Block 4 Section 235 Gungahlin
Site Investigation Report

Prepared for:

Suburban Land Agency (SLA)

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Executive Summary

JPS Engineering Consultants, commissioned by the Suburban Land Agency (SLA), have conducted a Site Investigation Report for Block 4 Section 235 Gungahlin. The subject site, currently a vacant block, spans approximately 2,895m^2 and is zoned as both CZ5: Mixed Use and PRZ1: Urban Open Space in the ACT Territory Plan Map (2024). Recently, a minor plan amendment has been uplifted to the Territory Plan that amends the Assessment Requirements in the Gungahlin District Policy to allow community housing on Block 4 Section 235 Gungahlin as a standalone use.

This report assesses the suitability of the subject site for the intended development of a residential type development that consists of 6 storey, 3 storey and 8 storey buildings and a yield in the range of 63 to 80 dwellings.

Considering the comprehensive evaluation of constraints and associated risk ratings, the subject site does not present any significant constraints that might impede its future development. Consequently, the site holds potential for the intended future residential development, with the condition that the recommendations below are addressed.

Based on the level of risk, recommendations have been listed in order of priority, to assist in programming the recommended works. The priority listing has been developed by assessing the importance of the additional investigations recommended and the effect that this work would have on other reports. A summary of the recommendations and necessary actions required to enable this site for development with the associated risk colour coded to that which is presented in Section 9 of this report is provided below:

- **Bushfire Assessment:** Undertake a site and development specific Bushfire Threat Assessment and Compliance Report as the site is located inside the area declared by the ESA to be subject to the threat of bushfire. Bushfire protection measures for the proposed development and an assessment of the site to the 2023 ACT Bushfire Management Standards is to be carried out by an accredited Bushfire Consultant as part of a Development Application.

- **Ecological Assessment:** Liaise with the Conservator of Flora and Fauna once the actual development proposal is known to confirm whether an Environmental Significance Opinion (ESO) is to be completed by an accredited ecologist. The main constraint to be assessed is the potential impact a proposed development would have on the adjacent Mulanggari Grasslands to the south of the site.

- **Urban Planning and Architectural Design:** Undertake detailed architectural design and a massing study to comprehensively assess the impact and demand of the proposed development on services and infrastructure. This should also include an evaluation of how the development may interact with the adjacent blocks for their future development to ensure holistic compatibility. The proposal is to be made in accordance with Territory Plan requirements and EPSDD's Development Application process.

- **Geotechnical Investigation:** The site must undergo a development specific geotechnical investigation to provide detailed advice on the most suitable earthworks methodology, excavation conditions for basement construction, internal pavement designs, and support and footings appropriate for the site conditions.

- **Stormwater Management:** Undertake a stormwater hydrological and hydraulic analysis as an update to the Estate Development Plan stormwater masterplan, for the proposed development in line with TCCS MIS documents. This is to include the catchment and capacity analysis of the existing road reserves surrounding the site and catchment to the north that is currently conveyed through the site. Verify whether the size and grade of the existing DN300 stormwater tie to the site has sufficient capacity to accommodate the block's drainage needs together with any on site detention/retention initiatives. The adequacy of the downstream stormwater infrastructure to accommodate the proposed development's stormwater flows must be checked and validated with TCCS.

- **Trees and Vegetation:** Commission a tree survey and qualified arborist to assess the existing trees to ensure the protection of protected trees adjacent the subject site. Validate the tree assessment with the ACT Urban Treescapes Unit (TCCS) before proceeding with any activities that could impact existing trees. Furthermore, if trees are proposed to be removed to accommodate a proposed development, replacement trees at a ratio and location agreed to with TCCS and EPSDD Climate Change and Energy will need to be considered.

- **Electrical Service:** Determine the best connection point to service the site, once actual development demands are calculated. Address any necessary upgrades to the electrical infrastructure to service the site. This is to be undertaken through collaborative consultation with Evoenergy. If vulnerable use is proposed on the site, seek advice from Evoenergy as to whether a step and touch potential test needs to be undertaken due to the nearby electrical substation, opposite Kate Crace Street, south east of the site.

- **Site Access Point:** Assess the most appropriate access point to the site given the constraints and limitations of Kate Crace Street with its central median not allowing right turns into and out of the site. The driveway to the site is to be designed in accordance with TCCS MIS 07 Driveways.

- **Traffic Impact:** In accordance with the TCCS Guidelines for Transport Impact Assessment, undertake a Transport Assessment Report (TAR). The traffic assessment will be dependent on the scale and intended use of the proposed development. Evaluate the potential impact of increased traffic on the existing transport network and parking requirements, including any on street parking.

- **Potable Water Supply:** For a potable water service to the site, work closely with Icon Water to establish a connection to their existing DN150 main either in Camilleri Way or Kate Crace Street. This is to be established once the development and its potable water demand, including firefighting water demand, is known. Determine if additional hydrants on existing mains are needed to meet a higher Fire Risk Type for the proposed development than that outlined in this report. Ensure compliance with all requirements and standards set by Icon Water and ACT Fire and Rescue throughout the preliminary and detailed design process.

- **Service Location Confirmation:** Confirm the exact locations of existing services to ensure accurate planning and prevent any conflicts during the development process. This is to be undertaken using non-destructive methods.

- **Telecommunications Service:** Liaise with NBN, Telstra or TPG Telecom for a telecommunications service connection to the site, if required.

This site investigation report is produced for information only. Purchasers are required to undertake their own assessment of the site prior to lodging a Development Application with EPSDD.

1 Introduction

JPS Engineering Consultants have been commissioned by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 235 Gungahlin, hereafter referred to as the 'subject site' or simply the 'site'. The purpose of this investigation is to provide a comprehensive understanding of the risks and opportunities to allow a proposed commercial and housing development on the site.

The subject site, currently a vacant block, spans approximately 2,895m^2. The block is adjacent the Gungahlin Mosque site to the west, Kate Crace Street to the east and Camilleri Way to the south. Further to the south of the site is the Mulanggari Grasslands Nature Reserve. Another vacant block (Block 3 Section 235) lies directly north of the site, with both blocks occasionally being used as informal overflow parking. The subject site was relatively recently developed as part of the Gungahlin Town Centre East project, with construction of some developments currently underway within this estate.

Hill Thalis Architecture + Urban Projects (Hill Thalis) have undertaken a preliminary masterplan for the entire Gungahlin East Precinct, which includes the subject site. This masterplan presents a modern and well-designed planning solution that complements the existing Gungahlin Town Centre and provides a realistic development scenario for the subject site. The current yield analysis on the subject site incorporates a commercial and residential development comprising between 63 to 80 residential dwellings, with the potential of a small shop/cafe.

Refer to Figure 1 for an aerial photograph of Block 4 Section 235 Gungahlin showing the area of this study outlined and shaded in blue with a red place marker.

Figure 1 – Locality Plan of Subject Site (ACTmapi, 2024)

The purpose of this Site Investigation Report is to assess the suitability of the subject site for the intended residential development and provide information to the ACT Government on the feasibility of the site for such a development. The primary objectives of this report therefore are as follows:

1. Establish Effective Communication: Initiate engagement with relevant stakeholders to establish clear communication channels. This will enable to gain an initial understanding of the site's condition and the requirements necessary to support the proposed development.

2. Evaluate Site Constraints: Identify any limitations imposed by current site conditions. This includes considering data from proposed infrastructure capital works, as well as assessing road, stormwater, and service requirements gathered through stakeholder consultations and available data.
3. Recommend Necessary Works: Identify both on site and off site work that should be undertaken prior to any proposed development on the site. Provide recommendations for effectively addressing these requirements, in line with latest standards and guidelines.
4. Assess Further Investigations: Identify any additional investigations that may be necessary to ensure a comprehensive understanding of the site and its implications for the future development.
5. Determine Infrastructure and Services Requirements: Evaluate the infrastructure and services required to enable the site's release. Additionally, outline any associated risks related to these components.

A detailed scope of works can be found in Section 4 of this report, outlining the specific tasks and activities that will be undertaken to achieve these objectives.

2 Land Use and Planning Framework

The following appreciation of the land use and planning framework is based on the ACT Legislation Register website, Territory Plan 2023, and the Planning Act 2023. The subject site is zoned as both a CZ5 – Mixed Use and PRZ1: Urban Open Space in the ACT Territory Plan Map (2024). Hence, based on the ACT Legislation Register website, the following zone policy outcomes are applicable to the subject site:

1. Commercial zones primarily serve commercial developments, emphasising economic activity and providing land for commercial services. In areas not designated as mixed-use, other complementary uses are allowed but should not detract from the zone's commercial nature.
2. Development should align with the zone hierarchy in scale and character.

Specifically regarding CZ5 – Mixed Use zoning, the following policy outcomes are to be achieved:

1. Promote higher density residential development in areas with convenient access to transport corridors, commercial hubs, and employment centres.
2. Foster an efficient and sustainable urban environment, offering diverse opportunities for living, working, and recreation.
3. Ensure urban design standards are consistent with those of major avenues, approach routes, and other strategically significant areas.
4. Promote street-level activities that enhance active public spaces.
5. Facilitate high-quality public spaces by encouraging active ground floor uses that connect with broader open space, pedestrian, and cycle networks to promote active travel and living.
6. Provide a mix of compatible land uses by integrating business, office, residential, retail, and other developments in accessible locations to encourage walking, cycling, and maximize public transport usage.

Reference is made to the Territory Plan 2023, specifically, the Part E Zone Policies, E2 – Commercial Zones Policy. The land uses/development types listed in Figure 2 below require a development application unless they meet the 'exempt development' definition of the Planning Act 2023. Uses not listed in Figure 2 are prohibited and additional land uses specified as prohibited development are in District Policies. Development of prohibited uses may be considered under certain limited circumstances as outlined under Part 7.3 of the Planning Act 2023.

Land Use / Development Type	CZ1	CZ2	CZ3	CZ4	CZ5	CZ6
ancillary use	Y	Y	Y	Y	Y	Y
animal care facility	-	-	Y	Y	-	-
aquatic recreation facility	-	-	-	-	-	Y
boarding house	-	-	-	-	Y	-
bulky goods retailing	Y	Y	Y	Y	Y	-
business agency	Y	Y	Y	Y	Y	-
café	Y	Y	Y	Y	Y	Y
car park	Y	Y	Y	Y	Y	Y
caravan park/camping ground	-	-	-	-	-	Y
caretakers' residence	-	-	-	-	-	Y
civic administration	Y	Y	Y	-	-	-
club	Y	Y	Y	Y	-	Y

Land Use / Development Type	CZ1	CZ2	CZ3	CZ4	CZ5	CZ6
co-housing	Y	Y	Y	Y	Y	-
commercial accommodation use	Y	Y	Y	-	-	Y
communications facility	Y	Y	Y	Y	Y	-
community activity centre	Y	Y	Y	Y	Y	Y
Community housing	Y	Y	Y	Y	Y	-
community theatre	Y	Y	Y	Y	Y	Y
complementary use	Y	Y	Y	Y	Y	Y
cultural facility	Y	Y	Y	Y	Y	Y
consolidation	Y	Y	Y	Y	Y	Y
craft workshop	Y	Y	Y	Y	-	Y
demolition	Y	Y	Y	Y	Y	Y
drink establishment	Y	Y	Y	Y	Y	Y
drive-in cinema	-	-	-	-	-	Y
early childhood education and care	Y	Y	Y	Y	Y	Y
educational establishment	Y	Y	Y	Y	Y	Y
emergency services facility	Y	Y	Y	-	Y	-
financial establishment	Y	Y	Y	Y	Y	-
freight transport facility	-	-	Y	-	-	-
funeral parlour	-	-	Y	-	-	-
group or organised camp	-	-	-	-	-	Y
guest house	Y	Y	Y	Y	Y	Y
health facility	Y	Y	Y	Y	Y	Y
home business	Y	Y	Y	Y	Y	-
hotel / motel	Y	Y	Y	-	Y	Y
hospital	Y	Y	Y	Y	Y	Y
indoor entertainment facility	Y	Y	Y	Y	Y	Y
indoor recreation facility	Y	Y	Y	Y	Y	Y
industrial trades	-	-	Y	Y	-	-
light industry	Y	-	Y	Y	-	-
light rail	Y	Y	Y	-	Y	Y
minor road	Y	Y	Y	Y	Y	Y
minor use	Y	Y	Y	Y	Y	Y
municipal depot	-	-	Y	Y	-	-
multi-unit housing	Y	Y	Y	Y	Y	-
office	Y	Y	Y	Y	Y	-
outdoor recreation facility	Y	Y	Y	-	Y	Y
overnight camping area	-	-	-	-	-	Y
parkland	Y	Y	Y	Y	Y	Y
pedestrian plaza	Y	Y	Y	Y	Y	Y
personal service	Y	Y	Y	Y	Y	Y
place of assembly	Y	Y	Y	-	Y	Y
place of worship	Y	Y	Y	Y	Y	Y
produce market	-	-	Y	Y	-	-
public agency	Y	Y	Y	Y	Y	-
recyclable materials collection	Y	Y	Y	Y	-	-
religious associated use	Y	Y	Y	Y	Y	Y
residential care accommodation	Y	Y	Y	Y	Y	-
restaurant	Y	Y	Y	Y	Y	Y

Land Use / Development Type	CZ1	CZ2	CZ3	CZ4	CZ5	CZ6
retail plant nursery	Y	Y	Y	Y	Y	Y
retirement village	Y	Y	Y	Y	Y	-
secondary residence	Y	Y	Y	Y	Y	-
service station	Y		Y	Y	-	-
shop	Y	Y	Y	Y	Y	Y
sign	Y	Y	Y	Y	Y	Y
single dwelling housing	Y	Y	Y	Y	Y	-
Storage facility	-	-	Y	-	-	-
subdivision	Y	Y	Y	Y	Y	Y
supermarket	Y	Y	Y	Y	Y	Y
supportive housing	Y	Y	Y	Y	Y	-
take-away food shop	Y	Y	Y	Y	Y	Y
temporary use	Y	Y	Y	Y	Y	Y
tourist facility	Y	Y	Y	-	-	Y
tourist resort	Y	Y	Y	-	-	Y
transport facility	Y	Y	Y	Y	Y	Y
varying a lease	Y	Y	Y	Y	Y	Y
vehicle sales	-	-	Y	-	-	-
veterinary clinic	Y	Y	Y	Y	Y	Y
veterinary hospital	-	-	Y	Y	-	-
warehouse	-	-	Y	-	-	-
zoological facility	-	-	-	-	-	Y

Figure 2 – Permissible Land Uses and Development Types in Commercial Zones (Territory Plan, 2024)

Relevant to the PRZ1: Urban Open Space zoned area within the subject site, the following zone policy outcomes are to be achieved:

1. Provide a high quality, well distributed network of parks and open spaces that address the recreational and social needs of the community.
2. Establish diverse settings that support a range of recreational and leisure activities while protecting flora and fauna habitats, ecological corridors, natural and cultural features, healthy waterways, and landscape character.
3. Facilitate stormwater drainage and protect water quality, stream flows, and stream environments in a sustainable and environmentally responsible manner, offering opportunities for safe community interaction with and interpretation of the natural environment.
4. Allow ancillary uses that support the care, management, and enjoyment of open spaces, including park maintenance depots and small-scale community activity centres.
5. Promote development that does not adversely affect the landscape or scenic quality, ecological connectivity, cultural values, adequacy of open space for other purposes, access to open space, or the amenity of adjoining residents.
6. Ensure integrated land and water planning and management.
7. Provide safe and convenient pedestrian and cycling access to urban open spaces to promote active living.

Reference is made to the Territory Plan, specifically, the Part E Zone Policies, E5 – Parks and Recreation Zones Policy. The land uses/development types listed in Figure 3 below require a development application unless they meet the ‘exempt development’ definition of the Planning Act 2024. Uses not listed in Figure 3 are prohibited and additional land uses specified as prohibited development are in District Policies.

