2013
HCB	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	98%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	84%
Heptachlor	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	92%
delta-BHC	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	93%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	94%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	91%
Dieldrin	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	99%
Endrin	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	84%
pp-DDD	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	91%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	LCS-6	93%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	101	94304-1	105 || 99 || RPD: 6	LCS-6	90%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/07/2013	94304-1	25/07/2013 || 25/07/2013	LCS-6	25/07/2013
Date analysed	-			28/07/2013	94304-1	28/07/2013 || 28/07/2013	LCS-6	28/07/2013
Diazinon	mg/kg	0.1	Org-008	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	0.1	Org-008	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	0.1	Org-008	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	94304-1	<0.1 || <0.1	LCS-6	73%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	94304-1	<0.1 || <0.1	LCS-6	104%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	94304-1	<0.1 || <0.1	LCS-6	89%
Surrogate TCMX	%		Org-008	101	94304-1	105 || 99 || RPD: 6	LCS-6	90%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/07/2013	94304-1	25/07/2013 || 25/07/2013	LCS-6	25/07/2013
Date analysed	-			28/07/2013	94304-1	28/07/2013 || 28/07/2013	LCS-6	28/07/2013
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	94304-1	<0.1 || <0.1	LCS-6	100%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	94304-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	101	94304-1	105 || 99 || RPD: 6	LCS-6	83%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			25/07/2013	94304-1	25/7/2013 || 25/7/2013	LCS-2	25/07/2013
Date analysed	-			25/07/2013	94304-1	25/7/2013 || 25/7/2013	LCS-2	25/07/2013
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	94304-1	<4 || 8	LCS-2	95%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	94304-1	<0.4 || <0.4	LCS-2	97%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	94304-1	15 || 29 || RPD: 64	LCS-2	102%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	94304-1	7 || 11 || RPD: 44	LCS-2	103%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	94304-1	7 || 13 || RPD: 60	LCS-2	97%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	94304-1	<0.1 || <0.1	LCS-2	89%

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QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	94304-1	4 || 9 || RPD: 77	LCS-2	101%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	94304-1	7 || 13 || RPD: 60	LCS-2	98%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			[NT]
Date analysed	-			[NT]
Moisture	%	0.1	Inorg-008	[NT]

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			25/07/2013	[NT]	[NT]	LCS-W1	25/07/2013
Date analysed	-			25/07/2013	[NT]	[NT]	LCS-W1	25/07/2013
TRH C_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	98%
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	98%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	101%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	101%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	95%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W1	96%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	97%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	99	[NT]	[NT]	LCS-W1	95%
Surrogate toluene-d8	%		Org-016	98	[NT]	[NT]	LCS-W1	102%
Surrogate 4-BFB	%		Org-016	95	[NT]	[NT]	LCS-W1	99%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	94304-17	25/07/2013 || 25/07/2013	94304-4	25/07/2013
Date analysed	-	94304-17	27/07/2013 || 27/07/2013	94304-4	27/07/2013
TRH C_6 - C_9	mg/kg	94304-17	<25 || <25	94304-4	98%
TRH C_6 - C_{10}	mg/kg	94304-17	<25 || <25	94304-4	98%
Benzene	mg/kg	94304-17	<0.2 || <0.2	94304-4	108%
Toluene	mg/kg	94304-17	<0.5 || <0.5	94304-4	95%
Ethylbenzene	mg/kg	94304-17	<1 || <1	94304-4	100%
m+p-xylene	mg/kg	94304-17	<2 || <2	94304-4	97%
o-Xylene	mg/kg	94304-17	<1 || <1	94304-4	92%
naphthalene	mg/kg	94304-17	<1 || <1	[NR]	[NR]

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QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Surrogate aaa-Trifluorotoluene	%	94304-17	103 || 96 || RPD: 7	94304-4	104%
QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	94304-17	25/07/2013 || 25/07/2013	94304-4	25/07/2013
Date analysed	-	94304-17	26/07/2013 || 26/07/2013	94304-4	26/07/2013
TRH C_{10} - C_{14}	mg/kg	94304-17	<50 || <50	94304-4	106%
TRH C_{15} - C_{28}	mg/kg	94304-17	<100 || <100	94304-4	129%
TRH C_{29} - C_{36}	mg/kg	94304-17	<100 || <100	94304-4	105%
TRH >C_{10}-C_{16}	mg/kg	94304-17	<50 || <50	94304-4	106%
TRH >C_{16}-C_{34}	mg/kg	94304-17	<100 || <100	94304-4	129%
TRH >C_{34}-C_{40}	mg/kg	94304-17	<100 || <100	94304-4	105%
Surrogate o-Terphenyl	%	94304-17	93 || 96 || RPD: 3	94304-4	120%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	94304-17	25/07/2013 || 25/07/2013	94304-4	25/07/2013
Date analysed	-	94304-17	25/07/2013 || 25/07/2013	94304-4	25/07/2013
Naphthalene	mg/kg	94304-17	<0.1 || <0.1	94304-4	88%
Acenaphthylene	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	94304-17	<0.1 || <0.1	94304-4	99%
Phenanthrene	mg/kg	94304-17	<0.1 || <0.1	94304-4	100%
Anthracene	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	94304-17	<0.1 || <0.1	94304-4	120%
Pyrene	mg/kg	94304-17	<0.1 || <0.1	94304-4	121%
Benzo(a)anthracene	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	94304-17	<0.1 || <0.1	94304-4	96%
Benzo(b+k)fluoranthene	mg/kg	94304-17	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	94304-17	<0.05 || <0.05	94304-4	129%
Indeno(1,2,3-c,d)pyrene	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	94304-17	99 || 107 || RPD: 8	94304-4	95%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	94304-17	25/07/2013 || 25/07/2013	94304-4	25/07/2013
Date analysed	-	94304-17	28/07/2013 || 28/07/2013	94304-4	28/07/2013
HCB	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	94304-17	<0.1 || <0.1	94304-4	105%
gamma-BHC	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	94304-17	<0.1 || <0.1	94304-4	92%
Heptachlor	mg/kg	94304-17	<0.1 || <0.1	94304-4	99%
delta-BHC	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	94304-17	<0.1 || <0.1	94304-4	105%
Heptachlor Epoxide	mg/kg	94304-17	<0.1 || <0.1	94304-4	99%
gamma-Chlordane	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	94304-17	<0.1 || <0.1	94304-4	97%
Dieldrin	mg/kg	94304-17	<0.1 || <0.1	94304-4	105%
Endrin	mg/kg	94304-17	<0.1 || <0.1	94304-4	89%
pp-DDD	mg/kg	94304-17	<0.1 || <0.1	94304-4	107%
Endosulfan II	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	94304-17	<0.1 || <0.1	94304-4	101%
Methoxychlor	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	94304-17	99 || 103 || RPD: 4	94304-4	100%

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QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	94304-17	25/07/2013 || 25/07/2013	94304-4	25/07/2013
Date analysed	-	94304-17	28/07/2013 || 28/07/2013	94304-4	28/07/2013
Diazinon	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	94304-17	<0.1 || <0.1	94304-4	83%
Fenitrothion	mg/kg	94304-17	<0.1 || <0.1	94304-4	116%
Bromophos-ethyl	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	94304-17	<0.1 || <0.1	94304-4	96%
Surrogate TCMX	%	94304-17	99 || 103 || RPD: 4	94304-4	102%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	94304-17	25/07/2013 || 25/07/2013	94304-4	25/07/2013
Date analysed	-	94304-17	28/07/2013 || 28/07/2013	94304-4	28/07/2013
Arochlor 1016	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	94304-17	<0.1 || <0.1	94304-4	102%
Arochlor 1260	mg/kg	94304-17	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	94304-17	99 || 103 || RPD: 4	94304-4	97%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	94304-17	25/7/2013 || 25/7/2013	LCS-2	25/07/2013
Date analysed	-	94304-17	25/7/2013 || 25/7/2013	LCS-2	25/07/2013
Arsenic	mg/kg	94304-17	<4 || <4	LCS-2	100%
Cadmium	mg/kg	94304-17	<0.4 || <0.4	LCS-2	102%
Chromium	mg/kg	94304-17	7 || 9 || RPD: 25	LCS-2	107%
Copper	mg/kg	94304-17	7 || 8 || RPD: 13	LCS-2	106%
Lead	mg/kg	94304-17	6 || 8 || RPD: 29	LCS-2	102%
Mercury	mg/kg	94304-17	<0.1 || <0.1	LCS-2	89%
Nickel	mg/kg	94304-17	1 || 1 || RPD: 0	LCS-2	105%
Zinc	mg/kg	94304-17	16 || 24 || RPD: 40	LCS-2	103%

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QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	94304-4	25/07/2013
Date analysed	-	[NT]	[NT]	94304-4	25/07/2013
Arsenic	mg/kg	[NT]	[NT]	94304-4	87%
Cadmium	mg/kg	[NT]	[NT]	94304-4	83%
Chromium	mg/kg	[NT]	[NT]	94304-4	83%
Copper	mg/kg	[NT]	[NT]	94304-4	95%
Lead	mg/kg	[NT]	[NT]	94304-4	81%
Mercury	mg/kg	[NT]	[NT]	94304-4	102%
Nickel	mg/kg	[NT]	[NT]	94304-4	77%
Zinc	mg/kg	[NT]	[NT]	94304-4	##

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Report Comments:

PAH (IN SOIL) The RPD for duplicate results is accepted due to the non homogenous Nature of the sample/s.

METALS_S: ## Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteriae has been exceeded for 94304-1 for Cr, Pb, Ni, Zn. Therefore a triplicate result has been issued as laboratory sample number 94304-26.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.

Asbestos ID was analysed by Approved Identifier:	Alex Tam
Asbestos ID was authorised by Approved Signatory:	Lulu Guo

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

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SAMPLE RECEIPT ADVICE

SE119285

CLIENT DETAILS

Contact	Ed Milne
Client	David Lane Associates
Address	Unit 2B, 30 Leighton Place HORNSBY NSW 2077
Telephone	02 9476 1765
Facsimile	02 9476 1557
Email	dlaenvironmental@bigpond.com
Project	**DL3136 - St Marys**
Order Number	(Not specified)
Samples	2

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Tue 23/7/2013
Report Due	Wed 31/7/2013
SGS Reference	**SE119285**

SUBMISSION DETAILS

This is to confirm that 2 samples were received on Tuesday 23/7/2013. Results are expected to be ready by Wednesday 31/7/2013. Please quote SGS reference SE119285 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	1 Soil	Type of documentation received	Email
Date documentation received	24/07/2013@10:48am	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.5°C
Sample container provider	Other Lab	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Samples will be held for one month for water samples and two months for soil samples from date of report, unless otherwise instructed.

COMMENTS

This sample receipt advice cancels and supersedes previous SRA issued by client due to email instruction to proceed with testing for BH3-1.0b for PAHs and heavy metals <24/07/2013@10:48am>.
Heavy Metals: Allocated for (As, Cd, Cr, Cu, Pb, Ni, Zn and Hg).

1 x soil sample has been placed on hold as no tests have been assigned for them by the client. This sample will not be processed.

To the extent not inconsistent with the other provisions of this document and unless specifically agreed otherwise in writing by SGS, all SGS services are rendered in accordance with the applicable SGS General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm as at the date of this document. Attention is drawn to the limitations of liability and to the clauses of indemnification.

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SAMPLE RECEIPT ADVICE

SE119285

CLIENT DETAILS

Client	David Lane Associates	Project	DL3136 - St Marys

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury in Soil	Moisture Content	PAH (Polynuclear Aromatic Hydrocarbons) in	Total Recoverable Metals in Soil by ICPOES from
001	BH3-1.0b	1	1	23	7

The above table represents SGS Environmental Services' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details.
Testing as per this table shall commence immediately unless the client intervenes with a correction.

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ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Ed Milne	Manager	Huong Crawford
Client	David Lane Associates	Laboratory	SGS Alexandria Environmental
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Project	**DL3136 - St Marys**	SGS Reference	**SE119285 R0**
Order Number	(Not specified)	Report Number	0000061962
Samples	2	Date Reported	31 Jul 2013
		Date Received	23 Jul 2013

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

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Organics Chemist

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Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Parameter	Units	LOR	Sample Number SE119285.001 Sample Matrix Soil Sample Date 22 Jul 2013 Sample Name BH3-1.0b
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420			
Naphthalene	mg/kg	0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1
Fluorene	mg/kg	0.1	<0.1
Phenanthrene	mg/kg	0.1	**0.3**
Anthracene	mg/kg	0.1	**0.2**
Fluoranthene	mg/kg	0.1	**0.9**
Pyrene	mg/kg	0.1	**1.1**
Benzo(a)anthracene	mg/kg	0.1	**0.5**
Chrysene	mg/kg	0.1	**0.4**
Benzo(b)fluoranthene	mg/kg	0.1	**0.6**
Benzo(k)fluoranthene	mg/kg	0.1	**0.3**
Benzo(a)pyrene	mg/kg	0.1	**0.5**
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	**0.3**
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	**0.3**
Total PAH	mg/kg	0.8	**5.4**
Carcinogenic PAHs (as BaP TEQ)*	TEQ	0.2	**0.6**
Surrogates			
d5-nitrobenzene (Surrogate)	%	-	**100**
2-fluorobiphenyl (Surrogate)	%	-	**98**
d14-p-terphenyl (Surrogate)	%	-	**108**
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320			
Arsenic, As	mg/kg	3	**5**
Cadmium, Cd	mg/kg	0.3	<0.3
Chromium, Cr	mg/kg	0.3	**20**
Copper, Cu	mg/kg	0.5	**8.1**
Lead, Pb	mg/kg	1	**9**
Nickel, Ni	mg/kg	0.5	**4.8**
Zinc, Zn	mg/kg	0.5	**7.5**

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Parameter	Units	LOR	Sample Number SE119285.001 Sample Matrix Soil Sample Date 22 Jul 2013 Sample Name BH3-1.0b
Mercury in Soil Method: AN312			
Mercury	mg/kg	0.01	<0.01
Moisture Content Method: AN002			
% Moisture	%	0.5	**12**

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Version: 1, Version Date: 13/12/2013

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Mercury in Soil **Method: ME-(AU)-[ENV]AN312**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB042235	mg/kg	0.01	<0.01	0 - 30%	105%	102%

PAH (Polynuclear Aromatic Hydrocarbons) in Soil **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB042140	mg/kg	0.1	<0.1	0%	109%	113%
2-methylnaphthalene	LB042140	mg/kg	0.1	<0.1	0%	NA	NA
1-methylnaphthalene	LB042140	mg/kg	0.1	<0.1	0%	NA	NA
Acenaphthylene	LB042140	mg/kg	0.1	<0.1	0%	110%	118%
Acenaphthene	LB042140	mg/kg	0.1	<0.1	0%	111%	115%
Fluorene	LB042140	mg/kg	0.1	<0.1	0%	NA	NA
Phenanthrene	LB042140	mg/kg	0.1	<0.1	0 - 40%	116%	121%
Anthracene	LB042140	mg/kg	0.1	<0.1	0%	110%	117%
Fluoranthene	LB042140	mg/kg	0.1	<0.1	0 - 70%	113%	122%
Pyrene	LB042140	mg/kg	0.1	<0.1	0 - 70%	110%	113%
Benzo(a)anthracene	LB042140	mg/kg	0.1	<0.1	0 - 26%	NA	NA
Chrysene	LB042140	mg/kg	0.1	<0.1	0 - 26%	NA	NA
Benzo(b)fluoranthene	LB042140	mg/kg	0.1	<0.1	0 - 26%	NA	NA
Benzo(k)fluoranthene	LB042140	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(a)pyrene	LB042140	mg/kg	0.1	<0.1	0 - 10%	117%	102%
Indeno(1,2,3-cd)pyrene	LB042140	mg/kg	0.1	<0.1	0%	NA	NA
Dibenzo(a&h)anthracene	LB042140	mg/kg	0.1	<0.1	0%	NA	NA
Benzo(ghi)perylene	LB042140	mg/kg	0.1	<0.1	0%	NA	NA
Total PAH	LB042140	mg/kg	0.8	<0.8	NVL	NA	NA
Carcinogenic PAHs (as BaP TEQ)*	LB042140	TEQ	0.2	<0.2	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d5-nitrobenzene (Surrogate)	LB042140	%	-	102%	4 - 6%	92%	98%
2-fluorobiphenyl (Surrogate)	LB042140	%	-	94%	2 - 6%	114%	96%
d14-p-terphenyl (Surrogate)	LB042140	%	-	102%	2 - 8%	114%	100%

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Version: 1, Version Date: 13/12/2013

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage.* Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest **Method: ME-(AU)-[ENV]AN040/AN320**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Arsenic, As	LB042232	mg/kg	3	<3	1 - 9%	96%	91%
Cadmium, Cd	LB042232	mg/kg	0.3	<0.3	0%	97%	93%
Chromium, Cr	LB042232	mg/kg	0.3	<0.3	2 - 4%	99%	94%
Copper, Cu	LB042232	mg/kg	0.5	<0.5	4 - 12%	97%	96%
Lead, Pb	LB042232	mg/kg	1	<1	0 - 1%	98%	91%
Nickel, Ni	LB042232	mg/kg	0.5	<0.5	3 - 4%	99%	94%
Zinc, Zn	LB042232	mg/kg	0.5	<0.5	2 - 25%	98%	98%

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METHOD SUMMARY

SE119285 R0

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analsysis by ASS or ICP as per USEPA Method 200.8.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN088	Orbital rolling for Organic pollutants are extracted from soil/sediment by transferring an appropriate mass of sample to a clear soil jar and extracting with 1:1 Dichloromethane/Acetone. Orbital Rolling method is intended for the extraction of semi-volatile organic compounds from soil/sediment samples, and is based somewhat on USEPA method 3570 (Micro Organic extraction and sample preparation). Method 3700.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	This analysis is not covered by the scope of accreditation.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.	NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au.pv.sgsv3/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

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STATEMENT OF QA/QC PERFORMANCE

SE119285 R0

CLIENT DETAILS

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Project	**DL3136 - St Marys**
Order Number	(Not specified)
Samples	2

LABORATORY DETAILS

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SGS Reference	SE119285 R0
Report Number	0000061963
Date Reported	31 Jul 2013

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

Sample counts by matrix	1 Soil	Type of documentation received	Email
Date documentation received	24/07/2013@10:48a	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.5°C
Sample container provider	Other Lab	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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HOLDING TIME SUMMARY

SE119285 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH3-1.0b	SE119285.001	LB042235	22 Jul 2013	23 Jul 2013	19 Aug 2013	29 Jul 2013	19 Aug 2013	29 Jul 2013

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH3-1.0b	SE119285.001	LB042257	22 Jul 2013	23 Jul 2013	05 Aug 2013	29 Jul 2013	03 Aug 2013	30 Jul 2013

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH3-1.0b	SE119285.001	LB042140	22 Jul 2013	23 Jul 2013	05 Aug 2013	25 Jul 2013	03 Sep 2013	31 Jul 2013

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH3-1.0b	SE119285.001	LB042232	22 Jul 2013	23 Jul 2013	18 Jan 2014	29 Jul 2013	18 Jan 2014	30 Jul 2013

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH3-1.0b	SE119285.001	%	60 - 130%	98
d14-p-terphenyl (Surrogate)	BH3-1.0b	SE119285.001	%	60 - 130%	108
d5-nitrobenzene (Surrogate)	BH3-1.0b	SE119285.001	%	60 - 130%	100

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Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB042235.001	Mercury	mg/kg	0.01	<0.01

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB042140.001		Naphthalene	mg/kg	0.1	<0.1
		2-methylnaphthalene	mg/kg	0.1	<0.1
		1-methylnaphthalene	mg/kg	0.1	<0.1
		Acenaphthylene	mg/kg	0.1	<0.1
		Acenaphthene	mg/kg	0.1	<0.1
		Fluorene	mg/kg	0.1	<0.1
		Phenanthrene	mg/kg	0.1	<0.1
		Anthracene	mg/kg	0.1	<0.1
		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	102
		2-fluorobiphenyl (Surrogate)	%	-	94
		d14-p-terphenyl (Surrogate)	%	-	102

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB042232.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE119288.009	LB042235.014	Mercury	mg/kg	0.01	0.026196983	60.0194164066	74	30
SE119312.016	LB042235.022	Mercury	mg/kg	0.01	0.010013945	50.0098614285	131	0

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE119288.001	LB042140.005		Naphthalene	mg/kg	0.1	0	0	200	0
			2-methylnaphthalene	mg/kg	0.1	0	0	200	0
			1-methylnaphthalene	mg/kg	0.1	0	0	200	0
			Acenaphthylene	mg/kg	0.1	0	0	200	0
			Acenaphthene	mg/kg	0.1	0	0	200	0
			Fluorene	mg/kg	0.1	0	0	200	0
			Phenanthrene	mg/kg	0.1	0.06	0.15	125	40
			Anthracene	mg/kg	0.1	0	0	200	0
			Fluoranthene	mg/kg	0.1	0.13	0.27	80	70
			Pyrene	mg/kg	0.1	0.12	0.25	84	70
			Benzo(a)anthracene	mg/kg	0.1	0.07	0.13	130	26
			Chrysene	mg/kg	0.1	0.08	0.13	125	26
			Benzo(b)fluoranthene	mg/kg	0.1	0.08	0.13	125	26
			Benzo(k)fluoranthene	mg/kg	0.1	0	0	200	0
			Benzo(a)pyrene	mg/kg	0.1	0.06	0.11	148	10
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0	0	200	0
			Dibenzo(a&h)anthracene	mg/kg	0.1	0	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0	0	200	0
			Total PAH	mg/kg	0.8	NVL	NVL	NVL	NVL
			Carcinogenic PAHs (as BaP TEQ)*	TEQ	0.2	0.0678	0.1243	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.46	0.48	30	4
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.44	0.45	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.47	0.48	30	2
SE119315.001	LB042140.017		Naphthalene	mg/kg	0.1	0	0	200	0
			2-methylnaphthalene	mg/kg	0.1	0	0	200	0
			1-methylnaphthalene	mg/kg	0.1	0	0	200	0
			Acenaphthylene	mg/kg	0.1	0	0	200	0
			Acenaphthene	mg/kg	0.1	0	0	200	0
			Fluorene	mg/kg	0.1	0	0	200	0
			Phenanthrene	mg/kg	0.1	0	0	200	0
			Anthracene	mg/kg	0.1	0	0	200	0
			Fluoranthene	mg/kg	0.1	0	0	200	0
			Pyrene	mg/kg	0.1	0	0	200	0
			Benzo(a)anthracene	mg/kg	0.1	0	0	200	0
			Chrysene	mg/kg	0.1	0	0	200	0
			Benzo(b)fluoranthene	mg/kg	0.1	0	0	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	0	0	200	0
			Benzo(a)pyrene	mg/kg	0.1	0	0	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	0	0	200	0
			Dibenzo(a&h)anthracene	mg/kg	0.1	0	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	0	0	200	0
			Total PAH	mg/kg	0.8	0	0	200	0
			Carcinogenic PAHs (as BaP TEQ)*	TEQ	0.2	0	0	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.52	0.49	30	6
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.48	0.45	30	6
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.53	0.49	30	8

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE119288.009	LB042232.014	Arsenic, As	mg/kg	3	3.54268991	323.5871218802	114	1
		Cadmium, Cd	mg/kg	0.3	0.120134606	00.1325741908	200	0
		Chromium, Cr	mg/kg	0.3	14.979970307	815.5399814798	33	4
		Copper, Cu	mg/kg	0.5	11.685028257	13.14363127	34	12
		Lead, Pb	mg/kg	1	19.48138338	219.4076003174	35	0
		Nickel, Ni	mg/kg	0.5	8.316609132	38.5626161919	36	3

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Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE119288.009	LB042232.014	Zinc, Zn	mg/kg	0.5	38.80722974230.2879486727		36	25
SE119312.016	LB042232.022	Arsenic, As	mg/kg	3	1.2435638288	1.3540632803	200	9
		Cadmium, Cd	mg/kg	0.3	0.0435779607	0.0501756752	200	0
		Chromium, Cr	mg/kg	0.3	2.2210588638	2.2590554621	52	2
		Copper, Cu	mg/kg	0.5	0.9009774444	0.8630529561	87	4
		Lead, Pb	mg/kg	1	3.8827049954	3.9134954981	56	1
		Nickel, Ni	mg/kg	0.5	1.3952484617	1.3347802671	67	4
		Zinc, Zn	mg/kg	0.5	36.30953091686	6.882614045€	35	2

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB042235.002	Mercury	mg/kg	0.01	0.21	0.2	70 - 130	105

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB042140.002		Naphthalene	mg/kg	0.1	4.4	4	60 - 140	109
		Acenaphthylene	mg/kg	0.1	4.4	4	60 - 140	110
		Acenaphthene	mg/kg	0.1	4.5	4	60 - 140	111
		Phenanthrene	mg/kg	0.1	4.6	4	60 - 140	116
		Anthracene	mg/kg	0.1	4.4	4	60 - 140	110
		Fluoranthene	mg/kg	0.1	4.5	4	60 - 140	113
		Pyrene	mg/kg	0.1	4.4	4	60 - 140	110
		Benzo(a)pyrene	mg/kg	0.1	4.7	4	60 - 140	117
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.5	60 - 140	92
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.6	0.5	60 - 140	114
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.6	0.5	60 - 140	114

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB042232.002	Arsenic, As	mg/kg	3	48	50	80 - 120	96
	Cadmium, Cd	mg/kg	0.3	49	50	80 - 120	97
	Chromium, Cr	mg/kg	0.3	49	50	80 - 120	99
	Copper, Cu	mg/kg	0.5	49	50	80 - 120	97
	Lead, Pb	mg/kg	1	49	50	80 - 120	98
	Nickel, Ni	mg/kg	0.5	49	50	80 - 120	99
	Zinc, Zn	mg/kg	0.5	49	50	80 - 120	98

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub -sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE119285.001	LB042235.004	Mercury	mg/kg	0.01	0.21	<0.01	0.2	102

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE119288.003	LB042140.008		Naphthalene	mg/kg	0.1	4.5	0	4	113
			2-methylnaphthalene	mg/kg	0.1	<0.1	0	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	0	-	-
			Acenaphthylene	mg/kg	0.1	4.7	0	4	118
			Acenaphthene	mg/kg	0.1	4.6	0	4	115
			Fluorene	mg/kg	0.1	<0.1	0	-	-
			Phenanthrene	mg/kg	0.1	5.2	0.32	4	121
			Anthracene	mg/kg	0.1	4.8	0.11	4	117
			Fluoranthene	mg/kg	0.1	5.5	0.64	4	122
			Pyrene	mg/kg	0.1	5.2	0.63	4	113
			Benzo(a)anthracene	mg/kg	0.1	<0.1	0.34	-	-
			Chrysene	mg/kg	0.1	<0.1	0.26	-	-
			Benzo(b)fluoranthene	mg/kg	0.1	<0.1	0.37	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0.13	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.4	0.28	4	102
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0.18	-	-
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	0	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	0.23	-	-
			Total PAH	mg/kg	0.8	39	3.49	-	-
			Carcinogenic PAHs (as BaP TEQ)*	TEQ	0.2	4.4	0.3829	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.5	0.52	-	98
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.48	-	96
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.52	-	100

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE119285.001	LB042232.004	Arsenic, As	mg/kg	3	50	5	50	91
		Cadmium, Cd	mg/kg	0.3	47	<0.3	50	93
		Chromium, Cr	mg/kg	0.3	67	20	50	94
		Copper, Cu	mg/kg	0.5	56	8.1	50	96
		Lead, Pb	mg/kg	1	55	9	50	91
		Nickel, Ni	mg/kg	0.5	52	4.8	50	94
		Zinc, Zn	mg/kg	0.5	57	7.5	50	98

MATRIX SPIKE DUPLICATES

SE119285 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here:
http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf

*	Non-accredited analysis.
-	Sample not analysed for this analyte.
^	Analysis performed by external laboratory.

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
†	Refer to Analytical Report comments for further information.

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SGS

LIMS No: SC1492 85

Request for Laboratory Services and Chain of Custody Form

SGS Australia, Unit 16, 33 Maddox Street, Alexandria, NSW 2015 Ph: +61 2 8594 0400 Fax: +61 2 8594 0499 Email: au.samplereceipt.sydney@sgs.com

Laboratory Section

Received Date: 23/7/13 Received By: [signature] Cooling Method: ☐ Ice ☑ Icepack ☐ None Samples intact: ☑ Yes ☐ No

Logged-in Date: 23/7/13 Time of Receipt: 3pm Cooler Sealed: ☑ Yes ☐ No ☐ N/A Temperature: ☐ Ambient ☑ Chilled

COD must pay via cheque or credit card before analysis is commenced. AMEX & DINERS cards incur a 5% surcharge

INVOICE TO:

Name:

Company: DLA Environmental

Address: Unit 2b/30 Leighton Place Hornsby

Email: ~~dlassociates@bigpond.com~~ dlaenvironmental@bigpond.com

Phone: 9476 1765 Fax:

Quote #:

Attached Parameter List: ☐ Yes ☐ No

Replacement Sample Containers Required: ☐ Yes ☐ No

Results Required By: Urgent TA requires lab approval

Notes:

Client information | **PO No.:** | **Project No.:**

Company Name: DLA Environmental

Contact Name: EA

Address: Unit 2b/30 Leighton Place Hornsby

Phone Number: 9476 1765 **After Hours Phone Number:**

Fax Number: **Email:** dlassociates@bigpond.com dlaenvironmental@bigpond.com.

Note: Results will be sent via email to an unlimited number of addresses for no additional fee. In the absence of email, fax is available upon request.

Indicate results format (please check one): Email ☑ Fax ☐

SAMPLE INFORMATION

Lab Sample ID	Sample Identifier	Date Sampled	Time	Matrix: Soil Water Other	# of Bottles	Analysis Requested: HOLD
1	BH3 – 1.0b	22/7		Soil	1	✓
2	BH6 – 2.0b	22/7		Soil	1	✓

SGS
Received 23/7/13
By [signature]
Time 3 am/pm
Samples intact yes/no
Ice/Cooler Pack yes/no
Temperature on Receipt 3.5 °C
Storage Location 5146
SGS REF No SC1492 85

Sampled By: DLA **Date:** 22/7/13

Relinquished By: DLA **Date:** 23/7/13 **Time:**

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

AU.SampleReceipt.Sydney (Sydney)

From: Ed Milne [dla.emilne@bigpond.com]
Sent: Wednesday, 24 July 2013 10:58 AM
To: Crawford, Huong (Sydney); AU.SampleReceipt.Sydney (Sydney)
Subject: RE: DL3136 - St Marys (Ref: BH3 BH6 - On Hold, Lab Ref: SE119285)

Standard TOT please

Regards

Ed Milne

Environmental Consultant
0407823075

Sydney
Unit 2B 30 Leighton Place,
Hornsby NSW 2077

Maitland
42B Church Street
Maitland, NSW, 2320

PO Box 137,
Branxton, NSW, 2335

Phone:
Fax:
Email:
(02) 9476 1765
(02) 9476 1557
dlaenvironmental@bigpond.com

Phone: (02) 4933 0001
Email: dla.hunter@bigpond.com

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Please consider the environment, if you intend on printing this email.

-----Original Message-----
From: Crawford, Huong (Sydney) [mailto:Huong.Crawford@sgs.com]
Sent: Wednesday, 24 July 2013 10:56 AM
To: AU.SampleReceipt.Sydney (Sydney)
Cc: dla.emilne@bigpond.com
Subject: FW: DL3136 - St Marys (Ref: BH3 BH6 - On Hold, Lab Ref: SE119285)

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Hi SR team,

Please see below for additional analyses, thanks.

Hi Ed,

Would you like fast or standard TAT? Thanks.

Kind Regards,
Huong Crawford
Environmental Services
Production Manager
SGS Australia Pty Ltd
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Phone: +61 (0)2 8594 0403
Fax: + 61 (0)2 8594 0499
E-mail: Huong.Crawford@sgs.com
Web: www.au.sgs.com
SGS DataNet: View Results Online
To provide your valuable feedback & help us to improve, please click here

-----Original Message-----
From: Ed Milne [mailto:dla.emilne@bigpond.com]
Sent: Wednesday, 24 July 2013 10:48 AM
To: Crawford, Huong (Sydney)
Subject: DL3136 - St Marys (Ref: BH3 BH6 - On Hold, Lab Ref: SE119285)

Hi Prasanna,

Please analyse for heavy metals and PAH in the following one (1) sample:

BH3-1.0b

Regards

Ed Milne

Environmental Consultant
0407823075

Sydney
Unit 2B 30 Leighton Place,
Hornsby NSW 2077

Maitland
42B Church Street
Maitland, NSW, 2320

PO Box 137,
Branxton, NSW, 2335

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Phone:
Fax:
Email:
(02) 9476 1765
(02) 9476 1557
dlaenvironmental@bigpond.com

Phone: (02) 4933 0001
Email: dla.hunter@bigpond.com

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-----Original Message-----
From: Ed Milne [mailto:dla.emilne@bigpond.com]
Sent: Wednesday, 24 July 2013 10:42 AM
To: SGS
Subject: FW: SGS Sample Receipt Advice (Ref: BH3 BH6 - On Hold, Lab Ref: SE119285)

Hi Prasanna,

Please analyse for heavy metals and PAH in the following one (1) sample:

BH3-1.0b

Regards

Ed Milne

Environmental Consultant
0407823075

Sydney
Unit 2B 30 Leighton Place,
Hornsby NSW 2077

Maitland
42B Church Street
Maitland, NSW, 2320

PO Box 137,
Branxton, NSW, 2335

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Phone:
Fax:
Email:
(02) 9476 1765
(02) 9476 1557
dlaenvironmental@bigpond.com

Phone: (02) 4933 0001
Email: dla.hunter@bigpond.com

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-----Original Message-----
From: DLA Environmental [mailto:dlaenvironmental@bigpond.com]
Sent: Tuesday, 23 July 2013 4:48 PM
To: dla.emilne@bigpond.com
Subject: FW: SGS Sample Receipt Advice (Ref: BH3 BH6 - On Hold, Lab Ref: SE119285)

Sydney
Unit 2B 30 Leighton Place,
Hornsby NSW 2077

Maitland
42B Church Street
PO Box 137,
Branxton NSW 2335

Phone:
Fax:
Email:
9476 1765
9476 1557
dlaenvironmental@bigpond.com

Phone: 49330001
Fax:
Email:dla.hunter@bigpond.com

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Version: 1, Version Date: 13/12/2013

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-----Original Message-----
From: AU.Samplereceipt.Sydney@SGS.com
[mailto:AU.Samplereceipt.Sydney@SGS.com]
Sent: Tuesday, 23 July 2013 4:31 PM
To: dlaenvironmental@bigpond.com
Subject: SGS Sample Receipt Advice (Ref: BH3 BH6 - On Hold, Lab Ref: SE119285)

Dear Ed Milne,

Please be advised we have received samples for analysis as detailed in the attached documentation.

Best regards,
Emily Yin
Sample Receipt Administrator
SGS Australia Pty Ltd
Phone: +61 (0)2 8594 0400
Fax: +61 (0)2 8594 0499

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SGS

AUSTRALIA – ENVIRONMENTAL SERVICES SYDNEY – PROFORMA FORM

SAMPLE INFORMATION

Approved: D. Liang

JOB No. SE119285

Sample No.	P 100ml UP	P 250ml UP	P 500ml UP	P 1L UP	G 100 Amber UP	G 200 Amber UP	G 500 Amber UP	G 1L Amber UP	G 40ml vial Up	G 40ml Vial HCl	P 100ml HCl	G 40ml Vial H2SO4	P 100ml H2SO4	P 250ml H2SO4	G 500ml Amber H2SO4	G 1L H2SO4	P 100/250ml HN03 Total	P 100ml HN03 Filtered	P 250ml NaOH	P 250ml Zn Acetate	Plastic Bag	G 250ml Soil Jar				Sample Matrix	Lab Bottles Supplied By	Comments
1-V																						1				Soil	Envirolab	Full

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD

ABN 36 088 095 112

Our ref : ASET34305/ 37485 / 1 - 2
Your ref :DL3136 - Marys
NATA Accreditation No: 14484

25 July 2013

DLA Environmental
2B/30 Leighton Street
Hornsby
NSW 2077

Attn: Mr David Lane,

Dear David

Asbestos Identification
This report presents the results of two samples, forwarded by DLA Environmental on 23 July 2013, for analysis for asbestos.

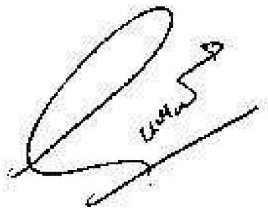
1.Introduction: Two samples forwarded was examined and analysed for the presence of asbestos.

2. Methods : The sample was examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with Dispersion Staining method **(Safer Environment Method 1.)**

3. Results : **Sample No. 1. ASET34305 / 37485 / 1. DL3136 - Marys - PB1.**
Approx dimensions 10.0 cm x 6.5 cm x 0.65 cm
The sample consisted of a fragment of a fibre cement material.
Chrysotile asbestos detected.

Sample No. 2. ASET34305 / 37485 / 2. DL3136 - Marys - PB2.
Approx dimensions 6.0 cm x 4.5 cm x 1.0 cm
The sample consisted of a hard fibrous material.
Chrysotile asbestos detected.

Analysed and reported by,



Mahen De Silva. BSc, MSc, Grad Dip (Occ Hyg)
Occupational Hygienist / Approved Identifier.
Approved Signatory

NATA
WORLD RECOGNISED
ACCREDITATION

This document is issued in accordance with NATA's Accreditation requirements. Accredited for compliance with ISO/IEC 17025.

SUITE 710 / 90 GEORGE STREET, HORNSBY NSW 2077 – P.O. BOX 1644 HORNSBY WESTFIELD NSW 1635
PHONE: (02) 99872183 FAX: (02)99872151 EMAIL: aset@bigpond.net.au WEBSITE: www.Ausset.com.au

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Appendix B

Groundwater Works Database Search

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

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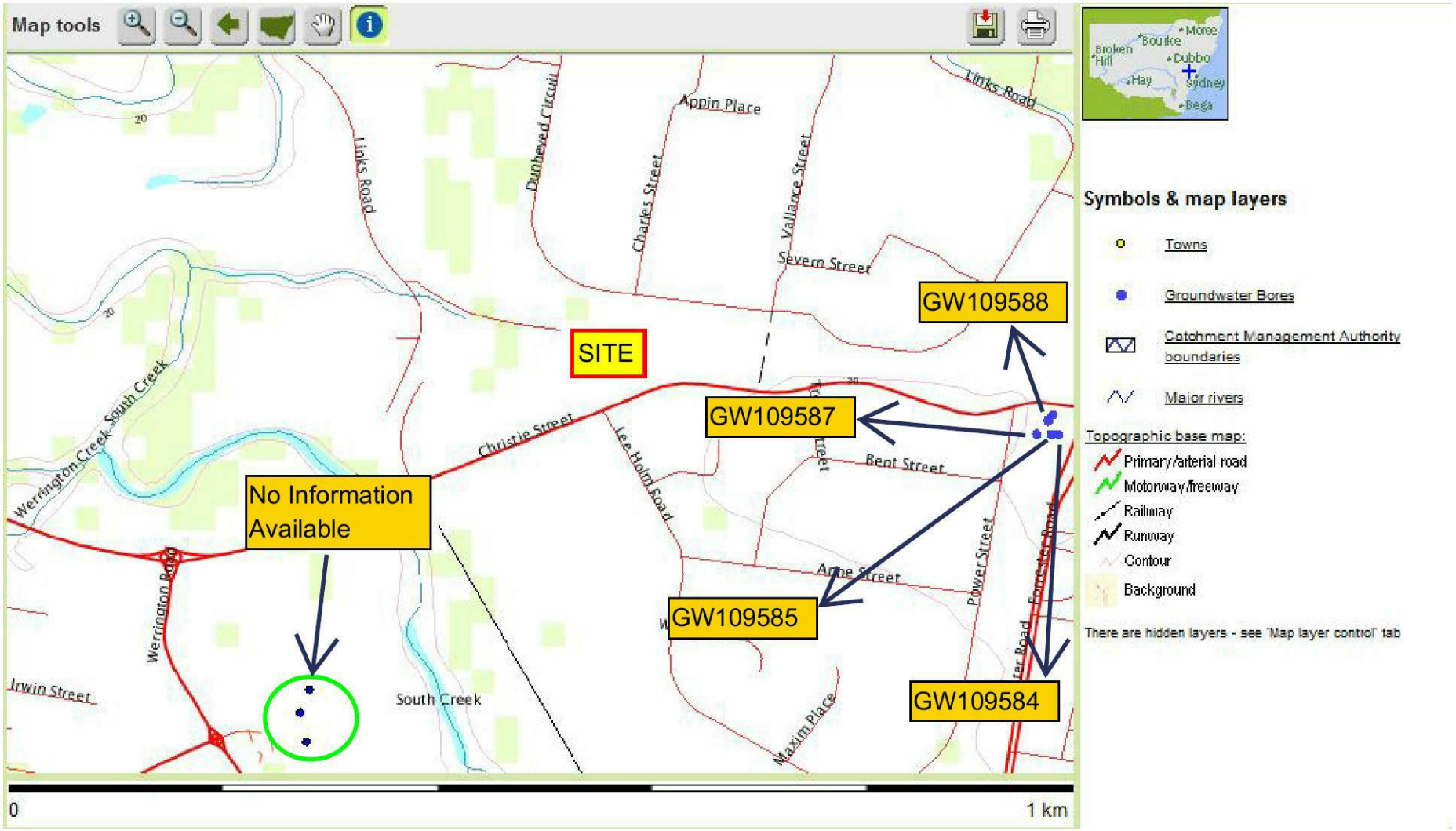
Version: 1, Version Date: 13/12/2013



Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 27, 2013

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW109588

Works Details (top)

GROUNDWATER NUMBER	GW109588
LIC-NUM	10BL163661
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-01-16
FINAL-DEPTH (metres)	8.20
DRILLED-DEPTH (metres)	8.20
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.62
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6263585.00
EASTING	294055.00
LATITUDE	33 44' 52"
LONGITUDE	150 46' 36"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

COUNTY	CUMBERLAND
PARISH	ROOTY HILL
PORTION-LOT-DP	51//774585

Licensed (top)

COUNTY	CUMBERLAND
PARISH	ROOTY HILL
PORTION-LOT-DP	51 774585

Construction (top)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE-NO	PIPE-NO	COMPONENT-CODE	COMPONENT-TYPE	DEPTH-FROM (metres)	DEPTH-TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	8.20	125			Hand Auger
1	1	Casing	P.V.C.	0.00	0.00	50			

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	0.00	0.00		2.62					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.20	0.20	CONCRETE		
0.20	0.70	0.50	FILL,CLAY		
0.70	2.60	1.90	CLAY,FIRM,ORANGE		
2.60	4.20	1.60	GRAVELLY CLAY		
4.20	7.20	3.00	CLAY,FIRM,BROWN,SOME GRAVEL		
7.20	8.20	1.00	SHALE,GREY,HARD		

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Groundwater Works Summary

For information on the meaning of fields please see Glossary
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Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW109584

Works Details (top)

GROUNDWATER NUMBER	GW109584
LIC-NUM	10BL163661
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-01-14
FINAL-DEPTH (metres)	8.20
DRILLED-DEPTH (metres)	8.20
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.89
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6263554.00
EASTING	294075.00
LATITUDE	33 44' 53"
LONGITUDE	150 46' 37"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

Document Set ID: 4302102
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COUNTY	CUMBERLAND
PARISH	ROOTY HILL
PORTION-LOT-DP	51//774585

Licensed (top)

COUNTY	CUMBERLAND
PARISH	ROOTY HILL
PORTION-LOT-DP	51 774585

Construction (top)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE-NO	PIPE-NO	COMPONENT-CODE	COMPONENT-TYPE	DEPTH-FROM (metres)	DEPTH-TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	8.20	95			Hand Auger
1	1	Casing	P.V.C.	0.00	0.00	50			

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	0.00	0.00		2.89					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.20	0.20	CONCRETE		
0.20	0.70	0.50	CLAY		
0.70	1.60	0.90	CLAY,GREY,ORANGE		
1.60	2.20	0.60	GRAVELLY CLAY,HARD , DRY		
2.20	5.50	3.30	CLAY,MOISTURE,FIRM		
5.50	8.20	2.70	SHALE,BEDROCK,DARK GREY		

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Groundwater Works Summary

For information on the meaning of fields please see Glossary
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Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW109585

Works Details (top)

GROUNDWATER NUMBER	GW109585
LIC-NUM	10BL163661
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-01-14
FINAL-DEPTH (metres)	8.20
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.40
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6263554.00
EASTING	294062.00
LATITUDE	33 44' 53"
LONGITUDE	150 46' 36"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

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COUNTY	CUMBERLAND
PARISH	ROOTY HILL
PORTION-LOT-DP	51//774585

Licensed (top)

COUNTY	CUMBERLAND
PARISH	ROOTY HILL
PORTION-LOT-DP	51 774585

Construction (top)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE-NO	PIPE-NO	COMPONENT-CODE	COMPONENT-TYPE	DEPTH-FROM (metres)	DEPTH-TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	8.20	125			Hand Auger

Water Bearing Zones (top)

no details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.20	0.20	CONCRETE		
0.20	0.60	0.40	FILL,CLAY		
0.60	3.90	3.30	CLAY,MOTTLED RED,BROWN		
3.90	6.20	2.30	GRAVELLY CLAY		
6.20	8.20	2.00	SHALE		

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Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 27, 2013

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW109587

Works Details (top)

GROUNDWATER NUMBER	GW109587
LIC-NUM	10BL163661
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-01-15
FINAL-DEPTH (metres)	8.20
DRILLED-DEPTH (metres)	8.20
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	6.70
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6263554.00
EASTING	294035.00
LATITUDE	33 44' 53"
LONGITUDE	150 46' 35"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

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COUNTY	CUMBERLAND
PARISH	ROOTY HILL
PORTION-LOT-DP	51//774585

Licensed (top)

COUNTY	CUMBERLAND
PARISH	ROOTY HILL
PORTION-LOT-DP	51 774585

Construction (top)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE-NO	PIPE-NO	COMPONENT-CODE	COMPONENT-TYPE	DEPTH-FROM (metres)	DEPTH-TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	8.20	125			Hand Auger
1	1	Casing	P.V.C.	0.00	0.00	50			

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	0.00	0.00		6.70					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.20	0.20	CONCRETE		
0.20	0.40	0.20	FILL		
0.40	3.50	3.10	CLAY,VERY STIFF		
3.50	5.00	1.50	GRAVELLY CLAY		
5.00	7.50	2.50	CLAY,FIRM BROWN		
7.50	8.20	0.70	SHALE,WHITE,GREY		

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Appendix C

Section 149 Certificate part (2) and (5)

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Facsimile: 02 4732 7958

PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

Property No: 199261
Your Reference: 640056/dls st marys DX
Contact No: 92337077

Issue Date: 26/07/2013
Certificate No: 13/03400
Receipt Date: 26/07/2013
Receipt No: 2480475

Issued to: Jenners Title Searching Co
DX 779
SYDNEY

PRECINCT 2010

DESCRIPTION OF LAND

County: CUMBERLAND **Parish: ROOTY HILL**

Location: 53-59 Christie Street ST MARYS NSW 2760
Land Description: Lot 136 DP 31912

- PART 1 PRESCRIBED MATTERS –

In accordance with the provisions of Section 149(2) of the Act the following information is furnished in respect of the abovementioned land:

1 *NAMES OF RELEVANT PLANNING INSTRUMENTS AND DCPs*

1(1) The name of each environmental planning instrument that applies to the carrying out of development on the land:

Penrith Local Environmental Plan 2010, published 22nd September 2010, as amended, applies to the land.

Sydney Regional Environmental Plan No.9 - Extractive Industry (No.2), gazetted 15 September 1995, as amended, applies to the local government area of Penrith.

Sydney Regional Environmental Plan No. 20 - Hawkesbury-Nepean River (No. 2 - 1997), gazetted 7 November 1997, as amended, applies to the local government area of Penrith (except land to which Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme applies).

The following State environmental planning policies apply to the land:
State Environmental Planning Policy No. 4 - Development Without Consent and Miscellaneous Exempt and Complying Development. (Note1: This policy may not apply to land reserved for certain public purposes. See clause 4 of the policy. Note 2: Clause 6 of the policy does not apply to land subject to Penrith City Centre Local Environmental Plan 2008 or State Environmental Planning Policy (Western Sydney Employment Area) 2009. Note 3: Clause 6 and Parts 3 and 4 of the policy do not apply to land subject to Penrith Local Environmental Plan (Glenmore Park Stage 2) 2009, Penrith Local Environmental Plan (South Werrington Urban Village) 2009, Penrith Local Environmental Plan (Caddens) 2009, or Penrith Local Environmental Plan 2010.)
State Environmental Planning Policy No. 6 - Number of Storeys in a Building.
State Environmental Planning Policy No.19 - Bushland in Urban Areas. (Note: This policy does not apply to certain land referred to in the National Parks and Wildlife Act 1974 and the Forestry Act 1916.)

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State Environmental Planning Policy No.21 - Caravan Parks.
State Environmental Planning Policy No.22 - Shops and Commercial Premises.
State Environmental Planning Policy No.30 - Intensive Agriculture.
State Environmental Planning Policy No.32 - Urban Consolidation (Redevelopment of Urban Land). (Note: This policy does not apply to land identified as coastal protection, environmental protection, escarpment, floodway, natural hazard, non-urban, rural, rural residential, water catchment or wetland.)
State Environmental Planning Policy No.33 - Hazardous and Offensive Development.
State Environmental Planning Policy No.50 - Canal Estate Development. (Note: This policy does not apply to the land to which Penrith Local Environmental Plan 1998 (Lakes Environs) and Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme apply.)
State Environmental Planning Policy No.55 - Remediation of Land.
Sate Environmental Planning Policy No.62 - Sustainable Aquaculture.
State Environmental Planning Policy No.64 - Advertising and Signage.
State Environmental Planning Policy No.65 - Design Quality of Residential Flat Development.
State Environmental Planning Policy No.70 - Affordable Housing (Revised Schemes).
State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (Note: This policy applies to land within New South Wales that is land zoned primarily for urban purposes or land that adjoins land zoned primarily for urban purposes, but only as detailed in clause 4 of the policy.)
State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004.
State Environmental Planning Policy (Major Development) 2005.
State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.
State Environmental Planning Policy (Temporary Structures) 2007.
State Environmental Planning Policy (Infrastructure) 2007.
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.
State Environmental Planning Policy (Affordable Rental Housing) 2009.
State Environmental Planning Policy (State and Regional Development) 2011.

1(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act:

The Planning Proposal for the Penrith City-wide Local Environmental Plan applies to the subject land. (See www.penrithcity.nsw.gov.au/ for details.)

Draft State Environmental Planning Policy (Competition) 2010 applies to the land.

Draft State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment 2012 applies to the land.

Draft State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Coal Seam Gas Exclusion Zones) 2013 applies to the land.

1(3) The name of each development control plan that applies to the carrying out of development on the land:

Penrith Development Control Plan 2010 applies to all land subject to Penrith Local Environmental Plan 2010. Penrith Development Control Plan 2006 applies to all land not subject to Penrith Local Environmental Plan 2010.

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

2 *ZONING AND LAND USE UNDER RELEVANT LEPs*

For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) that includes the land in any zone (however described):

2(a)-(d) the identity of the zone; the purposes that may be carried out without development consent; the purposes that may not be carried out except with development consent; and the purposes that are prohibited within the zone. Any zone(s) applying to the land is/are listed below and/or in annexures.

(Note: If no zoning appears in this section see section 1(1) for zoning and land use details (under the Sydney Regional Environmental Plan or State Environmental Planning Policy that zones this property).)

Zone IN1 General Industrial
(Penrith Local Environmental Plan 2010)

1 Objectives of zone

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.
- To promote development that makes efficient use of industrial land.
- To permit facilities that serve the daily recreation and convenience needs of persons working in industrial areas.

2 Permitted without consent

Roads

3 Permitted with consent

Animal boarding or training establishments; Car parks; Depots; Environmental facilities; Environmental protection works; Flood mitigation works; Freight transport facilities; General industries; Hardware and building supplies; Industrial retail outlets; Industrial training facilities; Industries; Landscaping material supplies; Light industries; Neighbourhood shops; Plant nurseries; Recreation areas; Sawmill or log processing works; Self-storage units; Signage; Take away food and drink premises; Timber yards; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres

4 Prohibited

Hazardous industries; Offensive industries; Any other development not specified in item 2 or 3

Additional information relating to Penrith Local Environmental Plan 2010

Note 1: Under the terms of Clause 2.4 of Penrith Local Environmental Plan 2010 development may be carried out on unzoned land only with development consent.

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PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

Note 2: Land to which Penrith Local Environmental Plan 2010 applies may be subdivided but only with development consent. Development consent must not be granted for the subdivision of land on which a secondary dwelling is situated if the subdivision would result in the principal dwelling and the secondary dwelling being situated on separate lots, unless the resulting lots are not less than the minimum size shown on the Lot Size Map in relation to the land.

Note 3: Under the terms of Clause 2.7 of Penrith Local Environmental Plan 2010 the demolition of a building or work may be carried out only with development consent.

Note 4: A temporary use may be permitted with development consent subject to the requirements of Clause 2.8 of Penrith Local Environmental Plan 2010.

Note 5: Under the terms of Clause 5.1 of Penrith Local Environmental Plan 2010 development on land acquired by an authority of the State under the owner-initiated acquisition provisions may, before it is used for the purpose for which it is reserved, be carried out, with development consent, for any purpose.

Note 6: Under the terms of Clause 5.3 of Penrith Local Environmental Plan 2010 development consent may be granted to development of certain land for any purpose that may be carried out in an adjoining zone.

Note 7: Under the terms of Clause 5.9 of Penrith Local Environmental Plan 2010 trees or other vegetation subject to Penrith Development Control Plan 2010 must not be ringbarked, cut down, topped, lopped, removed, injured or wilfully destroyed without the authority conferred by a development consent or a Council permit.

Note 8: Clause 5.10 of Penrith Local Environmental Plan 2010 details when development consent is required/not required in relation to heritage conservation.

Note 9: Under the terms of Clause 5.11 of Penrith Local Environmental Plan 2010 bush fire hazard reduction work authorised by the *Rural Fires Act 1997* may be carried out on any land without development consent.

Note 10: Sex services premises and restricted premises may only be permitted subject to the requirements of Clause 6.15 of Penrith Local Environmental Plan 2010.

Under the provisions of the Planning Proposal for the Penrith City-wide Local Environmental Plan the land is affected by the following draft zone:

Zone IN1 General Industrial

1 Objectives of zone

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities;
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.
- To promote development that makes efficient use of industrial land.
- To permit facilities that serve the daily recreation and convenience needs of people who work in the surrounding industrial area.

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2 Permitted without consent
Roads
3 Permitted with consent
Animal boarding or training establishments; Boat building and repair facilities; Car parks; Depots; Environmental facilities; Environmental protection works; Flood mitigation works; Freight transport facilities; General industries; Hardware and building supplies; Industrial retail outlets; Industrial training facilities; Industries; Kiosks; Landscaping material supplies; Light industries; Neighbourhood shops; Plant nurseries; Recreation areas; Sawmill or log processing works; Signage; Storage premises; Take-away food and drink premises; Timber yards; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Warehouse or distribution centres
4 Prohibited
Hazardous industries; Offensive industries; Any development not specified in Item 2 or 3

2(e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed:

(Information is provided in this section only if any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed.)

2(f) whether the land includes or comprises critical habitat:

(Information is provided in this section only if the land includes or comprises critical habitat.)

2(g) whether the land is in a conservation area (however described):

(Information is provided in this section only if the land is in a conservation area (however described).)

2(h) whether an item of environmental heritage (however described) is situated on the land:

(Information is provided in this section only if an item of environmental heritage (however described) is situated on the land.)

2A ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

(Information is provided in this section only if the land is within any zone under State Environmental Planning Policy (Sydney Region Growth Centres) 2006.)

3 COMPLYING DEVELOPMENT

GENERAL HOUSING CODE

Complying development under the General Housing Code **may** be carried out on the land.

RURAL HOUSING CODE

Complying development under the Rural Housing Code **may** be carried out on the land.

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HOUSING ALTERATIONS CODE

Complying development under the Housing Alterations Code **may** be carried out on the land.

GENERAL DEVELOPMENT CODE

Complying development under the General Development Code **may** be carried out on the land.

GENERAL COMMERCIAL AND INDUSTRIAL CODE

Complying development under the General Commercial and Industrial Code **may** be carried out on the land.

SUBDIVISIONS CODE

Complying development under the Subdivisions Code **may** be carried out on the land.

DEMOLITION CODE

Complying development under the Demolition Code **may** be carried out on the land.

(NOTE: (1) Council has relied on Department of Planning and Infrastructure Circulars and Fact Sheets in the preparation of this information. Applicants should seek their own legal advice in relation to this matter with particular reference to State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.
(2) Penrith Local Environmental Plan 2010 (if it applies to the land) contains additional complying development not specified in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.)

4 COASTAL PROTECTION

The land is not affected by the operation of sections 38 or 39 of the Coastal Protection Act 1979, to the extent that council has been so notified by the Department of Public Works.

5 MINE SUBSIDENCE

The land is not proclaimed to be a mine subsidence district within the meaning of section 15 of the Mine Subsidence Compensation Act 1961.

6 ROAD WIDENING AND ROAD REALIGNMENT

The land is not affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) an environmental planning instrument, or
(c) a resolution of council.

7 COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

(a) Councils Policies

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The land is not affected by a policy adopted by the council that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

(b) Other Public Authority Policies

The Bush Fire Co-ordinating Committee has adopted a Bush Fire Risk Management Plan that covers the local government area of Penrith City Council, and includes public, private and Commonwealth lands.

The land is not affected by a policy adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council, that restricts the development of the land because of the likelihood of land slip, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

7A FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

(1) This land has not been identified as being below the adopted flood planning level (ie. the 1% Annual Exceedance Probability flood level plus 0.5 metre) and as such flood related development controls generally do not apply for dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) if such uses are permissible on the land. Council reserves the right, however, to apply flood related development controls depending on the merits of any particular application. Should future studies change this situation this position may be reviewed.

(2) This land has not been identified as being below the adopted flood planning level (ie. the 1% Annual Exceedance Probability flood level plus 0.5 metre) and as such flood related development controls generally do not apply for any other purpose not referred to in (1) above. Council reserves the right, however, to apply flood related development controls depending on the merits of any particular application. Should future studies change this situation this position may be reviewed.

8 LAND RESERVED FOR ACQUISITION

No environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Act.

9 CONTRIBUTIONS PLANS

(Information is provided in this section only if a contributions plan applies to the land.)

9A BIODIVERSITY CERTIFIED LAND

(Information is provided in this section only if the land is biodiversity certified land (within the meaning of Part 7AA of the *Threatened Species Conservation Act 1995*).)

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10 BIOBANKING AGREEMENTS

(Information is provided in this section only if Council has been notified by the Director-General of the Department of Environment, Climate Change and Water that the land is land to which a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995* relates.)

11 BUSH FIRE PRONE LAND

The land is not identified as bush fire prone land according to Council records.

12 PROPERTY VEGETATION PLANS

(Information is provided in this section only if Council has been notified that the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.)

13 ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

(Information is provided in this section only if Council has been notified that an order has been made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.)

14 DIRECTIONS UNDER PART 3A

(Information is provided in this section only if there is a direction by the Minister in force under section 75P(2)(c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect.)

15 SITE COMPATIBILITY CERTIFICATES AND CONDITIONS AFFECTING SENIORS HOUSING

(Information is provided in this section only if:

(a) there is a current site compatibility certificate (seniors housing), of which the council is aware, issued under State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land; and/or

(b) any terms of a kind referred to in clause 18(2) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.)

16 SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

(Information is provided in this section only if there is a valid site compatibility certificate (infrastructure), of which council is aware, in respect of proposed development on the land.)

17 SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

(Information is provided in this section only if:

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(a) there is a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land; and/or
(b) any terms of a kind referred to in clause 17(1) or 37(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 have been imposed as a condition of consent to a development application in respect of the land.)

18 PAPER SUBDIVISION INFORMATION

(Information is provided in this section only if a development plan adopted by a relevant authority applies to the land or is proposed to be subject to a consent ballot, or a subdivision order applies to the land.)

NOTE: The following matters are prescribed by section 59(2) of the Contaminated Land Management Act 1997 as additional matters to be specified in a planning certificate

(a) (Information is provided in this section only if, as at the date of this certificate, the land (or part of the land) is significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.)

(b) (Information is provided in this section only if, as at the date of this certificate, the land is subject to a management order within the meaning of the Contaminated Land Management Act 1997.)

(c) (Information is provided in this section only if, as at the date of this certificate, the land is the subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.)

(d) (Information is provided in this section only if, at the date of this certificate, the land subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.)

(e) (Information is provided in this section only if the land is the subject of a site audit statement within the meaning of the Contaminated Land Management Act 1997 - a copy of which has been provided to Council.)

Note: Section 149(5) information for this property may contain additional information regarding contamination issues.

Note: The Environmental Planning and Assessment Amendment Act 1997 commenced operation on the 1 July 1998. As a consequence of this Act the information contained in this certificate needs to be read in conjunction with the provisions of the Environmental Planning and Assessment (Amendment) Regulation 1998, Environmental Planning and Assessment (Further Amendment) Regulation 1998 and Environmental Planning and Assessment (Savings and Transitional) Regulation 1998 and Environmental Planning and Assessment Regulation 2000.

Information is provided only to the extent that Council has been notified by relevant government departments.

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PENRITH CITY COUNCIL

Civic Centre
601 High Street, Penrith

PO Box 60 Penrith NSW 2751
DX 8017 Penrith

Telephone: 02 4732 7777
Facsimile: 02 4732 7958
Email: pencit@penrithcity.nsw.gov.au

PLANNING CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979

149(5) Certificate
This Certificate is directed to the following relevant matters affecting the land

When information pursuant to section 149(5) is requested the Council is under no obligation to furnish any of the information supplied herein pursuant to that section. Council draws your attention to section 149(6) which states that a council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this certificate.

Note:

- Council's 149(5) information does not include development consent or easement information. Details of development consents may be obtained by making enquiries with Council's Development Services Department pursuant to section 12 of the Local Government Act 1993 or (for development applications lodged after January 2007) by viewing the Online Services area at www.penrithcity.nsw.gov.au . Details of any easements may be obtained from a Title Search at Land and Property Information New South Wales.
- This certificate does not contain information relating to Complying Development Certificates.
- This certificate may not provide full details of development rights over the land.

* When considering any development application Council must have regard to the Threatened Species Conservation Act 1995. Please note that this legislation may have application to any land throughout the city. Interested persons should make their own enquiries in regard to the impact that this legislation could have on this land.

* See Clause 5.9 of Penrith Local Environmental Plan 2010 and Chapter C2 of Penrith Development Control Plan 2010 for specific controls relating to the preservation of trees and vegetation.

* Penrith Development Control Plan 2010, which applies to the land, sets out requirements for a range of issues that apply across the Penrith Local Government Area, including:

- Site Planning and Design Principles
- Vegetation Management
- Water Management
- Land Management
- Waste Management
- Landscape Design
- Culture and Heritage
- Public Domain
- Advertising and Signage
- Transport, Access and Parking
- Subdivision
- Noise and Vibration, and
- Infrastructure and Services.

The Development Control Plan also specifies requirements relating to various types of land uses including:

- Rural Land Uses
- Residential Development
- Commercial and Retail Development, and
- Industrial Development

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PENRITH
CITY COUNCIL

Civic Centre
601 High Street, Penrith

PO Box 60 Penrith NSW 2751
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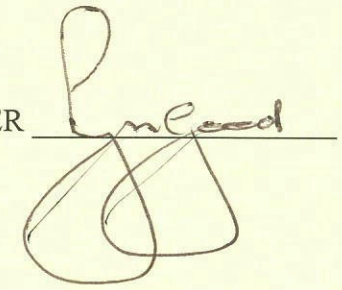
Telephone: 02 4732 7777
Facsimile: 02 4732 7958

as well as for a number of specific activities, including child care centres; health consulting rooms; educational establishments; places of public worship; vehicle repair stations; cemeteries, crematoria and funeral chapels; extractive industries; and telecommunication facilities.
The Development Control Plan also details requirements relating to key precincts within the Penrith Local Government Area, including:

- Mulgoa Valley
- Orchard Hills
- Waterside Corporate, and
- St Marys Town Centre.

Penrith Development Control Plan 2010 may be accessed at http://www.penrithcity.nsw.gov.au/index.asp?id=5451 .

Alan Stoneham
General Manager

PER 

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Appendix D

Dangerous Goods Search

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WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Our Ref: D13/101473
Your Ref: Ed Milne

19 August 2013

Attention: Ed Milne
DLA Environmental
Unit 2B,
30 Leighton Pl
Hornsby NSW 2077

Dear Mr Milne,

RE SITE: 53-59 Christie St St Marys NSW

I refer to your site search request received by WorkCover NSW on 13 August 2013 requesting information on licences to keep dangerous goods for the above site.

Enclosed are copies of the documents that WorkCover NSW holds on Dangerous Goods Licence 35/013356 relating to the storage of dangerous goods at the above-mentioned premises, as listed on the Stored Chemical Information Database (SCID).

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

Brent Jones
Senior Licensing Officer
Dangerous Goods Notification Team

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Reference

WORKCOVER AUTHORITY

Chemical Safety Unit
Locked Bag 10, P O CLARENCE STREET NSW 2000
Ph. (02) 370 5191 OR (02) 370 5192
Fax (02) 370 6105

Licensee

BORAL RESOURCES (NSW) P/L
BORAL CONCRETE
BOX 9 P O
ARTARMON 2064

25 MAY 1992

SCIENTIFIC SERVICES BRANCH
25 JUN 1992
DANGEROUS GOODS

Dear Sir/Madam,

RE **APPLICATION FOR RENEWAL** OF LICENCE FOR THE KEEPING OF DANGEROUS GOODS

Our records indicate you hold licence number 35/013356 for keeping dangerous goods at CHRISTIE ST IND AREA ST MARYS 2760.

Details of depots at site.

Depot No.	Depot type	Goods stored in depot	Quantity kg/litres/no.
1	UNDERGROUND TANK	FLAMMABLE LIQUIDS	20 000
2	UNDERGROUND TANK	FLAMMABLE LIQUIDS	10 000
3	ABOVEGROUND TANK	FLAMMABLE GASES	4 000

DATA
31 JUL 1992
ENTERED

This licence is now due for renewal. **TO RENEW YOUR LICENCE.** Please carefully check the details shown in this letter and make any required corrections. Then, **SIGN and DATE** the declaration below and return this letter to the WorkCover Authority, Chemical Safety Unit. **Fees for these licences have been abolished. DO NOT SEND ANY MONIES.**

Declaration: I wish to renew this licence to 15/06/93. I certify that the licence details shown in this letter are correct.

..... 12/6/92
(Signature) *(Date)*

If you do not wish to renew the licence. Please provide the Chemical Safety Unit with a signed statement giving the reason why it is not to be renewed. If you have sold/vacated the site please provide the name and address of the new owner/occupier so we may contact them.

Yours faithfully

Chief Inspector of Dangerous Goods.

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1. Applications must be forwarded to the Chief Inspector of Inflammable Liquid, Explosives Department, Box K.210, Royal Exchange Sydney. N.S.W. 2000 and must be accompanied by the prescribed fee, as set out hereunder:

Registration of Premises (Fee $4.50 p.a.) – For quantities not exceeding 300 gallons of mineral oil and 100 gallons of mineral spirit, if kept together; or 800 gallons of mineral oil and 100 gallons of mineral spirit, if kept in separate depots; or 500 gallons of mineral spirit, if kept in an underground tank depot; or 800 gallons of mineral oil and 500 gallons of mineral spirit, if mineral spirit is kept in an underground tank depot.

In addition to, or in lieu of the above, similar quantities of Dangerous Goods of Classes 1 and 2 may be kept under the like conditions; reading Dangerous Goods of Class 1 for the words Mineral Spirit and Dangerous Goods of Class 2 for the words Mineral Oil

Store Licence, Div. A (Fee, $9.00 p.a.) – For quantities in excess of those stated above, but not exceeding 4,000 gallons mineral oil and/or mineral spirit, and/or Dangerous Goods of Classes 1, 2 and 9.

Store Licence, Div. B (Fee, See Regulation 7) – For quantities exceeding 4,000 gallons of mineral spirit, and/or dangerous goods of Classes 1 and 2, and/or dangerous goods of Class 3.

For the keeping of Dangerous Goods of Classes 3 and/or 4. ($18.00 p.a.). CTK

Fees for the keeping of inflammable liquid and dangerous goods in excess of the above stated quantities and also for Liquid Petroleum Gas storage are set out in Regulation 7.

1. Name of occupier including full christian names.	Ready Mixed Concrete Industries Limited
2. Trading Name (if any)	
3. Locality of the premises in which the depot or depots are situated	No. or Name Industrial Area. Street Christie Town ST MARYS
4. Postal address 8.	Postcode 2760.
5. Occupation	
6. Nature of premises (dwelling, garage etc.)	Mixing Plant.

7. Particulars of construction of depots and maximum quantities of inflammable liquid and/or Dangerous Goods to be kept at any one time.

~~PLEASE ATTACH PLAN OF PREMISES~~

Depot No.	Construction of depots*			Inflammable liquid		Dangerous goods					
	Walls	Roof	Floor	Mineral spirit gallons	Mineral oil gallons	Class 1 gallons	Class 2 gallons	Class 3 lb	Class 4 cu ft	Class 5A water gal	Class 9 gallons
1	Underground tank			4000							
2	/		/	2000							
3											
4	Above ground tank									990	
5											
6											
7											
8											
9											
10											

PUBLIC REVENUE A/C. 1971 $4-00. 1972 (Dec) 50 36 79

* If product is kept in tanks describe depots as underground or aboveground tanks.

FOR AND ON BEHALF OF READY MIXED CONCRETE INDUSTRIES LIMITED

Signature of applicant _____ Chief Accountant

Date of application Oct 20, 1972

CERTIFICATE OF INSPECTION

I, Rodger Edward Oakes being an Inspector under the Inflammable Liquid Act, 1915 (as amended), do hereby certify that the premises or store herein referred to and described is suitable with regard to its situation and construction for the safe keeping of inflammable liquid and/or dangerous goods in quantity and nature specified.

Place Sydney Signature of Inspector R E Oakes

Date 20/12/72

Document Set ID: 4302102
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PLEASE TURN OVER

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3 of sheets

25'0" WIDE ROADWAY

15'6" 9'0" 13'6" 50'

10'

REMOTE FILL POINTS

SUCTION

6" THICK R.C. OVER TANKS AS DIRECTED

• 4000 GALLON TANK SUPER UNLEADED PETROL

• 6000 GALLON TANK DISTILLATE

VENTS 12 FEET ABOVE

RISTIE STREET

SEAL IN ACCORDANCE WITH CALTEX ORD. No. 1978351 OF PROTECTED WORKS WITHIN FEET.

ACCES GATES

EXPLOSIVES DEPT. PASSED

For Chief Inspector

25/10/72

TITLE

REFERENCE DRAWINGS

CALTEX OIL (AUSTRALIA) PTY. LTD.

LOCATION ST. MARYS

INSTALLATION

READY MIXED CONCRETE

STREET ST. MARYS

DRAWN

AUD

DIRECTIONS NEW LICENCE

1. Applications must be forwarded to the Chief Inspector of Inflammable Liquid, Explosives Department, Box R.216, Royal Exchange Sydney, N.S.W. 2000 and must be accompanied by the prescribed fee, as set out hereunder:

Registration of Premises (Fee $3.00 p.a.) – For quantities not exceeding 300 gallons of mineral oil and 100 gallons of mineral spirit, if kept together; or 800 gallons of mineral oil and 100 gallons of mineral spirit, if kept in separate depots; or 500 gallons of mineral spirit, if kept in an underground tank depot; or 800 gallons of mineral oil and 500 gallons of mineral spirit, if mineral spirit is kept in an underground tank depot.

In addition to, or in lieu of the above, similar quantities of Dangerous Goods of Classes 1 and 2 may be kept under the like conditions; reading Dangerous Goods of Class 1 for the words Mineral Spirit and Dangerous Goods of Class 2 for the words Mineral Oil.

Store License, Div. A (Fee, $6.50 p.a.) – For quantities in excess of those stated above, but not exceeding 4,000 gallons mineral oil and/or mineral spirit, and/or Dangerous Goods of Classes 1, 2 and 9.

Store License, Div. B (Fee, See Regulation 7) – For quantities exceeding 4,000 gallons of mineral spirit, and/or dangerous goods of Classes 1 and 2, and/or dangerous goods of Class 3.

For the keeping of Dangerous Goods of Classes 3 and/or 4. ($15.00 p.a.). OPTEX

Fees for the keeping of inflammable liquid and dangerous goods in excess of the above stated quantities and also for Liquid Petroleum Gas storage are set out in Regulation 7.

1. Name of occupier including full christian names. — READY MIXED CONCRETE LTD

2. Trading Name (if any) — A.S. ARROW

3. Locality of the premises in which the depot or depots are situated — No. or Name ____ Street CHRISTIE ST Town DUNHEVED

4. Postal address — 8. ST MARYS INDUSTRIAL Postcode ____

5. Occupation — PREMIX CONCRETE SUPPLIES

6. Nature of premises (dwelling, garage etc.) — MIXING PLANT

7. Particulars of construction of depots and maximum quantities of inflammable liquid and/or Dangerous Goods to be kept at any one time.

~~PLEASE ATTACH PLAN OF PREMISES~~

Depot No.	Construction of depots*			Inflammable liquid		Dangerous goods					
	Walls	Roof	Floor	Mineral spirit gallons	Mineral oil gallons	Class 1 gallons	Class 2 gallons	Class 3 lb	Class 4 cu ft	Class 5A water gal	Class 9 gallons
1	Underground Tank			4000							
2											
3											
4											
5											
6											
7											
8											
9	Above Ground Tank									900	
10											

PUBLIC REVENUE A/c. Pt Reg. / $ 15-00. 14/9/71 (Date) Receipt No. 8284

* If product is kept in tanks describe depots as underground or aboveground tanks.

READY MIXED CONCRETE INDUSTRIES LIMITED

Signature of applicant

Date of application ____, 19__

CERTIFICATE OF INSPECTION

I, ____ being an Inspector under the Inflammable Liquid Act, 1915 (as amended), do hereby certify that the premises or store herein referred to and described is suitable with regard to its situation and construction for the safe keeping of inflammable liquid and/or dangerous goods in quantity and nature specified.

Place SYDNEY Signature of Inspector

Date 20/9/71

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

PLEASE TURN OVER

Form DGI

Department of Industrial Relations

DANGEROUS GOODS ACT, 1975

LICENCE No. 35-015356.3

APPLICATION FOR ~~LICENCE~~ (or ~~AMENDMENT~~ or TRANSFER of LICENCE)* FOR THE KEEPING OF DANGEROUS GOODS

(* delete whichever is not required)

FEE: $15.00 per Depot for new licence.
$15.00 for amendment or transfer.

Name of Applicant in full (see Item 1 – Explanatory notes – page 4)	BORAL RESOURCES (N.S.W.) P/L
Trading name or occupier's name (if any)	BORAL CONCRETE
Postal Address	P.O. BOX 9 ARTARMON Postcode 2064
Address of the premises to be licensed. (Including Street No.)	CHRISTIE ST ST. MARYS Postcode 2760
Nature of premises (See Item 2 – Explanatory notes – page 4)	CONCRETE PLANT
Telephone number of applicant	STD Code Number 439 1611

Particulars of type of depots and maximum quantities of dangerous goods to be kept at any one time.

Depot number	Type of depot (See item 3 – Explanatory notes – page 4)	Storage capacity	Dangerous goods: Product being stored	C & C Office use only
1	UNDERGROUND TANK	20000	FLAMMABLE LIQUID	
2	" "	10000	" "	
3	ABOVEGROUND TANK	4000	PROPANE	
4				
5				
6				
7				
8				
9				
10				
11				
12				

Has site plan been approved by the Dangerous Goods Branch? Yes / ~~No~~ — If yes, no plans required. If no, ~~please attach site plan, or~~ provide sketch plan overleaf.

Have premises previously been licensed? Yes / ~~No~~ — If, yes, state name of previous occupier, and licence No. (if known).

Name of oil company supplying flammable liquid (if applicable). B.M.C LTD.

Signature of applicant ..... Date 12/8/85

For external explosives magazine(s), please fill in page 3.

FOR OFFICE USE ONLY

CERTIFICATE OF INSPECTION

I, RAYMOND CHARLES M'CARTH being an Inspector under the Dangerous Goods Act, 1975, do hereby certify that the premises described above do comply with the requirements of the Dangerous Goods Act, 1975, and the Dangerous Goods Regulation with regard to their situation and construction for the keeping of dangerous goods of the nature and in the quantity specified.

Signature of Inspector ..... Date 12.8.85

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Application is hereby made for— *~~a licence (or amendment of the licence)~~ *the transfer of the licence described below. (*delete whichever is not required) for the keeping of dangerous goods in or on the premises

FEE: ~~$10.00 per Depot for new licence~~. $10.00 for ~~amendment or~~ transfer.

Name of Applicant in full (see over) NF	BMG Resources Limited	
Trading name or occupier's name (if any) TF	BMG Concrete	
Postal address	P.O. Box 9, Artarmon	Postcode 2064
Address of the premises including street number (if any)	Christie St Industrial Area, St Marys	Postcode 2760
Nature of premises (see over)	Concrete Manufacturer	
Telephone number of applicant	STD Code 02	Number 439.1611

Particulars of type of depots and maximum quantities of dangerous goods to be kept at any one time.

Depot number	Type of depot (see over)	Storage capacity Litres	Dangerous goods: Product being stored	C & C Office use only
1	U/G tank	20,000	Flam. liquid 3	
2	"	10,000	" "	
3	A/G tank	4,000	L.P.G. 2-1	
4				
5				
6				
7				
8				
9				
10				
11				
12				

Has site plan been approved? Yes If yes, no plans required. ~~No~~ ~~If no, please attach site plan.~~

Have premises previously been licensed? Yes If yes, state name of previous occupier. ~~No~~

Name of company supplying flammable liquid (if any)

Signature of applicant ..... Date 16.11.82

For external explosives magazine(s), please fill in side 2.

FOR OFFICE USE ONLY

CERTIFICATE OF INSPECTION

I, RAYMOND CHARLES MCGRATH being an Inspector under the Dangerous Goods Act, 1975, do hereby certify that the premises described above do comply with the requirements of the Dangerous Goods Act, 1975, and the Dangerous Goods Regulation with regard to their situation and construction for the keeping of dangerous goods of the nature and in the quantity specified.

Signature of Inspector ..... Date 25.1.83

Licence No.