Land Use / Development Type	PRZ1	PRZ2
ancillary use	Y	Y
aquatic recreation facility	Y	Y
carpark	-	Y
club	-	Y
communications facility	Y	Y
community activity centre	Y	Y
complementary Use	Y	Y
consolidation	Y	Y
demolition	Y	Y
distribution reservoir	Y	Y
guest house	-	Y
hotel	-	Y
indoor recreation facility	-	Y
major electricity storage facility	Y	Y
major electricity sub-station	Y	Y
major gross pollutant trap	Y	Y
major pump station	Y	Y
major road	Y	Y
major service conduits	Y	Y
minor road	Y	Y
minor use	Y	Y
motel	-	Y
municipal depot	Y	-
outdoor recreation facility	Y	Y
parkland	Y	Y
playing field	Y	Y
power generation station	Y	Y
public agency	-	Y
sign	Y	Y
subdivision	Y	Y
temporary use	Y	Y
treatment plant	Y	Y
urban lake, pond and/or retardation basin	Y	Y
utility hydrogen production facility	Y	Y
varying a lease where not prohibited.	Y	Y
water storage dam	Y	Y

Figure 3 – Permissible Land Uses and Development Types in Parks and Recreation Zones (Territory Plan 2023)

A review of Part D District Policies, D1 – Gungahlin District Policy, does not provide additional types of development and land uses that are assessable and prohibited in the area of the subject site.

However, the District Policy does provide assessment requirements relevant to the subject site. In accordance with Figure 5 (refer Figure 4 below), a community needs assessment, approved by the ACT Government, is required to identify community uses in the specified area or elsewhere in the Town Centre. These uses will be designated as community facility zoned land or specified as a minimum gross floor area within a mixed-use development. The assessment will:

1. Consider the demand for community facilities in the town centre to meet Gungahlin community needs.
2. Identify mechanisms and safeguards to ensure gross floor area retention for community uses within mixed-use developments.
3. Take into account existing facilities within the town centre.

These assessment requirements are mandatory development controls that must be met for a future community use development.

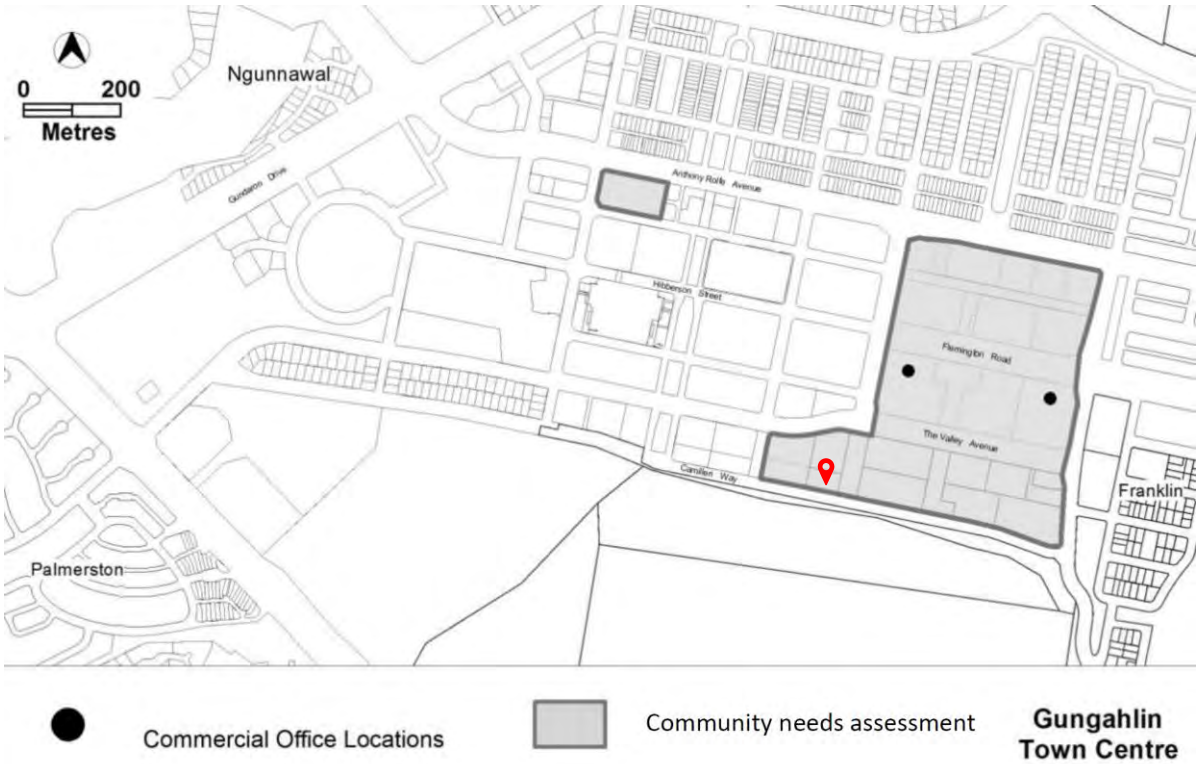


Figure 4 – Community Needs Assessment Areas (Territory Plan, 2024)

A minor plan amendment has been enacted that pertains the subject site on 1 August 2024 (notifiable instrument NI2024-435). This instrument amends the Assessment Requirements in the Gungahlin District Policy to allow community housing on Block 4 Section 235 Gungahlin as a standalone use. An assessment was undertaken to determine the most appropriate use for this site, identifying community housing as the most suitable option. Since the site is a new block and not on existing community facility zoned land, it was deemed unnecessary to require a place of worship or supportive housing in addition to the community housing.

The current Territory Plan (2024) for Gungahlin Block 4 Section 235 shows that the majority of the site has dual zoning with the eastern portion being CZ5: Mixed Use and the west as PRZ1: Urban Open Space. An excerpt of the Territory Plan map is shown in Figure 5, where the subject site for the Site Investigation Report is approximately located with red place marker.

Figure 5 – Territory Plan Land Use Map (ACTmapi, 2024)

3 Proposed Development

The subject site located in Gungahlin Block 4 Section 235 and is within the Gungahlin Town Centre, commonly referred to as Gungahlin Town Centre East. The Suburban Land Agency (SLA) engaged Hill Thalis to prepare the Gungahlin Town Centre East Design and Place Framework, aiming to create a vibrant urban centre that met community aspirations expressed during a recent engagement program. SLA released mixed-use and commercial sites in Gungahlin Town Centre East through an Expression of Interest (EOI) and Design Based Tender process.

The precinct, comprising the unbuilt portion of Gungahlin's Town Centre, is generally bounded by Anthony Rolfe Avenue in the north, Camilleri Way in the south, Kate Crace Street in the west, and Manning Clarke Crescent in the east. It includes sections (whole or part) of 230, 231, 235, 248, and 249, which are zoned for a range of permissible uses.

The design strategy involved civilising streets and removing unnecessary elements such as free left turns, which regularised block boundaries, enabling the built form to better address and support the city structure. Additionally, a system of lanes and walkways was excised from developable areas to form part of the finer public domain network. The potential public lane network that has been envisaged for Block 4 Section 235 Gungahlin can be seen in Figure 6 below.

Figure 6 – Section and Block Structure (Hill Thalis, 2023)

The built form, height, and future program of Gungahlin Town Centre East was calibrated by Hill Thalis in conjunction with the SLA to provide activity to major street frontages, public park edges, and laneways within blocks. All development proposals were encouraged to maximise ground floor activation with non-residential uses where possible.

The outcome of this study resulted in a potential yield of 63 to 80 dwellings over the subject site with 6 storey, 3 storey and 8 storey buildings. Refer to Figure 7 below for an excerpt from the Draft Framework by Hill Thalis, which illustrates the built form over the site.

Figure 7 – Gungahlin Town Centre East Concept Plan (Hill Thalis, 2023)

Specific details of the future development have not yet been established and the proposal detailed above is conceptual only. Additionally, the release process for the site has not been finalised. This Site Investigation Report provides an overview of potential servicing options for any required infrastructure upgrades or augmentations to accommodate future development on the site in the abovementioned proposed scenario. This report does not consider the broader development within Gungahlin Town Centre East and the infrastructure capacity to service a fully realised masterplan.

4 Investigation Scope

The scope and deliverables of this engagement will include the following:

- Introduction including site description and location in the site investigation report.
- Aerial photograph and site locality figure.
- Site zoning figure and Territory Plan review.
- Potential development review.
- Summary of any available relevant background reports regarding the site or surrounds.
- Existing site servicing and constraints based on Before You Dig Australia (BYDA) Plans, ACTmapi and correspondence with authorities as required. Schematic existing services excerpts will be produced to reflect these findings.
    - Stormwater (TCCS Stormwater Database and non-intrusive site inspection)
    - Overland flow and flood information (ACTmapi and/or EPSDD flood modelling information)
    - Sewer (BYDA and non-intrusive site inspection)
    - Water (BYDA and non-intrusive site inspection)
    - Electricity (Evoenergy and BYDA)
    - Telecommunication BYDA (BYDA and relevant authorities)
    - Natural gas supply (BYDA and Zinfra/Jemena)
    - Verge works including driveway and pedestrian access
    - Traffic review (TCCS Canberra Strategic Transport Model)
    - Parking (Aerial imagery)
    - Bushfire (ACTmapi/ACT Fire & Rescue)
    - Heritage (ACTmapi/ACT Heritage Council)
    - Environmental review (EPA historic data)
    - Tree Assessment (visual only)
    - Ecological (protected flora or fauna species)
    - Geotechnical
        - Review of any available geotechnical reports
        - On site non-intrusive inspection and geological mapping review
    - Other potential constraints identified
- Future site servicing guidance to latest standards and guidelines, based on existing services and infrastructure.
- Summary of opportunity and constraints in a risk assessment format.
- Recommendations for further studies in an itemised risk assessment format.
- Correspondence with all authorities.

It is understood that the outcomes of this study will lead the SLA to understand the feasibility of development of the site in line with the conceptual planning work undertaken to date. The report will also inform of the requirement for any further specialist studies needed to complete the due diligence process.

5 Site Description and Location

The subject site is situated within Gungahlin, as part of the town centre. The subject site, currently a vacant block, spans approximately 2,895m^2. It is adjacent to the Gungahlin Mosque development to the west, Kate Crace Street to the east, and Camilleri Way to the south. Further south of the site is the Mulanggari Grasslands Nature Reserve. Directly north of the site lies another vacant block (Block 3 Section 235), with both blocks occasionally used as informal overflow parking for the adjacent mosque. The subject site was relatively recently developed as part of the Gungahlin Town Centre East project, with the construction of some developments currently underway within this estate. It is understood that the Suburban Land Agency (SLA) will release the site for sale through an expression of interest and design based tender process as a mixed use development, with a predominant focus on residential use.

During a site inspection, it was observed that the topography of the site is evenly graded from the north west corner to the south east corner of the site boundary with an average approximate grade of 7%. The differing levels noticed within the subject site when compared to the surrounding development, natural grasslands and roads, suggest significant regrading activities may have occurred on the site as part of the estate works.

The site is unoccupied, fenced and does not contain any vegetation, while relatively recently planted trees are situated along the perimeter of the site in the adjacent road verges. Some existing trees, located away from the site, appear to meet the definition of a regulated tree as defined in the Urban Forest Act 2023.

The photos taken in Figure 8 to Figure 11 provide a general overview of the site from different visual aspects. The photos provide an indication of the site's current condition, topographical features, and some of the existing trees present surrounding the site.

Figure 8 – General Site Photo taken from the South of the Site Looking North East

Figure 9 – Site Photo Looking North from the Southern Boundary

Figure 10 – Photo of the Site Looking North West from the Block's South East Corner

Figure 11 – Photo of the Site from the North West Looking South East

6 Literature Review

JPS Engineering have undertaken a comprehensive literature review of the documents comprising the approved Gungahlin Town Centre East Estate Development Plan (EDP). The EDP was evaluated and approved by EPSDD under the Territory Plan 2007 in March 2019. Relevant reports applicable to the subject site that have been made available by EPSDD include the EDP report by Indesco from November 2016, the traffic report by Traffix Group from July 2016, the Bushfire Risk Assessment by ABPP from February 2016, and the ACT Heritage Council Advice from July 2016. The purpose of this review was to identify the risks and constraints associated with a future development scenario within the subject site, as outlined in a previous section of this report. Given the age of these reports, a brief summary only is provided in this section. The EDP report can be found in Appendix E, whilst the standalone bushfire report is in Appendix F, environmental report in Appendix G, heritage advice in Appendix I, and traffic report included in Appendix J.

6.1 Estate Development Plan Report

In November 2016, Indesco completed an Estate Development Plan Report for Gungahlin Town Centre (GTC) East Estate with supporting drawings. The GTC East development area is bordered by Anthony Rolfe Avenue, Manning Clark Crescent, the Mulanggari Grasslands, and the existing Gungahlin Town Centre West.

6.1.1 Environmental and Biodiversity Assessments

Indesco, in their EDP report, advised that the site was subject to a Strategic Assessment under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) on Matters of National Environmental Significance (MNES). This assessment included important flora, fauna, ecological communities, and heritage places. Additionally, the ACT Government conducted an assessment under the Planning and Development Act 2007, exempting the development from requiring an Environmental Impact Statement (EIS). The ACT Minister for the Environment and Sustainable Development granted this exemption on 20 November 2013. Refer to Appendix H for details of this exemption. Despite this, translocation of striped legless lizards from Gungahlin Town Centre East to Bredbo was completed between October and November 2015.

6.1.2 Hydrology and Catchment

The EDP report describes that the catchment including Block 4 Section 235 grades south to a low point in Camilleri Way and a retarding basin. Stormwater flows continues south into the Mulanggari Grasslands from this point. The retarding basin meets reduction targets for Total Suspended Solids (TSS), Total Phosphorus (TP), and Total Nitrogen (TN) for standards current at the time of submission. See below Figure 12 for an excerpt of the EDP hydrology plan, showing the catchment area delineated by dashed blue lines and arrows showing the direction of flow.

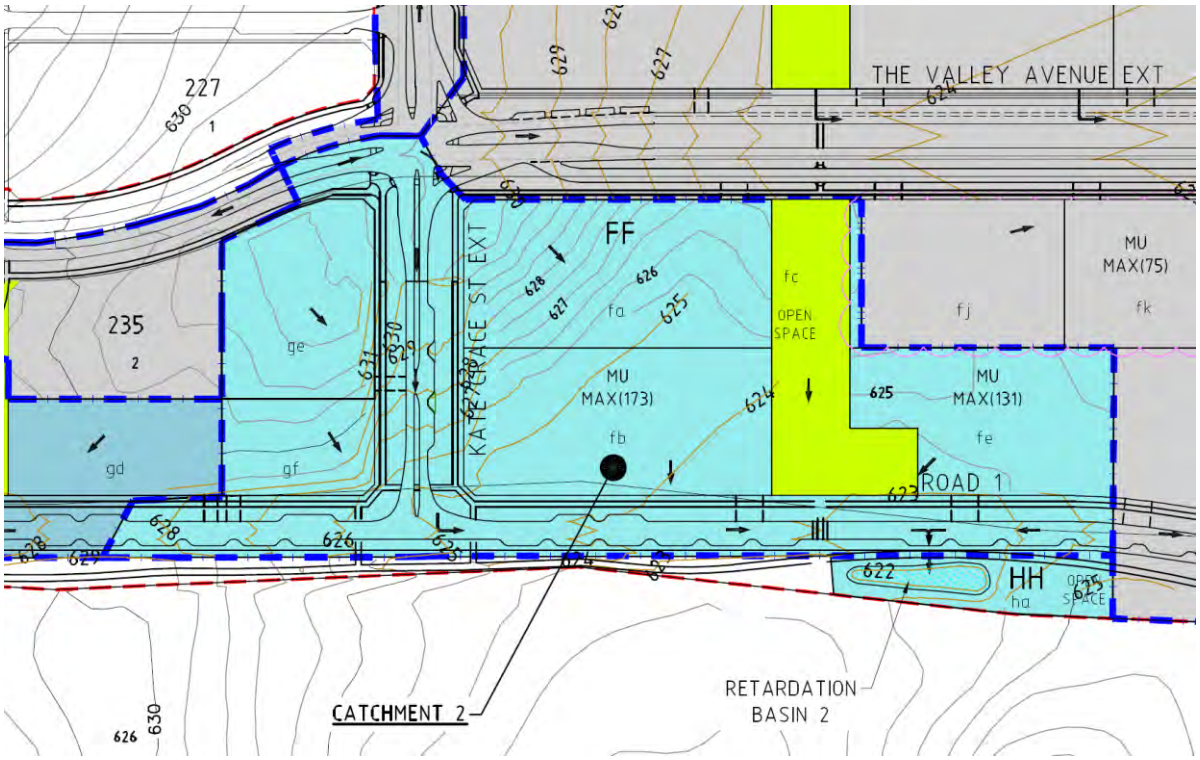


Figure 12 – Hydrology EDP Plan (Indesco, 2016)

6.1.3 Tree Assessment

Comprehensive tree assessments were conducted in December 2010 by Scenic Landscape Architecture and in December 2013 by Indesco. The area contained large, widely spaced trees and groups of remnant vegetation typical of former farming practices.

6.1.4 Noise Assessments

Two noise assessments were conducted as part of the EDP submission: the 'Road Traffic Noise Assessment' and the 'Capital Metro EIS Noise and Vibration Assessment'. Estimated noise levels for facades of mixed use developments near the property boundary were approximately 63 dBA. The Gungahlin Town Centre Roads traffic noise report recommended reassessing noise impacts on buildings once layouts are determined, with mitigation achievable through facade design. The light rail noise assessment indicated no daytime noise issues, but night time noise levels exceeded limits in some areas, suggesting further noise attenuation measures being necessary.

6.1.5 Geotechnical Information

Preliminary geotechnical information from Douglas Partners (February 2014) classified the majority of the site as H1 (Highly reactive) with some areas containing rock. No significant issues were identified however that would prevent urban development. The estate design generally follows the site's natural grading, minimising cutting and filling proposed as part of the estate design. Preliminary cut and fill extents can be seen in Figure 13 below, taken from the 2016 EDP drawings.

Refer to Appendix E for the full Estate Development report for Gungahlin Town Centre East Estate.

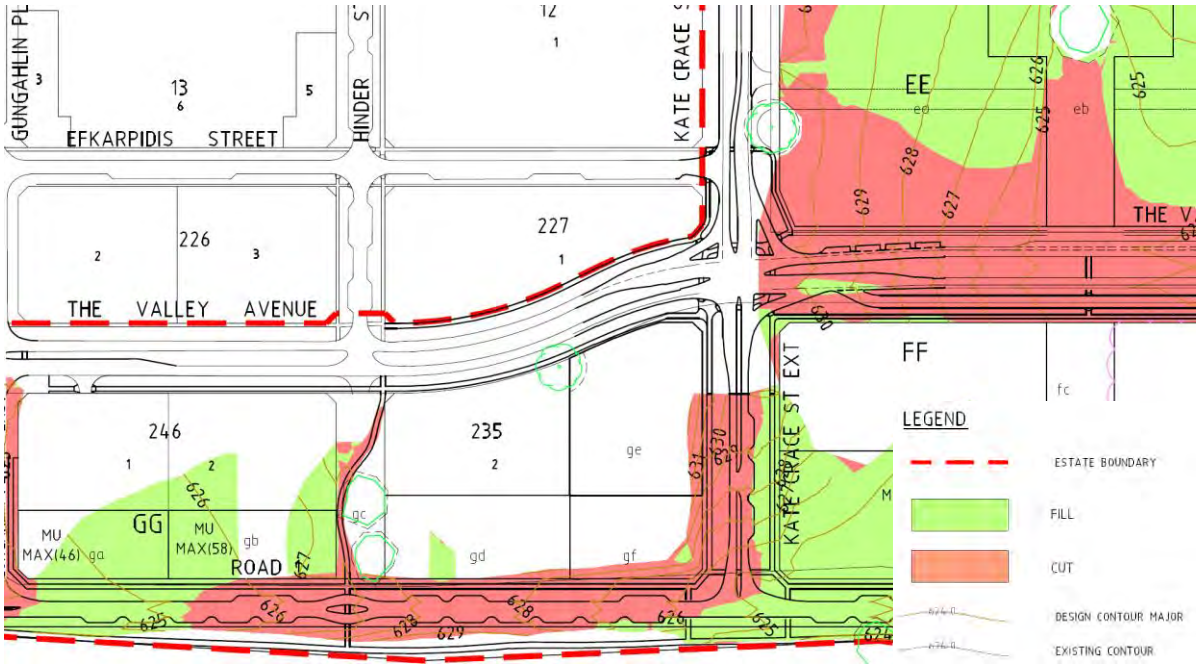


Figure 13 – Cut and Fill EDP Plan (Indesco, 2016)

6.2 Bushfire

Australian Bushfire Protection Planners (ABPP) Pty Limited were engaged in February 2016 to review comments on the Gungahlin Town Centre East Draft Estate Development Plan provided by the ACT Emergency Services Agency (ACTESA) and to prepare an updated Bushfire Risk Assessment. This update took into account the ACTESA's comments and the provisions of the ACT Strategic Bushfire Management Plan – Version 3 – 2014.

The bushfire risk assessment was conducted in accordance with AS/NZS ISO 31000:2009. The primary concern was the potential exposure of future mixed use and community developments to grassland fires from the adjoining Mulanggari Grassland Reserve and the Hills, Ridges, and Buffers Reserve on Block 221. The southern edge of the Gungahlin Town Centre East site was particularly vulnerable due to strong, hot, and dry south-westerly winds that could carry burning embers over long distances, igniting cured grassland vegetation and other combustible fuels. The topography south of the site created an upslope fire path from the south and southeast towards the eastern portion of the site. This fire path is represented in Figure 14 below, extract from the ABPP report.

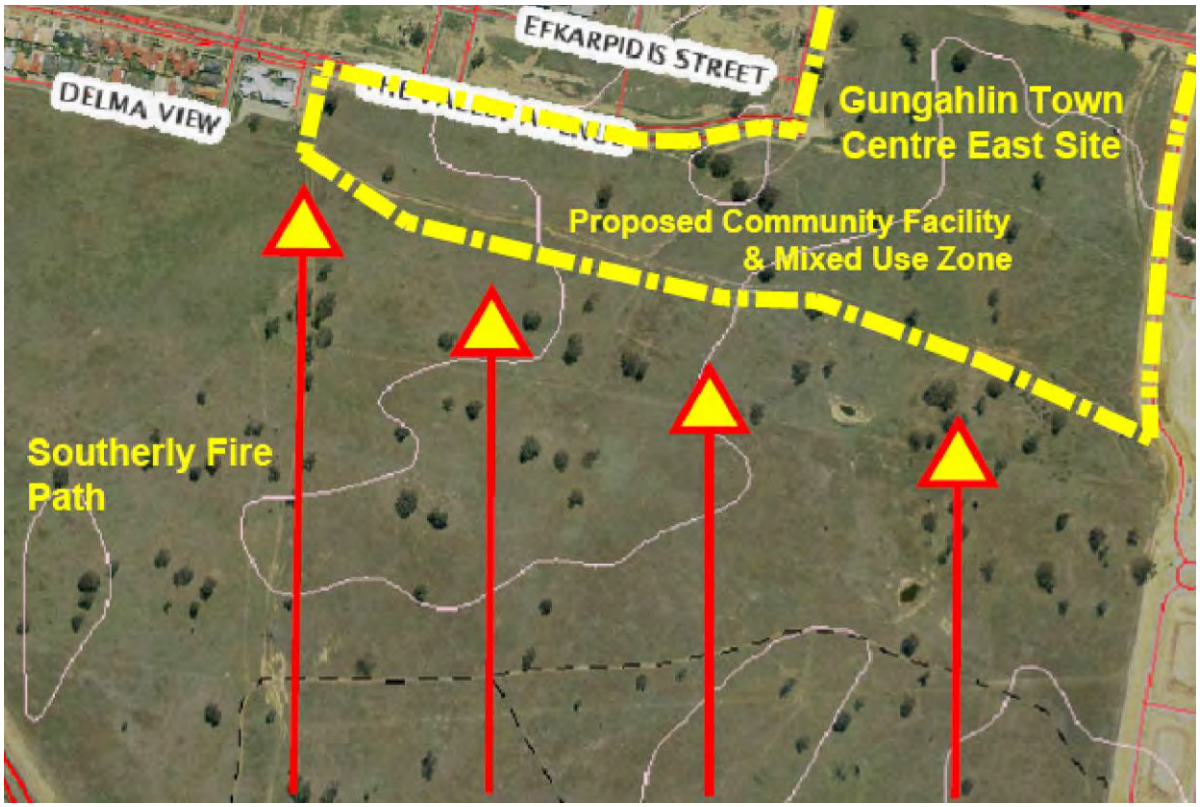


Figure 14 – GTC East Fire Path (ABPP, 2016)

The Precinct Code recommended a 20 metre wide Inner Asset Protection Zone to the south of the Gungahlin Town Centre Precinct. Additionally, it was recommended that no bushfire protection measures be located within the Mulanggari Nature Reserve. See below Figure 15, which is an excerpt from an EDP drawing that indicates this Inner Asset Protection Zone, with respect to the site and that buildings on the site are to be designed to Australian Standard AS 3959.

Refer to Appendix F for the full ABPP Bushfire Risk Assessment report.

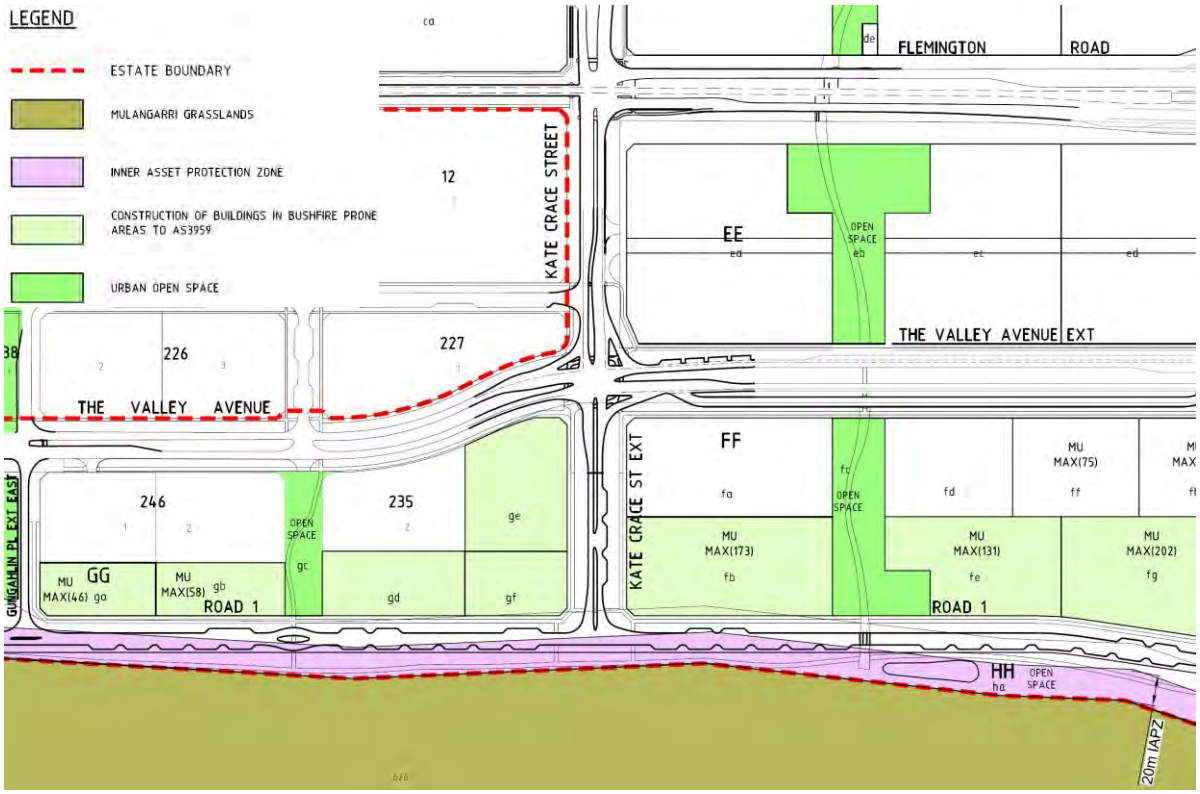


Figure 15 – Bushfire Protection Plan in Relation to the Subject Site (Indesco, 2016)

6.3 Environmental

A Stage 2 Contamination Investigation of the Gungahlin Town Centre (GTC) was conducted in March 2012 by Coffey Environments. The Environment Protection Authority (EPA) assessed and endorsed the report with specific conditions:

- Before commencing redevelopment works, the stockpile identified in the report had to be assessed by a suitably qualified environmental consultant to determine its suitability for beneficial reuse or waste disposal. The material from the stockpile was not to be reused or disposed of on or off the site without EPA approval. This stockpile was situated in the northern portion of GTC East Estate and quite distant from the subject site.
- A site management plan incorporating an unexpected finds protocol had to be prepared by a suitably qualified environmental consultant and endorsed by the EPA prior to the commencement of earthworks.

The site stockpiles were indicated on the Cut and Fill Plan. In May 2012, Coffey Environments conducted a Stockpile Beneficial Reuse Assessment and Waste Classification of the site stockpiles. The report concluded that the material was suitable for beneficial reuse within a commercial/industrial land use.

All works were to be carried out in accordance with the Environment Protection Guidelines for Construction and Land Development in the ACT, March 2011. The contractor was required to hold an Environmental Authorisation or enter into an Environment Protection Agreement with the EPA prior to commencing works. A site management plan, including an Unexpected Finds Protocol, needed to be prepared by a suitably qualified environmental consultant and implemented during earthworks. Additionally, a Pollution Control Plan had to be endorsed by the EPA before the commencement of on-site works.

Refer to Appendix G for the full Coffey Stage 2 Contamination Investigation report of the Gungahlin Town Centre.

6.4 Heritage

A series of Aboriginal and cultural heritage investigations were undertaken within the study area, including:

- Biosis, May 2012, Gungahlin East Stage 2 Aboriginal and Historical Cultural Heritage Study.
- Biosis, December 2015, Review of Gungahlin Construction Site.
- CHMA, February 2016, Manning Clark Crescent Extension Sub-Surface Test Pitting Program and Statement of Heritage Effects.
- GML, June 2015, ACT Light Rail Stage 1 – City to Gungahlin, Heritage Impact Assessment.
- Parsons Brinckerhoff Australia, 2015, Capital Metro Light Rail Stage 1 – Gungahlin to Civic. Environmental Impact Statement Addendum Report

Biosis (2012) did not identify any Aboriginal or cultural heritage constraints within the study area but noted that the alignment of Well Station Track held moderate cultural heritage value, warranting its recording for historical purposes. A shared path was proposed along this alignment, parallel to Camilleri Way and the Access Track.

Subsequent assessments by GML (2015) identified Block 1, Section 230, Gungahlin as an area of archaeological potential, a conclusion supported by Biosis (2015). The ACT Heritage Council's endorsement of the GML report was conditional and noted that further information on the archaeological potential of the locality was required. GML (2015) also identified a possible Aboriginal Scarred Tree on Block 1, Section 234, Gungahlin, with ongoing assessment.

Additional archaeological testing of Block 1, Section 234 and part of Block 1, Section 230, Gungahlin was undertaken as part of the Manning Clark Crescent extension project (CHMA, 2016). This assessment found the locality to be very disturbed and failed to locate Aboriginal places or objects. The ACT Heritage Council endorsed the findings and recommendations of this study.

Refer to Appendix I for the full ACT Heritage Council assessment and advice letter.