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Document Set ID: 4302102
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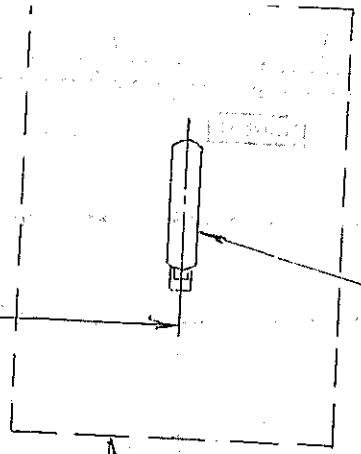

PROPOSED 990 GAL
LPG DISPENSING UNIT

BOUNDARY OF AREA ENCLOSED
BY MIN. DISTANCE OF
11 FT FROM LPG
DISPENSING UNIT

STREET

EXPLOSIVES DEPT.
PASSED
for Chief Inspector
11 6 17
SUBJECT TO COMPLIANCE WITH REGULATIONS

ITEM	PROJECT No.	DESCRIPTION	QTY
FOWLER WEX PTY LTD		SCALE	MATL
			FINISH
SITE LAYOUT		DRAWN	E33-007
PORT STEPHENS		DATE	
		CHECKED	
		APPT	

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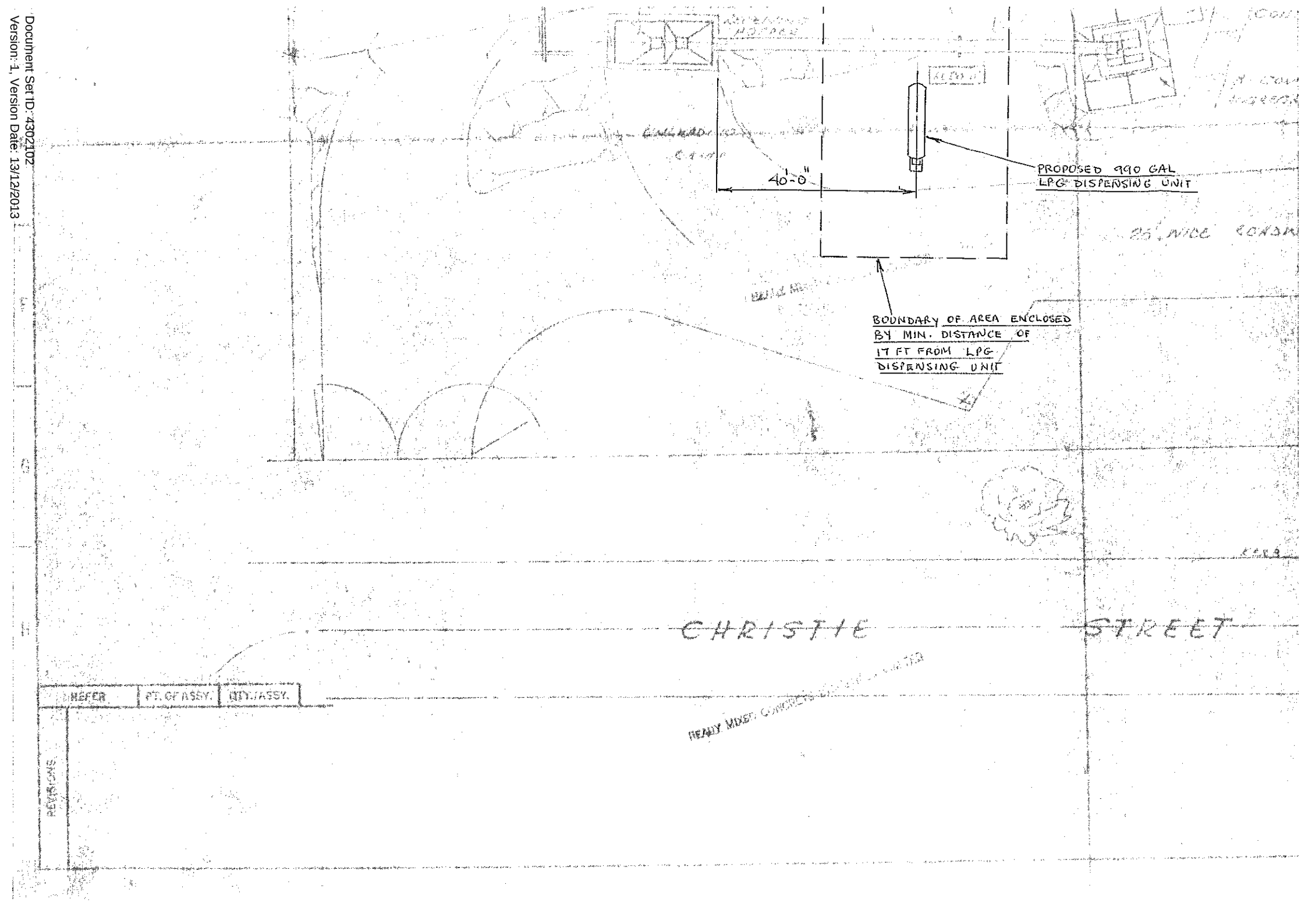

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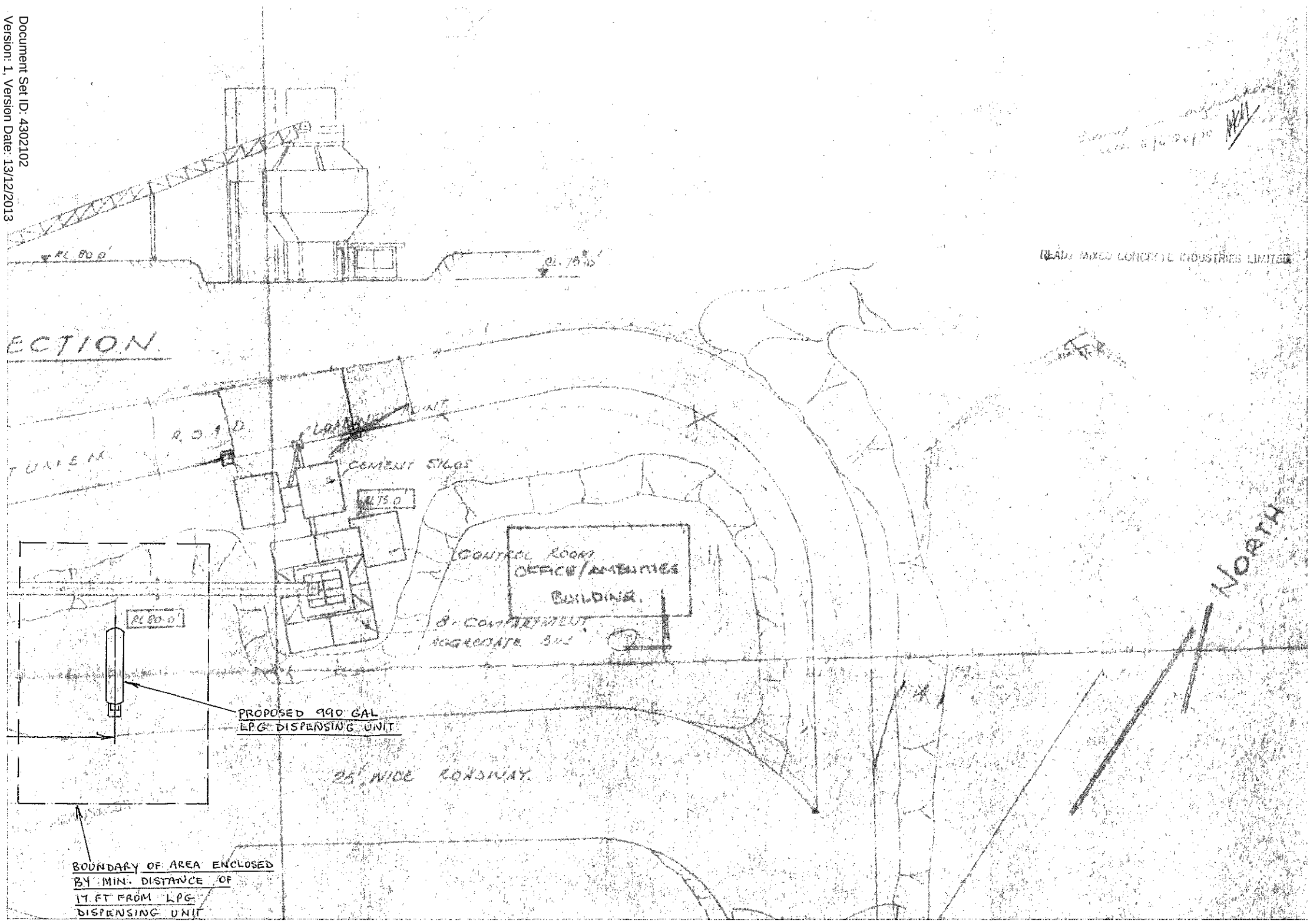

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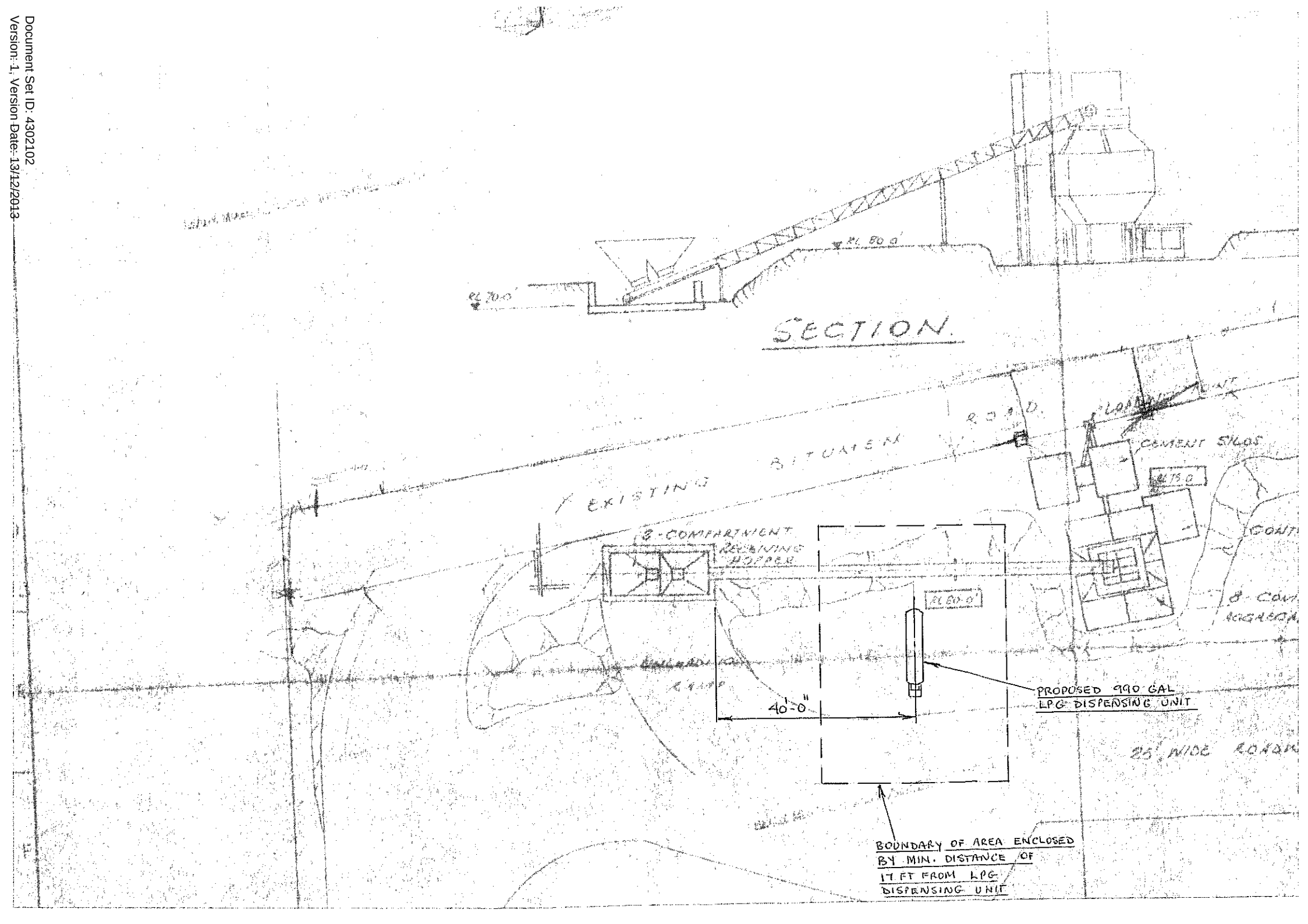
Version: 1, Version Date: 13/12/2013



Appendix E

Historical Title Search

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Version: 1, Version Date: 13/12/2013

~ Search ~

re 53-59 Christie Street St Marys
being Lot 136 in DP 31912

Title Tree

136 / 31912

↓

V. 90 x 3 F. 128

↓

V. 8237 F. 70

↓

V. 5500 F. 131

-KJ 20/12/13

Jenners Title Searching Co.
ESTABLISHED 1949

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

~ Search ~

	re 53-59 Christie Street St Marys Being Lot 136 in DP 31912
	Schedule of Registered Proprietors
Acquisitions 1943	The Commonwealth of Australia
Lr M180137 Reg 8/12/76 (V. 9043 F. 128)	Ready Mixed Concrete Industries Limited
Lr X531555 Reg 16/5/88 (V 9043 F. 128)	Boral Resources (NSW) Pty Limited

20/7/13

Jenners Title Searching Co.
ESTABLISHED 1949

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Jenners Title Searching Co.

LPI On-Line

Jenners Title Searching Co. hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act.

Information provided through Tri-Search an approved LPI*NSW* Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 136/31912

SEARCH DATE	TIME	EDITION NO	DATE
30/7/2013	9:44 AM	-	-

VOL 9043 FOL 128 IS THE CURRENT CERTIFICATE OF TITLE

LAND

LOT 136 IN DEPOSITED PLAN 31912
LOCAL GOVERNMENT AREA PENRITH
PARISH OF ROOTY HILL COUNTY OF CUMBERLAND
TITLE DIAGRAM DP31912

FIRST SCHEDULE

BORAL RESOURCES (NSW) PTY LIMITED (T X531555)

SECOND SCHEDULE (3 NOTIFICATIONS)

1 D431274 EASEMENT APPURTENANT TO THE LAND ABOVE DESCRIBED AFFECTING THE SITE OF PROPOSED DRAINAGE EASEMENT 33 FEET WIDE SHOWN IN DP431900
2 M63846 EASEMENT FOR WATER SUPPLY AFFECTING THAT PART OF THE LAND WITHIN DESCRIBED SHOWN AS SITE OF PROPOSED EASEMENT FOR WATER PIPE LINE 10 FT WIDE IN DP31912
3 M80137 COVENANT

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

DLA-St Marys PRINTED ON 30/7/2013

**ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.*

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Box:B27 Req:B672477 /Doc:CT 09043-128 CT /Rev:11-Feb-2011 /Sts:OK.OK /Prt:22-Jul-2013 12:40 /Pgs:ALL /Seq:1
Ref:1[illegible] /Src:W /WARNING: A4 Copy Supplied by LPI NSW for Conveyancing Purposes Only.

0, 1

NEW SOUTH WALES

[redacted]TICATE OF TITLE

[redacted]TY ACT, 1900, as amended.

GRANTED

(For Grant and title reference prior to first edition see Deposited Plan.)

Vol. 9043 Fol. 128

1st Edition issued 30-10-1961.

N

Fol. 128

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

GRANTED

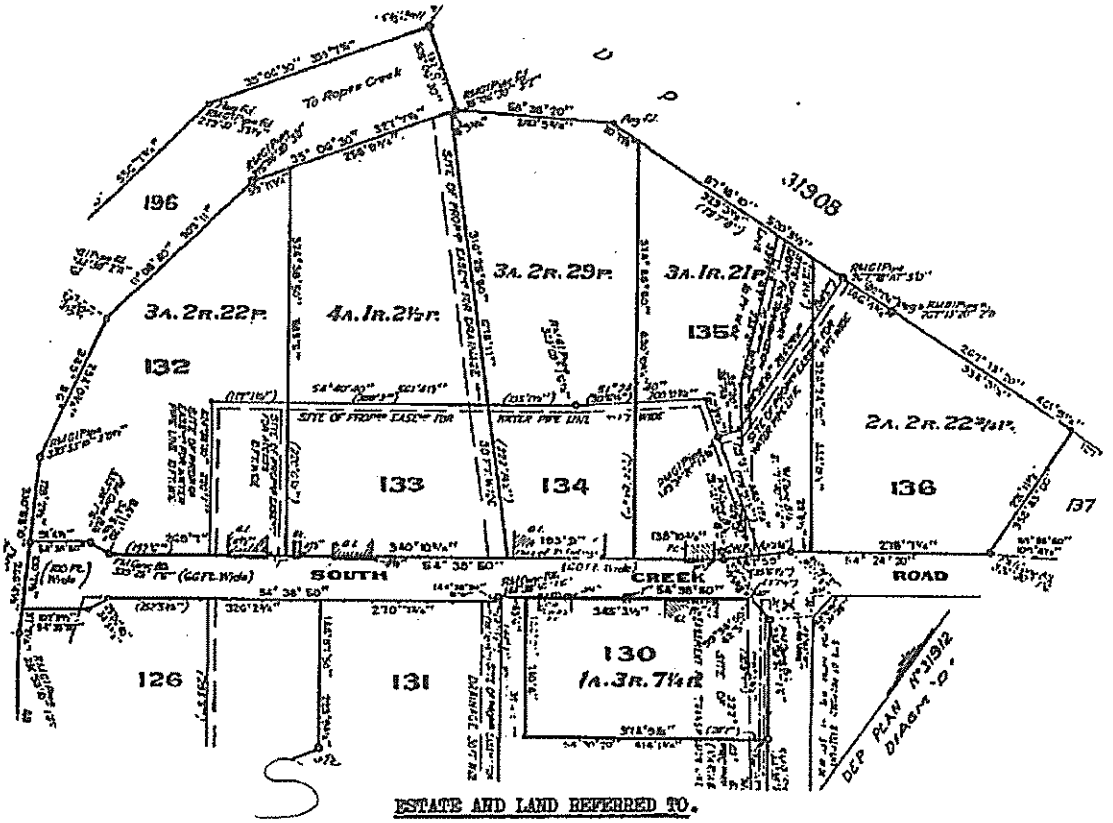
Witness

Registrar General.

SEE AUTO FOLIO

(Page 1) Vol. 9043

PLAN SHOWING LOCATION OF LAND.



ESTATE AND LAND REFERRED TO.

Estate in Fee Simple in Lot 136 in Deposited Plan 31912 in the City of Penrith Parish of Rooty Hill and County of Cumberland.

FIRST SCHEDULE (Continued overleaf)

~~THE COMMONWEALTH OF AUSTRALIA.~~

Registrar General.

GRN

SECOND SCHEDULE (Continued overleaf)

EA

1. Easement No. D431274 appurtenant to the land above described affecting the "Site of Proposed Drainage Easement 33 feet wide" shown in the plan in Acquisition No. D431274.

Registrar General.

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE LAND TITLES OFFICE.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED.

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FIRST SCHEDULE (continued)

Vol. 9043 Fol. 128

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General
Ready Mixed Concrete Industries Limited Boral Resources (NSW) Pty. Limited by Transfer X531555. Registered 10-5-1988	Transfer	M803[illegible]7	12[illegible]1970	6-10-1970	

M803[illegible]7 To
X531555

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION
EI Transfer	M638646	28-10-1970	Easement for Water Supply, as more fully set out in the said instrument affecting that part of the land shown described thereon as "Site of Proposed Easement for Water Pipes 5 wide" on the plan hereon			
CV Covenant	M820137		Created by Transfer M820137	E-18-1970 E-18-1970		

CANCELLED

SEE PHOTO FOLIO

(Page 2 of 2 pages)

FORM No. 184 NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

Appendix F

Bore Logs

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 1

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER:	DL3136
PROJECT:	Soil Supplemented Stage 1	COMMENCED:	22/07/2013
LOCATION:	53-59 Christie Street, St Marys	COMPLETED:	22/07/2013
		LOGGED BY:	Edward Milne

Monitoring Well Present? (No) Yes

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
			Heavy Silty Orange Clay		■	Sample BH1-0.1	
			Heavy Orange Clay (Natural)		■	Sample BH1-0.8 and BH1-0.8a	
	1.0		Heavy Grey Clay				
			END OF LOG				

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 2

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER:	DL3136
PROJECT:	Soil Supplemented Stage 1	COMMENCED:	22/07/2013
LOCATION:	53-59 Christie Street, St Marys	COMPLETED:	22/07/2013
		LOGGED BY:	Edward Milne

Monitoring Well Present? (No) Yes

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
			Sandy Silty Gravelly Mottled Black/ Orange/Red Clay Fill		■	Sample BH2-0.1	
			Medium Dark-brown Gravelly Clay Fill		■	Sample BH2-0.9	
	1.0		Heavy Orange/Grey Clay (Natural)				
			END OF LOG				
	2.0						

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 3

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER:	DL3136
PROJECT:	Soil Supplemented Stage 1	COMMENCED:	22/07/2013
LOCATION:	53-59 Christie Street, St Marys	COMPLETED:	22/07/2013
		LOGGED BY:	Edward Milne

Monitoring Well Present? (No) Yes

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
			Bitumen				
			Light-brown Sandy Gavelly Clay (Natural)		■	Sample BH3-0.1	
					■	Sample BH3-1.0, BH3-1.0a and BH3-1.0b	
	1.0		**END OF LOG**				

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 4

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER:	DL3136
PROJECT:	Soil Supplemented Stage 1	COMMENCED:	22/07/2013
LOCATION:	53-59 Christie Street, St Marys	COMPLETED:	22/07/2013
		LOGGED BY:	Edward Milne

Monitoring Well Present? (No) Yes

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
	0		Wet Grey Clay Fill	Wet	■	Sample BH4-0.1 Bore hole adjacent to former vehicle wash-out bays. Soil profile affected by concrete runoff from cleaning activities.	
	1.0						
	2.0				■	Sample BH4-2.0	
	3.0						
			Heavy Clay (Natural)		■	Sample BH4-4.0	
	4.0		**END OF LOG**				

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 5

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER:	DL3136
PROJECT:	Soil Supplemented Stage 1	COMMENCED:	22/07/2013
LOCATION:	53-59 Christie Street, St Marys	COMPLETED:	22/07/2013
		LOGGED BY:	Edward Milne

Monitoring Well Present? (No) Yes

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
			Asphalt				
			Medium Black/Dark-brown Sandy Clay Fill		■	Sample BH5-0.2 Inclusions: Gravel	
			Medium Grey/Light-brown Clay (Natural)		■	Sample BH5-0.5	
	1.0		**END OF LOG**				

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 6

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER: DL3136	Monitoring Well Present?
PROJECT:	Soil Supplemented Stage 1	COMMENCED: 22/07/2013	
LOCATION:	53-59 Christie Street, St Marys	COMPLETED: 22/07/2013	No / Yes
		LOGGED BY: Edward Milne	

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
			Concrete slab * 2				
			Heavy Dark-brown/Black/Orange Clay			Sample BH6-0.4	
	1.0						
						Sample BH6-2.0	
	2.0						
			END OF LOG				

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 7

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER:	DL3136
PROJECT:	Soil Supplemented Stage 1	COMMENCED:	22/07/2013
LOCATION:	53-59 Christie Street, St Marys	COMPLETED:	22/07/2013
		LOGGED BY:	Edward Milne

Monitoring Well Present? (No) Yes

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
			Heavy Sandy Mottled Orange/Grey Clay		■	Sample BH7-0.3	
	0.5		**END OF LOG**				

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 8

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER:	DL3136
PROJECT:	Soil Supplemented Stage 1	COMMENCED:	22/07/2013
LOCATION:	53-59 Christie Street, St Marys	COMPLETED:	22/07/2013
		LOGGED BY:	Edward Milne

Monitoring Well Present? (No) Yes

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
	0.5		Heavy Sandy Grey Clay		■	Sample BH8-0.3	

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 9

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER:	DL3136
PROJECT:	Soil Supplemented Stage 1	COMMENCED:	22/07/2013
LOCATION:	53-59 Christie Street, St Marys	COMPLETED:	22/07/2013
		LOGGED BY:	Edward Milne

Monitoring Well Present? (No) Yes

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
			Heavy Sandy Gravelly Grey Clay		■	Sample BH9-0.3	
	0.5		**END OF LOG**				

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 10

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER: DL3136	Monitoring Well Present?
PROJECT:	Soil Supplemented Stage 1	COMMENCED: 22/07/2013	
LOCATION:	53-59 Christie Street, St Marys	COMPLETED: 22/07/2013	(No) Yes
		LOGGED BY: Edward Milne	

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
			Medium Orange/White Sandy Clay Fill		■	Sample BH10-0.3	
	0.5		**END OF LOG**				

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA Environmental
Soil Profile Log

Bore Hole No. 11

CLIENT:	Artazan Property Group Pty Ltd	JOB NUMBER:	DL3136
PROJECT:	Soil Supplemented Stage 1	COMMENCED:	22/07/2013
LOCATION:	53-59 Christie Street, St Marys	COMPLETED:	22/07/2013
		LOGGED BY:	Edward Milne

Monitoring Well Present? (No) Yes

Drill Model: Truck Mounted Drill Rig Hole Angle: 90° Bore Size: 100mm

Method	Depth (m)	Graphic Log	Material Description	Moisture	Sampling	Field Records/Comments	Monitoring well Details
			Medium Dark-brown Sandy Clay		■	Sample BH11-0.3	
	0.5		**END OF LOG**				

Document Set ID: 4302102
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Appendix G

Site Survey

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Document Set ID: 4830102
Version: 1, Version Date: 13/12/2013

T. N.

M. N.

DENSE SCRUB AND NUMEROUS SMALL TREES

(A)

THIS AREA CONTAINS DUMPED MATERIAL - ANY LEVELS SHOWN HEREIN DO NOT REPRESENT NATURAL SURFACE. CONTOURS SHOWN INDICATE APPROXIMATE NATURAL SURFACE.

DENSE SCRUB AND NUMEROUS SMALL TREES

DENSE SCRUB AND NUMEROUS SMALL TREES

POND

POND

137
D.P. 31912
VACANT

136
D.P. 31912
1.070ha
DISUSED CONCRETE PLANT

2
D.P. 701087
VACANT

STORAGE FACILITY (SILO)

BRICK OFFICE

DRIVEWAY

BITUMEN

DUMP POINT FOR DRY MATERIALS

STORMWATER PIT IL 22.36

BENCHMARK NAIL IN KERB RL. 24.85 (A.H.D.)

CHRISTIE STREET

(A) EASEMENT FOR WATER SUPPLY 3.05 WIDE (M63846)

Scale 1:200 (A0)
Scale 1:400 (A2)
0 4 8 12 16 20 metres

TREE SCHEDULE			TREE SCHEDULE			TREE SCHEDULE		
TREE No.	SPREAD/TRUNK DIA./HEIGHT	LEVEL	TREE No.	SPREAD/TRUNK DIA./HEIGHT	LEVEL	TREE No.	SPREAD/TRUNK DIA./HEIGHT	LEVEL
1	3/0.2/9	24.31	33	6/0.4/12	25.61	65	12/0.6/14	25.74
2	4/0.2/8	24.53	34	10/0.5/10	23.57	66	8/0.4/10	25.91
3	4/0.2/8	24.46	35	8/0.3/9	25.77	67	8/0.4/10	25.77
4	10/0.5/10	24.79	36	8/0.4/10	24.05	68	10/0.4/12	25.66
5	8/0.5/12	24.84	37	6/0.3/6	25.14	69	6/0.3/9	25.96
6	15/0.7/17	24.91	38	10/0.5/14	25.72	70	6/0.3/8	25.88
7	8/0.4/12	24.66	39	8/0.4/12	25.84	71	6/0.3/8	25.99
8	5/0.3/7	24.40	40	8/0.4/10	25.61	72	10/0.5/10	25.88
9	8/0.3/8	25.69	41	8/0.3/9	25.75	73	10/0.5/10	26.01
10	12/0.6/12	25.31	42	6/0.3/10	25.78	74	4/0.3/10	26.66
11	12/0.7/18	25.71	43	10/0.4/12	25.90	75	8/0.4/10	26.85
12	14/0.7/20	25.24	44	10/0.4/10	26.15	76	12/0.4/12	26.34
13	10/0.6/15	25.26	45	12/0.4/14	25.73	77	12/0.7/12	26.92
14	6/0.35/8	25.01	46	12/0.5/14	25.84	78	18/0.9/14	27.24
15	8/0.5/12	25.05	47	10/0.4/10	25.74	79	10/0.3/10	27.79
16	6/0.3/10	24.53	48	8/0.4/12	26.11	80	10/0.3/10	28.09
17	6/0.3/10	25.12	49	5/0.3/7	26.45	81	8/0.3/10	27.00
18	5/0.3/7	25.70	50	10/0.3/10	26.53	82	6/0.3/10	26.68
19	15/0.7/20	25.89	51	8/0.4/10	26.78	83	5/0.3/5	27.29
20	12/0.5/12	25.67	52	12/0.6/12	26.50	84	6/0.3/6	27.00
21	6/0.3/7	24.72	53	8/0.3/12	26.05	85	8/0.4/8	26.95
22	4/0.3/9	24.63	54	12/0.6/10	26.54	86	6/0.4/9	26.66
23	6/0.5/10	24.50	55	6/0.4/10	25.69	87	8/0.4/10	27.72
24	6/0.3/8	25.02	56	6/0.3/8	26.87	88	5/0.3/10	28.12
25	6/0.3/8	25.01	57	10/0.4/12	26.57	89	5/0.3/7	26.79
26	8/0.3/10	25.50	58	10/0.5/12	25.28	90	8/0.6/12	26.04
27	10/0.4/10	25.58	59	8/0.5/10	25.40	91	6/0.3/7	25.71
28	10/0.3/10	25.50	60	12/0.5/12	25.30	92	6/0.4/10	25.90
29	6/0.4/10	25.54	61	8/0.3/8	25.92	93	8/0.3/7	26.18
30	6/0.3/7	25.46	62	8/0.4/10	25.94	94	8/0.3/8	26.38
31	6/0.3/10	25.73	63	10/0.4/12	26.15	95	10/0.5/12	26.88
32	6/0.3/7	25.54	64	8/0.4/12	25.84	96	8/0.3/9	25.88

SYMBOL LEGEND

- BENCHMARK
- CLOTHES LINE
- ELECTRICAL PILLAR
- GAS MAIN MARKER
- GAS METER
- GAS VALVE
- HYDRANT POTABLE
- HYDRANT RECYCLE
- LIGHTPOLE
- POWER POLE
- SEWER INSPECTION POINT
- SEWER MANHOLE
- SEWER VENT
- SIGN
- STOP VALVE POTABLE
- STOP VALVE RECYCLE
- TELSTRA PILLAR
- TELSTRA PIT SINGLE
- TELSTRA PIT DOUBLE
- TRAFFIC LIGHTS
- TRAFFIC LIGHTS CONTROL BOX
- WATER AIR VALVE
- WATER METER
- SURVEY CONTROL MARK
- TOP OF GUTTER LEVEL
- RIDGE LEVEL
- FLOOR LEVEL
- CHIMNEY LEVEL
- PARAPET LEVEL
- OVERHEAD WIRE LEVEL
- PIPE INVERT 600 DIA.

IMPORTANT NOTES

1 THE LEVELS AND DETAIL ON THIS PLAN HAVE BEEN DETERMINED BY TRIGONOMETRICAL METHODS AND ARE WITHIN THE GENERALLY ACCEPTED ACCURACY FOR SUCH A SURVEY.
2 THE RELATIONSHIP OF IMPROVEMENTS TO PROPERTY BOUNDARIES IS DIAGRAMMATIC ONLY. THE TRUE POSITIONS ARE SUBJECT TO FINAL SURVEY.
3 DIMENSIONS HAVE BEEN CALCULATED FROM INFORMATION SUPPLIED AND ARE SUBJECT TO FINAL SURVEY.
4 THE SERVICES AND DETAIL SHOWN ON THIS PLAN HAVE BEEN PREPARED FROM A COMBINATION OF FIELD SURVEY AND OFFICE CALCULATION. THE PLAN MAY NOT SHOW THE FULL EXTENT OF ABOVE GROUND STRUCTURES AND SUB SURFACE SERVICES. PRIOR TO ANY EXCAVATION OR CONSTRUCTION IT IS RECOMMENDED THAT THE LOCATION OF STRUCTURES AND SERVICES BE VERIFIED BY FIELD INSPECTION.
5 THE SPREAD OF THE CROWN OF THE TREES SHOWN ON THIS PLAN IS DIAGRAMMATIC ONLY, BASED ON THE AVERAGE SPREAD OBSERVED IN THE FIELD. PRIOR TO ANY DEVELOPMENT PROPOSAL WHICH MIGHT BE AFFECTED BY TREES IT IS RECOMMENDED THAT THE TREE SPREADS BE VERIFIED BY FIELD INSPECTION.
6 ALL LEVELS MUST BE REFERRED BACK TO THE BENCHMARK NAIL IN KERB R.L. 24.85(A.H.D.).
THE ORIGIN OF THIS LEVEL IS S.S.M.78866 R.L. 23.507 (A.H.D.) LOCATED IN CHRISTIE STREET.
7 CONTOUR INTERVAL IN METRES: 0.5
8 IF ANY WORK IS PLANNED WHICH RELIES ON CRITICAL SETBACKS FROM THE STREET OR SIDE BOUNDARIES IT IS IMPERATIVE THAT FURTHER SURVEY WORK BE CARRIED OUT TO DETERMINE PROPERTY BOUNDARIES
9 THE BEARINGS SHOWN ON THIS PLAN HAVE BEEN COMPILED FROM PLANS SUPPLIED BY LAND & PROPERTY INFORMATION

ALL ABOVE NOTES ARE AN INTEGRAL PART OF THIS PLAN

mepstead & ASSOCIATES
REGISTERED SURVEYORS AND DEVELOPMENT CONSULTANTS

Sydney
1/4 Central Avenue, Thornleigh N.S.W. 2120
Phone 02 9875 4500 **Fax** 02 9875 4833

Postal
PO BOX 208, Pennant Hills N.S.W. 1715

Internet
mepstead@mepstead.com.au
www.mepstead.com.au

Designed:		Scale: 1:200	A0
Drawn: C.P.		Datum: A.H.D.	
Checked: C.A.		Date: 11/07/13	
L.G.A.: PENRITH			

Principal: ARTAZAN PROPERTY GROUP
Drg. No. 5052-DET1
Project: PLAN OF DETAIL AND LEVELS OVER LOT 136 IN D.P. 31912 BEING No. 53-59 CHRISTIE STREET ST MARYS
Sheet No. 1 of 1 sheets
Our Ref: 5052

Appendix H

Print Gallery

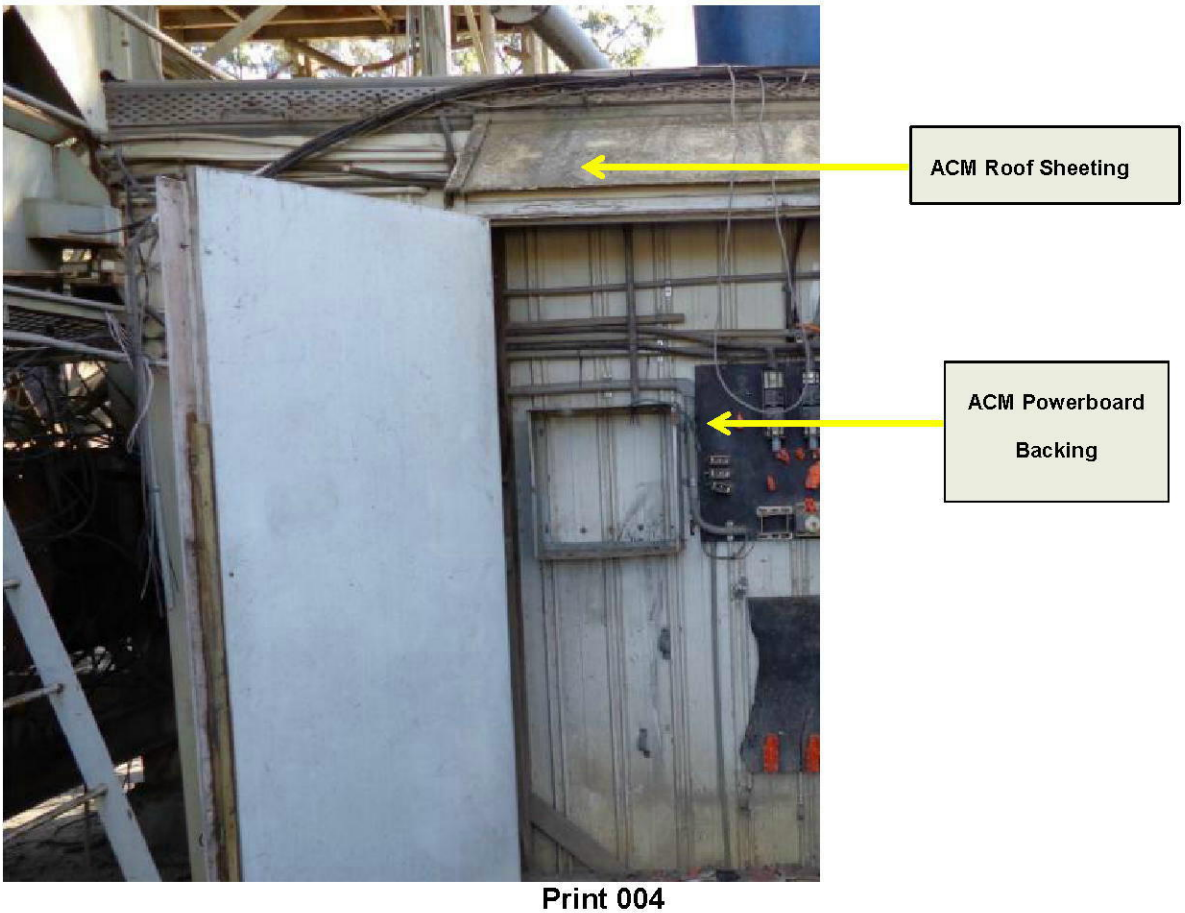
Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Print 001
Small stockpile of material to the west of the concrete plant (soil sample SP1)

Print 002
Overflow of concrete storage bays

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Print 003
Brake fluid and engine oil containers



Print 004
Asbestos-containing material identified at the small shed containing power boards

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Print 005
Chemical storage tanks behind block retaining wall, west of concrete plant

Print 006
Small stockpiles of general rubbish in north-western Lot corner fill area – Example 1

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Print 007
Small stockpiles of general rubbish in north-western Lot corner fill area – Example 2

Print 008
Old car in north-western Lot corner fill area

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Attachment 1

Unexpected Findings Protocol

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

DLA environmental
ABN 36 926 003 197

Sydney
Unit 2B 30 Leighton Place
Hornsby NSW 2077
Phone: 9476 1765
Fax: 9476 1557
Email: dlaenvironmental@bigpond.com

Maitland
42B Church Street
Maitland NSW 2320
PO Box 137
Branxton NSW 2335
Phone: 4933 0001
Email: dla.hunter@bigpond.com

Unexpected Findings Protocol for the Property Located at 53-59 Christie Street, St Marys, NSW, 2760.

DLA Environmental (DLA) was engaged by Mr James Harrison of Artazan Property Group Pty Ltd to provide an Unexpected Findings Protocol for the Site located at 53-59 Christie Street, St Marys, NSW 2760 (Site).

This unexpected findings protocol (UFP) has been developed to ensure appropriate management of soil and fill which may contain undefined contamination levels or foreign materials should they be encountered during site works.

The Site is proposed for re-development for industrial/commercial offices and potential contamination on the Site which may exist outside the confines of past environmental investigations will be managed through the following UFP.

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

UNEXPECTED FINDINGS PROTOCOL

1.0 Introduction

Due to the history of the Site, both past and present, there is potential for materials to be uncovered that have not been observed in previous investigations. These materials may require additional assessment or management. It is imperative that the potential for such material to impact site workers and the remainder of the site is minimised during further remedial and construction works.

Potential contamination may include:

- Asbestos Containing Materials (ACM);
- Fill material from unknown sources;
- Fill material contaminated with PAH's, hydrocarbons or heavy metals; and other unknown sources of contamination.

2.0 Typical features of "Unexpected Findings"

Any material that is uncovered during the earthworks deemed to be foreign, be that imported fill material or building waste, should be scrutinised further to determine if hydrocarbons, ACM, PAH or Heavy Metals or other contaminants are present.

The main features to look for are:

- material containing anthropogenic artefacts such as rubble, plastics, metal etc;
- asbestos or suspected asbestos containing material, ie sheet, pipe or lagging;
- material with fibres visible;
- material with an obvious unnatural odour i.e. fuel, solvent, burnt odour
- material that is noticeably stained in colour;
- archaeological artefacts; and
- any material that has evidently been dumped on site.

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

3.0 Implementation of the UFP

Prior to the commencement of any Excavation or Construction works on-site, an Occupational Health and Safety induction should be attended by all site staff. The aim and importance of the UFP and how it is to be implemented should be discussed at this time. Responsibility for its implementation will be assigned to the Principal Contractor.

Monitoring of environmental issues will be undertaken on a daily basis. If an unexpected finding is revealed during Site works, the following protocol is to be followed:

Unexpected findings protocol:

1. Cease disturbance of the affected portion of the Site and evacuate the immediate area;

2. Contact the Principal Contractor and the Contractors Environmental Representative (CER).

3. Principal Contractor and CER to conduct an assessment of the location and extent of the unexpected finding.

4. High risk areas should be isolated and secured against unintended access.

5. Temporary encapsulation (sealing) of the high risk area to ensure no airborne spread of contamination occurs may be appropriate. This may involve wetting down and placing clean soil/plastic sheeting over the contamination area.

6. Dust should be prevented by wetting the soil and drainage controls should be arranged where there is a potential for runoff to occur (runoff should be minimised).

7. Warning signs should be placed in and around the vicinity of the UF.

8. If the Principal Contractor and CER consider that the material warrants further investigation, the area is to be barricaded to provide an exclusion zone.

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9. If necessary, environmental controls should be established to minimise the potential for migration of contaminants from the impacted area.

10. Principal Contractor to complete UFP form (**Attachment A**) and issue to all relevant stakeholders.

11. Further visual assessment and sample collection and analysis is to be undertaken by a qualified environmental consultant. If necessary, samples will be sent to a NATA registered laboratory.

12. Evaluation of analytical data with respect to specific Health Investigation Levels (HILs) to be undertaken. Contaminated soil incident report amended with final classification of soils, including whether the soils are suitable for the proposed land use, need to be remediated or disposed of off-site to a suitably licensed facility. If soils are suitable to remain on-site and/or the area is found to be clean then a work instruction will be provided by the CER to this effect – a waste classification letter must be provided prior to any off-site disposal.

13. If the material is subsequently found to contain asbestos, or other hazardous materials, an appropriately licensed contractor will be employed to remove it. TRH impacted material can be stockpiled on-site for treatment or removed following waste classification.

14. Affected areas of the Site can be reopened for earthworks, following provision of clearance (based on laboratory results).

Notes:

1. Any suspected ACM, heavy metals, hydrocarbon, PAH or other contamination impacted material should be left in place and not disturbed. The CER will organise appropriate environmental professionals for further investigation purposes.

2. It is essential that material of differing compositions not be mixed.

3. All sampling for validation, waste classification or characterisation purposes will be carried out in accordance with the following documents:

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- NSW EPA (1995) Contaminated Sites: Sampling Design Guidelines;

- NSW EPA (1994) Contaminated Sites: Guidelines for Assessing Service Station Sites; and,

- Department of Environment Climate Change and Water NSW (2009) Waste Classification Guidelines Part 1: Classifying Waste

4. Any unexpected findings encountered should be listed on a UFP register, which should include the action taken and the status of the unexpected find. A suitable register is included in **Attachment B**.

5. Once an unexpected find has been identified and a UFP form filled in, the Principal Contractor and CER should liaise with the client as to the appropriate means of managing the situation. This should include discussions around the handling, treatment and disposal of material, WH&S considerations and how the affected area will be validated and reopened for works.

6. Prior to closing out an unexpected find, it will be important to ensure the appropriate documentation is obtained, such as photographs, the UFP form, waste classification letter(s) and a clearance report or letter.

7. A UFP form should be completed on each day of the remedial works as part of the daily Site records. This will ensure that the process is being undertaken even if no unexpected findings are encountered. The form should include the name, company and the position of the person undertaking the field observations.

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ATTACHMENT A UNEXPECTED FINDINGS FORM

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Unexpected Findings Protocol Form

(To be completed by the Site Controller/Environmental Representative)

Date: _____

Site: 53-59 Christie Street, St Marys, NSW 2760.

Personnel On-site: _____

Daily Summary:

1. Suspect material encountered during daily activities: ☐ Yes ☐ No
(if 'Yes', complete 2 - 8).

2. CER contacted: ☐ Yes ☐ No

3. UFP reference number (label occurrences sequentially 1, 2, 3, etc). _____

Description of material encountered:

4. Asbestos or suspected asbestos-containing material present: ☐ Yes ☐ No

5. **If No to 4,** is there an obvious odour present? (Note: **Do Not** inhale soil): ☐ Yes ☐ No

6. Visible staining: ☐ Yes ☐ No

7. Brief written description of material:

8. Material isolated: ☐ Yes ☐ No

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9. Location of contaminated material (include field sketch/map on back of this page if required):

10. Photographs taken: ☐ Yes ☐ No (Attach Photographs to UFP)

Name _____ **Signature:** _____

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ATTACHMENT B UNEXPECTED FINDINGS REGISTER

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DLA environmental

TABLE 1 UNEXPECTED FINDINGS REGISTER – 53-59 Christie Street, St Marys, NSW 2760.

UFP No	Date found	Suspect Material	Description	Recorded on UFP form (Y/N)	Action taken	Status

Appendix 'H'

Flora and Fauna Assessment Report

Prepared by SLR Consulting Australia Pty Ltd

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global environmental solutions

Lot 136 in DP 31912
Christie Street, St Marys

Proposed Industrial Development

Flora & Fauna Assessment Report

November 2013

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Lot 136 in DP 31912
Christie Street, St Marys

Proposed Industrial Development

Flora & Fauna Assessment Report

November 2013

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Document Control

Reference	Status	Date	Prepared	Checked	Authorised
610.12210	Version 1.0	November 2013	FI	FDF	F. Dominic Fanning

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LOT 136 in DP 31912
CHRISTIE STREET, ST MARYS

PROPOSED INDUSTRIAL DEVELOPMENT

FLORA & FAUNA ASSESSMENT REPORT

November 2013

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LOT 136 in DP 31912
CHRISTIE STREET, ST MARYS

PROPOSED INDUSTRIAL DEVELOPMENT

FLORA & FAUNA ASSESSMENT REPORT

November 2013

PART A	**INTRODUCTION & INFORMATION BASE**

1 INTRODUCTION

1.1 The Subject Site

The subject site is at Numbers 53-59 (Lot 136 in DP 31912) Christie Street, St Marys (Figure 1), and occupies an area of approximately 1 hectare. It is located approximately 40 kilometres to the northwest of the Sydney Central Business District (CBD), within the Penrith City Council *Local Government Area* (LGA).

The subject site (Figure 2) is surrounded by:

- Christie Street - along its southern boundary;
- similar industrial properties and a decommissioned railway line, which contain patches of moderately disturbed vegetation - to the north and west; and
- a smaller property with cleared grassland and disturbed forest - to the east.

The front half (*ie* the southern portion) of the subject site (Figure 2) has been substantially cleared of native vegetation for a now disused concrete plant (previously operated by Boral Industries), and is predominantly covered by asphalt with some landscaping. The northern half of the subject site (between the concrete batch and the disused rail line) contains two small portions of low quality native vegetation, as well as highly disturbed areas with large amounts of dumped building materials and exotic vegetation.

The vegetation in the northern part of the subject site (see Chapters 3 and 4) includes:

- areas of *Very Low* to *Low* condition Shale Gravel Transition Forest (SGTF) - which is:
  - an "*endangered ecological community*" (EEC) listed in the *Threatened Species Conservation Act 1995* (TSC Act); and
  - part of a "*critically endangered ecological community*" (CEEC), known as Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest, listed in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); and
- part of a small population of Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina* - which is a threatened plant listed as "*vulnerable*" in the TSC Act.

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With respect to the subject site at St Marys, SLR Ecology had previously prepared:

- an *Existing Environment Report* (SLR Ecology 2012) - to document the ecological values of and ecological constraints on the subject site, as part of due diligence investigations by the previous owner (Boral); and
- a letter (SLR Ecology 2013), in response to pre-DA negotiations with Council. The letter was provided to address Council's concerns regarding:
  - the potential for the retention of a wildlife corridor along the northern boundary of the site;
  - the condition of the SGTF vegetation in the northern part of the site; and
  - the location of Juniper-leaved Grevillea in the north of the site.

SLR Ecology has now been engaged to prepare a *Flora & Fauna Assessment Report* (FFAR), which is to accompany a *Development Application* (DA) for the industrial development of the subject site at St Marys (as described below).

1.2 Proposed Development

The proposed development of the subject site is for a new light industrial warehouse facility (Figure 3), involving:

- decommissioning and removal of existing structures, rubbish and rubble from the site;
- clearing of all vegetation - with the exception of a small triangular portion in the northwestern corner; and
- earthworks and the construction of:
  - five self-contained light industrial buildings around the periphery - with separate foyers, tea rooms and other internal facilities;
  - a central carparking area; and
  - a substantial landscaped street frontage.

1.3 Definitions

Definitions for areas used in this *Flora & Fauna Assessment Report* include:

- *subject site* Lot 136 in DP 31912 Christie Street, St Marys
- *general locality* an area 10km around the *"subject site"*

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1.4 Scope and Aims of this Report

The aims of this *Flora & Fauna Assessment Report* (FFAR) with respect to the subject site at Christie Street, St Marys are:

- to detail the previous surveys which identified the biota present and/or likely to occur;
- to assess the likely impacts of the proposed development of the land on the natural environment in general and on threatened biota in particular;
- to undertake a detailed assessment of likely impacts pursuant to:
- the *Environmental Planning & Assessment Act 1979* (EP&A Act);
- the *Threatened Species Conservation Act 1995* (TSC Act); and
- the Penrith *Local Environmental Plan – Planning Proposal 2012* (Penrith City Council 2012).

Consideration of the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act 1999) is also provided. It should be noted, however, that the EPBC Act is not a matter to be determined by a consent authority in determining a *Development Application* (DA) pursuant to NSW planning legislation.

This FFAR has also taken into account *inter alia* relevant statutory and planning policies, and agency *Guidelines*, including *inter alia*:

- the OEH *Principles for the Use of Biodiversity Offsets in NSW* (2011);
- the OEH *Threatened Species Survey & Assessment Guidelines* (dated 2004); and
- OEH documents regarding the Cumberland Plain, including *inter alia*:
    - *Cumberland Plain Vegetation Mapping* (NPWS 2002);
    - the *Cumberland Plain Recovery Plan* (DECCW 2011); and
    - *Recovering Bushland on the Cumberland Plain: Best Practice Guidelines for the Management and Restoration of Bushland* (DEC 2005).

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2 INFORMATION BASE

Existing information regarding relevant threatened and other native biota was obtained from:

- previous investigations undertaken by Gunninah Environmental Consultants[1] and Environmental InSites[2] on lands in the vicinity of the subject site (*eg* at St Marys and Cranebrook);
- inspection of the OEH[3] Atlas of NSW Wildlife records for the locality (Appendix B);
- inspection of the NPWS 2002 (Figure 4) and the Tozer *et al* 2010 (Figure 5) vegetation mapping of the locality; and
- the general published literature on threatened biota (see *Bibliography*).

As part of a previous *Due Diligence* investigation, a detailed survey by SLR ecologists was undertaken on the 6th of December 2012. That site survey involved the following activities:

- the collection of a series of photos across the site;
- opportunistic diurnal fauna observations;
- targeted searches for threatened species of flora; and
- the collection of a flora species list using the 'Random Meander' technique (*sensu* Cropper 1993).

A further supplementary site survey was undertaken on the 22nd of August 2013, involving:

- the conduct of a 'Random Meander' survey (*sensu* Cropper 1993) to obtain a more comprehensive flora species list (Figure 6; Appendix D);
- the undertaking of 20m x 20m flora survey quadrats (Figure 6; Appendix D) – involving the identification of all species present by intensive walked survey, and the recording of Braun – Blanquet ratings of abundance/cover for all species;
- detailed mapping of the Juniper-leaved Grevillea population (Figure 7);
- further dedicated searches for additional other threatened plants known from the locality which could potentially occur on the subject site (Appendix B); and
- targeted searches for the threatened fauna species (in particular the Cumberland Plain Land Snail) known to occur in the locality and which are potentially capable of occurring on the subject site (Appendix B).

---

[1] The principal author of this *Report* was previously the owner and Director of Gunninah Environmental Consultants.

[2] The authors of this *Report* were previously the Environmental Division of Whelans InSites, Sydney.

[3] The OEH (Office of Environment & Heritage), which is part of the Department of Premier & Cabinet, and which incorporates most of the former DECCW and includes the National Parks & Wildlife Service (NPWS).

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3 THE EXISTING ENVIRONMENT

3.1 The Locality

The subject site is located within an existing industrial precinct in the northwest of Sydney, which is extensively developed and which contains a few scattered and mostly highly degraded areas of remnant vegetation (Figure 1). Much of the land in this locality is already cleared and developed, either as a result of past agricultural and/or present industrial developments.

Vegetation on the land and in the vicinity of the subject site has been mapped by the NPWS (2002) as consisting of a variety of vegetation types (Figure 4), including:

- Shale/Gravel Transition Forest (SGTF);
- Shale Plains Woodland;
- Cooks River/Castlereagh Ironbark Forest (CRGF); and
- Alluvial Woodland.

More recent mapping of vegetation by Tozer *et al* (2010) identifies much less native vegetation on the site (Figure 5), but (like the NPWS 2002 mapping) has clearly not been ground-truthed.

3.2 The Subject Site

Approximately half of the subject site is occupied by a now disused concrete batch plant (which was previously owned by Boral) and associated features (such as carparks, storage areas and sheds). The facility is situated on the southern half of the subject site, and is accessed from Christie Street at the southern boundary. The rear section (northern half) of the subject site is partly vegetated with degraded or modified patches of Shale/Gravel Transition Forest, as well as areas of weeds and dumped fill.

A narrow eastern bund (approximately 3m high) runs along the entire length of the northern boundary. This is likely to have been constructed during the earthworks and construction of the previous railway line which once operated to the north of the subject site.

A large area in the northwestern portion of the subject site is highly degraded as a result of past dumping of fill materials and building rubble, and weed infestation. There is also a patch of Typha in the northeastern part of the site, in an area to which much of the site drains.

The NPWS (2002) have mapped the entire site as Shale/Gravel Transition Forest with <10% cover - urbanised vegetation (Figure 4). That mapping, however, is superseded by the vegetation mapping of Tozer *et al* 2010 (Figure 5) and the far more accurate ground-truthed mapping of SLR Ecology (Figure 8), as documented in this *Report*.

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4 FLORA and VEGETATION

4.1 Existing vegetation

The subject site is characterised in its southern half by the now disused concrete batch plant along Christie Street and a partially vegetated area (with some degraded land) in its northern half. As noted above, the NPWS 2002 vegetation mapping for the subject site identifies Shale Gravel Transition Forest in a less than 10% cover and urbanised state (Figure 4). Significantly, the Tozer *et al* 2010 mapping (Figure 5) does not identify any of the vegetation present on the site as an EEC or a TEC, indicating its highly degraded state.

More accurate and recent mapping of vegetation on the subject site has been undertaken by SLR Ecology (Figure 8). That mapping determines that a much reduced cover of SGTF is present, and identifies *inter alia*:

- a significant proportion of the subject site is occupied by the old concrete plant and areas of cleared and highly disturbed land;
- an artificial 'wetland' (created by surrounding earthworks) – which is characterised by a dense stand of Typha;
- a band of degraded weed-infested vegetation around the 'wetland'; and
- small bands of Shale/Gravel Transition Forest (SGTF) in *Very Low* to *Low* condition, through the northern parts of the subject site.

The SGTF vegetation (Figure 8) is limited to:

- a patch of *Low* to *Very Low* condition vegetation - in the northwestern corner of the site;
- a narrow band of *Very Low* condition SGTF, adjoining cleared land - in the northwestern part of the subject site;
- a band of *Low* condition SGTF - in the central northern part of the subject site; and
- a narrow band of *Very Low* condition SGTF - along the northeastern boundary.

4.1.1 Shale Gravel Transition Forest

The SGTF vegetation located within the northern portion of the subject site is generally dominated by Rough-barked Apple, with some scattered Cabbage Gum and Narrow-leaved Apple (Appendices A and D). There are also a few Thin-leaved Stringybark and Forest Red Gum (mainly in the northwestern corner), and a few Grey Box and Ironbark (predominantly in the northeastern corner). There is a patchy mid-canopy of exotic African Olive and Privet, with some native Black She-oak and *Melaleuca decora*.

The understorey is generally highly disturbed by invasive weeds (such as Blackberry, Asparagus Fern, Mother-of-millions, Paddy's Lucerne and Moth Vine), but there are areas (particularly the areas of *Low* condition) which are dominated by Blackthorn and other native species (including Juniper-leaved Grevillea, White Dogwood, Gorse Bitter Pea, Hairy Bush-Pea, Peach Heath and *Acacia falcata*).

The groundcover is dominated by African Love Grass, Kangaroo Grass and Three-awn Spear Grass in most places, but there are also areas of Wiry Panic and Small-flower Wallaby Grass, particularly in the

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northwestern corner. Other native species observed in the groundcover layer include White Root, Indian Pennywort, Kidney Weed, Forest Goodenia, Fish-weed and *Einadia nutans*.

Areas of SGTF on the subject site have been separated by SLR Ecology into the following conditions (Figure 8):

- *Low* condition (weed disturbance) – these areas are small and isolated, and contain native understorey and groundcover species, with a substantial cover of exotics;
- *Very Low* condition (fill and soil disturbance) – these are areas of regrowth SGTF vegetation which are growing from foreign fill and disturbed soil; and
- *Very Low* condition (weed dominant understorey and groundcover) – these areas contain a native canopy, but the understorey and groundcover and overwhelmingly dominated by exotic species (including thickets of African Olive, Blackberry and African Love Grass).

The areas of *Very Low* condition SGTF mapped on the subject site are not considered to constitute the SGTF community, due to the high levels of disturbance. The areas of *Low* condition represent the SGTF EEC which is listed in the TSC Act.

4.1.2 Disturbed Areas

Other highly disturbed portions of the site have been mapped as (Figure 7):

- Cleared and disturbed without native vegetation
- Concrete Plant
- Exotic wet-tolerant vegetation
- Typha pond

The parts of the site which have been mapped as 'Cleared and disturbed' include:

- an area in the northwestern portion of the subject site - which has been used to dump garden waste and building rubble or old construction materials. This area is dominated by Pampas Grass and Agave, with a number of other weeds including Asparagus Fern, Jacaranda, White Cedar, Privet, Blackberry, African Olive and African Love Grass; and
- an area in the northeastern corner of the site - which has been cleared and is dominated by the exotic Rhodes Grass.

The 'Typha pond' and surrounding 'Exotic wet-tolerant vegetation' in the northeastern corner of the site is an artificial wet area, which appears to have been excavated in the past. The natural topsoil appears to have been scraped back and used to form a bund along the northern boundary of the site. The wet area is dominated by Typha and Woolly Frogmouth, and there are some weeds around the periphery (including African Olive, Pampas Grass and Privet). There are also a few Swamp Oaks to the northeast of the wet area, which appear to have been introduced to the site.

These disturbed areas do not constitute any EEC listed in either the TSC Act or EPBC Act.

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4.2 Flora Species

Random Meander and systematic botanical surveys conducted as part of this investigation have recorded a total of 89 plant species from within the subject site (Appendix D). Of these, a total of 51 native species were recorded, along with 37 exotic species. A few of the exotic species (including Privet and African Olive) are also listed as noxious in NSW.

Twenty-one species recorded on the subject site are listed as "*characteristic*" in the *Final Determination* (Scientific Committee website 2013) for the SGTF community (Appendix D).

In addition, one of the species recorded (mostly) in the SGTF vegetation (the Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina*) is a "*threatened species*", which is listed as "*vulnerable*" in the TSC Act. This species was also observed scattered across the adjoining properties at St Marys.

4.3 Threatened Species

Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina* is the only "*threatened species*" detected on the site, and is listed as "*vulnerable*" in the TSC Act. This species was also observed scattered across the adjoining properties.

No other threatened species of flora were observed, and the subject site is not considered to be particularly suitable habitat for any such species (Appendix B).

4.4 Threatened Populations

No "*endangered populations*" of any flora species listed in the TSC Act have been recorded from the subject site.

One species (*Marsdenia viridiflora*), which is listed as an "*endangered population*" in the TSC Act, has been recorded within 10 km (Appendix B), but no specimens were detected during the recent survey, and there is no suitable habitat present.

4.5 Endangered Ecological communities

The vegetation mapped by the NPWS (2002) on the subject site (Figure 4) constitutes the "*endangered ecological community*" (EEC) listed in the TSC Act as Shale/Gravel Transition Forest (SGTF). Conversely, Tozer *et al* (2010) do not identify any EEC on the site – reflecting the degraded and isolated nature and condition of the vegetation present.

Ground-truthing of the vegetation by SLR Ecology on the subject site at St Marys (Figure 8) has determined that there are some disturbed patches of SGTF vegetation in the northern portion of the site. The areas mapped as *Very Low* condition, however, are not considered to constitute the EEC, due to the lack of native understorey and groundcover layers, as well as the highly disturbed nature of the soils and the prevalence of weeds.

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5 FAUNA and FAUNA HABITATS

5.1 Fauna Habitats

The subject site at St Marys is located within a large industrial precinct in western Sydney - which is largely developed, and which has had a long history of agricultural and industrial activities. The subject site contains scattered semi-mature and regrowth eucalypts in a modified and disturbed setting, with patches of *Low* quality native vegetation. The understorey remains largely intact in only two small patches on the subject site (see *Low* condition SGTF - Figure 8), and consists predominantly of indigenous shrub and groundcover species.

There were no hollow-bearing trees observed on the subject site during the surveys, and a brief walk of the adjacent properties also identified no hollow-bearing trees. As a consequence, the subject site is not likely to provide shelter for arboreal mammals, bats and some bird species, and would therefore only be used as possible foraging habitat for any such species.

The understorey vegetation (native and exotic) across the subject site could provide occasional habitat and shelter for small terrestrial fauna - such as small mammals, reptiles and common amphibians. The abundance of old building materials, concrete and fill, would provide further artificial reptile habitat. However, given the location of the subject site and the long history of development, disturbance and clearing at this location, there is no likelihood of any native terrestrial fauna, other than a few urban and peri-urban reptile species.

A small artificial wet area is located in the northeastern corner of the subject site. Although it was dry during the surveys, in times of high rainfall this dam would likely provide temporary habitat for some local amphibian species, particularly for more adaptable species (such as the Common Eastern Froglet or the Striped Marsh Frog).

There are no other habitat features or resources present which are of any particular significance for any native fauna, threatened or otherwise. The nature, condition and context of the subject site render it generally of value predominantly for abundant, widespread and adaptable species of native fauna, and of little or no relevance for threatened fauna species.

The subject site provides habitat opportunities for only a select group of native fauna, but is not likely to be essential for the survival of any threatened species found within the region (Appendix B). Due to the surrounding land uses, the subject site is unlikely to be utilised by any fauna groups other than highly mobile species and/or habitat generalists and species typical of urban and peri-urban environments (such as some bats and birds).

The fauna species observed during the site inspections during December 2012 and August 2013 attest to this observation. Overall, only 5 native species (4 birds and 1 reptile) were observed on the subject site, all of which are common in urban and peri-urban environments.

5.2 Fauna Species

The field investigations within the subject site in December 2012 and August 2013 identified a very restricted fauna assemblage of only 5 native species (4 birds and 1 reptile) and 1 introduced species (Appendix E). It is likely that additional common native fauna would utilise the subject site on occasions or on a seasonal basis.

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No amphibian species were recorded during the survey.

The subject site does not provide satisfactory habitat for the Green & Golden Bell Frog or the other threatened amphibians known in the locality (the Giant Burrowing Frog and the Red-crowned Toadlet). As indicated above, the small artificial wet area on the subject site appears to be mostly dry, and is densely vegetated with *Typha*, with no areas of open water. The subject site is considered of no importance for local amphibian populations.

Only one reptile (the Garden Skink *Lampropholis delicata*) was observed on the subject site during the surveys. Other reptile species which are common in urban and peri-urban environments (such as the Eastern Blue-tongue Lizard, Water Skink and Red-bellied Black Snake) could also utilise the subject site, at least on occasions.

There are no threatened reptile species known in the locality (Appendix B).

Four native bird species have been recorded on the subject site (Appendix E), all of which occur commonly in urban and peri-urban environments. An array of additional species are likely to be present on occasions at least, either seasonally or when certain plant species are flowering.

Whilst the subject site could theoretically be utilised on a temporary basis by individuals of some of the more wide-ranging threatened bird species known to occur in the locality, the modified and disturbed nature of the vegetation present and the extent of surrounding urban development suggest that the subject site would not be important for any of these species.

Twelve threatened mammals have been recorded within the locality (8 microchiropteran bats and 4 non-flying mammals), the majority of which are forest-dependent. The non-flying mammals are not likely to occur on the site at all, but individuals of at least some of the threatened microchiropteran bats could potentially use the site as an extremely small part of a larger foraging home range. Whilst this survey did not involve any nocturnal searches for bats, the subject site would only be used for foraging purposes, as there are no tree-hollow resources for roosting by microchiropteran bats.

Targeted searches for the Cumberland Plain Land Snail during the 2012 and 2013 surveys were un-successful in finding either live individuals or dead shells. Whilst this species is known to occur within the locality, the long-term modified nature of the subject site and its surrounds make it unlikely that the subject site is important (or indeed of any value) for the Cumberland Plain Land Snail.

5.3 Threatened Species

No threatened fauna species were recorded during the site surveys at St Marys.

Whilst individuals of some highly mobile threatened mammals (particularly those tolerant of urban and peri-urban environments) are likely to occur, the subject site does not constitute a significant area of habitat for a "*viable local population*" of any of these species - given its size, the disturbed nature of the site and the general nature of the locality.

Similarly, whilst individuals of some highly mobile and wide-ranging threatened bird species could theoretically utilise the flowering resources on the subject site, it cannot be considered likely that the site would be critical to the survival of even a single individual of any such species. The subject site

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constitutes only a miniscule and insignificant element within a substantial area of habitat within the home ranges of any such species.

Investigations of the subject site by SLR Ecology did not locate any live specimens or shells of the Cumberland Plain Land Snail. The vegetation and ground surface of the subject site were extremely dry during the both site surveys, which would inhibit the chances of finding this species. Generally speaking, however, the subject site does not constitute particularly suitable Cumberland Plain Land Snail habitat (given the high levels of disturbance and the long history of modification), and would not be of any importance for this species.

As noted above, the subject site, including the artificial 'dam', does not contain any suitable habitat for the Green & Golden Bell Frog, the Giant Burrowing Frog or the Red-crowned Toadlet, and there are no contiguous areas of suitable habitat for these species.

No threatened reptile species have been recorded in the region (Appendix B).

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6 GENERAL IMPACT ASSESSMENT

Whilst the proposed development (as noted above) will require the removal of the majority of the (degraded) native vegetation from the subject site at St Marys, there are a number of relevant considerations in assessing the potential or likely impacts of the proposal. Relevant matters in this assessment include:

- the overwhelming majority of the subject site is highly modified and/or artificial;
- much of the site has long been substantially cleared as part of the Boral facility; and
- there are very few resources or habitat features of even potential significance for any native fauna, including in particular for threatened species.

The proposed industrial development of the subject site at St Marys is consistent with the recent and ongoing expansion of industrial development areas in this part of Sydney.

The relevant "*objects*" of the EP&A Act with respect to ecological issues are:

- "*the proper management, development and conservation of natural and artificial resources for the purposes of promoting the social and economic welfare of the community and a better environment*";
- "*the promotion and co-ordination of the orderly and economic use and development of land*";
- "*the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats*"; and
- the achievement of "*ecologically sustainable development*".

With respect to the subject site at St Marys, the proposed development satisfies the "*objects*" of the EP&A Act by virtue of the following considerations:

- the vegetation present on the subject site is not regarded as "*significant*" or of particular relevance with respect to biodiversity conservation outcomes;
- the subject site is in an area which has been identified as appropriate for urban development purposes, and thus satisfies the goal of the EP&A Act with respect to "*the promotion and co-ordination of the orderly and economic use and development of land*";
- the proposed development of the subject site will not impose significant adverse impacts upon any native biota, including "*threatened species, populations and ecological communities, and their habitats*"; and
- the proposal does not contravene the objectives of "*ecologically sustainable development*" (ESD) on a local or regional scale.

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7 SECTION 79C of the EP&A ACT

The subject site at St Marys, which is proposed for industrial development, has long been highly modified, and does not constitute a significant element of the "*natural environment*". Whilst there are small and degraded patches of SGTF vegetation present in the northern part of the site, these are set in a highly modified and artificial landscape, and are essentially isolated from any relevant areas of native vegetation.

There are no native biota that would be reliant on or dependent on the vegetation present on the subject site for the survival of a "*local population*" in this general locality. Notwithstanding the removal of most of the vegetation present, the proposed industrial development of the site would not impose an unreasonable or substantial adverse impact upon the *"natural environment*" in general, given the highly disturbed nature of the subject site and the lack of conservation significance of the vegetation present.

An additional consideration is the context of the subject site, which is in the centre of an industrial precinct in western Sydney (Figure 1). Retention of vegetation on the subject site would not achieve any notable biodiversity conservation outcome, particularly in the absence of any mechanism for or likelihood of any rehabilitation or regeneration of native vegetation on adjoining lands.

With respect to the "*natural* environment", the proposed development of the subject site at St Marys, whilst requiring the removal of most of the 'native vegetation' present, is regarded as appropriate and reasonable in the context of the land and the surrounding urban activities. The St Marys area has long been identified as appropriate for industrial purposes, and the land is zoned for that purpose.

Neither the subject site nor adjoining lands are identified in the *Priority Conservation Lands* (PCLs) which have been identified by the Office of Environment & Heritage (OEH) for the conservation of significant vegetation in the Cumberland Plain. This circumstance, doubtless, is due to the extremely poor quality of the vegetation on the subject site and its small size, as well as its isolation and the urban context in which it is located. Further, vegetation on the site at St Marys is not mapped by Tozer *et al* (2010), reflecting its small size, degraded condition and isolated circumstances.

Given the considerations above, and on the basis of sensible planning objectives and the application of ESD principles, the proposed development of the subject site at St Marys does not constitute an activity which could be regarded as unacceptable or unreasonable with respect to the "*natural environment*" in terms of Section 79C of the EP&A Act.

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8 SECTION 5A of the EP&A ACT

8.1 The Statutory Regime

The *Threatened Species Conservation Act 1995* (TSC Act) has modified the *Environmental Planning & Assessment Act 1979* (EP&A Act) by, *inter alia*, including a requirement to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*". The relevant factors of Section 5A of the EP&A Act "*must be taken into account*" by a consent or determining authority when considering a *Development Application*, and in administering Sections 78A, 79B, 79C, 111 and 112 of the EP&A Act, as relevant.

In addition to the seven factors which "*must be taken into account*" (where relevant) pursuant to Section 5A(2) of the EP&A Act (see below), Section 5A(1)(b) of the EP&A Act requires that "*any* [relevant] *assessment guidelines*" promulgated by the relevant authorities (particularly in this instance the OEH) also "*must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*".

In undertaking the *Section 5A Assessments of Significance* documented below, the authors have "*taken into account*" the *Threatened Species Assessment Guidelines: the Assessment of Significance* prepared by the then Department of Environment & Climate Change (now OEH), dated August 2007.

The A*ssessment of Significance* provided below, prepared pursuant to Section 5A of the EP&A Act, deals with those threatened biota which could theoretically or potentially occur on the subject site (*eg* individuals of some threatened microchiropteran bats or threatened birds), as well as the Grey-headed Flying Fox and the Cumberland Plain Land Snail. None of these species have been recorded on the site, and other than possible occasional individuals of the more mobile species, none are likely to use the site.

8.2 The Seven Factors of Section 5A

Factor a Threatened Species – Risk of Extinction

It is not likely that the subject site itself would support or be crucial to the survival of a "*viable local population*" of any of the "*threatened species*" which could potentially occur on the site (Appendix B).

With respect to threatened fauna, it is possible that individuals of a few wide-ranging threatened species (such as microchiropteran bats or birds) would or may utilise the subject site on occasions. However, there are no roosting resources present on the subject site, and it is not likely that even a single individual of any such species would be dependent on the subject site *per se*.

Whilst the Cumberland Plain Land Snail and the Grey-headed Flying Fox have been observed in the locality, the subject site is not considered to provide suitable habitat for either of these species. No Snails were recorded on the site (which is at best only marginal habitat for this species) and there are only limited potential resources of possible relevance to the Grey-headed Flying Fox.

It is not likely that a "*viable local population*" of any threatened fauna species would be dependent on the subject site, either in isolation or as a significant element in a broader area of habitat. Indeed, it is not likely that removal of all of the vegetation from the subject site would affect any "*viable local population*" of any threatened biota that might occur in the locality.

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The Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina* was recorded on the subject site and onto adjoining properties at St Marys. Although listed as "*vulnerable*" in the TSC Act, this species is highly resilient, and often occurs as localised small populations on road verges and other disturbed areas.

A detailed *Section 5A Assessment of Significance* for the Juniper-leaved Grevillea is provided in Appendix F of this *Report*.

No other threatened flora species were recorded on the subject site during the site inspections and, given the highly disturbed nature of the site, none are likely to be present (even in any soil seedbank). Consequently, the removal of vegetation from the subject site cannot be regarded as relevant in terms of the "*life cycle*" of any threatened plants.

Given the considerations discussed above, there is no likelihood of a "*viable local population*" of any "*threatened species*" being "*placed at risk of* ***extinction***"[4] (emphasis added) by the proposed development of the subject site at St Marys.

Factor b Endangered Populations – Risk of Extinction

The TSC Act defines an "*endangered population*" as "*a population specified in Part 2 of Schedule 1*" of the Act.

There is no "*endangered population*" of any species likely to occur or be present on the subject site or in the locality.

Factor c Threatened Ecological Communities – Risk of Extinction

The TSC Act defines a "*threatened ecological community*" (TEC) as "*a community specified in Part 3 of Schedule 1, Part 2 of Schedule 1A or Part 2 of Schedule 2*" of the Act.

The two small patches of SGTF on the subject site (see *Low Condition* SGTF in Figure 8) are degraded, isolated and of extremely low biodiversity conservation value. Removal of this highly degraded vegetation is not likely to render the "*local occurrence*" of this EEC extinct. A detailed *Section 5A Assessment of Significance* for the SGTF is provided in Appendix F.

The removal of vegetation from the subject site would not impose a "*significant effect*" upon any TEC, at any relevant scale.

Factor d Impacts on Habitat for Threatened Biota

As noted above, the subject site at St Marys does not contain significant or important habitat or resources for any of the threatened biota which could potentially occur on the land, as a consequence of the highly modified and degraded nature of the site, its context, its location and its size.

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4 The term "*extinction*" is significant. It means the destruction of or the obliteration of a "*viable local population*" – its cessation to exist. It does not mean merely some reduction in the population or in the extent of its distribution, or some reduction in the extent of relevant habitat.

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Those threatened species which could potentially occur on the subject site are likely to be widely distributed in the general locality and/or are wide-ranging and highly mobile. The subject site does not constitute significant, critical or important habitat for any possible threatened biota.

Given the circumstances described above, and given the nature and condition of the subject site, as well as its context and size, "*the action proposed*":

- is not likely to result in the removal or modification of significant areas of potential habitat for any threatened biota ("*threatened species, endangered populations, or ecological communities*"). The area to be affected by the proposal is not considered to be of any particular relevance or significance for any threatened biota, and constitutes only a minute proportion of potentially suitable habitat for any such biota in the general locality – Factor (d)(i);
- is not likely to result in any habitat for threatened biota becoming "*fragmented or isolated from other areas of habitat*" – Factor (d)(ii), given:
  - the extent and distribution of potential habitat in the locality;
  - the context and location of the land; and
  - the lack of significant or relevant resources; and
- is not likely to result in any disturbance to important or significant habitat for any threatened biota, even if any such biota are present. The subject site cannot reasonably be regarded as of importance with respect to "*the long-term survival*" of any threatened biota "*in the locality*", or indeed at any relevant scale – Factor (d)(iii).

Factor e Critical Habitat

The TSC Act defines "*critical habitat*" as "*habitat declared to be critical habitat under Part 3*" of the *Act*.

The subject site does not represent listed "*critical habitat*" for any threatened biota.

Factor f Recovery Plans and Threat Abatement Plans

There are no relevant *Recovery Plans* or *Threat Abatement Plans* which relate to any of the additional threatened biota which would be likely of relevance to the subject site at St Marys, given its existing condition.

Factor g Key Threatening Processes

The only "*key threatening process*" listed in the TSC Act which could be of even potential relevance to the proposed development on the subject site is the "*clearing of native vegetation*".

With respect to the "*clearing of native vegetation*", however:

- it is to be noted that the "*vegetation*" present is highly degraded; and

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- the loss of the vegetation present is not considered likely to be of any relevance or significance with respect to those additional threatened species which could potentially occur on the land (see Factor a and Factor d above).

Given those considerations, the minor imposition of or exacerbation of that "*key threatening process*", as required for the development of the subject site at St Marys for industrial purposes (as proposed), is not considered of significance with respect to any threatened biota. Importantly, the imposition of any "*key threatening processes*" as a result of the "*action proposed*" is not considered sufficient to impose a "*significant effect*" upon any such additional threatened biota (even if present).

8.3 Conclusions

Given the considerations outlined above, and in Appendix F, the proposed development on the subject site at St Marys is not considered "*likely*" to impose a "*significant effect*" upon any "*threatened species, populations or ecological communities, or their habitats*", pursuant to Section 5A of the EP&A Act.

Even if individuals of some threatened biota were to use the subject site, it is not likely that the vegetation present would support a "*viable local population*" of any such biota in isolation. It is not likely that any such "*population*", nor indeed any individuals of any such species, would be dependent or reliant solely (or to any relevant extent) on the subject site.

As discussed in detail in Appendix F, it is not "*likely*" that the proposed development would impose a "*significant effect*" on either the SGTF community or the Juniper-leaved Grevillea.

There is no requirement for the preparation of a *Species Impact Statement* (SIS) for the proposed development at St Marys.

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9 APPLICATION of the EPBC ACT

9.1 Introduction

The *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) requires consideration of the potential for a "*significant impact*" to be imposed by an activity on a *Matter of National Environmental Significance* (MNES).

In the event that such an "*impact*" is "*likely*" to be imposed, the activity proposed must be referred to the Commonwealth for determination as to whether it constitutes a "*controlled action*". Where a development activity does constitute a "*controlled action*", an approval from the Commonwealth Minister of the Environment is required.

The MNES include *inter alia*:

- world heritage properties;
- national heritage places;
- wetlands of international importance (listed under the Ramsar Convention);
- listed threatened species and ecological communities;
- migratory species protected under national agreements;
- Commonwealth marine areas;
- the Greater Barrier Reef Marine Park;
- nuclear actions (including uranium mines); and
- "*The environment, where actions proposed are on, or will affect, Commonwealth land and environment*".

9.2 Relevant MNES

The proposed industrial development of the subject site at St Marys has no potential to affect any MNES other than (theoretically at least):

- listed threatened species and ecological communities; and/or
- migratory species.

Migratory Species

With respect to "*migratory species protected under international agreements*", the subject site at St Marys is not of any potential significance or relevance, given:

- its current highly disturbed and modified state;
- its small size with respect to the home ranges of any such species;
- the lack of particular resources of even potential relevance for any "*migratory species*"; and
- its context within an existing industrial area in the centre of Sydney.

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There is no likelihood of a "*significant impact*", nor indeed any impact at all, being imposed upon even individuals of any possible "*migratory species*".

Threatened Species and Ecological Communities

No "*threatened species*" listed in the EPBC Act have been recorded on the subject site, and it is unlikely that even individuals of any such species would occur, other than on occasional basis.

There are no resources or habitat features of any particular value or relevance for any of the "*threatened species*" listed in the EPBC Act that could potentially occur on the site, and there is no likelihood of a "*significance impact*" being imposed upon any such species. Indeed, there is little likelihood of a "*significant impact*" being imposed upon even individuals of any such species.