6.5 Traffic

In July 2016, Traffix Group completed a traffic study for the Gungahlin Town Centre (GTC) East Estate Development Plan (EDP). This report was primarily based on the previous report 'Gungahlin Town Centre East – EDP Traffic Report' by Indesco, completed in June 2015. Indesco prepared this traffic study to assess internal traffic movements, key internal intersection configurations, and the impact on connections to the existing network. The Road Hierarchy Plan, seen in Figure 16 below, shows that both Kate Crace Street and Camilleri Way were classified as Minor Collector roads.

Figure 16 – Road Hierarchy Plan (Indesco, 2016)

A summary of the Indesco report findings included:

- The proposed layout featured a mix of commercial and residential dwellings.
- The additional traffic volumes generated did not reduce the operational performance of the existing road network.
- Parking demand generated by the development would be accommodated on block.
- Several four way intersections would require signalisation.

The Traffix report provided a detailed traffic engineering assessment of the generation and distribution of traffic and investigated key intersections and their performance within the Gungahlin Town Centre. The full traffic report can be found in Appendix J.

7 Existing Site Servicing

7.1 General

In this Section, a detailed summary of the existing services information has been compiled for the subject site. This information is based on received data from Before You Dig Australia (BYDA) enquiries, work as executed (WAE) records, correspondence with service authorities, and a visual site inspection. Additionally, services that are proposed to be constructed and those to be relocated have also been considered.

While every effort has been made to ensure the accuracy of the provided information, the detailed dimensions and alignments of existing services included within the report should be treated as indicative only and the accuracy of the information cannot be warranted. It is essential that all services be accurately verified through on site potholing before commencing any development activities. Additionally, the verification of services may be required to facilitate future design efforts for the site.

All relevant correspondence with service authorities and Before You Dig Australia information is included within Appendix C and Appendix B, respectively.

7.2 Sewer

The assessment of the existing sewer infrastructure involved gathering information from multiple sources, including Before You Dig Australia (BYDA) data, records from Work as Executed (WAE) drawings, and an on site inspection.

The BYDA and WAE information shows that there is a DN150 sewer tie connection to Block 4 Section 235 Gungahlin that enters the site at the south east corner. The sewer tie to the site connects to a manhole at the intersection of Kate Crace Street and Camilleri Way, where a DN150 sewer continues east in the northern verge of Camilleri Way. The sewer manhole over the mains and sewer tie was located during a site inspection to the south east of the site and can be seen in Figure 17 below. A DN150 sewer main also runs northward under the path in the west verge of Kate Crace Street and terminates at a manhole just to the north of the site, where it services Block 3 Section 235. See photo in Figure 18, for the manhole that services Block 3 Section 235, as observed on site.

For further details on existing sewer infrastructure within and surrounding the site, refer to Figure 17, which is extracted from the BYDA information.

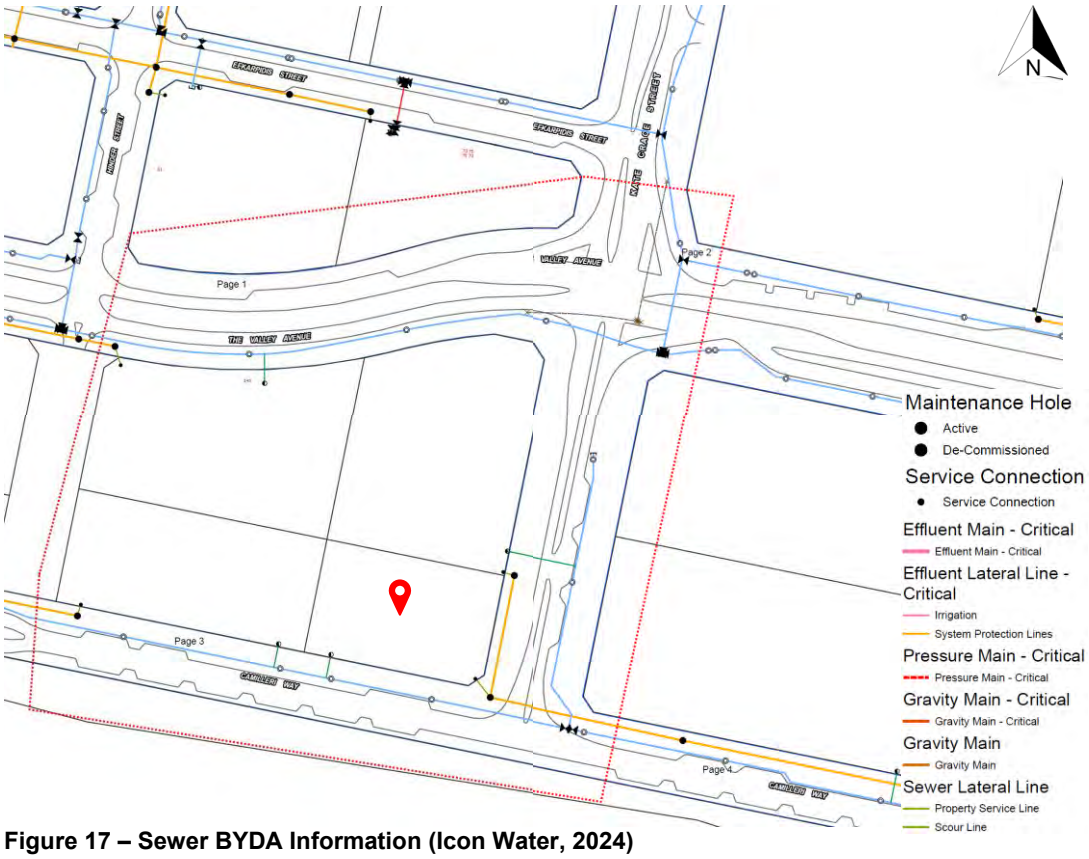


Figure 17 – Sewer BYDA Information (Icon Water, 2024)

Figure 18 – Sewer Manhole North East of Site

Figure 19 – Sewer Manhole with Tie to Site

7.3 Water Supply

The existing water supply service information was compiled from Before You Dig Australia (BYDA) and WAE information.

Potable water services in the immediate vicinity of the site are limited to a DN150 watermain located south and east of the subject site, within the northern verge of Camilleri Way and east verge of Kate Crace Street, respectively. A tie to the subject site is available near the south west corner of the block, approximately 10m from the block's west boundary. The water meter to Block 4 was observed during the site inspection as shown in Figure 24. The hydrant spacing over the DN150 main south of the site is approximately 60m, where two fire hydrants over this DN150 main are located in close proximity to the subject site. Two of these hydrants can be seen in proximity to the subject site in Figure 21 and Figure 25 below. Additionally, two hydrants are situated on the DN150 main to the east of the site in Kate Crace Street, which can be seen in Figure 22 and Figure 23. These hydrants on Kate Crace Street are interspaced at between 45m to 60m.

For further details on existing water infrastructure surrounding the subject site, refer to Figure 20, which is extracted from the Icon Water BYDA information.

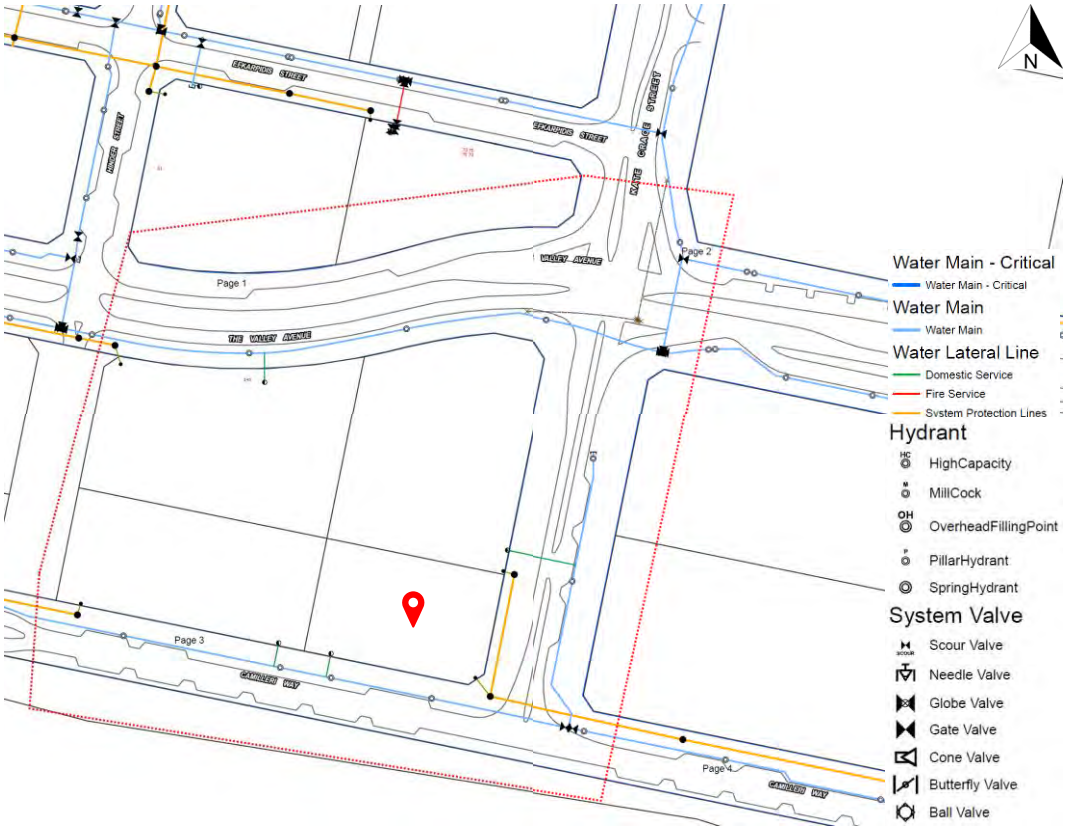


Figure 20 – Existing Water Infrastructure Near the Subject Site (Icon Water, 2024)

Figure 21 – Existing Hydrant Directly South of Site

Figure 22 – Existing Hydrant North East of Site

Figure 23 – Existing Hydrant North East of Site

Figure 24 – Existing Water Mater to Site

Figure 25 – Existing Hydrant South West of Site

7.4 Stormwater Drainage

The existing stormwater infrastructure information was compiled from the TCCS Stormwater Database, WAE information and observations made during a site inspection.

Block 4 Section 235 Gungahlin is serviced by a stormwater tie located near its south east corner. This service tie is sized as a DN300 pipe with a 1.0% grade and connected to a roadside sump at the intersection of Camilleri Way and Kate Crace Street. From this sump, the flows discharge into a DN300 stormwater pipe that cross Camilleri Way and continue as a DN300 pipe along the southern verge of Camilleri Way to the east. The pipe then upsizes to a DN600 where it connects to the Kate Crace Street pipe network. See Figure 28 for a photo of the stormwater sump on Camilleri Way that is the junction of the Kate Crace and Camilleri Way stormwater pipe network, south east of the site.

There are several other stormwater sumps surrounding the subject site that drain both the existing adjacent blocks, Kate Crace Street and Camilleri Way. Figure 29, Figure 30 and Figure 31 are examples of these sumps near the subject site.

For visual reference, refer to the excerpt from the WAE services drawing, provided in Figure 26 below. This excerpt displays the indicative positions of these stormwater pipes (depicted in green linework) and associated structures. Additionally, the stormwater pipe network shown in Figure 27 is extracted from the TCCS Stormwater Database and ACTmapi data. The combination of these elements contributes to the existing stormwater infrastructure in the vicinity of the subject site.

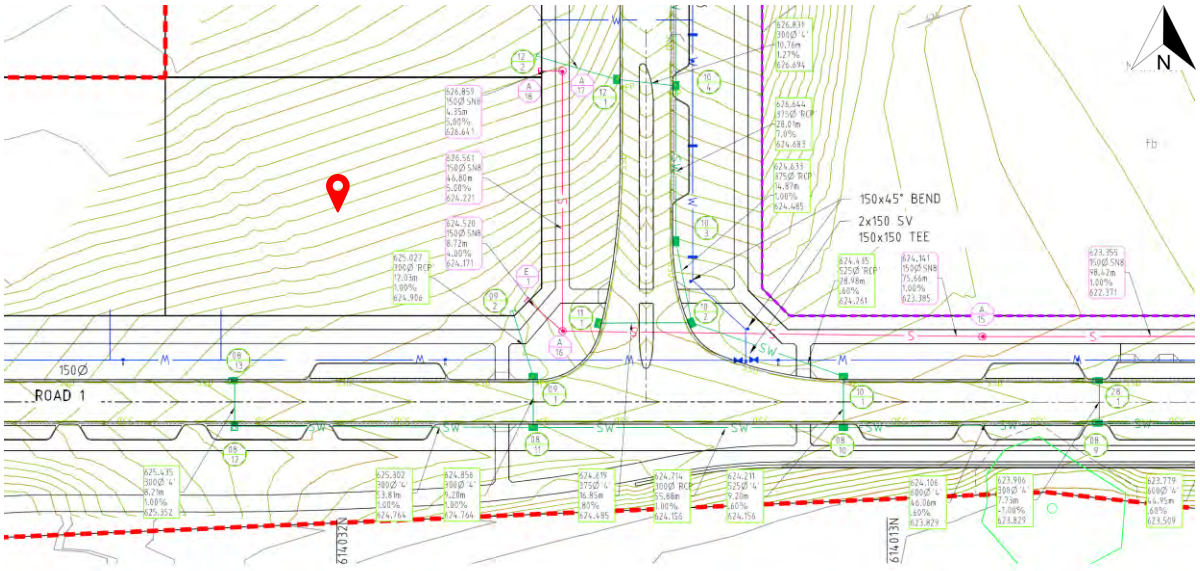


Figure 26 – Existing Stormwater Infrastructure in Proximity of the Site (Indesco, 2017)

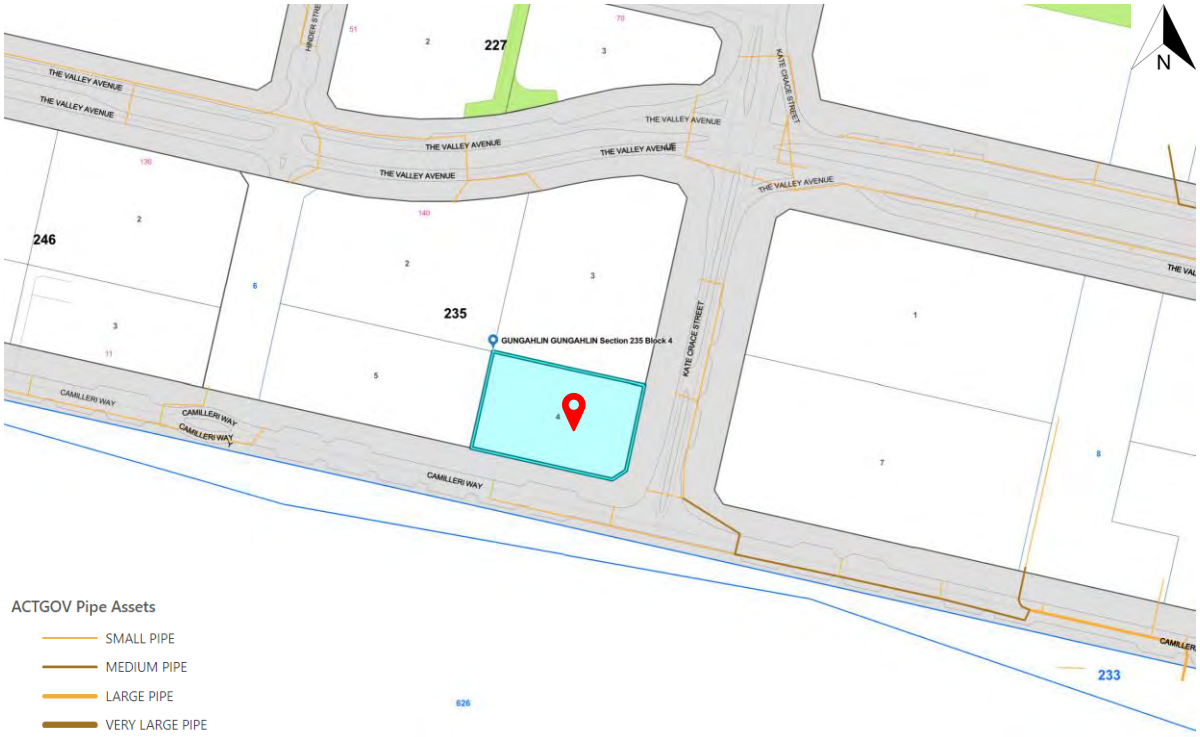


Figure 27 – Stormwater Pipe Network (ACTmapi, 2024)

Figure 28 – Stormwater Sump at Junction of DN525 from Kate Crace Street and DN300 from Camilleri Way to a DN600 Pipe

Figure 29 – Existing Stormwater Sump in Kate Crace Street East of Site

Figure 30 – Stormwater Sump South East of Site

Figure 31 – Stormwater Sump South of Site

7.5 Overland Flow and Flooding

Based on a site inspection and review of site WAE survey contours, it has been determined that the subject site falls from the north west towards the south east with an approximate 7% grade over an overland flow path distance of approximately 47 metres. The slope is generally consistent along the subject site.