In addition to its listing in the TSC Act, the SGTF is listed as part of a "*critically endangered ecological community*" (CEEC) in the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) – known as the 'Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest' community.

Importantly (and most valuably), the EPBC Act listing provides *Threshold Criteria* for that CEEC, which require *inter alia* that:

- the area of the patch of vegetation be larger than one hectare; and
- at least 30% of the groundcover species be native plants typical of the community.

The "*patch of vegetation*" on the subject site and on adjoining land which could theoretically (possibly) be SGTF may constitute an area greater than 1 hectare, if the patches are combined.

However, the groundcover layer through the vegetated parts of the subject site and surrounding lands does not consist of "*at least 30% of .. native plants typical of the community*" (Appendix D).

Consequently, the vegetation on the subject site is not the CEEC as defined in the EPBC Act.

9.3 Conclusions

There are no "*threatened species and ecological communities*" or "*migratory species*" which are likely to be adversely affected by the proposed industrial development of the subject site at St Marys. There is no potential for a "*significant impact*" (or indeed any adverse impact at all) to be imposed upon any such biota as a consequence of the proposed development of the site.

As noted above, there are no other MNES of even potential relevance to the proposed development of the subject site at St Marys.

The proposed industrial development of the subject site at St Marys is of no concern with respect to any biota listed in the EPBC Act. There will be no "*significant impact*" upon any MNES as a result of the proposed industrial development on the subject site and there is, consequently, no requirement for any "*referral*" of the proposal to the Commonwealth pursuant to the EPBC Act.

It should be noted that matters with respect to the EPBC Act are not relevant to the determination of a *Development Application* by a consent authority pursuant to the EP&A Act.

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10 IMPACT AMELIORATION and ENVIRONMENTAL MANAGEMENT MEASURES

Notwithstanding the minor impacts on the "*natural environment*" which would ensue from development of the subject site at St Marys as proposed, given the highly degraded and isolated nature of the site, appropriate impact amelioration and environmental management measures would be anticipated (as a standard practice) for implementation as part of the future development of the land, as proposed.

Specific measures in this regard, which either have been incorporated into the industrial development design or which should be included as *Conditions of Consent*, should include:

- the management of stormwater discharge volumes and water quality from the development area - both during construction activities and following completion and occupation of the site, according to current 'best practice' and 'Water Sensitive Urban Design' principles;
- the use of sediment fences and other appropriate control measures during construction activities - to avoid erosion and sediment discharge or the discharge of other pollutants or contaminants;
- the implementation of a management regime during the construction process - to ensure that no other wastes (including building rubble, garbage, contaminants, fuels, oils, paints or other chemicals) are discharged from the construction area, and that all such wastes and contaminants are contained within the construction footprint, and are appropriately managed;
- the collection and re-use of native vegetation material removed from the site - particularly (where possible) for native bush regeneration purposes on the site (in the northwestern corner and in the landscape area along the street frontage) and in the vicinity;
- the implementation of a program of collecting seed from and seedlings of *G. juniperina* from the subject site, and their germination and maintenance for use in rehabilitation of the northwesern corner, in the landscaping along Christie Street, and in other bush regeneration by Council or the Western Sydney Parklands Trust; and
- the preparation of a *Vegetation Management Plan* (VMP) - to deal with the salvage of native plant materials from the subject site (as detailed above) and the maintenance of the small area of native vegetation in the northwestern corner of the site.

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GLOSSARY

CEEC	A "*critically endangered ecological community*" – listed in either or both the TSC Act and/or the EPBC Act
DA	A *Development Application* prepared pursuant to the EP&A Act
DEC	Department of Environment & Conservation
DECC	Department of Environment & Climate Change
DECCW	Department of Environment, Climate Change & Water
EEC	An "*endangered ecological community*" – listed in either or both the TSC Act and/or the EPBC Act
Endangered Population	A "*population specified in Part 2 of Schedule 1*" of the TSC Act
EP&A Act	NSW *Environmental Planning & Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*
Key Threatening Process	A "*threatening process specified in Schedule 3*" of the TSC Act
NPWS	NSW National Parks & Wildlife Service
OEH	Office of the Environment & Heritage, which is part of the Department of Premier & Cabinet, and which incorporates most of the DECCW and its predecessors
Recovery Plan	A "*plan prepared and approved under Part 4*" of the TSC Act
Region	A "*bioregion defined in a national system of bioregionalisation that is determined (by the Director-General by order published in the Gazette) to be appropriate for those purposes*" (TSC Act)
SIS	*Species Impact Statement* prepared pursuant to Sections 109, 110 and 111 of the TSC Act
Threatening Process	A "*process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities*" (TSC Act)
Threatened Species	A "*species*" listed as "*threatened*" (including "*vulnerable*" or "*endangered*" in either or both the TSC Act and/or the EPBC Act
TSC Act	NSW *Threatened Species Conservation Act 1995*

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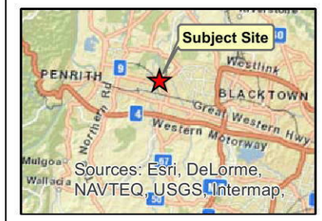
Figure 1 Location of the subject site at Christie Street, St Marys

LEGEND

Subject Site



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Metres

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NOTES

1. Aerial imagery courtesy of Nearmap 09/08/2013
2. Digital cadastral database (DCDB) © 2012 NSW Dept. of Lands.
3. Subject site boundary based on DCDB © 2012
4. Map locator courtesy of ESRI basemap, Streets
5. All features are approximate only and subject to detailed survey

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Prepared for:
Boral Property Group

Project No: **610.12210**

Scale	Date
1:12,000 @ A3	27/08/2013

Drafted	Approved
Kelly Campbell	Fiona Iolini

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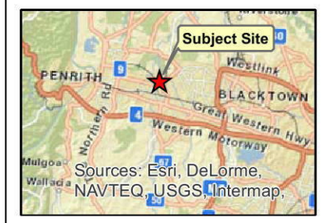
Figure 2

Features of the subject site at Christie Street St Marys

LEGEND

Subject Site



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Metres

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NOTES

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Projects:SLR610.SYD610.12210 Christie Street, St Marys\GIS\SLR_610_12210_002_02_mxd_27/08/2013_11:03_by kellycampbell

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Figure 3 **Proposed Development on the subject site at St Marys**

LEGEND

0 2.5 5 10 15 20
Metres

N

NOTES

1. Aerial imagery courtesy of Nearmap 09/08/2013
2. Digital cadastral database (DCDB) © 2012 NSW Dept. of Lands.
3. Subject site boundary based on DCDB © 2012
4. Proposed Development Plan courtesy Nicholas Associates Architects
5. All features are approximate only and subject to detailed survey

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Prepared for:
Boral Property Group

Project No: **610.12210**

Scale	Date
1:500 @ A3	13/11/2013

Drafted	Approved
Kelly Campbell	Fiona Iolini

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Version: 1, Version Date: 13/12/2013

Figure 4 Vegetation mapping by NPWS 2002 of the subject site and surrounds at St Marys

Dunheved Golf Club
Dunheved Road
Christie Street
Forrester Road
St Marys Rugby League Club
Ropes Creek
Parkes Avenue Sporting Complex
Werrington Road
South Creek
Rance Oval

LEGEND

- Subject Site

Greater than 10% cover

- Shale/Gravel Transition Forest
- Cooks River Castlereagh Ironbark Forest
- Alluvial Woodland
- Shale Plains Woodland

Less than 10% cover

- Shale/Gravel Transition Forest
- Cooks River Castlereagh Ironbark Forest
- Alluvial Woodland
- Shale Plains Woodland

Less than 10% cover and urbanised

- Shale/Gravel Transition Forest
- Cooks River Castlereagh Ironbark Forest
- Alluvial Woodland
- Shale Plains Woodland

N

0 100 200 400
Metres

NOTES

1. Aerial imagery courtesy of Nearmap 09/08/2013
2. Digital cadastral database (DCDB) © 2012 NSW Dept. of Lands.
3. Subject site boundary based on DCDB © 2012
4. Map locator courtesy of ESRI basemap, Street
5. Vegetation mapping © NPWS 2002 (Cumberland Plain Vegetation mapping project)
6. All features are approximate only and subject to detailed survey

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Scale	Date
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Version: 1, Version Date: 13/12/2013

Figure 5

Vegetation mapping by Tozer 2010 of the subject site and surrounds at St Marys

LEGEND

- Subject Site
- Castlereagh Shale-Gravel Transition Forest
- Cleared
- Cumberland River Flat Forest
- Cumberland Shale Plains Woodland

N

0 100 200 400
Metres

NOTES

1. Aerial imagery courtesy of Nearmap 09/08/2013
2. Digital cadastral database (DCDB) © 2012 NSW Dept. of Lands.
3. Subject site boundary based on DCDB © 2012
4. Map locator courtesy of ESRI basemap, Street
5. Vegetation mapping © Tozer 2010
6. All features are approximate only and subject to detailed survey

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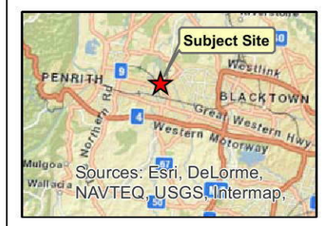
Version: 1, Version Date: 13/12/2013

Figure 6

Recent surveys of the subject site at St Marys

LEGEND

- Subject Site
- Meander
- Vegetation Notes
- Quadrats



0 2.5 5 10 15 20
Metres

N

NOTES

1. Aerial imagery courtesy of Nearmap 09/08/2013
2. Digital cadastral database (DCDB) © 2012 NSW Dept. of Lands.
3. Subject site boundary based on DCDB © 2012
4. Meander, Vegetation Notes and Quadrats surveyed by SLR Ecology on the 22nd of August 2013
5. Map locator courtesy of ESRI basemap, Streets
6. All features are approximate only and subject to detailed survey

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Prepared for:

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Project No: **610.12210**

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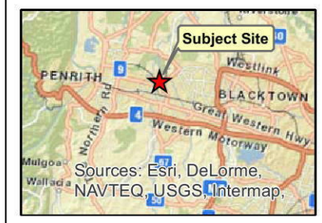
Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Figure 7 Juniper-leaved Grevillea on the subject site at St Marys

LEGEND

Subject Site

Juniper-leaved Grevillea



0 2.5 5 10 15 20
Metres

N

NOTES

1. Aerial imagery courtesy of Nearmap 09/08/2013
2. Digital cadastral database (DCDB) © 2012 NSW Dept. of Lands.
3. Subject site boundary based on DCDB © 2012
4. Juniper-leaved Grevilliea map[ed from the subject site and surrounds on the 22nd of August 2013
5. Map locator courtesy of ESRI basemap, Streets
6. All features are approximate only and subject to detailed survey

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Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Figure 8 **Recent vegetation mapping by SLR on the subject site at St Marys**

LEGEND

- Subject Site

Vegetation Communities

- Cleared and disturbed without native vegetation
- Concrete Plan
- Exotic wet-tolerant vegetation
- Shale/ Gravel Transition Forest - Low condition (weed disturbance)
- Shale/ Gravel Transition Forest - Very Low condition (fill and soil disturbance)
- Shale/ Gravel Transition Forest - Very Low condition (weed dominant understorey and groundcover)
- Typha pond

0 2.5 5 10 15 20
Metres

N

NOTES

1. Aerial imagery courtesy of Nearmap 09/08/2013
2. Digital cadastral database (DCDB) © 2012 NSW Dept. of Lands.
3. Subject site boundary based on DCDB © 2012
4. Map locator courtesy of ESRI basemap, Streets
5. All features are approximate only and subject to detailed survey

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Prepared for:
Boral Property Group

Project No: **610.12210**

Scale	Date
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Drafted	Approved
Kelly Campbell	Fiona Iolini

Projects:SLR610.SydSYD610.12210 Christie Street, St Marys\7 GIS\SLR 610 12210 008 01.mxd 15/11/2013 13:45 by KCampbell

Document Set ID: 4362102
Version: 1, Version Date: 13/12/2013

global environmental solutions

Lot 136 in DP 31912
Christie Street, St Marys

Proposed Industrial Development

Flora & Fauna Assessment Report

Appendix A
Photographs of the subject site

November 2013

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Version: 1, Version Date: 13/12/2013

Photo 1 Facing southwest into the site from its northeastern corner, showing scattered native trees with a mainly exotic understorey, and the rear of the concrete plant (06/12/12)

Photo 2 Facing northwest into the subject site from its southeastern corner, showing the scattered native eucalypts around the concrete plant and carparks (06/12/12)

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Version: 1, Version Date: 13/12/2013

Photo 3 Facing northeast into the subject site from its southwestern corner, showing the asphalt areas around the concrete plant (06/12/12)

Photo 4 Facing southeast into the subject site from its northwestern corner, showing the western patch of Shale/Gravel Transition Forest (06/12/12)

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Photo 5 The man-made dam in the northeastern corner of the site, which was dry on inspection in December 2012. This area is heavily dominated by Typha (06/12/12)

Photo 6 The heavily disturbed area in the northwestern corner of the subject site consisting of weeds amongst dumped building materials and foreign fill (06/12/12)

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Version: 1, Version Date: 13/12/2013

Photo 7 A specimen of the threatened plant *Grevillea juniperina* subsp. *juniperina* found in the northern area of the subject site (06/12/12)

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Photo 8 Facing west along fence from Point 1 (Figure 6), showing Blackberry, African Love Grass and Privet with scattered Rough-barked Apple (22/08/13)

Photo 9 Facing east at Point 2 (Figure 6) showing dense African Love Grass at the southwestern edge of the patch of Typha (22/08/13)

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Photo 10 Facing north from Point 3 (Figure 6) showing the central patch of *Low condition* vegetation (22/08/13)

Photo 11 Facing northeast at Point 4 (Figure 6) showing the edge of native canopy with African Love Grass and other weeds dominating (22/08/13)

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Version: 1, Version Date: 13/12/2013

Photo 12 Facing east from Point 5 (Figure 6) showing the area of *Low Condition* native vegetation with scattered African Love Grass and other weeds (22/08/13)

Photo 13 Facing north from Point 6 (Figure 6) showing the African Love Grass and other weeds and the bund with regrowth natives and weeds (22/08/13)

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Photo 14 Facing south at Point 7 (Figure 6) from the top of the bund with dense She-oak, showing weeds and rubble extending into the area of eucalypts (22/08/13)

Photo 15 Facing east at Point 8 (Figure 6) showing weeds and rubble extend into the area of native vegetation for a few metres (22/08/13)

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global environmental solutions

Lot 136 in DP 31912
Christie Street, St Marys

Proposed Industrial Development

Flora & Fauna Assessment Report

Appendix B
OEH Wildlife Atlas Search

November 2013

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

KEY	
Status	The "*threatened species*" listing in the *Threatened Species Conservation Act 1995*
V	Species listed as "*vulnerable*"
E1	Species listed as "*endangered*"
E4A	Species listed as "*critically endangered*"
E2	Species listed as an "*endangered population*"
Records	The number of records of the relevant "*threatened species*" listed in the search area
Relevance	The potential relevance that the "*threatened species*" might have to the subject site.
H	"*High*" potential relevance
M	"*Moderate*" potential relevance
VL	"*Very Low*" potential relevance
L	"*Low*" potential relevance
N	"*No*" potential relevance

NOTES

The table below is based on data obtained from the recently reformed *Atlas of NSW Wildlife* website http://www.bionet.nsw.gov.au/, and the following notes accompanying this dataset:

- Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions.
- Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°; ^^ rounded to 0.01°).
- Copyright the State of NSW through the Office of Environment and Heritage.
- Search criteria: Report of all Valid Records of Threatened (listed on TSC Act 1995) Entities in selected area [North: -33.65 West: 150.62 East: 150.87 South: -33.83] returned a total of 3,074 records of 66 species.
- Report generated on 27/08/2013 11:37 AM.

Status	Scientific Name	Common Name	Records	Relevance
	PLANTS			
	Apocynaceae			
E2	*Marsdenia viridiflora* subsp. *viridiflora*	*M. viridiflora* population	23	N
	Casuarinaceae			
E1	*Allocasuarina glareicola*	-	31	N
	Ericaceae			
E1	*Leucopogon fletcheri* subsp. *fletcheri*	-	162	N
	Fabaceae – Faboideae			
V	*Dillwynia tenuifolia*	-	364	N
E1	*Pultenaea parviflora*	-	390	N
E2	*Pultenaea villifera*	*P. villifera* population	9	N
	Fabaceae – Mimosoideae			
E1	*Acacia bynoeana*	Bynoe's Wattle	34	N
	Lobeliaceae			
E1	^^*Hypsela sessiliflora*	-	7	N
	Marsileaceae			
E1	^^*Pilularia novae-hollandiae*	Austral Pillwort	1	N
	Myrtaceae			
V	*Melalueca deanei*	Deane's Paperbark	1	N
E1	*Micromyrtus minutiflora*	-	48	N

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Version: 1, Version Date: 13/12/2013

Appendix B OEH Wildlife Atlas Search for "*threatened species*" within 10km of the subject site

Status	Scientific Name	Common Name	Records	Relevance
	Orchidaceae			
E1	^*Pterostylis saxicola*	Sydney Plains Greenhood	1	N
	Proteaceae			
V	*Grevillea juniperina* subsp. *juniperina*	Juniper-leaved Grevillea	1085	H
V	*Grevillea parviflora* subsp. *parviflora*	Small-flower Grevillea	1	N
E1	^^*Persoonia hirsuta*	Hairy Geebung		
E1	*Persoonia nutans*	Nodding Geebung	160	N
	Thymelaeaceae			
V	*Pimelea curviflora var. curviflora*	-	1	N
E1	*Pimelea spicata*	Spiked Rice-flower	21	N
	AMPHIBIANS			
	Myobatrachidae			
V	*Heleioporus australiacus*	Giant Burrowing Frog	2	N
V	*Pseudophryne australis*	Red-crowned Toadlet	16	N
	Hylidae			
E1	*Litoria aurea*	Green & Golden Bell Frog	18	N
	AVES			
	Anatidae			
V	*Oxyura australis*	Blue-billed Duck	2	N
V	*Stictonetta naevosa*	Freckled Duck	2	N
	Ardeidae			
E1	*Botaurus poiciloptilus*	Australian Bittern	2	N
	Burhinidae			
E1	*Burhinus grallarius*	Bush Stone-curlew	2	N
	Accipitridae			
V	^^*Lophoictinia isura*	Square-tailed Kite	6	N
V	*Hieraaetus morphnoides*	Little Eagle	12	N
	Circus assimilis	Spotted Harrier	1	N
	Falconidae			
V	*Falco subniger*	Black Falcon	1	N
	Cacatuidae			
V	^^*Callocephalon fimbriatum*	Gang-gang Cockatoo	15	N
V	^*Calyptorhynchus lathami*	Glossy Black Cockatoo	7	N
	Ciconiidae			
E1	*Ephippiorhynchus asiaticus*	Black-necked Stork	3	N
	Psittacidae			
E1	^^*Lathamus discolor*	Swift Parrot	23	VL/N
V	*Glossopsitta pusilla*	Little Lorikeet	3	VL/N
V	*Neophema pulchella*	Turquoise Parrot	2	VL/N
	Strigidae			
V	^^*Ninox strenua*	Powerful Owl	2	N
V	^^*Ninox connivens*	Barking Owl	1	N
	Tytonidae			
V	^^*Tyto novaehollandiae*	Masked Owl	11	N
V	^^*Tyto tenebricosa*	Sooty Owl	3	N
	Acanthizidae			
V	*Pyrrholaemus saggitatus*	Speckled Warbler	20	N
	Meliphagidae			
E4A	*Anthochaera phrygia*	Regent Honeyeater	22	VL/N
V	*Grantiella picta*	Painted Honeyeater	1	VL/N
V	*Melithreptis gularis gularis*	Black-chinned Honeyeater	4	N

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Appendix B OEH Wildlife Atlas Search for "*threatened species*" within 10km of the subject site

Status	Scientific Name	Common Name	Records	Relevance
	Neosittidae			
V	*Daphoenositta chrysoptera*	Varied Sittella	41	N
	Petroicidae			
	Petroica rodinogaster	Pink Robin	1	N
V	*Petroica boodang*	Scarlet Robin	11	N
V	*Petroica phoenicea*	Flame Robin	6	N
	Estriididae			
V	*Stagonopleura guttata*	Diamond Firetail	1	N
	MAMMALS			
	Dasyuridae			
E	*Dasyurus maculatus*	Tiger Quoll	11	N
V	*Phascogale tapoatafa*	Brush-tailed Phascogale	1	N
	Phascolarctidae			
V	*Phascolarctos cinereus*	Koala	16	N
	Pteropodidae			
V	*Pteropus poliocephalus*	Grey-headed Flying Fox	35	VL-N
	Emballonuridae			
V	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail Bat	2	VL
	Molossidae			
V	*Mormopterus norfolkensis*	Eastern Freetail Bat	31	VL
	Vespertilionidae			
V	*Chalinolobus dwyeri*	Large-eared Pied Bat	6	VL
V	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	5	VL
V	*Miniopterus australis*	Little Bent-wing Bat	2	VL
V	*Miniopterus schreibersii oceanensis*	Eastern Bent-wing Bat	70	VL
V	*Myotis macropus*	Southern Myotis	23	N
V	*Scoteanax rueppellii*	Greater Broad-nosed Bat	13	VL
	INSECTA			
	Petaluridae			
V	*Petalura gigantea*	Giant Dragonfly	6	N
	GASTROPODS			
	Camaenidae			
E1	*Meridolum corneovirens*	Cumberland Plain Snail	252	VL/N

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global environmental solutions

Lot 136 in DP 31912
Christie Street, St Marys

Proposed Industrial Development

Flora & Fauna Assessment Report

Appendix C
Protected Matters Search

November 2013

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

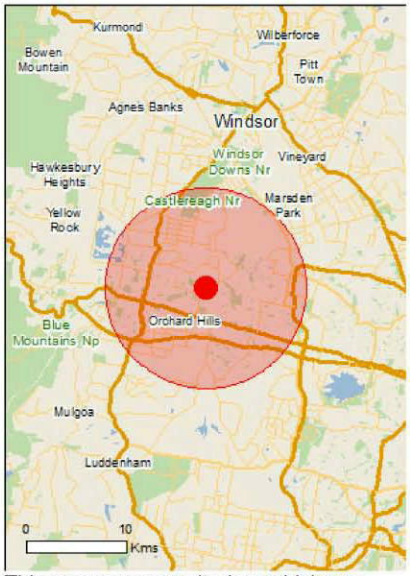
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 27/08/13 13:32:08

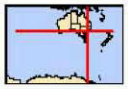
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 10.0Km



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Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	31
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	15
Commonwealth Heritage Places:	3
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

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Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	19
State and Territory Reserves:	3
Regional Forest Agreements:	None
Invasive Species:	52
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur

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Name	Status	Type of Presence within area
Frogs		
Heleioporus australiacus		
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus		
Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Acacia bynoeana		
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat likely to occur within area
Acacia pubescens		
Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat likely to occur within area
Allocasuarina glareicola		
[21932]	Endangered	Migration route known to occur within area
Cynanchum elegans		
White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Micromyrtus minutiflora		
[11485]	Vulnerable	Species or species habitat likely to occur within area
Persoonia nutans		
Nodding Geebung [18119]	Endangered	Species or species habitat likely to occur within area
Pimelea curviflora var. curviflora		
[4182]	Vulnerable	Species or species habitat known to occur within area
Pimelea spicata		
Spiked Rice-flower [20834]	Endangered	Species or species habitat known to occur within area

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Name	Status	Type of Presence
Pomaderris brunnea		
Rufous Pomaderris [16845]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis gibbosa		
Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Pterostylis saxicola		
Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Pultenaea parviflora		
[19380]	Vulnerable	Species or species habitat likely to occur within area
Rhizanthella slateri		
Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Streblus pendulinus		
Siah's Backbone, Sia's Backbone, Isaac Wood [21618]	Endangered	Species or species habitat may occur within area
Reptiles		
Hoplocephalus bungaroides		
Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Xanthomyza phrygia		
Regent Honeyeater [430]	Endangered*	Species or species habitat known to occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area

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Name	Threatened	Type of Presence
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land -
Commonwealth Land - Airservices Australia
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Defence Housing Authority
Commonwealth Land - Defence Service Homes Corporation
Commonwealth Land - Deputy Director of War Service Homes
Commonwealth Land - Director of War Service Homes
Commonwealth Land - Telstra Corporation Limited
Defence - 1CAD ORCHARD HILLS KINGSWOOD
Defence - AIRTC ST MARYS
Defence - PENRITH DEPOT (Army Stores)
Defence - RANMME (DEOH)
Defence - SIGNAL STRS DEPOT-KINGSWOOD

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Natural		
Orchard Hills Cumberland Plain Woodland	NSW	Listed place
Shale Woodland Llandilo	NSW	Listed place
Historic		
Llandilo International Transmitting Station	NSW	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area

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Name	Threatened	Type of Presence
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Castlereagh Jewel Beetle Habitat and Movement Corridor	NSW	Registered
Castlereagh State Forest and Adjacent Area	NSW	Registered
Orchard Hills Cumberland Plain Woodland	NSW	Registered
Shale Woodland Llandilo	NSW	Registered
Western Sydney Shale Woodland St Marys	NSW	Registered
Indigenous		
Native Institution	NSW	Registered
Historic		
Castlereagh Cemetery	NSW	Indicative Place
Homestead Site & Windbreak	NSW	Indicative Place
The Rooty Hill	NSW	Indicative Place
Combewood, Outbuildings and Garden	NSW	Registered
King Family Farm Sites and Trees	NSW	Registered
Mamre and Curtilage	NSW	Registered
Museum of Fire	NSW	Registered
St Mary Magdalene Anglican Church & Cemetery	NSW	Registered
St Marys Permanent Cottage Area	NSW	Registered

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Name	State	Status
St Stephens Anglican Church & Graveyard	NSW	Registered
Thornton Hall & Surrounds	NSW	Registered
Victoria Bridge	NSW	Registered
Werrington House	NSW	Registered

State and Territory Reserves [Resource Information]

Name	State
Castlereagh	NSW
Penrith Lakes	NSW
Wianamatta	NSW

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Carduelis chloris European Greenfinch [404]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species

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Name	Status	Type of Presence
		habitat likely to occur within area
Frogs		
Bufo marinus		
Cane Toad [1772]		Species or species habitat likely to occur within area
Rhinella marina		
Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus		
Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris		
Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer		
Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis		
Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus		
House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus		
Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus		
Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus		
Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes		
Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides		
Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia		
Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus		
Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides		
Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus		
Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area

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Name	Status	Type of Presence
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area

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Name	Status	Type of Presence
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus		
Gorse, Furze [7693]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area

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Coordinates

-33.74703 150.76828

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

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Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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global environmental solutions

Lot 136 in DP 31912
Christie Street, St Marys

Proposed Industrial Development

Flora & Fauna Assessment Report

Appendix D
Flora Species List

November 2013

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Appendix D Flora surveyed from the site on the 6th of December 2012 and 22nd August 2013.

KEY	
Symbol	**Description**
Status	
*	Exotic species
**	Noxious species declared in the Penrith City Council LGA
+	Native but not endemic
V	Species is listed as "*vulnerable*" in the *Threatened Species Conservation Act 1995* (TSC Act)
SGTF	Species is listed as "*characteristic*" within the *Final Determination* (Scientific Committee 2013) for the Shale/Gravel Transition Forest (SGTF), which is listed as an "*endangered ecological community*" on the TSC Act and *Environment Protection & Biodiversity Conservation Act* 1999 (EPBC Act)
Record	
Q1	Quadrat 1 sampled from the small triangular portion of vegetation in the northwestern corner of the subject site (Figure 4)
Q2	Quadrat 2 sampled from the area of native vegetation in the centre of the site (Figure 4)
	* Quadrat of Braun-Blanquet Cover Abundance from the subject site; • 1 (<5% uncommon); • 2 (<5% common); • 3 (5-25% common); • 4 (25-50%); • 5 (50-75%); • 6 (75-100%)

Status	Species name	Common name	Q1	Q2
	Acanthaceae			
SGTF	*Brunoniella australis*	Blue Trumpet	1	
	Agavaceae			
*	*Agave* sp.	-		
	Apiaceae			
	Centella asiatica	Indian Pennywort		
	Apocynaceae			
*	*Araujia sericifera*	Moth Vine	2	
*	*Nerium oleander*	Oleander		
	Arecaceae			
*	*Syagrus romanzoffiana*	Cocos Palm		
	Asparagaceae			
*	*Asparagus aethiopicus*	Asparagus Fern	2	2
*	*Asparagus asparagoides*	Bridal Creeper	1	
	Asteraceae			
*	*Ageratina adenophora*	Crofton Weed		
*	*Bidens pilosa*	Cobblers Peg		
*	*Cirsium vulgare*	Spear Thistle		
*	*Conyza bonariensis*	Flaxleaf Fleabane		
*	*Dimorphotheca ecklonis*	Cape Daisy		
**	*Onopordum acanthium*	Scotch Thistle		
	Ozothamnus diosmifolius	White Dogwood		2
*	*Senecio madagascariensis*	Fireweed		
*	*Taraxacum officinale*	Dandelion		

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Appendix D Flora surveyed from the site on the 6th of December 2012 and 22nd August 2013.

Status	Species name	Common name	Q1	Q2
	Bignoniaceae			
*	*Jacaranda mimosifolia*	Jacaranda		
	Casuarinaceae			
	Allocasuarina littoralis	Black She-oak	4	3
+	*Casuarina glauca*	Swamp Oak		
	Chenopodiaceae			
	Einadia nutans subsp. *linifolia*	-		
	Einadia trigonos	Fishweed		
	Commelinaceae			
	Commelina cyanea	Native Wandering Jew	1	
	Convolvulaceae			
SGTF	*Dichondra repens*	Kidney Weed		
	Crassulaceae			
*	*Bryophyllum delagoense*	Mother-of-millions		
	Cyperaceae			
	Carex inversa	-		1
	Fimbristylis dichotoma	Common Fringe-sedge		
	Dilleneaceae			
	Hibbertia diffusa	Wedge Guinea Flower		
	Ericaceae			
SGTF	*Lissanthe strigosa*	Peach Heath	2	
	Euphorbiaceae			
*	*Euphorbia peplus*	Petty Spurge		
	Fabaceae – Caesalpinioideae			
*	*Senna pendula*	-		
	Fabaceae – Faboideae			
SGTF	*Daviesia ulicifolia*	Gorse Bitter Pea		3
SGTF	*Dillwynia sieberi*	-		2
SGTF	*Hardenbergia violaceae*	False Sarsaparilla		1
	Pultenaea villosa	Hairy Bush-pea		
	Fabaceae – Mimosoideae			
	Acacia binervia	Coast Myall		
	Acacia elongata	Swamp Wattle		2
SGTF	*Acacia falcata*	-	1	1
SGTF	*Acacia parramattensis*	Parramatta Wattle		
	Goodeniaceae			
SGTF	*Goodenia hederaceae*	Forest Goodenia		
	Lobeliaceae			
SGTF	*Pratia purpurascens*	White Root		
	Lomandraceae			
SGTF	*Lomandra filiformis subsp. filiformis*	-		
	Lomandra longifolia	Spiny-headed Mat-rush		
SGTF	*Lomandra multiflora*	Many-flowered Mat-rush		
	Malaceae			
*	*Cotoneaster glaucophyllus*	Cotoneaster		
*	*Eriobotrya japonica*	Loquat		
	Malvaceae			
*	*Sida rhombifolia*	Paddy's Lucerne		

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Appendix D Flora surveyed from the site on the 6th of December 2012 and 22nd August 2013.

Status	Species name	Common name	Q1	Q2
	Meliaceae			
+	*Melia azedarach*	White Cedar	1	
	Myrsinaceae			
*	*Anagallis arvensis*	Scarlet Pimpernel		
	Myrtaceae			
	Angophora bakeri	Narrow-leaved Apple		2
	Angophora floribunda	Rough-barked Apple	4	5
+	*Callistemon sp. cultivar*	Bottlebrush		
	Eucalyptus amplifolia subsp. *amplifolia*	Cabbage Gum		1
	Eucalyptus crebra	Narrow-leaved Ironbark		
	Eucalyptus eugenioides	Thin-leaved Stringybark	4	
SGTF	*Eucalyptus fibrosa*	Red Ironbark		
SGTF	*Eucalyptus moluccana*	Grey Box		
SGTF	*Eucalyptus tereticornis*	Forest Red Gum	2	
SGTF	*Melaleuca decora*	-		2
	Oleaceae			
**	*Ligustrum lucidum*	Large-leaved Privet	2	
**	*Ligustrum sinense*	Small-leaved Privet	1	1
**	*Olea europaea* subsp. *cuspidata*	African Olive	2	
	Philydraceae			
	Philydrum lanuginosum	Frogmouth		
	Phyllanthaceae			
	Glochidion ferdinandi	Cheese Tree		1
	Pittosporaceae			
SGTF	*Bursaria spinosa*	Blackthorn	4	4
	Plantaginaceae			
*	*Plantago lanceolata*	Lamb's Tongue		
	Poaceae			
*	*Andropogon virginicus*	Whiskey Grass		1
SGTF	*Aristida vagans*	Three-awn Spear Grass	1	1
	Bothriochloa decipiens	Red Grass		
*	*Briza subaristida*	-		
*	*Chloris gayana*	Rhodes Grass		
*	*Cortaderia selloana*	Pampas Grass		
	Cymbopogon refractus	Barbed Wire Grass		1
+	*Cynodon dactylon*	Common Couch		
**	*Eragrostis curvula*	African Love Grass	3	3
	Entolasia marginata	Border Panic		2
SGTF	*Entolasia stricta*	Wiry Panic	3	
*	*Paspalum dilatatum*	Paspalum		
*	*Pennisetum clandestinum*	Kikuyu		
	Rytidosperma setaceum	Smallflower Wallaby Grass		
SGTF	*Rytidosperma tenuius*	-	2	
*	*Setaria parviflora*	-	1	
SGTF	*Themeda australis*	Kangaroo Grass	2	3
	Proteaceae			
V	*Grevillea juniperina*	Juniper-leaved Grevillea		3
	Rosaceae			
**	*Rubus anglocandicans*	Blackberry	1	

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Appendix D Flora surveyed from the site on the 6th of December 2012 and 22nd August 2013.

Status	Species name	Common name	Q1	Q2
	Solanaceae			
*	*Solanum nigrum*	Black-berry Nightshade		
	Typhaceae			
	Typha sp.	Cumbungi		
	Verbenaceae			
*	*Verbena bonariensis*	Purpletop		
	Total native	51	14	19
	Total exotic	37	9	4
	Total SGTF	21	9	8

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Lot 136 in DP 31912
Christie Street, St Marys

Proposed Industrial Development

Flora & Fauna Assessment Report

Appendix E
Fauna Species List

November 2013

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Appendix E Fauna Species List surveyed from the subject site on the 6th of December 2012

KEY	
Symbol	**Description**
*	Exotic species
**	Noxious species

Status	Species name	Common name
AVES		
	Artamidae *Gymnorhina tibicen*	Magpie
	Columbidae *Ocyphaps lophotes*	Crested Pigeon
	Meliphagidae *Manorina melanocephala*	Noisy Miner
	Psittacidae *Platycercus eximius*	Eastern Rosella
REPTILES		
	Scincidae *Lampropholis delicata*	Garden Sun-skink

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Flora & Fauna Assessment Report

Appendix F
Section 5A Assessments of Significance

November 2013

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LOT 136 in DP 31912
CHRISTIE STREET, ST MARYS

PROPOSED INDUSTRIAL DEVELOPMENT

FLORA & FAUNA ASSESSMENT REPORT

November 2013

1 INTRODUCTION

The *Threatened Species Conservation Act 1995* (TSC Act) has modified the *Environmental Planning & Assessment Act 1979* (EP&A Act) by, *inter alia*, including a requirement to determine "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*". Section 5A (2) identifies seven factors which "*must be taken into account*" by a consent or determining authority in administering Sections 78A, 79B, 79C, 111 and 112 of the EP&A Act, as relevant in the circumstances.

The factors contained within Section 5A (2) of the EP&A Act which "*must be taken into account*" in determining "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" were amended in 2005, after proclamation of the *Threatened Species Amendment Act 2002* (TSAA Act). This *Report* addresses the amended version of Section 5A and the relevant factors contained therein.

In addition to the seven factors which "*must be taken into account*" (where relevant) pursuant to Section 5A(2) of the EP&A Act (see below), Section 5A(1)(b) of the EP&A Act requires that "*any* [relevant] *assessment guidelines*" promulgated by the relevant authorities (particularly in this instance the OEH) also "*must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*".

The *Section 5A Assessment of Significance* contained herein, and the generic *Section 5A Assessment of Significance* contained in the main *Report*, have been prepared in cognisance of the *Threatened Species Assessment Guidelines – The Assessment of Significance* prepared by the then Department of Environment & Climate Change (dated August 2007).

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2 FACTORS for CONSIDERATION

The factors which "*must be taken into account*" pursuant to Section 5A of the EP&A Act (as amended in 2005) are:

(a) in the case of threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such as that a viable local population of the species is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

  (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

  (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

(d) in relation to the habitat of a threatened species, population or ecological community:

  (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

  (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

  (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

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3 ASSESSMENT of SIGNIFICANCE

3.1 Relevant Biota

As discussed in detail in the *Flora & Fauna Assessment Report* to which this Appendix is attached, the subject site contains an area of vegetation in the northern parts of the subject site at St Marys which is characteristic of the Shale/Gravel Transition Forest (SGTF) community.

The SGTF vegetation on the site is in *Low* condition as a result of the past disturbances. Portions of the site have some *Very Low* condition remaining and/or regrowth areas of SGTF vegetation, but these are not considered to constitute the EEC. The two small patches of vegetation in *Low* condition are considered to constitute the EEC, and are considered in detail in this *Section 5A Assessment of Significance*.

The threatened plant Juniper-leaved Grevillea *Grevillea juniperina* subsp. *juniperina* was also detected on the site, and on adjoining lands. This species is listed as "*vulnerable*" in the TSC Act, and a detailed *Section 5A Assessment of Significance* is provided below.

Individuals of a number of threatened fauna species could potentially or theoretically occur on the subject site at St Marys. However, the subject site is not likely to be of relevance or significance for any such species. Given the circumstances of the proposed development, it is not "*likely*" that a "*significant effect*" would be imposed upon any such threatened species, even if present.

These potential threatened biota are addressed pursuant to Section 5A of the EP&A Act in Chapter 6.3 of the *Ecological Issues & Assessment Report*.

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3.1	Shale/Gravel Transition Forest	Endangered Ecological Community

Factor (a) Threatened Species and the Risk of Extinction

A "*threatened species*" is defined in the TSC Act as "*a species specified in Part 1 or 4 of schedule 1 or in schedule 2*" of the Act.

The Shale/Gravel Transition Forest (SGTF) community is not a "*threatened species*".

Factor (b) Endangered Populations and the Risk of Extinction

The TSC Act defines an "*endangered population*" as "*a population specified in Part 2 of schedule 1*" of the Act.

The SGTF community is not an "*endangered population*".

Factor (c) Endangered Ecological Communities and the Risk of Extinction

The "*local occurrence*" of the SGTF community would include the subject site at St Marys and adjoining properties to the east, west and north. It is noted, however, that this "*local occurrence*" is highly degraded and disturbed, and does not constitute a relevant "*local occurrence*" in biodiversity conservation terms.

Much of the SGTF vegetation on the subject site (and on the adjoining lands) is highly modified or degraded, and is considered of only very low biodiversity conservation value. Further, the vegetation on the subject site constitutes only a part of the "*local occurrence*" of the SGTF community, and the proposed development will thus move only part of that community. In addition, it is proposed that a small area of SGTF in the northwestern corner be rehabilitated, and that landscaping along the Christie Street frontage will utilise SGTF species.

Given the circumstances, and the extent of the SGTF vegetation at this location:

- it is not "*likely*" that the "*local occurrence*" of the SGTF vegetation will be "*placed at risk of **extinction***" (emphasis added)[1] as a consequence of "*the action proposed*"; and
- it is not considered "*likely*" that the proposed activity would "*substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to placed at risk of **extinction***" (emphasis added).

[1] The term "*extinction*" is significant. It means the destruction of or obliteration of a "*local occurrence*" of an "*endangered ecological community*" – *ie* its cessation to exist. It does not mean merely some reduction in the extent of the community, or even a reduction in its floristic diversity.

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Factor (d) Habitat Removal, Modification, Fragmentation, Isolation and Importance

Only a part of the SGTF community at Christie Street, St Marys is to be removed as a consequence of the proposed development. Furthermore, a small area of SGTF is to be rehabilitated in the northwestern corner, and landscaping along the Christie Street frontage will incorporate SGTF species.

In respect of the relevant considerations of Factor (d) of Section 5A:

- only a small area of habitat for the "*local occurrence*" of the SGTF community "*is likely to be removed or modified as a result of the action proposed*" – Factor (d)(i);
- there is no potential for habitat for the SGTF community becoming "*fragmented or isolated*" as a consequence of the action proposed, given that there is SGTF on the railway land to the north and that the vegetation patch at this location is, in any case, already isolated – Factor (d)(ii); and
- the small area of SGTF habitat to be affected by the proposed activity is not of "*importance*" with respect to "*the long-term survival*" of the SGTF community in the *"locality"*[2] – Factor (d)(iii).

Factor (e) Critical Habitat – Direct and Indirect Effects

The TSC Act 1995 defines "*critical habitat*" as "*habitat declared to be critical habitat under Part 3*" of the Act.

At the time of this *Report*, no "*critical habitat*" for the SGTF community had been declared.

Factor (f) Recovery Plans and Threat Abatement Plans

There are no *Threat Abatement Plans* of relevance to the SGTF community or the proposed development at St Marys.

An approved *Recovery Plan* for Cumberland Plain vegetation (including the SGTF community) has been prepared by the then DECCW. The *Cumberland Plain Recovery Plan* contains *inter alia* a number of "*proposed recovery objectives, actions and performance criteria*" which are intended "*to provide for the long-term survival and protection of the threatened biodiversity of the Cumberland Plain*". Whilst many of the proposed "*recovery actions*" are predominantly to be implemented by the OEH, the DPI and/or local Councils, there are "*recovery actions*" which may be implemented by individual landowners.

The proposed development of the subject site at St Marys would not contravene the "*recovery objectives*", "*recovery actions*" or "*key performance targets*" which are outlined in the *Cumberland Plain Recovery Plan*, in particular because of the highly degraded, depauperate and isolated nature and condition of the SGTF vegetation present on the subject site, and on adjoining lands.

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2 The *"locality"* is an area of at least 5km radius around the subject site (or an area of 7,800ha).

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Factor (g) Key Threatening Processes

The only particularly relevant "*key threatening processes*" listed on Schedule 3 of the TSC Act are the "*clearing of native vegetation*", and invasion or infestation by invasive grasses, Lantana and/or Bitou Bush.

Whilst the proposed development subject site at St Marys will involve the "*clearing of native vegetation*", including some degraded SGTF, the proposal also includes the retention and rehabilitation of the small area of SGTF in the northwestern corner of the subject site, as well as the use of SGTF in landscaping along the Christie Street frontage. Other areas of SGTF will remain on the lands to the immediate east, west and north.

Given those circumstances, the proposed development of the subject site at St Marys will not involve the imposition or exacerbation of a "*key threatening process*", to any relevant or significant extent. In particular, it is not "*likely*" that any such *"key threatening processes*" would result in a *"significant effect*" being imposed on the SGTF community, or would place the "*local occurrence*" of the SGTF community "*at risk of extinction*".

CONCLUSIONS

The relevant factors which must be considered pursuant to Section 5A of the EP&A Act in the determination of "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" are discussed above with regard to the SGTF community and the proposed development on the subject site at St Marys.

Given the small area of SGTF vegetation to be affected for the proposed and the highly degraded condition of the vegetation at St Marys, the development as proposed would not be "*likely*" to impose "*a significant effect*" upon the SGTF community. A *Species Impact Statement* is not required for the proposed development with respect to the SGTF community.

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3.2	Juniper-leaved Grevillea	Threatened Species

Factor (a) Threatened Species and the Risk of Extinction

A "*threatened species*" is defined in the TSC Act as "*a species specified in Part 1 or 4 of Schedule 1 or in Schedule 2*" of the Act. *Grevillea juniperina* subsp. *juniperina* is listed as a "*threatened species*" (vulnerable) in the TSC Act.

There is a population of *G. juniperina* subsp. *juniperina* on the subject site and on adjoining lands at St Marys. This species is highly resilient, and in fact responds in a positive manner to disturbance - being more prevalent in areas that have been disturbed and highly modified than in areas of relatively intact bushland in this part of western Sydney.

The proposed development will remove many of these specimens of *G. juniperina* from the subject site at Christie Street, St Marys, although individuals will be retained in the northwestern corner. In addition, it is proposed to implement a program of plant propagation and/or collection (particularly of seedlings and small plants), and their use in landscaping along the Christie Street frontage and in the northwestern corner – where vegetation is to be rehabilitated.

In addition, those parts of the "*local population*" which are located on lands to the immediate east, west and north will remain following development of the subject site as proposed.

Given those circumstances, it is not "*likely*" that a "*viable local population*" of *G. juniperina* var. *juniperina* will be "*placed at risk of extinction*".

Factor (b) Endangered Populations and the Risk of Extinction

An "*endangered population*" is defined in the TSC Act as "*a population specified in Part 2 of Schedule 1*".

There is no "*endangered population*" of *Grevillea juniperina* subsp. *juniperina*.

Factor (c) Endangered Ecological Communities and the Risk of Extinction

The TSC Act defines an "*endangered ecological community*" as "*an ecological community specified in Part 3 of Schedule 1*" of the Act.

The plant *Grevillea juniperina* subsp. *juniperina* is not an "*endangered ecological community*".

Factor (d) Habitat Removal, Modification, Fragmentation, Isolation and Importance

As noted above, *G. juniperina* is a highly resilient species, which thrives in areas which have been disturbed and/or degraded. Habitat for this species includes much of the subject site and surrounding lands, as is evident by the presence of the species in these degraded patches of vegetation.

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With respect to the matters raised in Factor (d) of Section 5A of the EP&A Act, in respect of *G. juniperina* on the subject site at St Marys:

- the extent of known or suitable habitat for *G. juniperina* which is to be removed is insignificant with respect to the broader extent of habitat for the species "*in the locality*". In respect of the survival either of the "*local population*" or of *G. juniperina* in the broader context, the area of known or potential habitat for the species which is to be removed or modified as a result of the action proposed is extremely small, and not of significance – Factor (d)(i);
- as discussed elsewhere, the subject site is isolated by surrounding urban development and infrastructure, and has no direct connectivity to large areas of native vegetation of any significance. Whilst the development as currently proposed would remove most of the *G. juniperina* specimens from the subject site, a program of propagation will provide specimens for replanting in the landscape area at the front and in the retained vegetation in the northwestern corner. Given the existence of *G. juniperina* also on adjoining lands to the east, west and north, the proposal will not result in a significant increase in fragmentation of habitat for this species – Factor (d)(ii); and
- the habitat which is to be affected by the proposed development of the subject site at St Marys is not regarded as of "*importance .. to the long-term survival of the species .. in the locality*" – Factor (d)(iii).

Factor (e) Critical Habitat – Direct and Indirect Effects

The TSC Act 1995 defines "*critical habitat*" as "*habitat declared to be critical habitat under Part 3*" of the Act.

At the time of this *Report*, no "*critical habitat*" for *Grevillea juniperina* subsp. *juniperina* had been declared.

Factor (f) Recovery Plans and Threat Abatement Plans

There is no relevant *Recovery Plan* for *Grevillea juniperina* subsp. *juniperina* or its habitat in place at the time of this *Report*. Similarly, there are no *Threat Abatement Plans* in place for any "*key threatening process"* of relevance to this species.

Factor (g) Key Threatening Processes

The only potentially relevant "*key threatening process"* listed in the TSC Act likely to be of relevance to *G. juniperina* in respect of the proposed development is the "*clearing of native vegetation*".

The action of clearing native vegetation from the subject site for the development as currently proposed would involve the removal of a small area of known habitat for *G. juniperina* in the northern part of the subject site. As noted above, however, this species is highly resilient and disturbance-tolerant, and the "*clearing of native vegetation*" from the subject site would not result in a "*significant effect*" being imposed upon the species as a whole, either in the "*locality*" or in western Sydney.

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Notwithstanding the loss of much of the "*local population*" (unless the plants are translocated and/or otherwise propagated), the "*clearing of native vegetation*" as proposed is not considered to be a process which would threaten the species or result in a "*significant effect*" on the species at this general location.

CONCLUSIONS

The relevant factors which must be considered in Section 5A of the EP&A Act in the determination of "*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*" are discussed above with regard to *Grevillea juniperina* subsp. *juniperina*.

On the basis of the assessment provided above, the proposed development of the subject site at St Marys is not "*likely*" to involve the imposition of "*a significant effect*" on *Grevillea juniperina* subsp. *juniperina* or its habitat.

A *Species Impact Statement* is not required for the proposed development with respect to *Grevillea juniperina* subsp. *juniperina*.

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Appendix 'I'

Landscape Architect Design Statement

Prepared by HLS Pty Ltd

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LANDSCAPE DESIGN STATEMENT
53-59 CHRISTIE STREET, ST MARYS – NEW LIGHT INDUSTRIAL/ WAREHOUSE FACILITY

The site is a former concrete plant in St Marys. It is located in an area of very low rainfall when compared with much of Sydney. The native vegetation of the site, the Shale Transition Gravel Forest community has adapted to this environment, however been placed under stress from urbanisation and is in low to very low condition. Much of the site is very degraded with landfill, excavation and dumping having occurred here in the past.

There is a small section of low condition vegetation in the rear north-western corner able to be retained. A triangular area will be managed and fenced. This area will have interpretative signage, to explain to site users that it is a protected portion of remnant bushland. A locked gate in the fence will provide maintenance access. The area will be managed as per a Vegetation Management Plan, to be prepared.

There are only three viable native trees able to be retained within the site frontage where the former concrete plant is located, with the remainder in poor condition or dead. Three small introduced pine trees are located on the western boundary of the site frontage and will be removed.

The endangered shrub Grevillea juniperina is currently found in many positions on the site, as mapped in the Flora and Fauna Statement, often on top of piles of fill. Seed will be collected from these plants as well as other local native species and grown on at the appropriate time to be replanted within the site frontage and the managed triangle at the rear. The site frontage will have a perimeter 'hedge' of denser growing native, but not endemic planting, to discourage pedestrian access, and then will have a representative mix of species from the native plant community on site within this border. The area will have interpretive signage to explain the replanting scheme, identify the endangered Grevillea and educate users of the site about the adaptability of the local native species to the environmental conditions, soil and rainfall, and the threats from urbanisation.

The value of Grevillea juniperina has been further recognised and will be planted within carpark bays, surrounded by a border of lusher native grasses. The Grey Box (Eucalyptus mollucana) were considered a suitable species for the carpark shade trees.
A roof garden was considered but deemed not appropriate for this site. The additional structural support needed to carry the weight of a soil layer for the expansive roof space was not viable. Rainfall in the area (at Erskine Park Reservoir) has been only 42mm over the months July-Sept, so barely enough to sustain plant life on a shallow soil roof space. Any rainfall captured on the roof will be used for irrigation of the mass planted areas below the roof line, planting in carpark bays and along site frontage.

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18 November 2013

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Appendix 'J'

Traffic Study

Prepared by Thompson Stanbury Associates

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TRAFFIC IMPACT STATEMENT
PROPOSED INDUSTRIAL WAREHOUSE DEVELOPMENT
53 – 59 CHRISTIE STREET
ST MARYS

Ref: 13-092

NOVEMBER 2013

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1. INTRODUCTION

Thompson Stanbury Associates has been engaged by Artazan Property Group on behalf of Mr Jeremy Lethlean to prepare a traffic impact assessment to accompany an application to Penrith City Council seeking approval for the demolition of existing site structures and the construction of an industrial warehouse unit development at 53 – 59 Christie Street, St Marys.

This report undertakes an assessment of the proposed development with respect to the potential traffic and parking related implications to existing conditions in the immediate vicinity of the subject site. In this regard, assessment is made of the following:

- The suitability or otherwise of the proposed site access arrangements and internal circulation servicing the development with respect to the projected operational requirements;
- The suitability or otherwise of the proposed parking provision with respect to the projected operational requirements of the proposed use and Council's established requirements;
- The existing road network conditions within the vicinity of the site including traffic volumes and general traffic safety;
- The traffic likely to be generated by the subject development; and
- The ability of the surrounding road network to accommodate additional traffic movements projected by the proposal.

Reference has been made to the following documents throughout this report:

- The Roads & Maritime Services' *Guide to Traffic Generating Developments*
- The Australian Standard for *Parking Facilities Part 1: Off-Street Car Parking* (AS2890.1-2004), *Part 2: Off-Street Commercial Vehicle Facilities* (AS2890.2-2002) and *Part 6: Off-Street Parking for People with Disabilities* (AS2890.6-2009); and
- Chapter C10 of Penrith City Council's *Development Control Plan 2010* (DCP 2010) relating to *Transport, Access and Parking.*

The report has been prepared in accordance with State Environmental Planning Policy (Infrastructure) 2007.

The report should be read in conjunction with site plans prepared by Nicholas Associates Architects Pty. Ltd., reduced copies of which are included as **Appendix 1**.

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2. SITE DETAILS

2.1 Site Location

The subject premises are located within the northern side of Christie Street to the immediate east of its junction with Lee Holm Road, St Marys. This location is illustrated within a neighbourhood context by **Figure 1** shown overleaf, being an extract of UBDs *Australian City Streets* – Version 4.

2.2 Site Description

The subject premises provide a real property description of Lot 136 DP 31912 and a street address of 53 – 59 Christie Street, St Marys. The site forms an irregularly shaped parcel of land providing an approximate frontage to Christie Street of 85m. The site extends to the north away from Christie Street approximately 135m and 87m along its western and eastern boundaries respectively, providing a total site area in the order of 1.07ha.

2.3 Existing Use

The subject site accommodates a disused concrete batching plant and associated buildings. The previous batching plant was served by two access driveways connecting with Christie Street in the south-western and south-eastern corners of the site.

2.4 Surrounding Uses

The site is surrounded by large scale industrial developments contained within the St Marys industrial estate.

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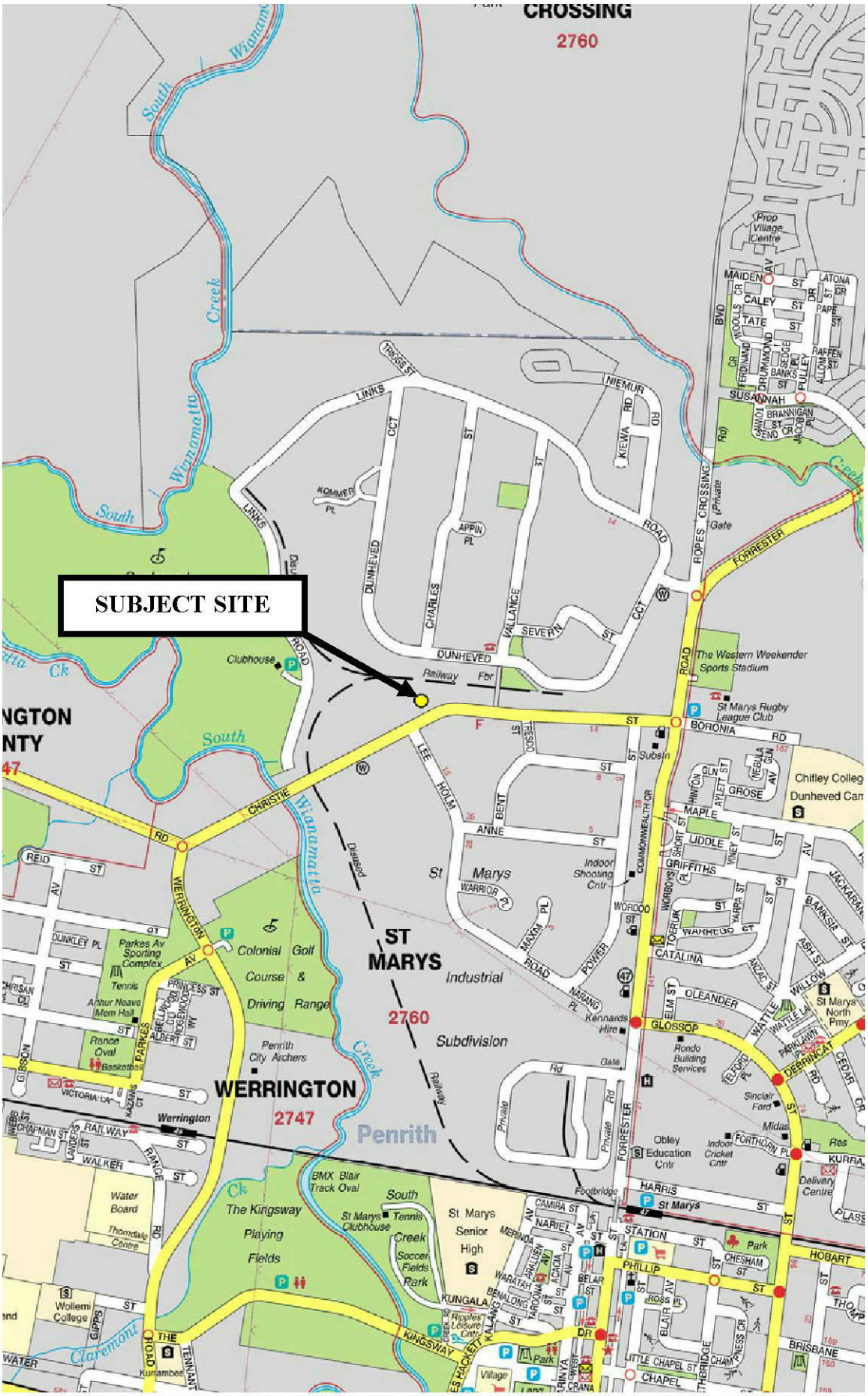

FIGURE 1 – SITE LOCATION WITHIN A NEIGHBOURHOOD CONTEXT

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3. PROPOSED DEVELOPMENT

3.1 Built Form

The application involves the demolition of existing site structures and the construction of an industrial warehouse unit development. The development is proposed to comprise five warehouse tenancies, each providing a two storey ancillary office component. **Table 1** below provides a summary of the proposed floor space provisions, whilst full developments are contained within **Appendix 1**.

TABLE 1
PROPOSED FLOOR SPACE SUMMARY

Unit	Warehouse	Office	Total
1	693m^2	175m^2	868m^2
2	719m^2	211m^2	930m^2
3	786m^2	207m^2	993m^2
4	814m^2	262m^2	1,076m^2
5	1,576m^2	425m^2	2,001m^2
Total	**4,588m^2**	**1,280m^2**	**5,868m^2**

Table 1 indicates that the proposal involves the provision of 4,588m^2 of warehouse floor space and 1,280m^2 of ancillary office floor space.

The abovementioned floor space is proposed to be contained within two buildings, one adjoining the western site boundary and the other adjoining the northern and eastern site boundaries. Each warehouse is proposed to be serviced by at least one roller door providing connectivity to an internal loading bay, capable of accommodating vehicles up to and including 12.5m long Heavy Rigid Vehicles (HRVs).

The central portion of the site is proposed to accommodate a passenger vehicle parking area containing a total of 75 spaces.

Vehicular access between the site and Christie Street is proposed to be provided via a combined ingress / egress driveway approximately central to the southern site frontage.

3.2 Proposed Operation

The proposed tenancy details of the units was not known at the time of writing however this Practice has been advised that the units are most likely to accommodate bulk storage and distribution type warehouse uses. Notwithstanding this, in order to generate a worst case scenario, this Practice has assumed that 50% of the floor space will be utilised for warehouse uses and 50% will be utilised for industrial / manufacturing uses.

The likely operation of the site with regard to the total daily and peak hourly traffic generation (both passenger and heavy vehicles) is investigated in Section 6 of this report.

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4. SITE ACCESS & INTERNAL CONSIDERATIONS

4.1 Access Arrangements

Access to the subject development is proposed to be provided by a 12.5m wide access combined ingress / egress driveway connecting with Christie Street, approximately central to the southern site frontage.

In order to undertake an assessment of the suitability of the proposed access arrangements reference is made to AS2890.2-2002. This Standard provides driveway design recommendations based on a number of site characteristics such as the number and classification of vehicles to be accommodated on-site and the functional role of the frontage road.

AS2890.2-2002 indicates that based on the site being required to accommodate heavy vehicles up to and including HRVs and the non-arterial functional order of Christie Street, the access driveway should provide a minimum combined ingress / egress width of 12.5m. Accordingly, the proposed access arrangements are considered to be satisfactory in terms of driveway width.

In order to further demonstrate that a HRV can suitably enter and exit the site from and to Christie Street, swept path plans have been prepared by this Practice and included as **Appendix 2**, utilising Autoturn software incorporating HRV manoeuvring specifications provided by AS2890.2-2002.

It is acknowledged that the horizontal alignment of Christie Street is variable within the immediate vicinity of the subject site, particularly to the east thereby somewhat limiting available sight distance along the frontage road in that direction. Notwithstanding this, site inspections have indicated the sight distance provided in both directions along Christie Street is greater than 150m thereby suitably exceeding the minimum specified by AS2890.2-2002 for a sign posted speed limit of 60km/h. In consideration of this and the above discussion, the proposed site access driveway design is considered to be satisfactory.

4.2 Parking Provision

The subject site is proposed to provide 75 passenger vehicle parking spaces.

Penrith City Council provides the following locally sensitive parking requirements relevant to the subject development within DCP 2010:

> ***Industries***
> *1 space per 75m^2 gross floor area or 1 per 2 employees, whichever is greater*
>
> ***Warehouse***
> *1 space per 100m^2 gross floor area*
>
> ***Commercial Premises including Office (within St Marys)***
> *1 space per 60m^2*

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Table 1 indicates that the proposal involves the provision of 4,588m^2 of warehouse floor space and 1,280m^2 of ancillary office floor space however for the purposes of this assessment, the development has been assessed to provide 2,294m^2 of industrial / manufacturing floor space, 2,294m^2 of warehouse floor space and 1,280m^2 of office floor space.

Advice received from the applicant based upon his experience in operating a similar use business in the St Marys industrial precinct has indicated that these uses generate approximately six employees per 1,000m^2 of floor area.

The following calculations are therefore made with respect to the proposed floor area summary provided within **Table 1**:

(2,294m^2 / 75m^2) + (2,294m^2 / 100m^2) + (1,280m^2 / 60m^2) = 75 spaces
or
(14 / 2) + (2,294m^2 / 100m^2) + (1,280m^2 / 60m^2) = 52 spaces

The subject development is therefore required to provide 75 spaces in accordance with DCP 2010.

The proposed parking provision of 75 spaces is compliant with DCP 2010 and accordingly is considered to be satisfactory.

4.3 Internal Circulation

4.3.1 Passenger Vehicles

Passenger vehicle parking is proposed to be provided in a series of 90 degree rows both immediately adjoining the industrial buildings and within a centralised parking area. These parking areas suitably comply with the minimum dimensional requirements of AS2890.1-2004 and AS2890.6-2009, providing the following dimensions:

- Normal parking space width = 2.5m;
- Disabled parking space width = 2.4m (plus adjoining 2.4m wide shared area);
- Parking space length = 5.5m; and
- Parking aisle width = 6m.

In order to further investigate the suitability of the internal manoeuvrability associated with the parking areas, the site plans have been assessed utilising B85 turning templates provided by AS2890.1-2004 and swept path plans prepared utilising Autoturn, attached as **Appendix 2**.

The swept path plans indicate that passenger vehicles are capable of manoeuvring into and out of all spaces. It must also be noted that AS2890.1 states the following with regard to the use of templates to assess vehicle manoeuvring:

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> *'Constant radius swept turning paths, based on the design vehicle's minimum turning circle are not suitable for determining the aisle width needed for manoeuvring into and out of parking spaces. Drivers can manoeuvre vehicles within smaller spaces than swept turning paths would suggest.'*

It would therefore appear that whilst the turning paths provided within AS2890.1-2004 can be utilised to provide a 'general indication' of the suitability or otherwise of internal parking and manoeuvring areas, vehicles can generally manoeuvre more efficiently than the paths indicate. In consideration of this and the abovementioned discussion and recommendation, internal passenger vehicle manoeuvrability associated with those spaces subject to alteration is considered to be satisfactory.

4.3.2 Heavy Vehicles

Upon entry to the subject site from Christie Street, heavy vehicles up to the size of HRVs travel in a forward direction to access the industrial warehouse buildings via the proposed roller doors. In order to assess heavy vehicle manoeuvrability, this Practice has prepared a number of swept paths plans utilising Autoturn software and vehicle turning specifications for HRVs (with the exception of one loading area within unit 1, which is only to accommodate vehicles up to the size of SRVs) obtained from AS2890.2-2002.

This assessment has indicated that all proposed heavy vehicle manoeuvring is capable of being undertaken in a safe and efficient manner within the areas provided.

Further to the above, the following minimum internal design dimensions are proposed in accordance with the specifications contained within AS2890.2-2002:

- Internal loading bay width = 3.5m;
- Internal loading bay length (HRV) = 12.5m;
- Internal loading bay length (SRV) = 6.4m;
- One-way roadway width = 4.3m;
- Maximum gradient = 1:16; and
- Maximum gradient within 8.5m of the property boundary = 1:20.

In consideration of this and the above discussion, this Practice is satisfied that the internal circulation and manoeuvring arrangements for heavy vehicles are suitable.

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5. EXISTING TRAFFIC CONDITIONS

5.1 Traffic Functions and Conditions

Christie Street performs a major collector road function under the care and control of Penrith City Council. It provides an east-west link connecting Forrester Road in the east with Werrington Road and Dunheved Road in the west. Both Christie Street junctions with Forrester Road and Werrington Road / Dunheved Road operate under roundabout intersection control.

In the vicinity of the subject site, Christie Street provides a 13m wide pavement providing one through traffic lane in each direction in conjunction with a marked parked lane along both alignments. Parking restrictions apply along both kerb alignments on approach to both Forrester Road and Werrington Road / Dunheved Road roundabout controlled junctions to provide two approach and departure travel lanes. Traffic flow is governed by a sign posted speed limit of 60km/h

To the immediate west of the site, Christie Street forms a T-junction with Lee Holm Road under major / minor priority control with Christie Street forming the priority route. Lee Holm Road performs a higher order access function to the St Marys industrial precinct. It provides a 7.5m wide pavement within a 20m wide road reservation. The Lee Holm Road pavement provides one through lane of traffic in each direction. Parallel parking is not restricted however observations have indicated that kerbside parking is largely non-existent, with demand primarily being accommodated within abutting industrial developments. Traffic flow is governed by a sign posted speed limit of 60km/h.

To the east, Forrester Road performs a major collector road function extending to the north-east to connect with Palmyra Avenue, which in turn links with Luxford Road, which provides an easterly connection to the arterial road network in Rooty Hill Road North. Forrester Road links with Glossop Street to the south, which in turn links with the arterial road network in Great Western Highway. In the vicinity of the St Marys industrial precinct, Forrester Road provides a four lane divided carriageway.

To the west, Werrington Road performs a collector function providing a southerly connection between Christie Street and Dunheved Road to Great Western Highway. Dunheved Road provides a similar collector function, however extending further to the west to link with Richmond Road forming part of The Northern Road arterial route.

5.2 Traffic Volumes

In order to obtain an indication of the level of service of the surrounding road network during peak times, reference is made to manual traffic surveys undertaken by this Practice at the junction of Christie Street and Lee Holm Road. Surveys at the intersection were undertaken during the morning and afternoon peak periods (between 7.00am – 9.00pm and 4.00pm - 6.00pm) on 22nd of October 2013.

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Figure 2 provides a graphical representation of the peak hour (8.00am – 9.00am and 5.00pm – 6.00pm) movement profile obtained from the above manual traffic surveys whilst **Appendix 3** contains full details.

FIGURE 2
OCTOBER 2013 PEAK HOUR TRAFFIC MOVEMENTS
INTERSECTION OF CHRISTIE STREET & LEE HOLM ROAD

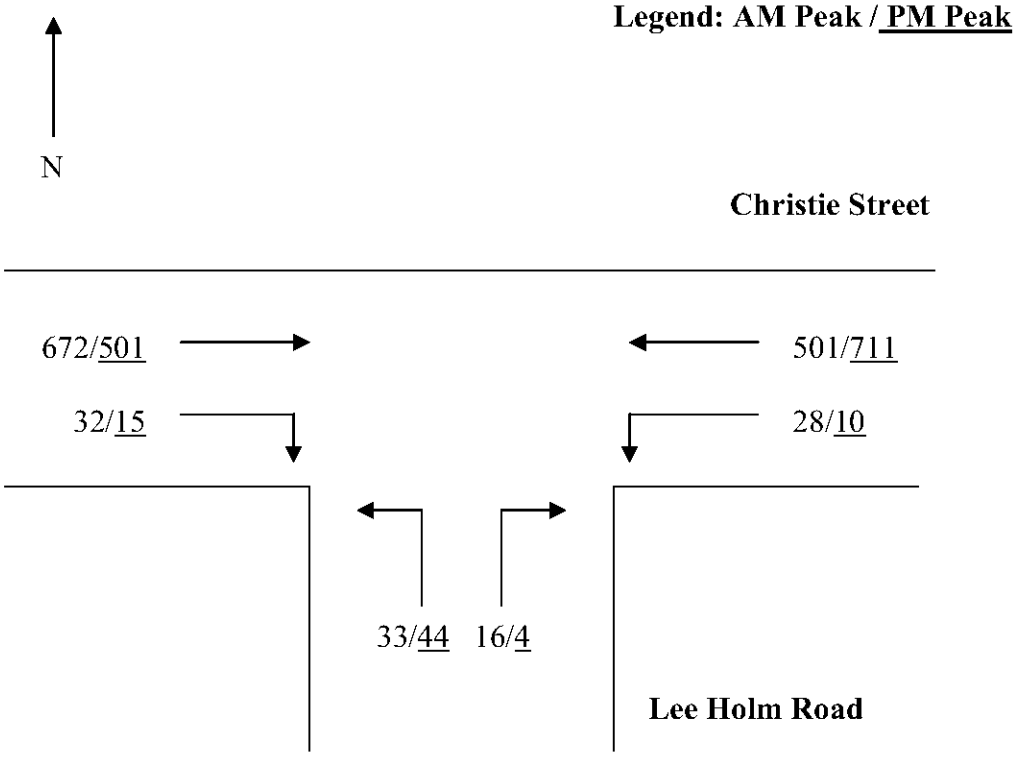

Figure 2 indicates the following:

- Bidirectional traffic demands within Christie Street are significant during peak periods, being approximately 1,200 vehicles per hour;
- Through traffic demands within Christie Street are somewhat tidal during peak periods, with eastbound flows dominating during the morning peak and westbound flows dominating during the evening peak;
- Traffic demands within Lee Holm Road are low, providing bidirectional traffic flows during peak hours of approximately 75 – 150 vehicles.

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5.3 Road Network Performance

5.3.1 Christie Street

In order to undertake an assessment of the operational performance of Christie Street, reference is made to the Roads & Maritime Services' *Guide to Traffic Generating Developments*. This publication indicates that a two lane two way carriageway accommodating peak hour directional traffic volumes in the order of 600 vehicles per hour provides a level of service 'C'. This service level is zone of stable flow, however most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream.

5.3.2 Junction of Christie Street and Lee Holm Road

In order to estimate the existing peak efficiency of the adjoining road network, an INTANAL analysis has been undertaken of the surveyed junction of Christie Street and Lee Holm Road. INTANAL is an advanced analytical tool for evaluation of alternative intersection designs in terms of capacity, level of service, a wide range of performance measures including delay, queue length, and number of stops. Key indicators of INTANAL include level of service which is a summary indicator ranging from A to F with A representing optimum intersection performance, and degree of saturation which represents a ratio of the demand of an approach to its capacity.

INTANAL uses detailed analytical traffic models coupled with an iterative approximation method to provide estimates of the abovementioned key indicators of capacity and performance statistics. Other key indicators provided by INTANAL are average vehicle delay, the number of stops per hour and the degree of saturation. Degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach. Degree of saturation is a useful and professionally accepted measure of intersection performance.

INTANAL provides analysis of the operating conditions that can be compared to the performance criteria set out in **Table 2** overleaf (adapted from the Roads & Maritime Services' *Guide to Traffic Generating Developments*).

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TABLE 2 LEVELS OF SERVICE CRITERIA FOR INTERSECTION			
Level of Service	**Average Delay per Vehicle (secs/veh)**	**Traffic Signals, Roundabout**	**Give Way & Stop Signs**
A	Less than 14	Good Operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

The existing conditions have been modelled utilising the peak hour traffic volumes presented within **Figure 2**. **Table 3** provides a summary of the INTANAL output data whilst **Appendix 4** contains full details.

TABLE 3 INTANAL OUTPUT – PEAK HOUR INTERSECTION PERFORMANCE JUNCTION OF CHRISTIE STREET & LEE HOLM ROAD		
	AM Peak	**PM Peak**
Average Vehicle Delay (sec/veh)	30.3	37.7
Number of Stops	112	58
Degree of Saturation	0.45	0.33
Level of Service	C	C

Table 2 indicates that the junction of Christie Street and Lee Holm Road currently operates with a level of service 'C' during the morning and evening peaks representing satisfactory operation.

The Roads & Maritime Services specify that signage controlled junctions providing a level of service 'C' should be subject to an accident study to determine if the current intersection control is satisfactory. It is however noted that the INTANAL analysis represents a slightly worst scenario than that which exists in practice. The INTANAL analysis provides single lane approaches to the subject junction however in reality left and right turning vehicles exiting Lee Holm Road can occur in combination. Further, the marked parking lanes within Christie Street provide pseudo under and overtaking lanes to allow trailing through vehicle movements to pass decelerating or stopped vehicles wishing to access Lee Holm Road.

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Notwithstanding this, this Practice has obtained a five year (2008 – 2012 inclusive) crash history for the junction of Christie Street and Lee Holm Road from the Roads & Maritime Services, a copy of which is included as **Appendix 5** for reference. This history indicates that the subject junction has been the site of 3 recorded accidents (none fatal). Such a small number of accidents do not suggest that there is a safety concern at the subject junction, thereby reiterating that satisfactory performance conditions prevail.

5.4 Public Transport

Westbus operate the following bus services along Christie Street in the immediate vicinity of the subject site:

- Route 780 – Penrith to Mt Druitt; and
- Route 782 – Penrith to St Marys.

Route 780 provides a frequency of 30 minutes increasing to 10 minutes during commuter peaks.

Route 782 provides a frequency of 60 minutes increasing to 30 minutes during commuter peaks.

Eastbound services are provided with a bus stop within Christie Street immediately opposite Lee Holm Road whilst westbound services are provided with a stop located approximately 50m to the west of Lee Holm Road (both within 100m walking distance of the site).

The above services provide efficient connectivity between the subject site and regional transport interchanges at Penrith, St Marys and Mount Druitt Railway Stations.

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6. PROJECTED TRAFFIC CONDITIONS

6.1 Traffic Generation

Section 3.2 of this report presented that the proposed tenancy and use of the allotments was not known at the time of writing this report. However, for the purposes of this assessment, it has been assumed that half of the industrial building is proposed to be utilised as factory space whilst the remaining half will be utilised as warehouse space.

In order to estimate the level of peak hourly traffic generation, reference is made to the Roads & Maritime Services' *Guide to Traffic Generating Developments*. This publication establishes vehicular generation rates based on surveys of similar uses throughout the Sydney metropolitan area.

The traffic generation rates are derived from the average of all the survey locations and in this regard are not conductive to taking into consideration specific locational areas where the dependence on private motor vehicle use varies. Nevertheless, the rates for factory and warehouse uses as outlined within the Roads & Maritime Services' guide are represented below:

Factories
Peak Hour Vehicle Trips = 1 per 100m² GFA

Warehouses
Peak Hour Vehicle Trips = 0.5 per 100m² GFA

Office
Peak hour Vehicle Trips = 2 per 100² GFA

Based on the above traffic generation rates the following calculations have been undertaken in order to estimate the likely peak hour traffic generation of the site:

$$(2{,}294m^2 / 100m^2) + 0.5(2{,}294m^2 / 100m^2) + 2(1{,}280m^2 / 100m^2) = 60 \text{ trips}$$

The subject development is therefore projected to result in approximately an additional 60 peak hour trips to and from the subject site.

In order to undertake an estimation of the likely peak period heavy vehicular traffic generation, reference is once again made to the *Guide to Traffic Generating Developments*. The Guide indicates that whilst vehicular generation rates differ with respect to the type of goods being warehouse, a relationship between the floor area, the number of employees and the heavy vehicular traffic generation is provided.

The Guide indicates that warehouse developments generate an average of approximately 15 commercial vehicle movements per 1000 staff. Adopting an total employment density of 1 staff to 50m² GFA (averaged over the industrial, warehouse and office floor space), approximately 1 to 2 commercial vehicle movements are projected to be generated during the peak periods.

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6.2 Trip Assignment

In order to gauge the impact of the traffic projected to be generated by the proposed development on the local road network, it is necessary to determine the impact on surrounding intersection efficiency. The objective of this section is to distribute the traffic generated by the proposed development along the major approach routes before it dissipates throughout the general road network.

It is common to assume that trips to the subject site will be distributed in accordance with existing traffic patterns. In this regard, **Figure 2** indicates that traffic movements within Christie Street are slightly tidal during peak periods, with eastbound movements dominating during the morning peak and westbound movements dominating during the evening peak.

Accordingly, it has been assigned that 60% of traffic will travel in an eastbound direction during the morning peak 40% will travel in a westbound direction. The reverse condition is projected during the evening peak i.e., 60% of traffic will in a westbound direction whilst 40% will travel in an eastbound direction.

Further to the above, for the purposes of this assessment 80% of all morning peak hour trips are projected to be inbound trips and 20% outbound, associated with the journey to work trips. The reverse is assigned to apply during the evening peak with 80% of trips being outbound and 20% of trips being inbound.

6.3 Projected Traffic Volumes

Based on the discussion provided previously on likely traffic generation and trip assignment, the projected peak hour traffic volumes have been formulated by adding the trip assignment presented above to the to the volumes existing surveyed peak conditions provided within **Figure 2**. **Figure 3** overleaf provides an estimation of the future traffic volumes associated with and adjoining the subject site.