The subject site is bounded by existing roadways that impede overland flows from entering the site. However, overland flows from the north in Block 3 Section 235 and parts of Blocks 2 and 5 Section 235 to the west of the site appear to be conveyed through the subject site. The area contributing to overland flow for the majority of the block is therefore assumed to be limited to the site area and a portion of Block 3 to the north, with a minor catchment from Blocks 2 and 5 to the west. The grading of Blocks 3, 2, and 5 in relation to the subject site can be seen in Figure 33 below, which is a photo taken from the high point in the north west corner of Block 3 Section 235 looking south toward the site.

It is assumed that the 1% AEP is contained within the respective road corridors surrounding the site and that the general hydrology and catchment is as shown in Figure 12 previously in this report. A review of ACTmapi flood data did not show any flood prone or hazard areas within proximity of the site.

Refer to Figure 32 for an indication of the stormwater overland flow directions within and surrounding the subject site depicted with blue arrows.

These preliminary assumptions regarding stormwater runoff are subject to confirmation through a detailed site survey encompassing the immediate surroundings and a subsequent hydrological and hydraulic analysis in accordance with the ACT Government TCCS MIS 08 document. This detailed assessment will provide accurate insights into the extent and behaviour of overland flow and flooding on the subject site, which may change with a development on Block 3 Section 235.

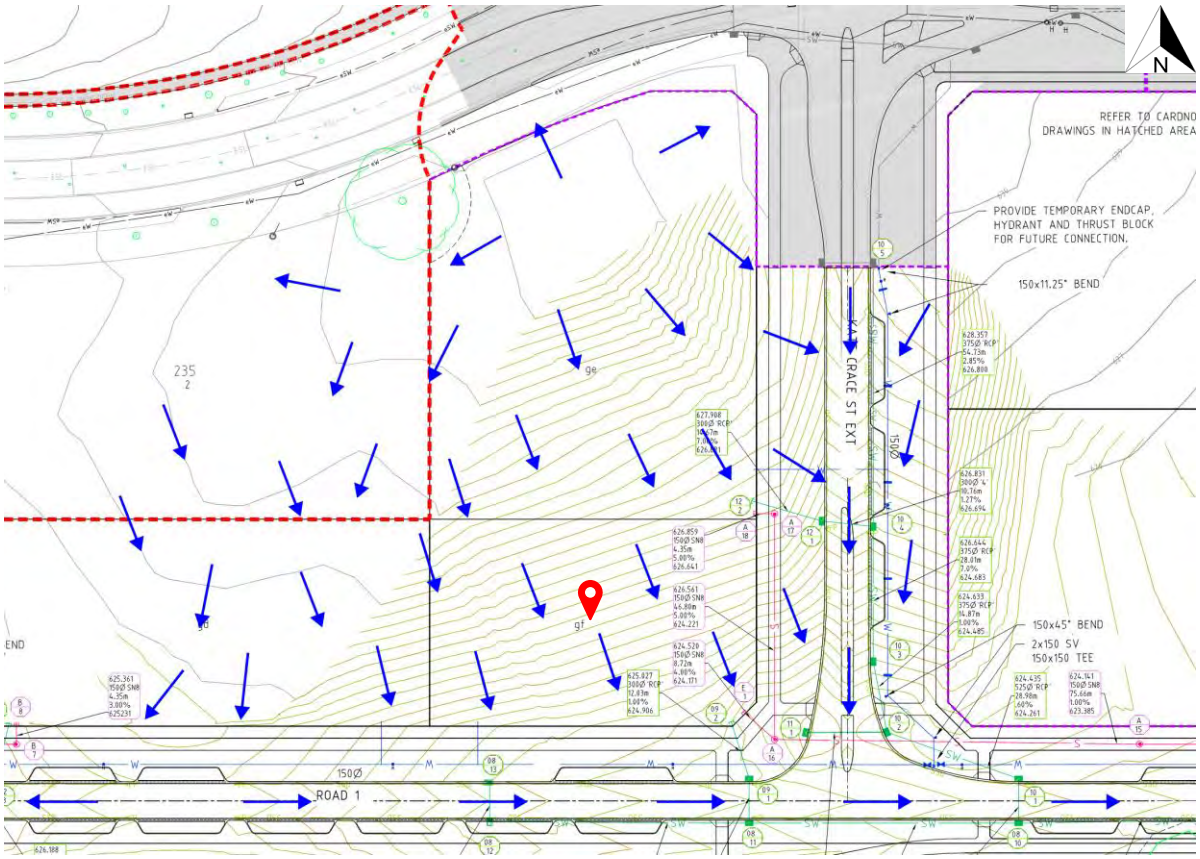


Figure 32 – Stormwater Overland Flow Diagram

Figure 33 – Photo Looking South Toward Site from High Point in Block 3 Section 235 Gungahlin

7.6 Telecommunication Services

The following telecommunication infrastructure information has been compiled from BYDA information, and a site inspection.

7.6.1 Telstra

BYDA information indicates that Telstra services are present in the north east verge of Kate Crace Street, near the intersection of The Valley Avenue. There are also Telstra services within the northern verge of The Valley Avenue, north of the site.

See Figure 35 below for pit over the Telstra services north of the site in The Valley Avenue. Also, Figure 36 and Figure 37 show photos of access chambers to Telstra services that are available in the east verge of Kate Crace Street, north east of the site.

Refer to Telstra BYDA information that has been produced from digital data provided in Figure 34 below.

Figure 34 – Telstra BYDA Information in Proximity of the Subject Site (Telstra, 2024)

Figure 35 – Telstra Pit over Telstra Service in The Valley Avenue

Figure 36 – Telstra Access Chamber North East of Site

Figure 37 – Telstra Access Chamber North East of Site

7.6.2 NBN

BYDA information indicates that the subject site is not serviced by NBN, however, NBN services are present at the intersection of Kate Crace Street and The Valley Avenue. This can be seen from the alignment of the NBN service in Figure 38 below.

Figure 38 – NBN BYDA Information Near the Subject Site (NBN, 2024)

7.6.3 TPG Telecom

TPG Telecom BYDA information indicates that a TPG owned TransACT service runs along the north and southern verges of The Valley Avenue, crossing Kate Crace Street at its intersection with The Valley Avenue. TPG labelled pits were identified during a site inspection, one of which in the west verge of Kate Crace Street can be seen in Figure 40 below.

See below Figure 39 for the location of these TransACT service lines in proximity of the site, which are shown in red line type.

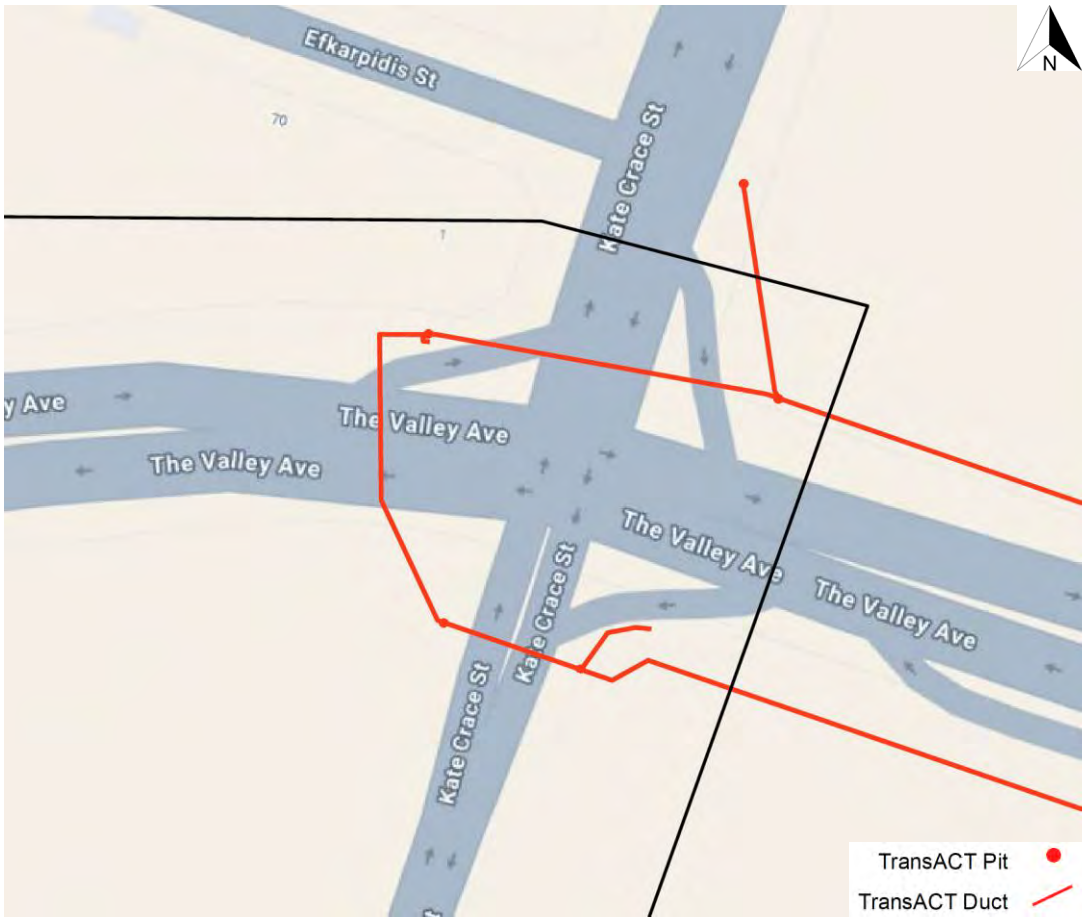


Figure 39 – TPG Telecom DBYD Information Near the Subject Site (TPG, 2024)

Figure 40 – TPG Pit in West Verge of Kate Crace Street North East of the Site

7.7 Gas Supply

BYDA information indicates that a DN50 210kPa nylon distribution gas main runs within the east and west verges of Kate Crace Street, to the east of the site. The main that is within the east verge of Kate Crace Street, terminates approximately 16m north of the site.

There is another DN50 210kPa nylon distribution gas main in the northern verge of Camilleri Way, which crosses Kate Crace Street and continues to the east.

The subject site does not have a gas service tie.

For a visual representation of this gas main and services locations in proximity to the subject site, refer to Figure 41 below, which is an excerpt from the BYDA information.

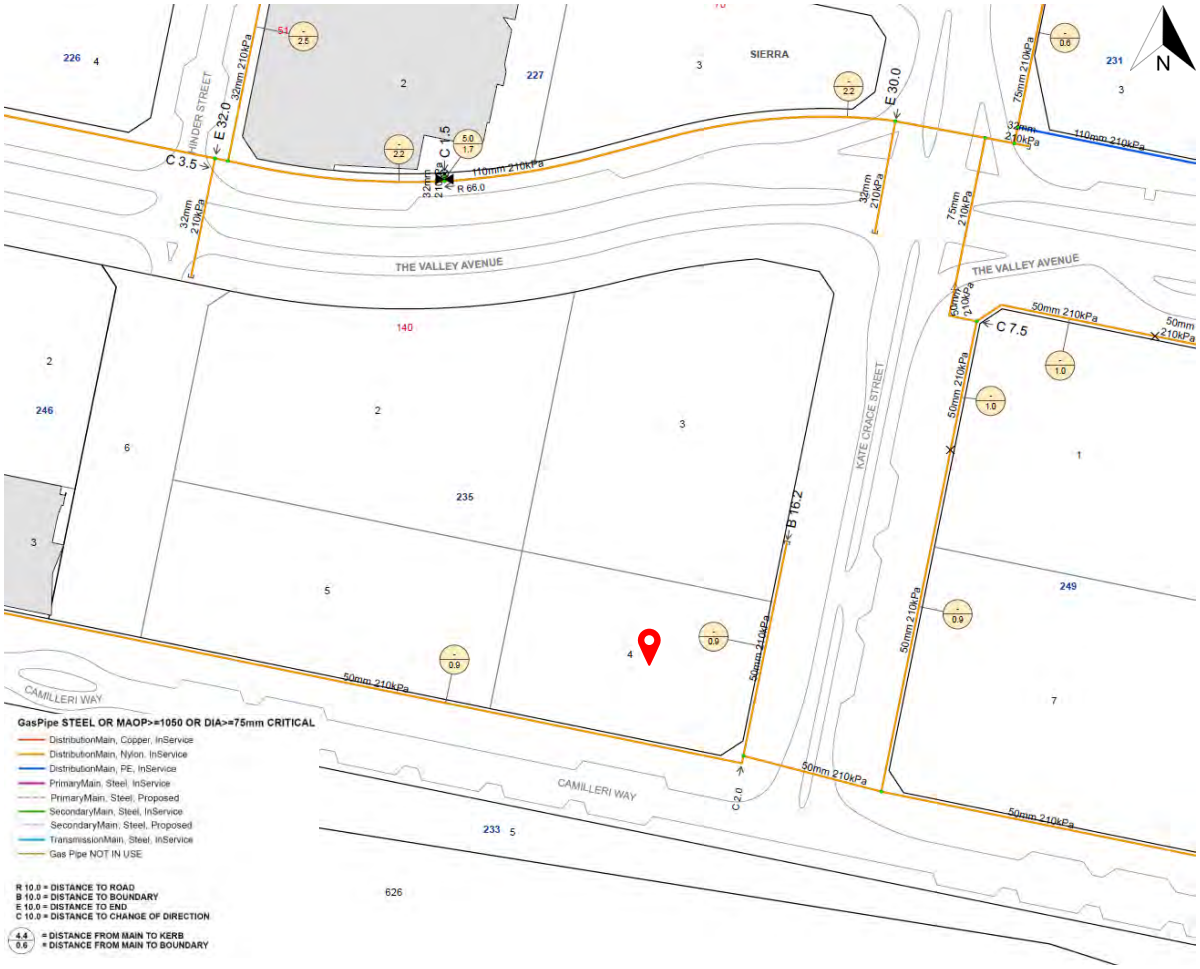


Figure 41 – Gas BYDA Information in Proximity of the Subject Site (Evoenergy, 2024)

7.8 Electrical Supply and Streetlighting

Information received from Evoenergy and TCCS through BYDA was confirmed through a visual site inspection. The electrical infrastructure within the subject site and its immediate vicinity has been therefore comprehensively identified as follows:

- Streetlights and associated underground infrastructure are present within the northern and southern verges of Camilleri Way. These streetlights are interspaced at between 68m and 78m. Refer to Figure 46 below for a photo of streetlights on Camilleri Way, south of the subject site.
- Branching from the underground electrical service in the southern verge of Camilleri Way, streetlights are situated along the shared path, which can be seen in Figure 43 below.
- Additional streetlight infrastructure is present within Kate Crace Street, with electrical lines and streetlights in the east and west verge. The spacing of these streetlights are between approximately 35m and 68m. See Figure 44 below for a streetlight in Kate Crace Street, adjacent the subject site.
- Extensive streetlight infrastructure is present within The Valley Avenue, with dual mast lights in the central median of the road. Figure 45 is an example of these streetlights, north of the site.