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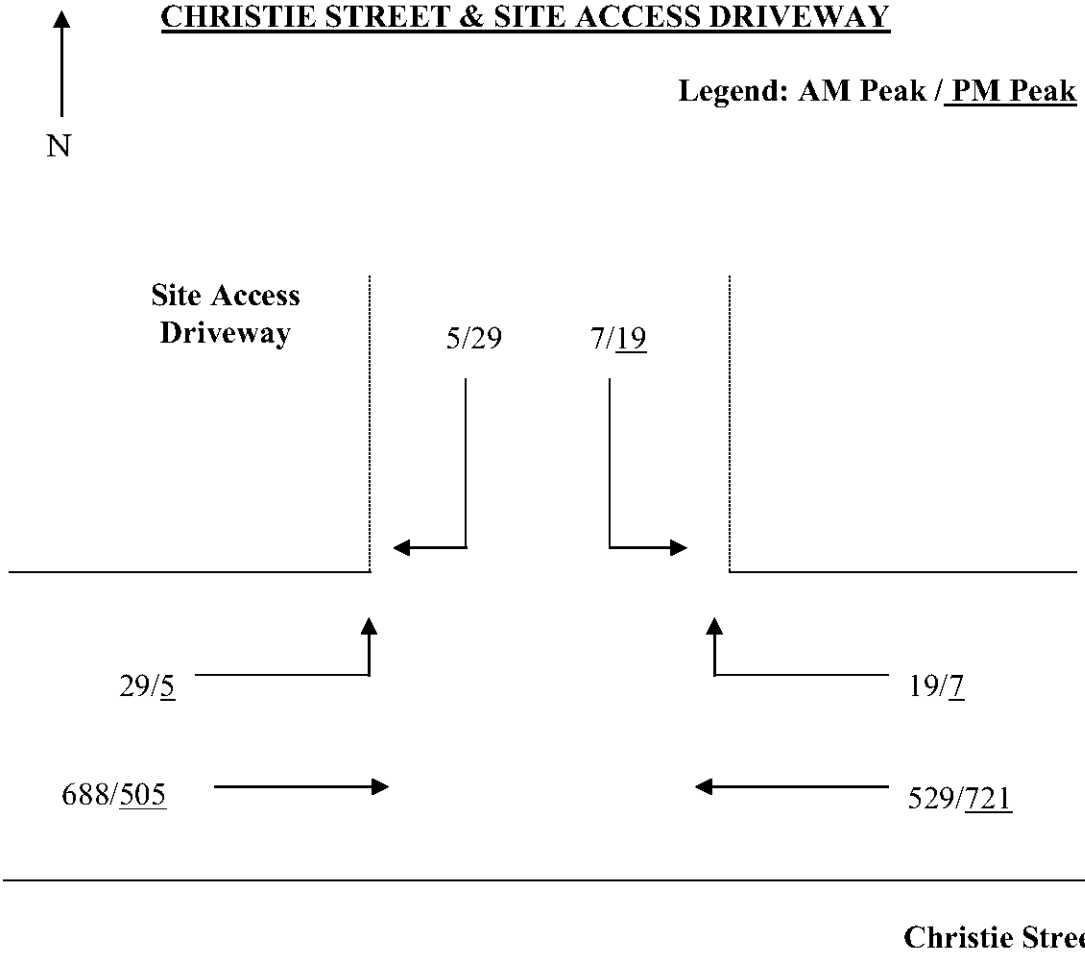
FIGURE 3
PROJECTED PEAK HOUR VOLUMES
CHRISTIE STREET & SITE ACCESS DRIVEWAY



6.4 Assessment of Impacts

6.4.1 Site Access Performance

The subject development has been assessed to generate in the order of 60 peak hour vehicle movements, or approximately one additional vehicle movement every minute.

In order to assess the ability of Christie Street to absorb the traffic movements to and from the development, a capacity analysis has been undertaken in accordance with the Roads & Maritime Services' *Road Design Guide*. This publication states that the capacity of traffic flow along two-lane two-way roads is dependent upon the percent of time delayed, average speed, and sight distance. The same publication provides guidelines associated with the crossing and turning capacity of roads, stating that capacity figures for uninterrupted flow at intersections carrying a light crossing are dependent upon critical gap acceptance (T) and follow up headway (T_0).

Table 4 (adopted from the *Road Design Guide*, table 4.4.1) provides suitable values of these parameters, according to the subject situation.

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TABLE 4 CRITICAL ACCEPTANCE GAPS AND FOLLOW UP HEADWAYS RELEVANT TO THE SUBJECT SITE		
	Critical Acceptance Gap T(sec)	**Follow-up Headway T_0(sec)**
Left Turn In	*	*
Right Turn In	4	2
Left Turn Out	5	3
Right Turn Out	5	3

Notes:

* Left turn ingress movements are not required to give-way to other movements and therefore the capacity of such a movement can not be calculated utilising this method

The Roads & Maritime Services provide the following formula based on the existing directional traffic volumes and the gap acceptance criteria provided within **Table 1** to calculate the ability of a roadway to accommodate additional turning movements:

$$C = \frac{Qe^{(-Q\times T)}}{1-e^{(-Q\times T_0)}}$$

Where: C = Turning Capacity
Q = Major Route Through Flow (veh/sec)
T = Critical Gap Acceptance (sec)
T_0 = Follow-up Headway (sec).

Utilising the presented formula, the following capacities have been calculated associated with left and right turn movements to and from the site during peak periods:

- The capacity of the right turn ingress movement during the morning peak is 984 vehicles per hour;
- The capacity of the right turn ingress movement during the afternoon peak is 1,173 vehicles per hour;
- The capacity of the left turn egress movement during the morning peak is 606 vehicles per hour;
- The capacity of the left turn egress movement during the afternoon peak is 728 vehicles per hour;
- The capacity of the right turn egress movement during the morning peak is 345 vehicles per hour; and
- The capacity of the right turn egress movement during the afternoon peak is 346 vehicles per hour.

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This analysis indicates that the existing Christie Street through volumes have more than enough capacity to accommodate the projected traffic generated by the industrial warehouse uses with all movements to and from the subject site being less than 10% of their abovementioned calculated capacities.

Left turn ingress movements are assisted by the existence of marked parking lane adjoining the site, which forms a pseudo deceleration lane allowing vehicles accessing the site to decelerate without any or very minor impedance on trailing through eastbound Christie Street traffic.

Section 4.1 of this report presented that the existing horizontal and vertical alignment of Christie Street provides motorists entering and exiting the site with acceptable sight distance to and from the access driveway. In consideration of this and the above discussion, the projected additional traffic movements generated by the proposed use are envisaged to be provided with safe and efficient conditions within which to access and exit the site.

6.4.2 Junction of Christie Street and Lee Holm Road

In order to estimate the future operational efficiency of the junction of Christie Street and Lee Holm Road a secondary INTANAL analysis has been undertaken incorporating the additional traffic movements projected to be generated by the subject development. **Table 5** provides a summary of the most pertinent results whilst a more detailed summary is contained within **Appendix 6**.

TABLE 5
INTANAL OUTPUT – INTERSECTION PERFORMANCE
JUNCTION OF CHRISTIE STREET & LEE HOLM ROAD

	Existing Conditions		Projected Conditions	
	AM	PM	AM	PM
Average Delay (secs)	30.3	37.7	31.4	40.0
Number of Stops	112	58	117	61
Degree of Saturation	0.45	0.33	0.47	0.33
Level of Service	C	C	C	C

Table 5 indicates that the traffic projected to be generated by the subject proposal is expected to result in a minor increase to the average vehicular delay, number of stops and degree of saturation at the junction of Christie Street and Lee Holm Road. However, the intersection level of service at the subject junction is projected to remain at 'C', representing satisfactory operation. The proposed development is therefore not projected to have any unreasonable impacts on the general operation of the surrounding road network.

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7. CONCLUSION

This traffic impact assessment details our assessment of the traffic generation, access and safety considerations associated with a proposal involving the demolition of existing site structures and the construction of an industrial warehouse unit development within 53 – 59 Christie Street, St Marys. Having regard to the contents of this report the following conclusions are made:

- The existing on-site parking provision is adequate to accommodate for the projected demand and suitably accords with the relevant Council requirements as outlined within DCP 2010;

- The proposed site access arrangements and internal circulation are projected to provide for safe and efficient vehicular and pedestrian movements during peak times;

- The surrounding road operates with an acceptable level of service during peak periods;

- The proposed use is projected to generate up to 60 peak hour vehicle trips to and from the site; and

- The surrounding road network is capable of accommodating the vehicular traffic generated by the proposal.

Having regard to the conclusions abovementioned, this Practice is satisfied that the proposed development is worthy of support in relation to the traffic issues discussed.

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APPENDIX 1

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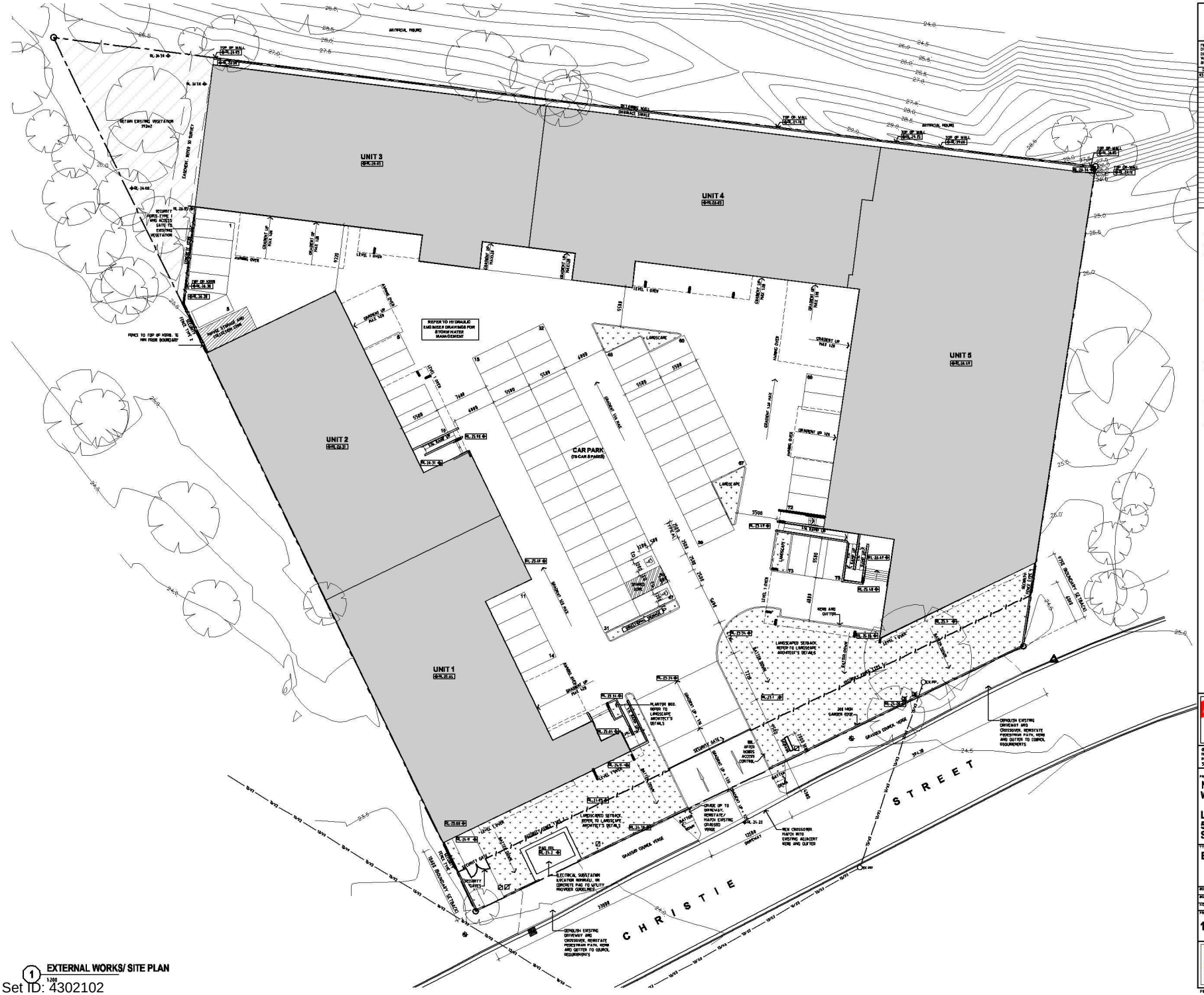
UNIT 1
UNIT 2
UNIT 3
UNIT 4
UNIT 5
CAR PARK
(73 CAR SPACES)
CHRISTIE STREET
ARTIFICIAL MOUND
RETAIN EXISTING VEGETATION
REFER TO HYDRAULIC ENGINEER DRAWINGS FOR STORMWATER MANAGEMENT
LANDSCAPED SETBACK REFER TO LANDSCAPE ARCHITECT'S DETAILS
ELECTRICAL SUBSTATION (LOCATION NOMINAL, OR CONCRETE PAD TO UTILITY PROVIDER GUIDELINES)
DEMOLISH EXISTING DRIVEWAY AND CROSSOVER, REINSTATE PEDESTRIAN PATH, KERB AND GUTTER TO COUNCIL REQUIREMENTS
NEW CROSSOVER MATCH INTO EXISTING ADJACENT KERB AND GUTTER
GRADE UP TO DRIVEWAY, REINSTATE/ MATCH EXISTING GRASSED VERGE
SECURITY GATE
SECURITY GATES
PLANTER BED. REFER TO LANDSCAPE ARCHITECT'S DETAILS
NO AFTER HOURS ACCESS CONTROL
200 HIGH GARDEN EDGE
GRASSED COUNCIL VERGE
LANDSCAPE
LANDSCAPE SETBACK
AWNING OVER
GRADIENT UP MAX 1:20
GRADIENT 1:20 MAX
LEVEL 1 OVER
KERB AND GUTTER
EX. RETAINING WALL
EX. SEWER MH
EX. STORMWATER PIT
EX. GAS METER
EX. POWER POLE
EX. TELSTRA PIT
EX. OVERHEAD ELECTRICAL SUPPLY LINE
PROPERTY BOUNDARY
STREET KERB
MAIN BOUNDARY SETBACK
SECURITY FENCE TYPE 1 AND ACCESS GATE TO EXISTING VEGETATION
FENCE TO TOP OF KERB, 1m MIN FROM BOUNDARY
TOP OF WALL
TOP OF KERB
RL 24.14
RL 24.68
RL 24.80
RL 25.14
RL 25.47
RL 25.68
RL 25.44
RL 25.14
RL 25.67
RL 25.71
RL 25.71
RL 25.71

APPENDIX 2

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A1

A ORIGINAL ISSUE

NOTES: –

1. THIS PLAN IS BASED ON ARCHITECTURAL PLANS PREPARED BY NICHOLAS ASSOCIATES ARCHITECTS PTY. LTD.
2. THE TURNING PATHS USED ON THIS PLAN ARE GENERATED USING AUTOTURN SOFTWARE AND DERIVED FROM SPECIFICATIONS PROVIDED WITHIN THE AUSTRALIAN STANDARD FOR PARKING FACILITIES PART 1: OFF–STREET CAR PARKING (AS2890.1–2004) FOR B85 PASSENGER VEHICLES & PART 2: OFF–STREET COMMERCIAL VEHICLE FACILITIES (AS2890.2–2002) FOR HRVs.

THOMPSON STANBURY ASSOCIATES

THOMPSON STANBURY ASSOCIATES

PROPOSED INDUSTRIAL WAREHOUSE UNIT DEVELOPMENT

53 – 59 CHRISTIE STREET

ST MARYS

VEHICLE SWEPT PATH PLANS

SCALE: 1:250

FILE: 13–092

SUPERSEDES SHEET/ISSUE –

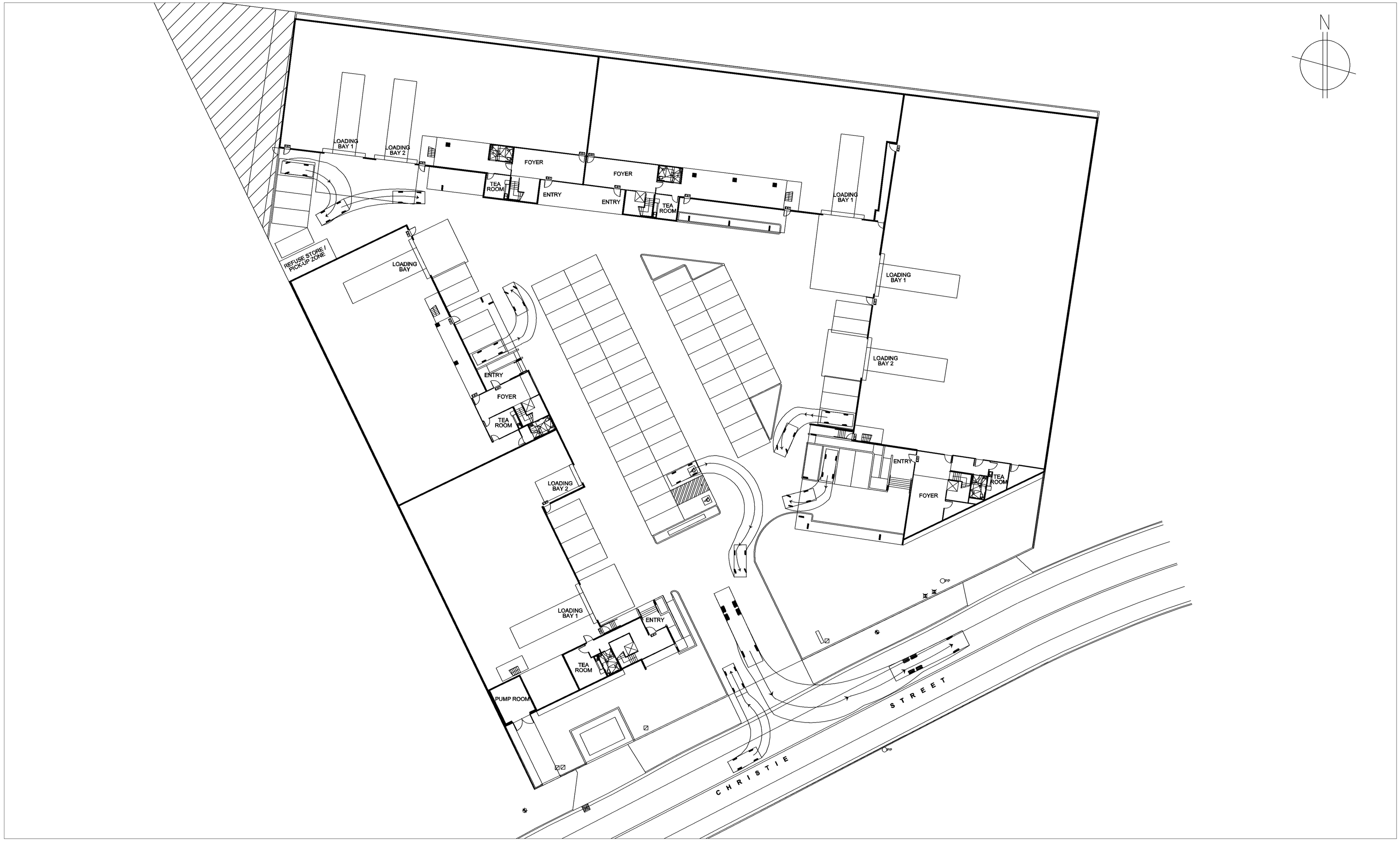
ISSUE A

DATE: 14/11/2013

SHEET 1

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

A1



A ORIGINAL ISSUE		NOTES:- 1. THIS PLAN IS BASED ON ARCHITECTURAL PLANS PREPARED BY NICHOLAS ASSOCIATES ARCHITECTS PTY. LTD. 2. THE TURNING PATHS USED ON THIS PLAN ARE GENERATED USING AUTOTURN SOFTWARE AND DERIVED FROM SPECIFICATIONS PROVIDED WITHIN THE AUSTRALIAN STANDARD FOR PARKING FACILITIES PART 1: OFF-STREET CAR PARKING (AS2890.1-2004) FOR B85 PASSENGER VEHICLES & PART 2: OFF-STREET COMMERCIAL VEHICLE FACILITIES (AS2890.2-2002) FOR HRVs.	THOMPSON STANBURY ASSOCIATES	THOMPSON STANBURY ASSOCIATES PROPOSED INDUSTRIAL WAREHOUSE UNIT DEVELOPMENT 53 - 59 CHRISTIE STREET ST MARYS VEHICLE SWEPT PATH PLANS	SCALE: 1:250 FILE: 13-092 SUPERSEDES SHEET/ISSUE - DATE: 14/11/2013	ISSUE A SHEET 2

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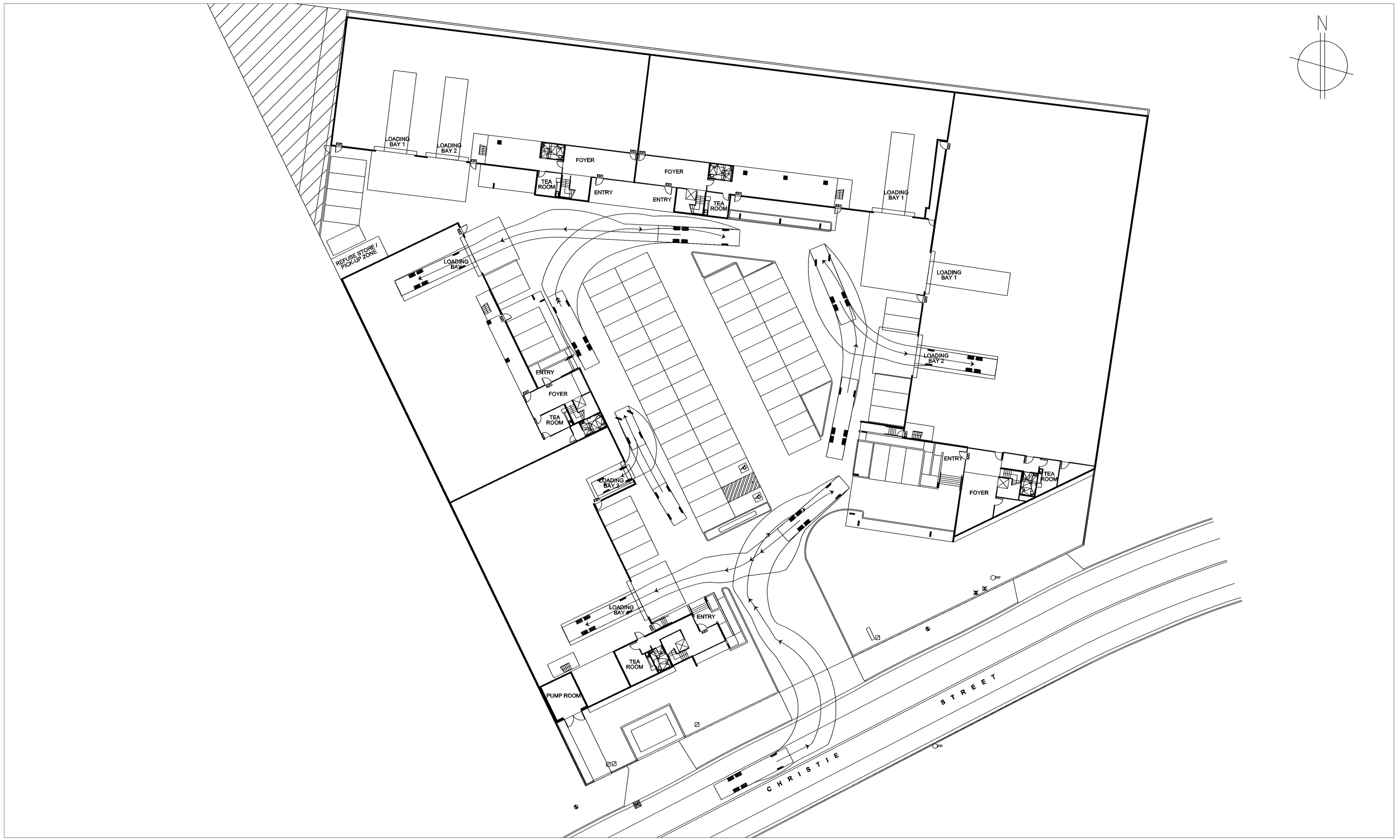
A1



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THOMPSON STANBURY ASSOCIATES

THOMPSON STANBURY ASSOCIATES

PROPOSED INDUSTRIAL WAREHOUSE UNIT DEVELOPMENT

53 – 59 CHRISTIE STREET

ST MARYS

VEHICLE SWEPT PATH PLANS

SCALE: 1:250

ISSUE A

FILE: 13–092

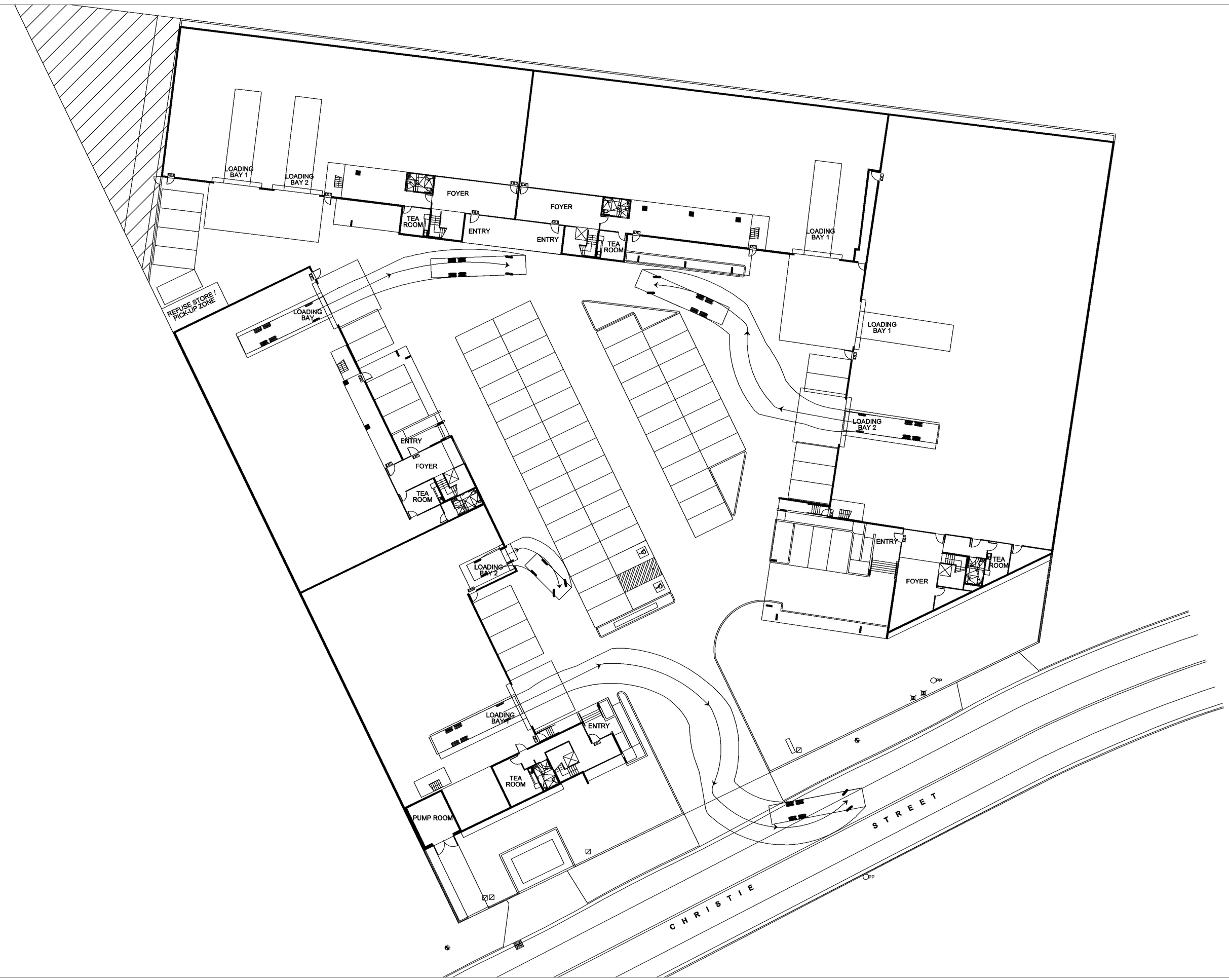
SUPERSEDES SHEET/ISSUE –

DATE: 14/11/2013

SHEET 3

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

A1



A ORIGINAL ISSUE

NOTES: –

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2. THE TURNING PATHS USED ON THIS PLAN ARE GENERATED USING AUTOTURN SOFTWARE AND DERIVED FROM SPECIFICATIONS PROVIDED WITHIN THE AUSTRALIAN STANDARD FOR PARKING FACILITIES & PART 2: OFF–STREET COMMERCIAL VEHICLE FACILITIES (AS2890.2–2002) FOR SRVs & HRVs.

THOMPSON STANBURY ASSOCIATES

THOMPSON STANBURY ASSOCIATES

PROPOSED INDUSTRIAL WAREHOUSE UNIT DEVELOPMENT

53 – 59 CHRISTIE STREET

ST MARYS

VEHICLE SWEPT PATH PLANS

SCALE: 1:250

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SUPERSEDES SHEET/ISSUE –

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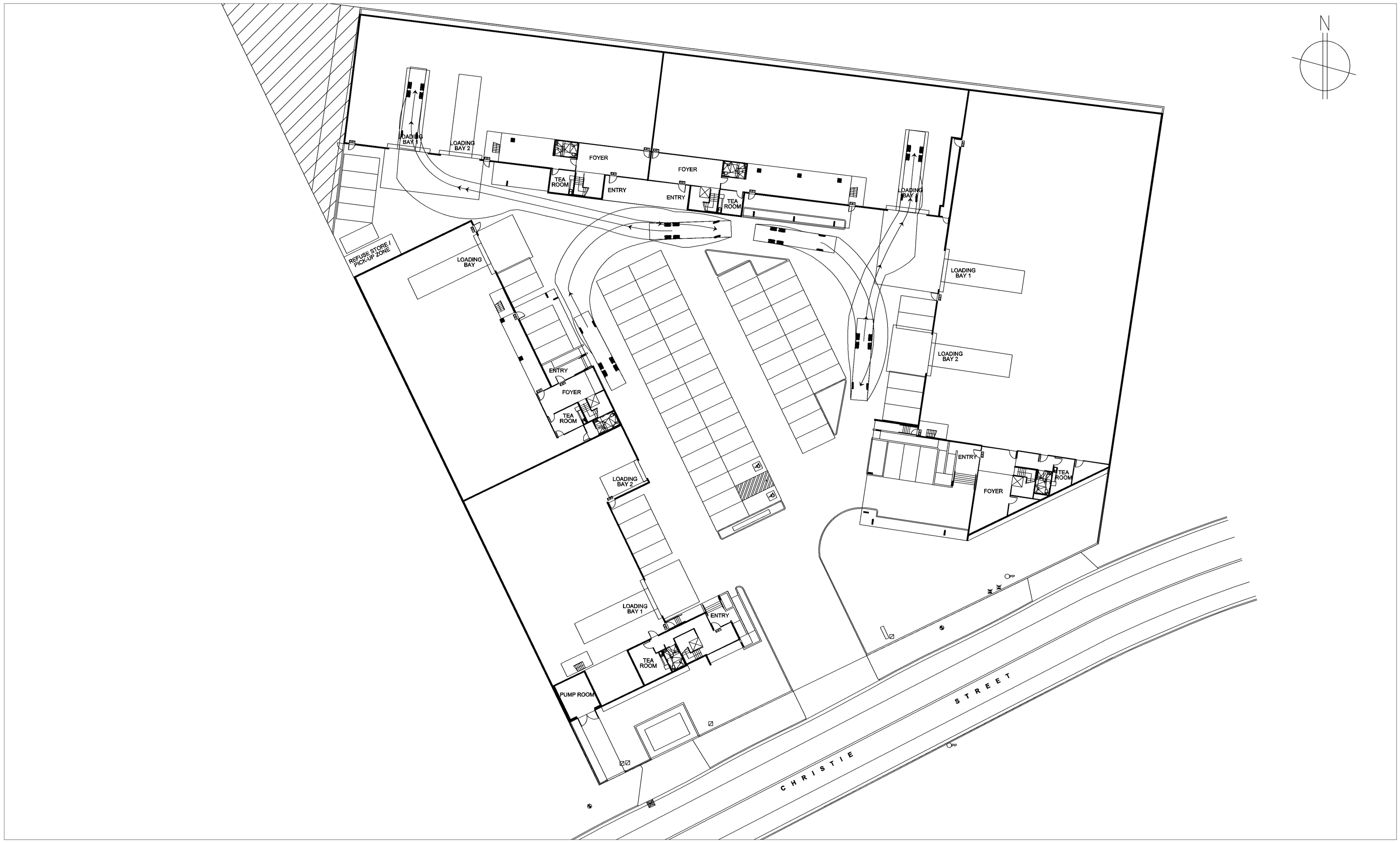

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THOMPSON STANBURY ASSOCIATES

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PROPOSED INDUSTRIAL WAREHOUSE UNIT DEVELOPMENT

53 – 59 CHRISTIE STREET

ST MARYS

VEHICLE SWEPT PATH PLANS

SCALE: 1:250

ISSUE A

FILE: 13–092

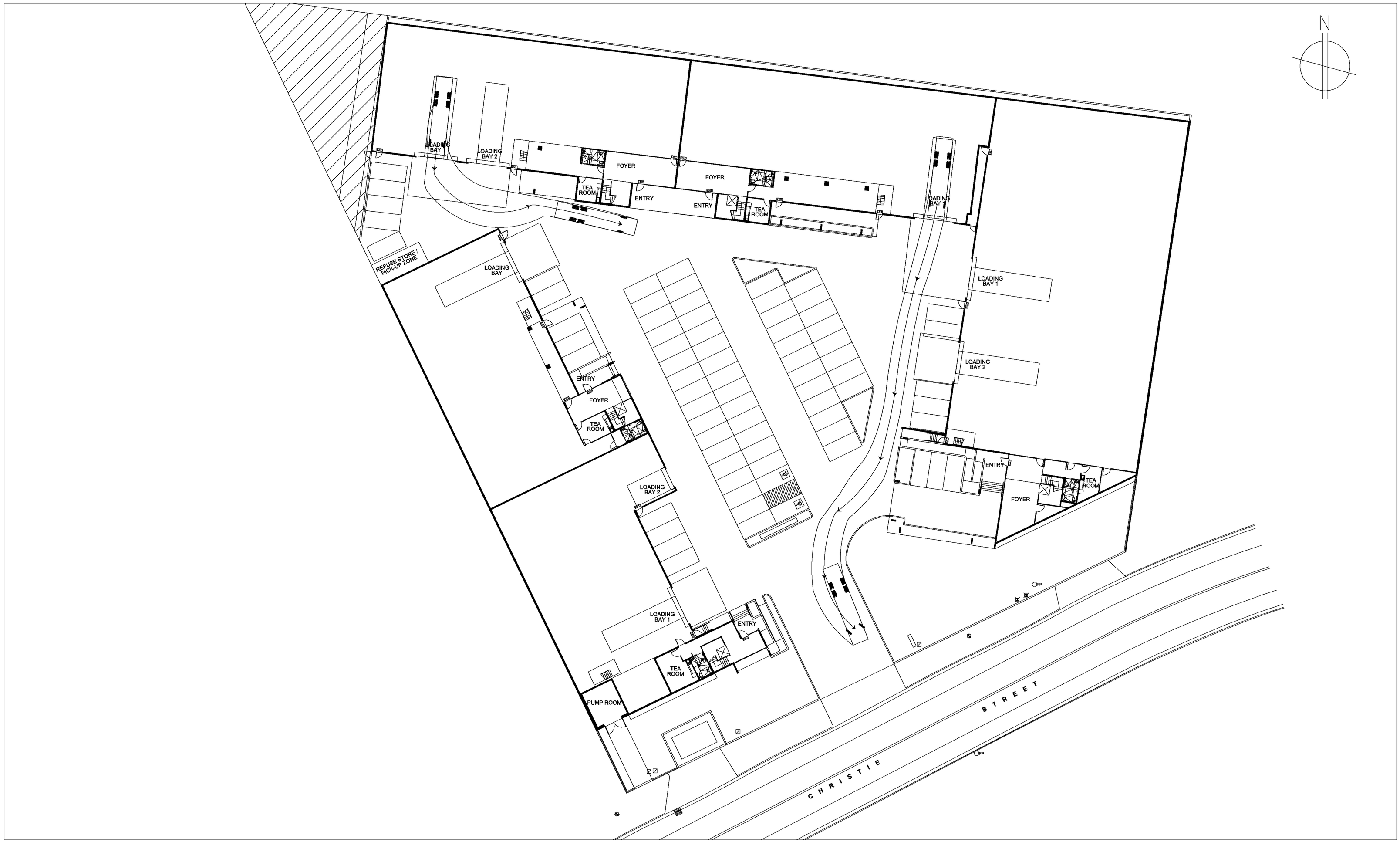
SUPERSEDES SHEET/ISSUE –

DATE: 14/11/2013

SHEET 5

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

A1



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53 – 59 CHRISTIE STREET

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SHEET 6

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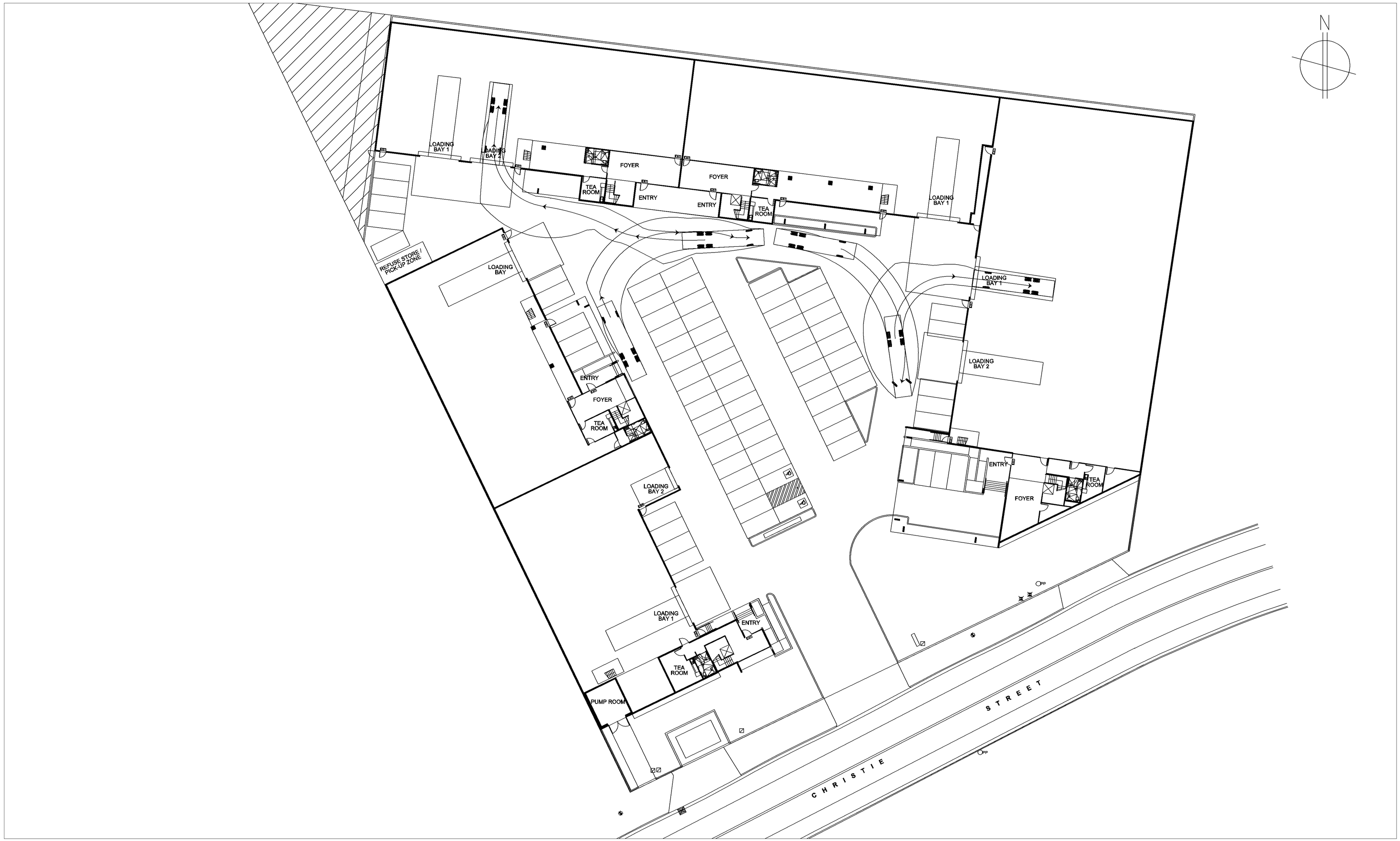
A1



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THOMPSON STANBURY ASSOCIATES

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PROPOSED INDUSTRIAL WAREHOUSE UNIT DEVELOPMENT

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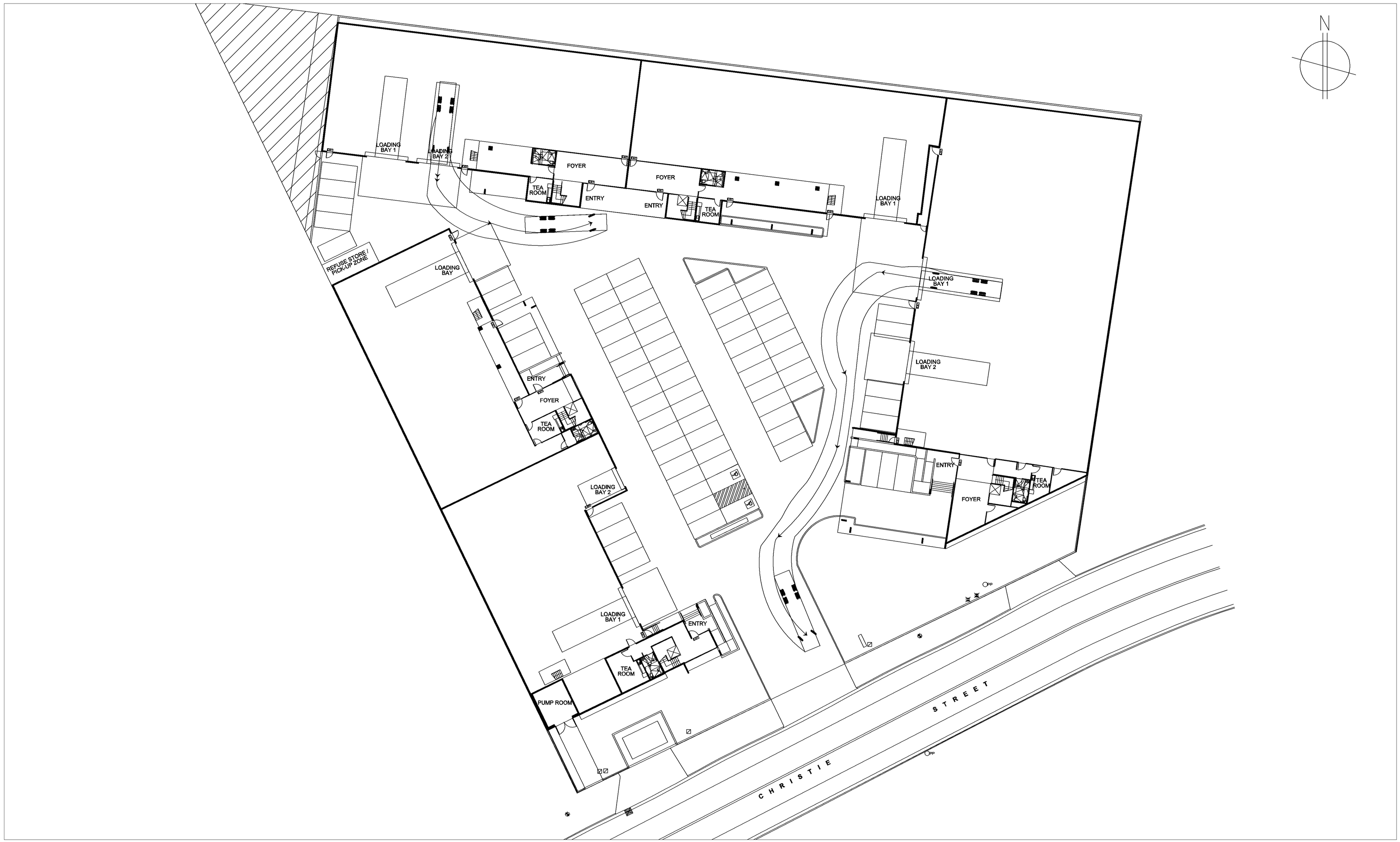

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THOMPSON STANBURY ASSOCIATES

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PROPOSED INDUSTRIAL WAREHOUSE UNIT DEVELOPMENT

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SUPERSEDES SHEET/ISSUE –

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SHEET 8

Document Set ID: 4302102
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APPENDIX 3

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

Office:
Suite 15/9 Hoyle Ave., Castle Hill NSW 2154

All Correspondence:
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E-mail: david@thompsonstanbury.com.au
morgan@thompsonstanbury.com.au
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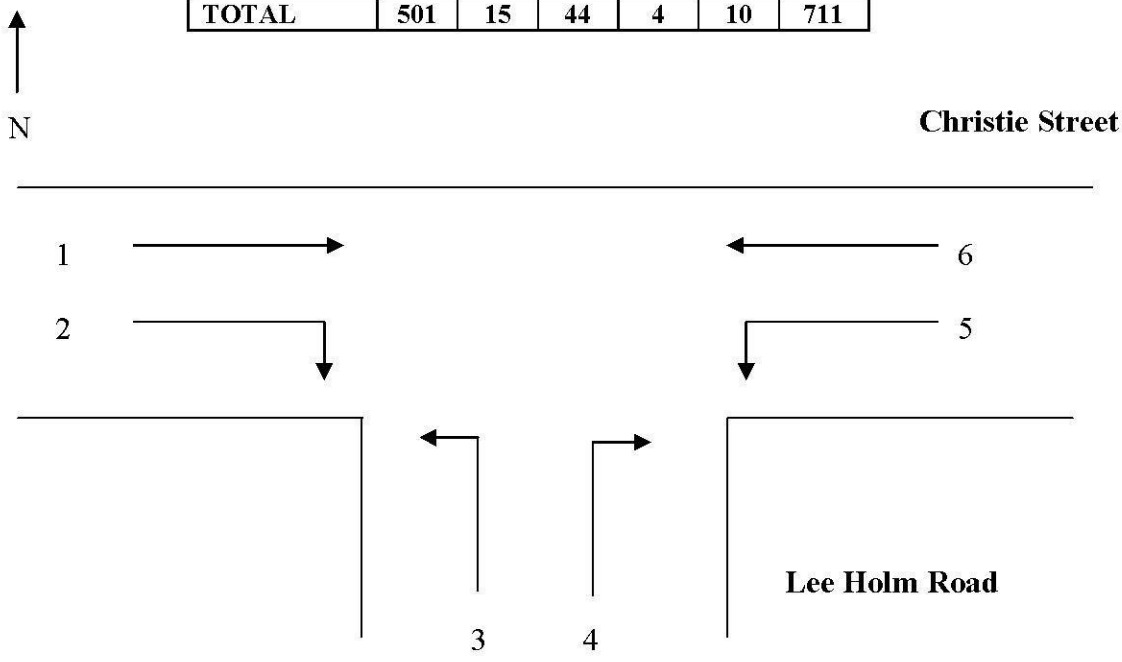
MOBILE PHONES: *David Thompson: 0418 262 125* *Morgan Stanbury: 0410 561 848*

THOMPSON STANBURY ASSOCIATES

ABN: 79 943 737 368

TRAFFIC COUNTS AT: Christie Street & Lee Holm Road
DATE: 22nd of October 2013
TIME: 7.00-9.00am & 4.00–6.00pm

Time	Direction of Vehicular Traffic					
	1	**2**	**3**	**4**	**5**	**6**
7.00-7.15am	151	7	6	1	7	101
7.15-7.30am	165	15	6	3	5	126
7.30-7.45am	177	10	8	3	11	133
7.45-8.00am	176	10	5	4	6	132
TOTAL	**669**	**42**	**25**	**11**	**29**	**492**
8.00-8.15am	173	7	9	7	8	127
8.15-8.30am	177	7	5	5	8	139
8.30-8.45am	180	8	12	1	5	117
8.45-9.00am	142	10	7	3	7	118
TOTAL	**672**	**32**	**33**	**16**	**28**	**501**
4.00-4.15am	111	3	11	2	4	169
4.15-4.30am	129	6	10	4	4	165
4.30-4.45am	132	5	12	1	0	185
4.45-5.00am	130	5	11	4	4	178
TOTAL	**507**	**19**	**44**	**11**	**12**	**701**
5.00-5.15am	119	5	9	2	2	183
5.15-5.30am	139	3	8	0	5	187
5.30-5.45am	117	5	14	1	1	176
5.45-6.00am	126	3	14	1	2	165
TOTAL	**501**	**15**	**44**	**4**	**10**	**711**



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APPENDIX 4

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

INTANAL DATA FILE
CHRLEE10

INTANAL Program Version: 3.19 Date: 30-OCT-13 Time: 14:20:51
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

CHRISTIE STRE & LEE HOLM RO
EXISTING CONDITIONS

VOLUME DATA SCREEN

	AM PEAK				PM PEAK				BUSINESS			
AM	Vol	Sat	Phse	Yval Utrn	Vol	Sat	Phse	Yval Utrn	Vol	Sat	Phse	Yval Utrn
1L												
1T	672	1765	AB	0.40	501	1795	AB	0.29	410	1780	AB	0.24
1R	32	85	B	0.40	15	56	B	0.29	16	70	B	0.24
2L	33	1178	BC	0.03	44	1610	BC	0.03	27	1400	BC	0.02
2T												
2R	16	572	C	0.03	4	140	C	0.03	7	350	C	0.02
3L	28	91	A	0.32	10	50	A	0.20	13	54	A	0.26
3T	501	1659	A	0.32	711	1727	A	0.43	424	1697	A	0.26
3R												
4L												
4T												
4R												

A	Min	ELT	H%AM	H%PM	H%B	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	5	5	5	0'		0			
2	5	4.0	5	5	5		0	0	G	N	25
3	5	4.0	5	5	5	0'	0				25
4											

File = CHRLEE10
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

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LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	1	0		1	0	0	1	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	TR	9999	1850	LR	9999	1750	LT	9999	1750			
2												
3												
4												
5												
6												
7												
8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0	0	0	0	0	0	0			
Depart	0	0	0	0	0	0	0	0	0			

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = CHRLEE10

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

	AM PEAK			PM PEAK			BUSINESS		
Phse	PT%o	CLo	Yo	PT%o	CLo	Yo	PT%o	CLo	Yo
A	41.0	105	0.76	54.7	113	0.76	44.4	64	0.56
B	50.5			37.3			41.6		
C	8.6			8.0			14.1		
D	Peds	@ CLm=	140	Peds	@ CLm=	140	Peds	@ CLm=	140
E	Delo	DSm=	0.82	Delo	DSm=	0.82	Delo	DSm=	0.57
F	0	Ym=	0.75	0	Ym=	0.75	0	Ym=	0.53
G		Delaym=	8.80		Delaym=	8.20		Delaym=	4.79

Seq	ABC			ABC			ABC		
	Signals	Signs	Round	Signals	Signs	Round	Signals	Signs	Round
Delo	7.9	0.6	1.3	7.8	0.5	1.2	3.4	0.2	0.8
Stpo	692	112	35	736	58	36	483	31	17
D/So	0.86	0.45	0.52	0.85	0.33	0.43	0.69	0.27	0.32
L/So	B	C	A	B	C	A	A	B	A

File = CHRLEE10

Required Bays

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	10	1		
2	10	1	14	1
3			10	1
4				

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SIGNS DELAY - STOPS DATA SCREEN

File = CHRLEE10 TCS = 0 Type = T2
AM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.45		0.1	0.5	0.0		0.1	0.8	1	6	101
1	R	0.45		0.1	8.3	0.0	5.3	0.1	11.4	1	6	2
2	L	0.15	236	0.0	4.7	0.1	8.0	0.1	13.1	1	6	5
2	T											
2	R	0.19	90	0.0	5.7	0.1	6.0	0.1	30.3	1	6	3
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.45		0.3	1.3	0.3		0.6	2.5			112

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

SIGNS DELAY - STOPS DATA SCREEN

File = CHRLEE10 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.33		0.1	0.4	0.0		0.1	0.6	1	6	44
1	R	0.33		0.0	8.1	0.0	5.3	0.1	12.6	1	6	1
2	L	0.29	161	0.1	5.1	0.2	8.0	0.3	21.8	1	6	13
2	T											
2	R	0.05	87	0.0	5.4	0.0	6.0	0.0	37.7	1	6	1
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.33		0.2	1.0	0.3		0.5	2.8			58

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

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APPENDIX 5

Document Set ID: 4302102
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Version: 1, Version Date: 13/12/2013

Summary Crash Report

Transport Centre for Road Safety

# Crash Type		
Car Crash	2	66.7%
Light Truck Crash	2	66.7%
Rigid Truck Crash	1	33.3%
Articulated Truck Crash	0	0.0%
'Heavy Truck Crash	(1)	(33.3%)
Bus Crash	0	0.0%
"Heavy Vehicle Crash	(1)	(33.3%)
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	0	0.0%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	0	0.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	3	100.0%
Non intersection	0	0.0%

* Up to 10 metres from an intersection
~ 07:30-09:30 or 14:30-17:00 on school days

Collision Type		
Single Vehicle	0	0.0%
Multi Vehicle	3	100.0%

Road Classification		
Freeway/Motorway	0	0.0%
State Highway	0	0.0%
Other Classified Road	0	0.0%
Unclassified Road	3	100.0%

Contributing Factors		
Speeding	0	0.0%
Fatigue	0	0.0%

Weather		
Fine	2	66.7%
Rain	1	33.3%
Overcast	0	0.0%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	1	33.3%
Dry	2	66.7%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	0	0.0%
Daylight	3	100.0%
Dusk	0	0.0%
Darkness	0	0.0%

Crash Movement		
Intersection, adjacent approaches	1	33.3%
Head-on (not overtaking)	0	0.0%
Opposing vehicles; turning	1	33.3%
U-turn	0	0.0%
Rear-end	1	33.3%
Lane change	0	0.0%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	0	0.0%
Off road on straight, hit object	0	0.0%
Out of control on straight	0	0.0%
Off road, on curve	0	0.0%
Off road on curve, hit object	0	0.0%
Out of control on curve	0	0.0%
Other crash type	0	0.0%

Speed Limit				
40 km/h or less	0	0.0%	80 km/h zone	0	0.0%
50 km/h zone	0	0.0%	90 km/h zone	0	0.0%
60 km/h zone	3	100.0%	100 km/h zone	0	0.0%
70 km/h zone	0	0.0%	110 km/h zone	0	0.0%

~ 40km/h or less 0 0.0%

CRASHES	3
Fatal crash	0 0.0%
Injury crash	1 33.3%
Non-casualty crash	2 66.7%

CASUALTIES	1
Killed	0 0.0%
Injured	1 100.0%
^ Unrestrained	0 0.0%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Time Group		% of Day	
00:01 - 02:59	0	0.0%	12.5%
03:00 - 04:59	0	0.0%	8.3%
05:00 - 05:59	0	0.0%	4.2%
06:00 - 06:59	0	0.0%	4.2%
07:00 - 07:59	0	0.0%	4.2%
08:00 - 08:59	1	33.3%	4.2%
09:00 - 09:59	2	66.7%	4.2%
10:00 - 10:59	0	0.0%	4.2%
11:00 - 11:59	0	0.0%	4.2%
12:00 - 12:59	0	0.0%	4.2%
13:00 - 13:59	0	0.0%	4.2%
14:00 - 14:59	0	0.0%	4.2%
15:00 - 15:59	0	0.0%	4.2%
16:00 - 16:59	0	0.0%	4.2%
17:00 - 17:59	0	0.0%	4.2%
18:00 - 18:59	0	0.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	0	0.0%	8.3%

Crashes		Casualties
2	2010	0
1	2008	1

~ School Travel Time		
Involvement	2	66.7%

Street Lighting Off/Nil	% of Dark
0 of 0 in Dark	0.0%

McLean Periods			% Week
A	1	33.3%	17.9%
B	0	0.0%	7.1%
C	2	66.7%	17.9%
D	0	0.0%	3.5%
E	0	0.0%	3.6%
F	0	0.0%	10.7%
G	0	0.0%	7.1%
H	0	0.0%	7.1%
I	0	0.0%	12.5%
J	0	0.0%	10.7%

Day of the Week						# Holiday Periods		
Monday	1	33.3%	Thursday	1	33.3%	Sunday	0	0.0%
Tuesday	0	0.0%	Friday	0	0.0%	WEEKDAY	3	100.0%
Wednesday	1	33.3%	Saturday	0	0.0%	WEEKEND	0	0.0%

New Year	0	0.0%	Queen's BD	0	0.0%	Easter SH	0	0.0%
Aust. Day	0	0.0%	Labour Day	0	0.0%	June/July SH	1	33.3%
Easter	0	0.0%	Christmas	0	0.0%	Sept./Oct. SH	0	0.0%
Anzac Day	0	0.0%	January SH	0	0.0%	December SH	0	0.0%

Crashid dataset Christie street and lee holme drive 5 years 08-12
Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

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Detailed Crash Report

Transport Centre for Road Safety

Crash No.	Date	Day of Week	Time	Distance		ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
																					S F
Sydney Region																					
Penrith City LGA																					
St Marys																					
Christie St																					
646236	11/08/2008	Mon	09:30		at	LEE HOLM RD	TJN	STR	Fine	Dry	60	2	LOR	M54	W in CHRISTIE ST	20 Turning right		I	0	1	
E34895050							RUM:	21	Right through				TRK	M71	E in CHRISTIE ST	50 Proceeding in lane					
698984	03/02/2010	Wed	08:15		at	LEE HOLM RD	TJN	STR	Raining	Wet	60	2	UTE	M34	E in CHRISTIE ST	50 Proceeding in lane		N	0	0	
E42256581							RUM:	32	Right rear				CAR	F46	E in CHRISTIE ST	0 Wait turn right					
721547	15/07/2010	Thu	09:20		at	LEE HOLM RD	TJN	STR	Fine	Dry	60	2	CAR	M63	N in LEE HOLM RD	15 Proceeding in lane		N	0	0	
E134221798							RUM:	10	Cross traffic				TRK	M47	E in CHRISTIE ST	50 Proceeding in lane					

Report Totals: Total Crashes: 3 Fatal Crashes: 0 Injury Crashes: 1 Killed: 0 Injured: 1

Crashid dataset Christie street and lee holme drive 5 years 08-12

Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

APPENDIX 6

Document Set ID: 4302102
Version: 1, Version Date: 13/12/2013

INTANAL DATA FILE
CHRLEE11

INTANAL Program Version: 3.19 Date: 30-OCT-13 Time: 10:54:05
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

CHRISTIE STRE & LEE HOLM RO
PROJECTED CONDITIONS

VOLUME DATA SCREEN

	AM PEAK				PM PEAK				BUSINESS			
AM	Vol	Sat	Phse	Yval Utrn	Vol	Sat	Phse	Yval Utrn	Vol	Sat	Phse	Yval Utrn
1L												
1T	701	1768	AB	0.42	506	1796	AB	0.30	423	1782	AB	0.25
1R	32	82	B	0.41	15	56	B	0.29	16	68	B	0.25
2L	33	1178	BC	0.03	44	1610	BC	0.03	27	1400	BC	0.02
2T												
2R	16	572	C	0.03	4	140	C	0.03	7	350	C	0.02
3L	28	91	A	0.32	10	50	A	0.20	13	54	A	0.26
3T	506	1659	A	0.32	740	1728	A	0.45	436	1698	A	0.27
3R												
4L												
4T												
4R												

A	Min	ELT	H%AM	H%PM	H%B	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	5	5	5	0'		0			
2	5	4.0	5	5	5		0	0	G	N	25
3	5	4.0	5	5	5	0'	0				25
4											

File = CHRLEE11
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

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LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	1	0		1	0	0	1	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	TR	9999	1850	LR	9999	1750	LT	9999	1750			
2												
3												
4												
5												
6												
7												
8												

	No Parking			No Parking			No Parking			No Parking		
	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS	AM	PM	BUS
Apprch	0	0	0	0	0	0	0	0	0			
Depart	0	0	0	0	0	0	0	0	0			

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = CHRLEE11

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

	AM PEAK			PM PEAK			BUSINESS		
Phse	PT%o	CLo	Yo	PT%o	CLo	Yo	PT%o	CLo	Yo
A	40.5	112	0.77	55.7	118	0.77	44.8	68	0.57
B	51.4			36.6			42.0		
C	8.0			7.6			13.2		
D	Peds	@ CLm=	140	Peds	@ CLm=	140	Peds	@ CLm=	140
E	Delo	DSm=	0.84	Delo	DSm=	0.84	Delo	DSm=	0.59
F	0	Ym=	0.76	0	Ym=	0.77	0	Ym=	0.54
G		Delaym=	9.32		Delaym=	8.68		Delaym=	4.96

Seq	ABC			ABC			ABC		
	Signals	Signs	Round	Signals	Signs	Round	Signals	Signs	Round
Delo	8.6	0.6	1.3	8.4	0.5	1.2	3.6	0.2	0.8
Stpo	704	117	37	765	61	37	490	33	17
D/So	0.87	0.47	0.55	0.86	0.33	0.45	0.69	0.27	0.33
L/So	B	C	A	B	C	A	A	B	A

File = CHRLEE11

Required Bays

	A RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	10	1		
2	10	1	14	1
3			10	1
4				

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SIGNS DELAY - STOPS DATA SCREEN

File = CHRLEE11 TCS = 0 Type = T2
AM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.47		0.1	0.5	0.0		0.2	0.8	1	6	106
1	R	0.47		0.1	8.4	0.0	5.3	0.1	11.6	1	6	2
2	L	0.15	234	0.0	4.7	0.1	8.0	0.1	13.2	1	6	5
2	T											
2	R	0.20	85	0.0	5.7	0.1	6.0	0.1	31.4	1	6	3
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.47		0.3	1.3	0.3		0.6	2.4			117

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

SIGNS DELAY - STOPS DATA SCREEN

File = CHRLEE11 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.33		0.1	0.4	0.0		0.1	0.6	1	6	46
1	R	0.33		0.0	8.2	0.0	5.3	0.1	13.0	1	6	1
2	L	0.30	153	0.1	5.1	0.2	8.0	0.3	23.3	1	6	14
2	T											
2	R	0.05	82	0.0	5.4	0.0	6.0	0.0	40.0	1	6	1
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.33		0.2	1.0	0.3		0.5	3.0			61

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

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Appendix 'K'

Means of compliance with Penrith City Council DCP 2010

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Means of compliance with Penrith City DCP 2010:

Clause	Means of compliance	Compliant
A Introduction	The proposed development incorporates the principles of sustainable development through the delivery of balanced social, economic and environmental outcomes. The site is classified as "Light Industries" and "Warehouse or Distribution Centres" in 1.11 Matrices, and is required to refer to DCP Parts B, C and D.	√
B DCP Principles	The proposal supports the DCP principles by: ▪ Providing a building that embraces the principles of sustainability; socially, environmentally and economically ▪ Recognises the value of natural ecosystems and sets to retain and restore a substantial portion of the site to it's natural state as well as enhancing the street frontage to include species endemic to the site, in a maintained and nurtured fashion	√
C1 Site Planning and Design	▪ 1.1. Site Planning – The proposed development enhances the character of the existing industrial urban form and it's design is consistent with other contemporary light industrial/ warehouse developments within Penrith City ▪ 1.2. Design Principles o The proposed development will achieve a minimum 4 Green Star rating through the Green Building Council of Australia, which will be detailed with the application for Construction Certificate o The office spaces have been oriented to maximise street presence and comply with DCP Part D o Shade devices will be fitted as required to maximise the control of year round solar heat gain and will work in association with concrete floors to help regulate internal temperatures o External light shelves will be fitted to maximise internal natural day lighting to the offices o Office walls will utilise current reverse veneer technology and all internal walls will be masonry, increasing areas of thermal mass and helping to regulate internal temperatures o Offices incorporate operable windows to maximise the control of fresh airflow and cross ventilation o Each tenancy has separate zoning and sub-metering for individual monitoring and control o Lighting systems will be sensor operated and consist of energy efficient fittings fit for the purpose of the part of the building they are serving o Water saving fixtures will be incorporated into all kitchens and wet areas o The warehouse roof will incorporate translucent sheeting to reduce the reliance on artificial lighting during the day o Warehouse space will incorporate roof mounted ventilators, designed by a Mechanical Engineer to	√

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optimise natural air flow

- BCA Section J –
  - Office external walls, roof and ceiling will be insulated to min R3.2
  - Internal walls separating office from warehouse portions – min R1.0 (ventilation not more than 1.5 air changes per hour of outside air during occupied hours) or R1.8 in any other case
  - Glazing to office areas will comply with Clause J2.4. A glazing calculator will be provided at CC stage to verify compliance
  - Sealing of windows and doors will comply with the requirements of Clause J3.4
  - Construction of roofs walls and floors will satisfy the requirements of Clause J3.6 with respect to leakage
  - Air conditioning systems will satisfy the requirements of Part J5
  - Interior artificial lighting will satisfy the requirements of Part J6
  - Hot water supply for sanitary purposes will satisfy the requirements of Clause J7.2
  - Access for maintenance will be provided in accordance with the requirements of Clause NSW J8.2
- Building Form, Height, Bulk and Scale
  - The height, bulk and scale of the proposed buildings are consistent with those of similar type and use in the St Mary's industrial zone.
  - The elevation of the development together with the generous landscaped street setback will enhance the scenic character of the street; providing a endemic plant species zone along the street frontage, linking the two adjoining blocks
  - The front facades of the buildings are articulated in both material and form
  - The proposed development will not overshadow buildings or public spaces and will not result a significant reduction in amenity
  - Setbacks meet the requirements of the DCP, with increased setbacks to the street to enhance the visual amenity and rear setbacks to allow for hydraulic requirements
  - The design of the façade represents the DCP Planning Principles
  - The roof design is appropriate for the use of the buildings. A green roof has been considered, *refer to Landscape Architect Design Statement*
- Responding to the Site's Topography and Landform
  - The lowest point of the existing site is RL 23.22, and the highest point is 29.7; neither of these levels are Natural Ground Line. The design levels respond to what is possibly the natural ground line of the adjacent properties, while providing an efficient and fit for purpose outcome for a light industrial/ warehouse facility

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- The CPTED Principles of Active and Passive Surveillance, Access Control, Territorial Reinforcement and Space Management have been considered in the design of the development and will be considered again at CC stage to ensure maxim incorporation of the principles
- Maximising Access and Adaptability – The proposed development is not intended to attract frequent public use. The majority of users will be employees. A BCA Consultant has reviewed the proposed design and will be engaged to oversee the application of BCA 3 and AS1428.1. The design also acknowledges the principles of universal design within the parameters of BCA D3 and AS1428.1 as follows:
  - (Note that Unit 3 includes the allowance for the future installation of a lift to the first floor. A lift is to be installed in the adjacent Unit 4 with flexibility for possible future amalgamation of the two units)
  - *Equitable Use* – The development will be fully accessible to people with diverse disabilities
  - *Flexibility in Use* – the offices and warehouses have been designed as open plan, allowing the accommodation of a wide range of individual preferences to suit their abilities
  - *Simple and Intuitive Use* – The internal layout is easy to understand; the stair is directly adjacent to the lift, with direct access from the main entry and wet areas and tea facilities are grouped together in a logical manner. All main entry points are located within an under croft, with colour and material differentiation to the warehouse areas; contributing to the repetitive language of the external design
  - *Perceptible Information* – The design will communicate useable information through Braille and tactile surfaces
  - *Tolerance for Error* – The design minimises hazards by having clear entry points, rational internal design and the use of tactile indicators
  - *Low Physical Effort* – The site is designed to minimise level changes while providing efficient use of the site; minimising fatigue through the incorporation of minimum gradients. The office spaces are compact with a central WC/Kitchenette core nearby the lift/stair
  - *Size and Space for Approach and Use* – generous corridors are provided, along with open office spaces to allow for flexibility of use for all abilities
- *Lifting the Bar*. The proposed development lifts the bar of Council's Site Planning and Design Principles as follows –
  - The design is visually attractive and will be improvement on the existing industrial streetscape of Christie Street
  - The design embraces sustainability through passive solar control, thermal mass and natural day lighting principles

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	▪ A portion of the rear of the site has been set aside to retain and re-establish remnant landscape. This parcel is connected to the artificial mound to the rear of the site on the rear adjoining property, which forms a fauna link to the east and west adjacent properties ▪ A quality landscape design will include the reestablishment of the endemic *Grevillea juniperina* in a well maintained and managed environment, including interpretative signage to educate on the significance of the species to the area ▪ A thorough stormwater management design is included with the application, including water harvesting initiatives ▪ The levels of the development have considered the existing natural levels of the adjacent properties ▪ Timber will not be used as part of the structure of the building ▪ 1.3. Fencing – Fences are commonplace as part of the character of the St Mary's industrial area. Fences are required to provide security to the buildings, as well as the landscaped areas. Fencing will be provided as follows: o Christie Street Frontage – Open style metal security fencing in a dark grey colour. Set back 6m from the street boundary and returning back to the buildings along the side boundaries o Adjacent properties – The buildings will form the fence to the adjoining properties. The walls will be concrete parapet, with no gutter to the boundary and will not require access for maintenance. The panels will be lifted into place from within the subject site during construction. 2.1m height solid fencing to the boundary adjacent to Unit 2 that is not bound by building o The remnant landscape to the rear of the site will be protected with a security fence the same as Christie Street frontage, with a secure access gate for maintenance	
C2 Vegetation Management	A Flora and Fauna report is included in this application. A Landscape Design Statement is included in this application	√
C3 Water Management	Stormwater Management and Drainage Design is included in this application	√
C4 Land Management	Erosion and Sediment Control measures are included in this application. *Limitation of Earthworks – Earthworks to create a building platform shall not be undertaken where excavation and/or filling would exceed one metre from the existing natural ground level.* The proposed development is difficult to assess in relation to this clause as follows, as the "natural ground level" (as being exclusive of imported/ dumped fill) is difficult to identify: ▪ The existing site has been subject to extensive historical cut	

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	and fill; forming a low level driveway to the south of the site and an artificial mound to the north that is partially on the adjoining property ▪ The existing site has a 6.48 m difference between the highest and lowest points, neither of which are representative of the Natural Ground Level ▪ Some levels on the adjoining properties are also not representative of Natural Ground Level ▪ The nature of the proposed development, which is typical of that permissible within the industrial zoning, is such that it requires, in addition to wheelchair accessibility, a building platform with easy access and truck manoeuvrability ▪ The design recognises what could be the Natural Ground Level of the adjoining properties and keeps excavation to a minimum at the rear and sides by grading a driveway up from the street, and designing a grade into the car park ▪ The grading of the car park to minimise excavation has resulted in providing stepped building solution between all units except Units 3 + 4 ▪ All proposed retaining walls are minimised and identified ▪ Topsoil will be reserved and reused in landscape areas	
C5 Waste Management	Construction Waste: ▪ A Waste Management Plan is included in this application. *Lifting the Bar* ▪ The proposal will have a minimum 4 Green Star rating under the Green Building Council of Australia rating system ▪ Timber from old growth forests will not be used in the development ▪ Re-using excavation on site and rationalising construction techniques to prefabricated modular components will reduce waste going to landfill ▪ The design allows for pre-fabrication of structural components off-site, as well as fabrication of tilt-up of concrete panels on site, minimising waste. Operational Waste: ▪ A refuse storage and collection zone is located to the rear of Unit 2 ▪ A garbage truck can enter and exit the site in a forward direction with minimal manoeuvring within the site ▪ The proposal does not allow for the removal of hazardous waste ▪ On-site sewage management is not required	√
C6 Landscape Design	The development is Category 3. A Landscape Design and Landscape Statement have been prepared by a Landscape Architect listed in Council's Approved Landscape Consultant's list. *Refer to Landscape Drawings and Landscape Architect Design Statement*	√
C7 Culture and Heritage	▪ Dunheved Fire Station, 50 Christie Street is listed as a Heritage Item in Schedule 5 of Penrith LEP 2010 ▪ The building is listed as SHI Number 2260655 on the Penrith Heritage Inventory ▪ *Refer 4.19 Heritage Conservation* showing the relationship of the heritage item to the subject site	√

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	▪ The Penrith Heritage Inventory lists the building as: o *Criterion a) The Building has historical association with the local community since commencing it's operation* o *Criterion d) The building is held in high regard fir its links with the local community especially the families of volunteers/retained firemen.* ▪ Relative to C7: o *Criterion a)* – The building is important in the course or pattern of the local history of the area o *Criterion d)* - The building has strong or special association with a particular community or cultural group in the local area for social or cultural reasons o The heritage item holds no aesthetic significance, does not contribute to rare cultural or natural history, does not have the potential to yield information that will contribute to the understanding of local culture or local history and is not considered a cultural or natural place or environment ▪ Impact on the heritage item - the proximity of the subject site to the heritage item *(refer to 4.19 Landscape Heritage)* demonstrates that the proposed development: o Will not affect the heritage item, place or area itself, as described under this section o Will not affect a significant view to or from the item o Will not affect the setting or heritage cartilage, including any landscape or horticultural features of the item, o Will not overshadow the item o Will not undermine or cause physical damage to the item o Will not have an adverse impact on the heritage significance of the item	
C8 Public Domain	▪ The public domain of the proposed development is private space that is visible but generally inaccessible to the general public. The proposed development meets the objectives of the section, showing: o The quality of the existing public domain is being greatly enhance by the proposed development o The proposal is a response to the physical requirements of a light industrial/warehouse facility in an industrial zone, in a manner that responds to the landscape character of Penrith by providing a quality landscaped street frontage as the public domain with adjoining attractive legible built form that embraces the principles of Universal Design ▪ Pedestrian Amenity: o It is expected that access to the site will be predominantly vehicular due to the nature of the development and the location of the subject site, therefore a high level of pedestrian activity is not expected to this site	√
C9 Advertising and Signage	▪ Signs in the Vicinity of Heritage Items: o The sign will not be fixed to the heritage item o The sign has been located so that there is no direct line of site between the sign and the heritage item, therefore the architectural details of the heritage building and the heritage character of the site are not obscured or diminished	√

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	▪ Industrial Zone o The signage will be a single integrated sign displaying building and tenant identification ▪ *Refer to 4.35 SEPP 64 – Advertising and Signage*	

C10 Transport Access and Parking	▪ Pedestrian Access
	  o There is currently no pedestrian path to the northern side of Christie Street
	  o Christie Street is a major collector road in an industrial zone and as is such, crossing Christie Street at the subject site would not be considered appropriate for a person with impaired mobility
	  o *Refer to C8 Public Domain*
	▪ Transport and Parking – *Refer to Traffic Impact Statement*
		√

C11 Subdivision	This section is not applicable to the subject development	√
C12 Noise and Vibration	This section is not applicable to this development application	√
C13 Infrastructure and Services	▪ The design takes into consideration an existing easement for water supply on the site. *Refer to Survey* for location. ▪ There is adequate provision of utilities to the existing site	√

D4 Industrial Development	▪ Key Precincts – The subject site is located in Precinct 1: St Mary's, north of Christie Street
	▪ Building Height
	  o The proposed design is in keeping with the existing and desired future character for the area; it is a contemporary high quality, clean warehouse/ light industrial facility
	  o The existing site has been cut and filled to suit previous developments, therefore natural ground level is not known and existing ground level is not considered appropriate for the measurement of building heights. The building heights relate to existing levels at the side and rear boundaries and are below those permitted under the DCP
	  o The proposed development will not adversely impact of views to of from the heritage listed building at 50 Christie Street. *Refer to 4.19 Heritage Conservation*
	  o The proposed design meets the objectives of this section by responding to the topography of the site through grading the platform and stepping the buildings and is at a scale that compliments the industrial landscape of the area while addressing the street with contemporary office building forms
	▪ Building Setbacks and Landscape
	  o The proposed design meets the objectives by:
	  ▪ Providing deep setbacks with quality landscape of species endemic to the site
	  ▪ Retaining a stand of existing vegetation to the rear of the site adjoining the adjacent vegetated areas
	  ▪ All planting areas of a size suitable for appropriate landscaping
	  ▪ The impact of hard surface areas reduced
		√

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through the use of landscaping
        - Loading bays located away from the direct line of site from the public domain
        - Enhancing the character of the area by providing a quality landscape setback as the transition between the public and private domain
    - The proposed building setback ranges from the minimum 9m to 9.8m, with an extended landscape frontage of 21.4m
    - There is no allocated parking in the setback
    - Plants have been chosen to reduce the bulk and scale of the building
    - Vegetation and landscape – *Refer to:*
        - *Flora and Fauna Assessment Report*
        - *Landscape Design Drawings and Landscape Architect Design Statement*
        - *4.19 Heritage Conservation*
- Building Design
    - The objectives of this section are met by:
        - A contemporary street elevation with significant architectural and design merit incorporating quality finishes and materials that will set a benchmark for industrial buildings in Christie Street
        - The proposed design will comply with the requirements of BCA section J, as well as obtaining a minimum 4 Green Star rating
        - The site layout of the development is a typical perimeter design for an industrial facility and will be a higher quality than that of other industrial developments within the vicinity
        - Use of innovative design to enhance the building's visual and sustainable qualities
        - Good articulation of the street elevation with no large blank wall surfaces
    - Side and rear elevations will be appropriately finished "tilt slab" construction which is visually broken up with articulation joints
    - Mechanical plants and equipment will be screened and roof ventilators will form part of the industrial design of the building
    - All materials will be high quality, low maintenance and non-reflective across the whole design
    - The Landscape Architect has worked closely with the Architect to integrate architectural form and landscape
    - The office components of the building are integrated into the overall building design and all offices have clear points of entry with consideration of Universal Design
    - Loading bays are screened from Christie street either by the building itself, or landscaped zones; there are no direct and uninhibited lines of site to loading bays
- Storage of Materials and Chemicals
    - Waste enclosure is sited behind Unit 2
    - The storage of materials or chemicals does not form part of this application
- Accessing and Servicing the Site - *Refer to Traffic Impact Statement*

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- Lighting
  - The proposal meets the objectives of this section by:
    - An efficient external lighting layout will be designed by an Electrical Engineer that will enhance the architectural qualities and functionality of the building as well as provide lighting for passive and active security
- Lifting the Bar
  - The design includes the retention of a parcel of land at the rear of the site as an area of remnant landscape suitable for native habitat, that will not be disturbed during the construction process and fenced off form the development for protection into the future
  - The front landscape zone is increased to 21.4m to provide a good depth and layering of quality landscaping to the public domain
  - Landscape beds are incorporated into the car park where appropriate; bringing the layers of landscape into the development
  - The building is highly articulated on the front and internal facades and integrates a range of quality finishes and functional fixtures that contribute to the visual aesthetics while minimising the bulk and scale of the warehouse

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Appendix 'L'

Waste Management Plan

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Waste Management Plan

A site manager is to be present on-site at all times during working hours to supervise and ensure that the following waste management procedures are followed by building staff and sub-contractors.

Demolition Waste

- Materials to be demolished and/or excavated include:
  - Earth
  - Rock
  - Vegetation
  - In ground service pipes
  - Concrete
  - Bricks
  - Steel
- Hazardous building materials are to be demolished in the proximity of the proposed works. *Refer to Soil Supplemented Stage 1 Preliminary Site Investigation*
- Excavated earth and rock will be generally be reused in proposed landscaping or fill on site
- Excavated material unsuitable for use as fill at on site will be disposed of at authorised tipping sites by licensed waste contractors
- Excavated materials suitable for fill will be used as fill with the site
- Vegetation will be recycled for mulching or compost

Construction Waste

- Materials to be used in construction include:
  - Concrete
  - Brick
  - Steel reinforcing
  - Aluminium sections and fittings
  - Drainage pipe-work
  - Steel
  - Timber
- Where possible, construction packaging will be made available for recycling
- Excess construction material to be returned to supplier where suitable
- Construction waste that is not suitable for recycling will be deposited daily into industrial waste bins located in accordance with council guidelines. Bins will be provided by licensed waste contractors and disposed of at authorised tipping sites.

Operational Waste

- The proposed New Light Industrial/ Warehouse Facility will recycle glass, metal, plastics and paper, with waste disposal and collection to be in line with Council requirements.

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Appendix 'M'

Site Construction and Safety Management

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Site construction & safety management

A site manager is to be present on-site at all times during working hours to supervise and ensure that the following construction and safety management procedures are followed by building staff and sub-contractors.

- Site access is to be controlled by the erection of temporary chain wire site fencing & appropriate signage.
- Site sheds, storage & waste containers are to be located on site.
- The works shall be dust isolated from neighbouring buildings with dust screens as necessary.
- Demolition is to be undertaken in a safe and orderly manner in accordance with the requirements of WorkCover.
- Proposed hours of construction are as required by Council.

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