See Figure 42 below for the location of the abovementioned streetlight assets as provided by TCCS in BYDA information within the vicinity of the subject site.

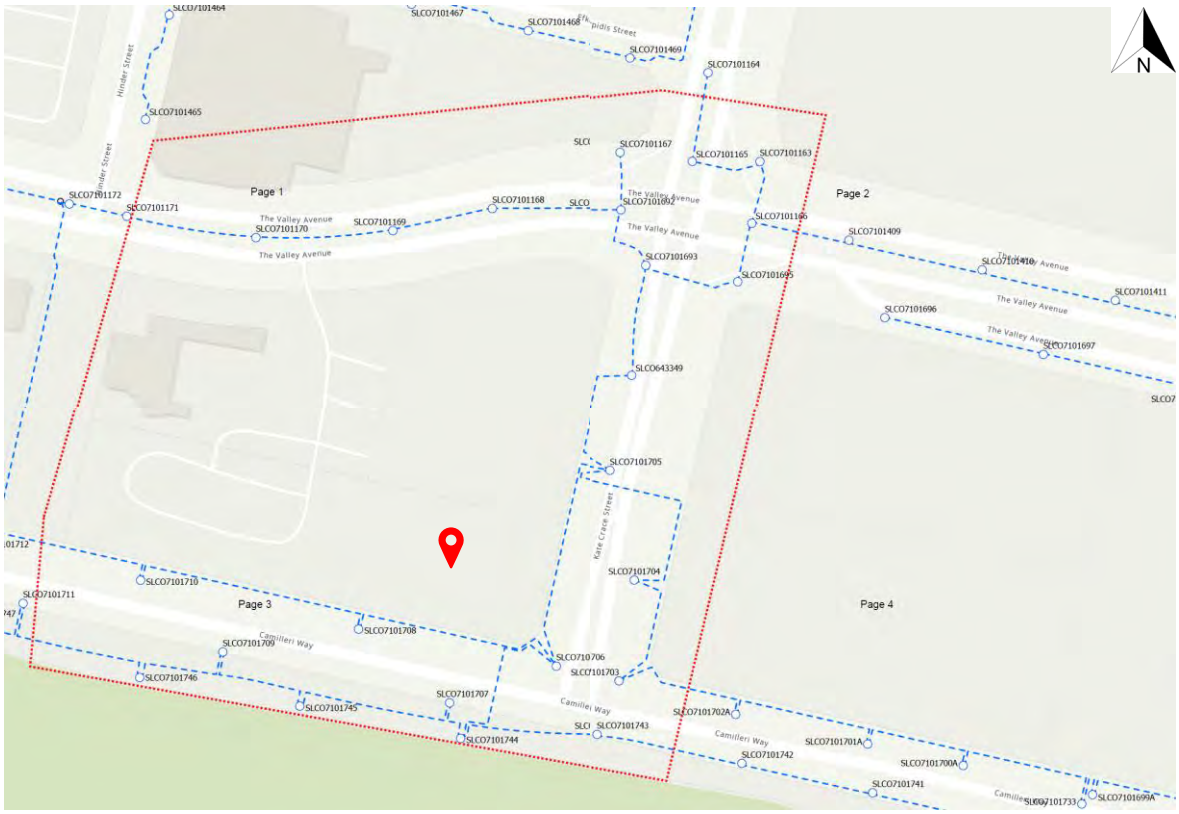


Figure 42 – Streetlight BYDA Information (TCCS, 2024)

Figure 43 – Streetlights along Shared Path South of the Site

Figure 44 – Streetlight in Kate Crace Street South East of Subject Site

Figure 45 – Dual Mast Streetlights in The Valley Avenue Central Median

Figure 46 – Streetlights on Camilleri Way

Based on DBYD information, information received from Evoenergy, and a visual site audit, the electrical infrastructure within and in close proximity to the subject site has been identified as follows:

- A high voltage (HV) substation (S 11554) is situated within Block 7 Section 249 Gungahlin, east of the subject site. Refer to Figure 48 below for a photo of this electrical substation.
- Underground HV lines run within the east verge of Kate Crace Street that terminate at the abovementioned substation.
- Underground HV lines are also situated in the northern verge of The Valley Avenue, further to the north of the site, to which the HV lines in Kate Crace Street connect to.
- A service point is not shown to the subject site.

Refer to Figure 47 for the electrical BYDA information, depicting HV lines in red dashed lines, LV underground lines in green dashed lines, and service lines shown in lighter green dashed lines for underground services.

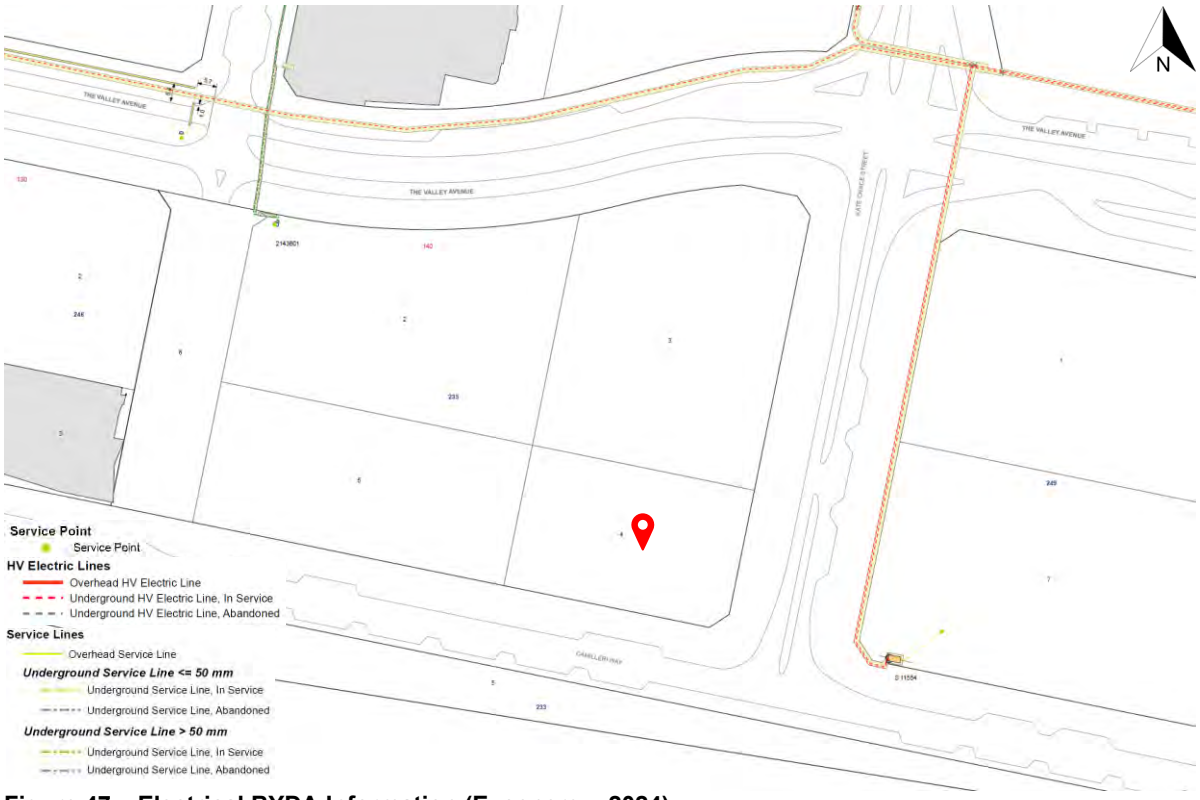


Figure 47 – Electrical BYDA Information (Evoenergy, 2024)

Figure 48 – Electrical Substation (S 11554) in South East Corner of Block 7 Section 249

7.9 Boundaries and Easements

A review of ACTmapi does not show any easements within the site's block boundary. No existing services or access ways have been identified that run through the subject site that would necessitate an easement.

A search on ACTmapi indicates that there are several survey markers in proximity of the site. These include a steel rod (SR) marker south east of the site in the Camilleri Way south verge (SR-1790).

There are also coordinated reference markers (CRM) on kerbs on The Valley Avenue, north of the site and on Camilleri Way, south west of the site. See Figure 49 below for a photo of the CRM kerb survey marker on The Valley Avenue.

Refer to Figure 49 for an extracted image from ACTmapi showing the location of this and other nearby survey markers and easements that are situated surrounding the site.

Figure 49 – Existing Survey Markers and Easements Surrounding the Site (ACTmapi, 2024)

Figure 50 – Kerb Survey Marker on The Valley Avenue (CRM11556)

7.10 Transport

7.10.1 Traffic and Vehicular Access

The subject site is surrounded by Kate Crace Street to the east, Camilleri Way to the south, and The Valley Avenue further to the north. Kate Crace Street, for the section that is south of The Valley Avenue, adjacent the site, is not signposted and therefore assumed to be 50km/h. This section of Kate Crace Street is separated by a central concrete median and has three double on street parking bays in the eastern carriageway. The intersection of Kate Crace Street with The Valley Avenue is signalised. See Figure 53 for a general perspective view of Kate Crace Street adjacent to the site and Figure 54 for a photo of the Kate Crace and The Valley Avenue signalised intersection.

Camilleri Way is also not signposted, but the entrance to the road from Gungahlin Place, further to the east of the site is signposted as 60km/h. Camilleri Way is a two lane road with indented on street parking bays along the length in the northern and southern verges. Refer to Figure 52 and Figure 56 for a general view of Camilleri Way looking west and east from the site, respectively.

The Valley Avenue is a dual single lane carriageway road, separated by a grassed central median. On road cycle lanes and some indented on street parking bays are also on The Valley Avenue, with the operating speed signposted as 60km/h. The section of The Valley Avenue to the north east of the site also has a service lane to the south to provide direct access to future developments in Section 249 Gungahlin. Figure 57 gives a general perspective of The Valley Avenue looking west from the Kate Crace intersection.

The subject site does not have a formal access to either Kate Crace Street or Camilleri Way. It is assumed that the preferred access to the site will be from Camilleri Way, as this would provide full turn movement access in and out of the site. An access gate to the site was noted near the south west corner of the block as can be seen in Figure 58 below.

A comprehensive traffic assessment will be necessary to evaluate the potential impact on the surrounding public road network once the development details and connection arrangements are established.

Based on the Active Travel Infrastructure Practitioner Tool (refer to Figure 51 for an excerpt), a summary of the classifications of roads within the vicinity of the site were reviewed. The road geometry requirements for each of these classifications, with the exception of 'arterial road' is provided within the Estate Development Code (2020). TCCS standard MIS 01 'Street Planning and Design' provides guidance on functional road classifications based on traffic volumes, whilst MIS 06 Verges provides guidance on verge widths. These MIS documents were referred to in confirming the road classifications provided in Table 1 below, which differs to that presented in the Active Travel Infrastructure Practitioner Tool map below.

Table 1 – Road Traffic Classification

Road Name	Classification
Camilleri Way	Minor Collector
Kate Crace Street (south)	Access Street B
The Valley Avenue	Major Collector

Figure 51 – Extract from the Active Travel Infrastructure Practitioner Tool (2024)

Figure 52 – Camilleri Way Looking West

Figure 53 – Kate Crace Street Looking North

Figure 54 – Intersection of Kate Crace Street and The Valley Avenue Looking North East

Figure 55 – Access gate to Block 3 Section 235

Figure 56 –Camilleri Way Looking East

Figure 57 – The Valley Avenue Looking West from Kate Crace Street Intersection

Figure 58 – Access Gate to the Subject Site off Camilleri Way

TCCS was consulted to obtain their Canberra Strategic Transport Model (CSTM) outputs with assumed turn movements for the AM and PM travel peak periods in the 2026, 2031 and 2041 forecast scenarios. These outputs are provided in Figure 59 to Figure 64 below. From these maps, it can be seen that all roads in the immediate vicinity of the subject site, show peak hour traffic volumes that are within each respective roads' capacity in both the 2026, 2031 and 2041 morning and afternoon peak periods.

Camilleri Way is projected to have an eastbound traffic volume of 237 vehicles per hour (vph) during the 2026 morning peak hour, which is within 45% of the road's geometric capacity. This critical morning peak hour traffic increases slightly to 248 vph in 2031 but decreases to 186 vph by 2041. Similarly, The Valley Avenue experiences its highest traffic volumes during the morning peak hour, particularly in the eastbound lane of the section east of Kate Crace Street. In contrast, the traffic volume west of Kate Crace Street on The Valley Avenue is consistently lower in the forecast years.

For the 2026 morning peak hour, the eastbound traffic on The Valley Avenue east of Kate Crace Street is projected to be 517 vph. This increases marginally to 526 vph by 2031. Despite this high volume, the lane is still operating within 85% of its capacity. By 2041, the eastbound traffic volume is projected to reduce to 455 vph, which is within 70% of the road's capacity.

The consistent reduction in traffic from 2031 to 2041 in the road network surrounding the site may be attributed to an anticipated higher reliance on public transport, such as the nearby light rail and bus services within the town centre.

For the section of Kate Crace Street that is south of The Valley Avenue, east of the site, traffic volumes are not shown in the CSTM. However, this section of Kate Crace Street is projected to operate within 25% of its geometric capacity across all forecast years.

MIS 03 'Pavement Design' stipulates that the average AM and PM peak hour traffic volumes represent between 10% and 12% of the average annual daily traffic. Therefore, for Camilleri Way, taking the most conservative scenario of 248 vph in the 2031 AM peak in a single direction, this would translate to approximately 2,480 vehicles per day (vpd), which is within the Minor Collector classification provided in MIS 01 of 1,001-3,000 vpd. A single direction is taken, as Camilleri Way is shown that there is no traffic westbound in the 2031 morning peak hour.

When examining the most trafficked section of The Valley Avenue, located northeast of the subject site, the traffic volume in the critical eastbound carriageway is 5,260 vpd in the 2031 PM peak. This volume falls within the Major Collector classification range in MIS 01, which is 3,001-6,000 vpd. The Valley Avenue is separated into two single lane carriageways, providing sufficient capacity to accommodate this traffic flow. The section of Kate Crace Street that is south of The Valley Avenue does not have specified traffic volume numbers; however, it can be safely assumed that this section falls under an Access Street B category of 0-1,000 vpd. Nevertheless, the road's geometry suggests that it would be more appropriately classified as a Minor Collector as stipulated in MIS 01.

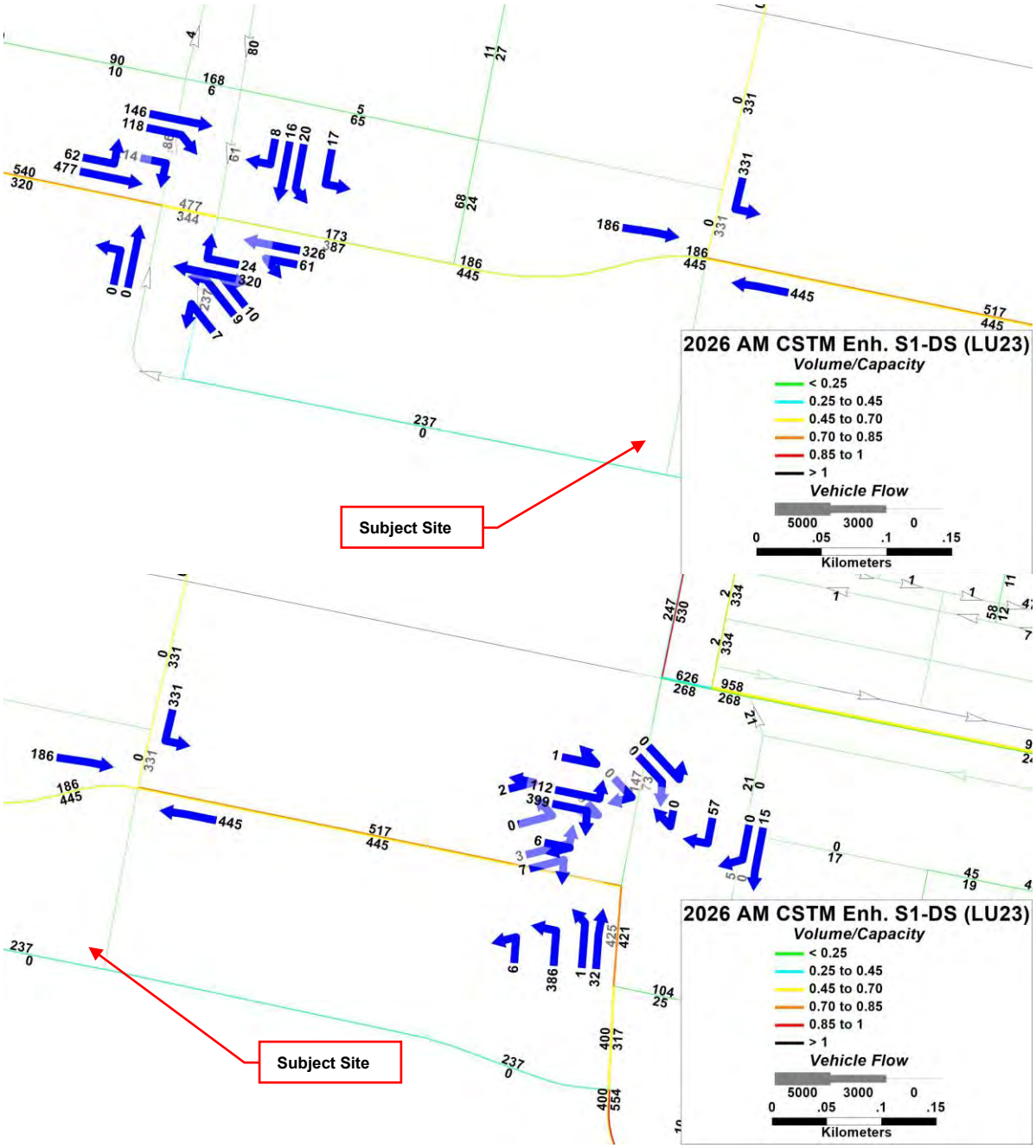


Figure 59 – CSTM Modelling – 2026 AM Peak Volumes (TCCS, 2024)

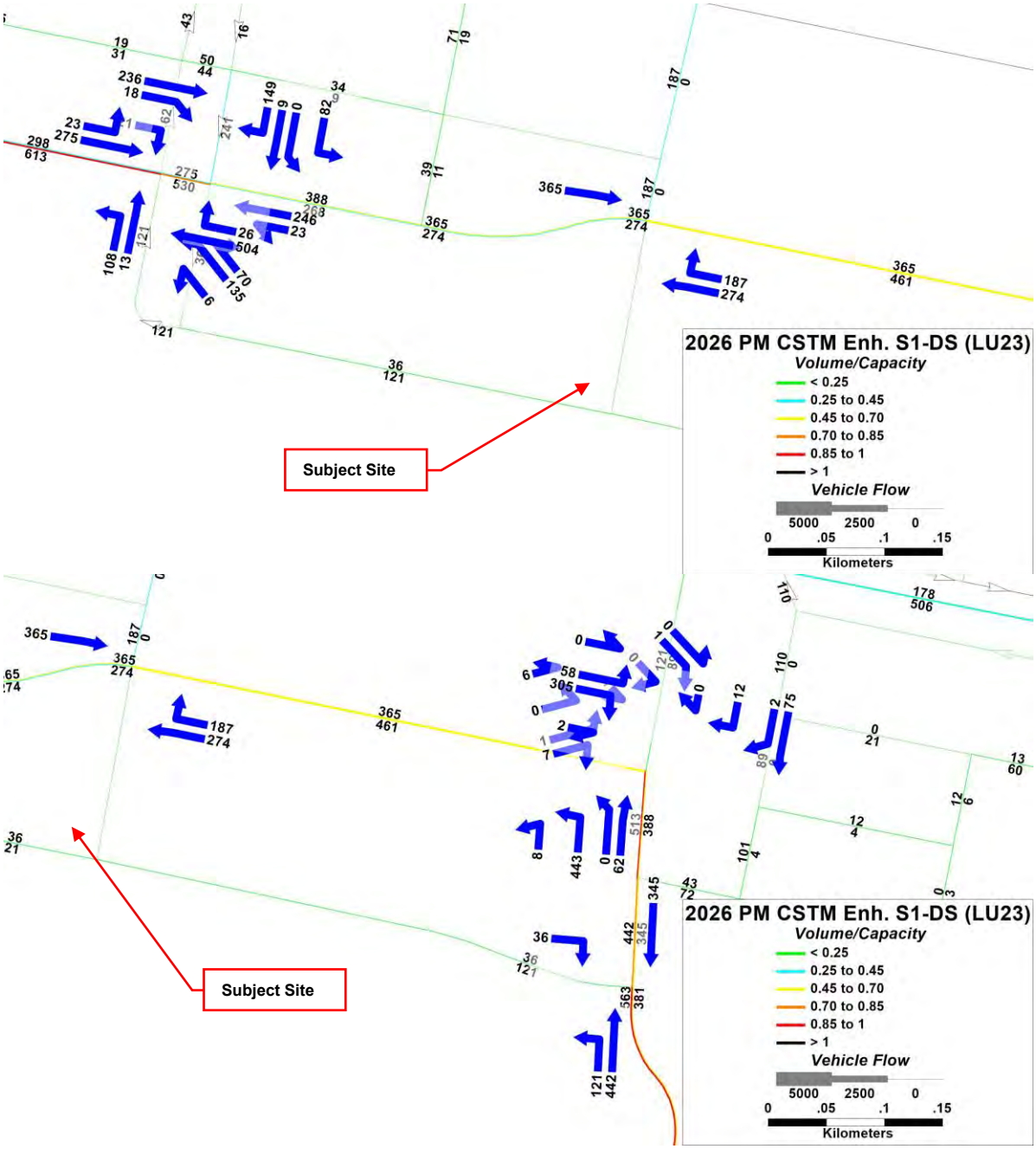


Figure 60 – CSTM Modelling – 2026 PM Peak Volumes (TCCS, 2024)

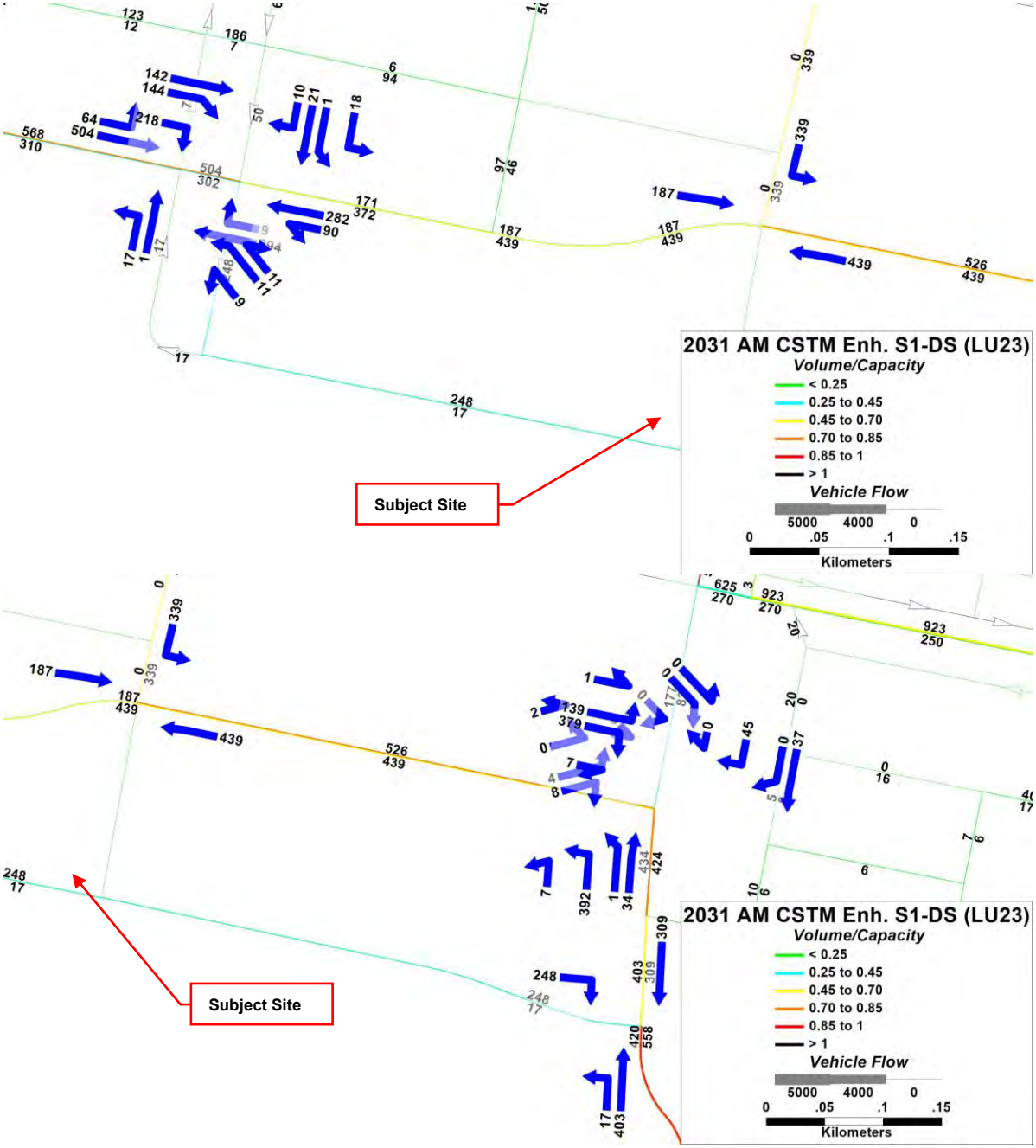


Figure 61 – CSTM Modelling – 2031 AM Peak Volumes (TCCS, 2024)

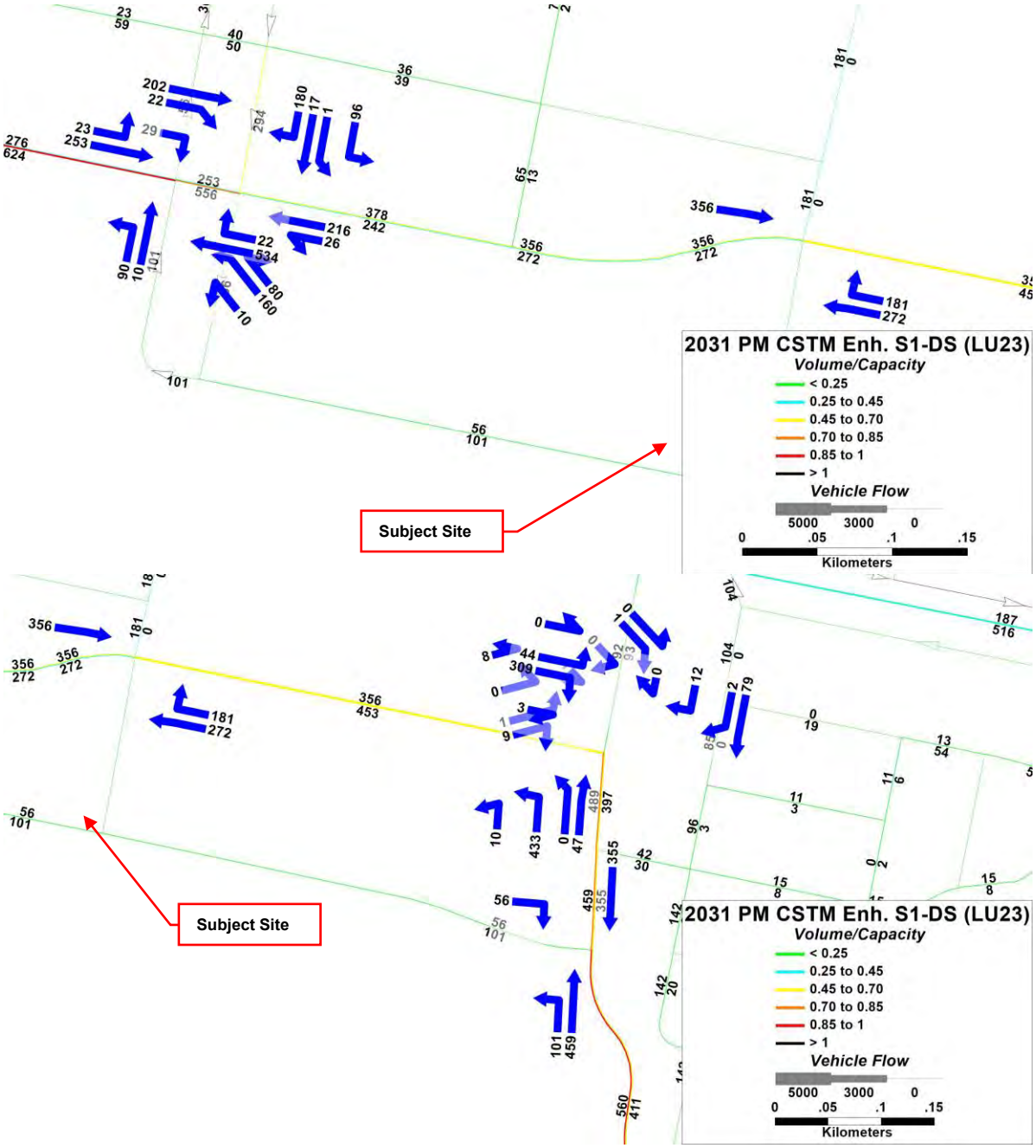


Figure 62 – CSTM Modelling – 2031 PM Peak Volumes (TCCS, 2024)

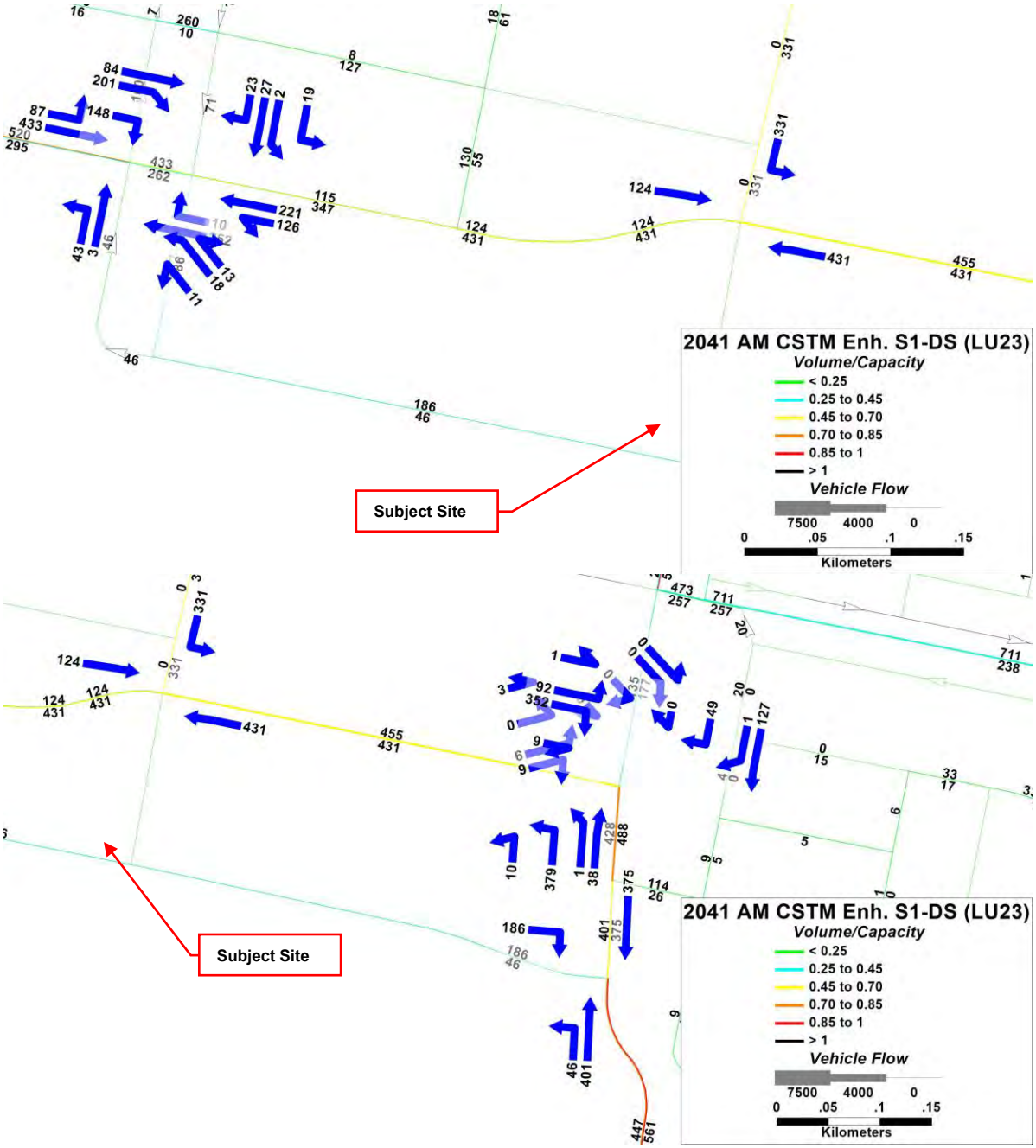


Figure 63 – CSTM Modelling – 2041 AM Peak Volumes (TCCS, 2024)

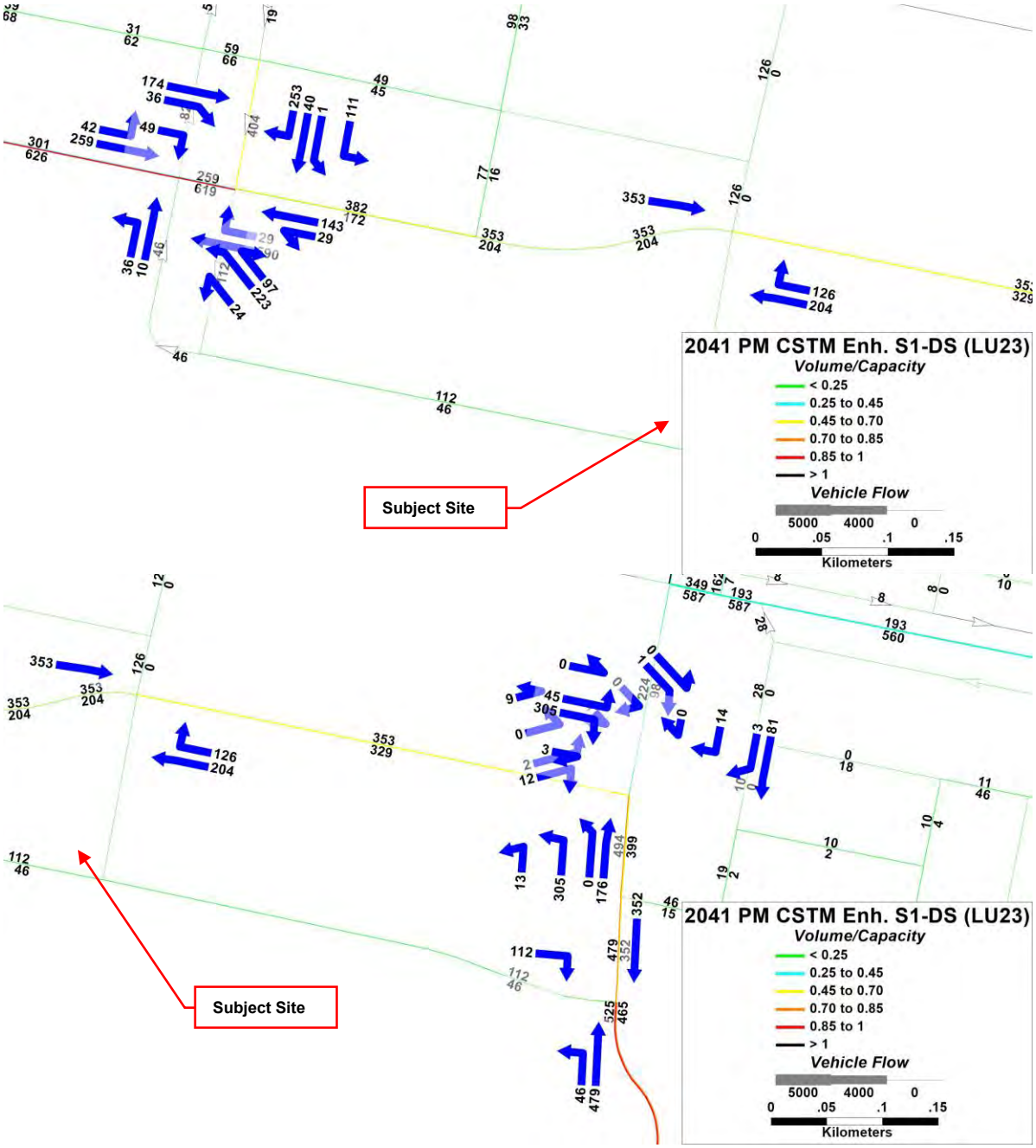


Figure 64 – CSTM Modelling – 2041 PM Peak Volumes (TCCS, 2024)

The demographics and associated populations assumed for the local area that is applied to the Canberra Strategic Transport Model (CSTM) was provided by ACT Government TCCS and is detailed in Figure 65 and Table 2 below. The data confirms that the site is located in an area (CSTM Zone 020727) that is a mix of residential, employment, and retail space. To understand the broader demographic changes over the forecast years, the entire Gungahlin Town Centre numbers are provided in Table 2. Residential population numbers show a steady increase over the years, with 42 in 2026, rising to 51 in 2031, and further increasing to 68 by 2041. Employment also sees a rise, from 1,089 in 2026 to 1,291 in 2031, with a more pronounced increase to 1,734 by 2041. Retail space, measured in square meters, shows consistent growth from 2,455m^2 in 2026 to 3,144m^2 in 2031, reaching 3,809m^2 by 2041. School enrolment numbers in nearby zones (Gungahlin College) shows an increase from 1,420 in 2026 to 1,598 in 2031, which maintains at the same number by 2041.

Table 2 – CSTM Assumed Demographic Data (TCCS, 2024)

SUBURB	CSTM ZONE ID	POPULATION			EMPLOYMENT			RETAIL SPACE			SCHOOL ENROLMENT		
		2026	2031	2041	2026	2031	2041	2026	2031	2041	2026	2031	2041
Gungahlin	020701	876	1,072	1,428	75	89	120	1,953	2,503	3,030	-	-	-
Gungahlin	020702	748	915	1,219	77	91	122	-	-	-	-	-	-
Gungahlin	020703	614	750	1,000	19	22	30	1,884	2,414	2,922	-	-	-
Gungahlin	020704	1,844	2,256	3,007	30	36	48	12,326	15,798	19,123	-	-	-
Gungahlin	020705	921	1,126	1,501	56	66	89	2,718	3,484	4,218	-	-	-
Gungahlin	020706	731	894	1,191	80	95	127	-	-	-	-	-	-
Gungahlin	020707	-	-	-	572	678	912	40,456	51,850	62,765	-	-	-
Gungahlin	020708	-	-	-	-	-	-	12,173	15,601	18,885	-	-	-
Gungahlin	020709	12	15	20	399	473	636	20,745	26,587	32,185	-	-	-
Gungahlin	020710	641	784	1,045	63	75	101	-	-	-	-	-	-
Gungahlin	020711	171	209	279	23	27	36	-	-	-	-	-	-
Gungahlin	020712	-	-	-	4	5	6	6,504	8,333	10,089	-	-	-
Gungahlin	020713	273	334	445	74	88	118	-	-	-	-	-	-
Gungahlin	020714	-	-	-	-	-	-	-	-	-	-	-	-
Gungahlin	020715	70	86	115	34	40	53	-	-	-	-	-	-
Gungahlin	020716	-	-	-	238	282	379	6,154	6,154	6,154	1,278	1,437	1,437
Gungahlin	020717	-	-	-	741	878	1,180	-	-	-	-	-	-
Gungahlin	020718	228	279	372	29	34	46	22,310	28,592	34,612	-	-	-
Gungahlin	020719	352	431	574	31	37	49	-	-	-	-	-	-
Gungahlin	020720	-	-	-	1,460	1,731	2,326	19,987	25,615	31,008	-	-	-
Gungahlin	020721	-	-	-	-	-	-	-	-	-	-	-	-
Gungahlin	020722	205	250	333	24	28	38	-	-	-	-	-	-
Gungahlin	020723	-	-	-	-	-	-	-	-	-	-	-	-
Gungahlin	020724	360	441	588	21	24	33	-	-	-	-	-	-
Gungahlin	020725	-	-	-	7	9	12	-	-	-	-	-	-
Gungahlin	020726	-	-	-	-	-	-	-	-	-	1,420	1,598	1,598
Gungahlin	**020727**	**42**	**51**	**68**	**1,089**	**1,291**	**1,734**	**2,455**	**3,144**	**3,809**	**-**	**-**	**-**
Gungahlin	020728	63	77	102	55	65	87	-	-	-	-	-	-

Figure 65 – Canberra Strategic Transport Model (CSTM) Zone ID (TCCS, 2024)

7.10.2 Parking

Car parking is extensively available around the Gungahlin Town Centre as off street and on street public parking. This is mainly supplied within Section 228 and Section 232 Gungahlin, together with indented on street parking, particularly around the subject site. A breakdown of the existing car park spaces by their category are listed below:

- 3 on street spaces directly south of the site in the northern Camilleri Way verge.
- 4 on street parking bays south of the site in the southern Camilleri Way verge for the extent of the site.
- 2 on street parking bays east of the site in the eastern Kate Crace Street verge.
- Several additional indented on street parallel parking bays are in the east verge of Kate Crace Street and southern verge of Camilleri Way.

Within 100m of the site, there are 31 on street indented parking spaces. All of these parking bays were noted to be signposted as 2-hour parking. The photo in Figure 68 shows existing on street car parking bays on Camilleri Way, whilst Figure 67 shows an example of a 2-hour parking sign on Camilleri Way, south of the site.

Any development proposed on the site that could potentially generate traffic will be assessed in accordance with TCCS requirements (Transport Canberra and City Services).

The Planning (Commercial Zones) Technical Specifications 2024 (effective: 20 March 2024) establishes parking generation rates, considering the site's location and intended uses. For residential use development, the parking provision rates are as applicable to a residential zone, which are:

- One parking space per single bedroom dwelling; and
- A minimum average provision of 1.5 spaces per two bedroom dwelling, provided that each two bedroom dwelling is allocated a minimum of one parking space and a maximum of two parking spaces; or
- Two parking spaces per two bedroom dwelling; and

- Two parking spaces for each dwelling with three or more bedrooms; plus
- One visitor space per four dwellings or part thereof where a complex comprises four or more dwellings.

The Planning (Commercial Zones) Technical Specifications stipulates that the location of long stay, short stay and operational parking are as follows for a residential development in a commercial zone:

- Long stay parking – On-site
- Short stay parking – On-site or within 100m
- Operational parking – On-site
- Visitor parking – On-site or within 100m

Under the Planning (Residential Zones) Technical Specifications, the following requirements apply for parking spaces designated for motorcycles and motor scooters:

- Three dedicated spaces per 100 car parking spaces are necessary, with at least one space mandated for car parks containing a minimum of 30 car parking spaces.
- These provisions must be in addition to the required number of car parking spaces. Compliance with AS 2890 standards (both part 1 - Off-street and part 5 - On-street) is essential for the provision of motorcycle parking spaces.

Also, in line with the Technical Specification, for public car parks containing more than 10 spaces, parking spaces designated for people with disabilities must constitute a minimum of 3% (rounded up to the nearest whole number) of the total number of parking spaces required for the development.

In accordance with Clause 22.1 of the Commercial Zones Technical Specifications, electric vehicle ready parking only needs to be provided to at least 1 for each unit in a new multi-unit housing development or 20% of non-residential parking spaces in new commercial developments.

The design of the proposed parking layout and its associated geometrical dimensions on the site must adhere to Australian Standard AS2890.1, with disability parking conforming to AS2890.6.

Any proposed use of existing parking surrounding the subject site needs to be agreed with TCCS.

A parking study of the Gungahlin Town Centre was conducted on 8 June 2023 by Trans Traffic Survey, who were engaged by TCCS. **Please note that the data in this study is confidential and intended for the use of the ACT Government only.**

The parking assessment aimed to determine the average and maximum occupancy rates of available parking during the study period. As part of this study, both on street parking and available public parking bays were assessed. The Town Centre was divided into various precincts for the parking assessment. A map of these areas is provided in Figure 66 below.

Based on the defined precinct locations, the available parking supply, average occupancy percentage and maximum occupancy percentages were determined to be as outlined in Table 3.

Figure 66 – Car Parking Study Precinct Areas (Trans Traffic Survey, 2023)

Table 3 – Parking Supply Summary (Trans Traffic Survey, 2023)

Location	Supply	Average Occupancy (%)	Maximum Occupancy (%)
Anthony Rolfe Ave	6	68.2%	100.0%
Boon Ln	0	0.0%	0.0%
Crinigan Cir	65	26.6%	52.3%
Delma View	55	8.4%	12.7%
Efkarpidis St	39	38.7%	53.8%
Ernest Cavanagh St	29	44.8%	69.0%
Franz Bormann Cl	32	27.6%	34.4%
Fussell Ln	4	0.0%	0.0%
G10	140	74.8%	95.7%
G11	585	65.4%	83.2%
G12	238	63.7%	86.1%
G13	177	23.8%	40.7%
G15	343	70.7%	98.8%
G16	102	65.0%	96.1%
G2	208	62.6%	97.6%
G3	83	62.5%	88.0%
G4	278	49.0%	65.1%
G5	51	68.4%	80.4%
G6	238	62.2%	99.6%
G7	526	44.5%	68.8%
G8	731	30.0%	45.0%
G9	346	74.3%	99.1%
Ginn St	3	0.0%	0.0%
Gozzard St	12	23.5%	50.0%
Gribble St	1	0.0%	0.0%
Gundaroo Dr	0	0.0%	0.0%
Gungahlin Dr	0	0.0%	0.0%
Gungahlin Pl	36	42.7%	61.1%
Hibberson St	106	42.1%	54.7%
Hinder St	67	57.3%	74.6%
Kate Crace St	3	18.2%	66.7%
O'Brien Pl	33	54.5%	78.8%
The Valley Ave	8	9.1%	37.5%
The Valley Ave Service Ln	6	12.1%	33.3%
Warwick St	24	4.2%	12.5%

Figure 67 – 2 Hour Parking Sign on Camilleri Way

Figure 68 – Camilleri Way On Street Car Parking

7.10.3 Pedestrian and Cycle Access

A concrete footpath, approximately 2.5m wide, runs along the east and west verges of Kate Crace Street, to the east of the site. This footpath ensures connectivity within the area to the town centre and accommodates both pedestrians and cyclists. See below Figure 74 for a photo of the path in the west verge of Kate Crace Street.

Additionally, a concrete footpath, also approximately 2.5m wide, is situated in the northern verge of Camilleri Way, facilitating pedestrian movement along this route. Refer to Figure 70 for a photo of this path adjacent the subject site.

On the southern verge of Camilleri Way, a 3.0m wide asphaltic shared path is available, which caters to both pedestrian and bicycle traffic. Figure 72 shows a photo of this shared path. A path connection across Camilleri Way is present near the south east corner of the site, linking directly to the shared path, enhancing accessibility. These path connections can be seen in Figure 71 and Figure 73 below.

Furthermore, a concrete footpath, approximately 2.0m wide, is provided in the southern verge of The Valley Avenue, east of Kate Crace Street. Similarly, the northern verge of The Valley Avenue, east of Kate Crace Street, features a concrete path, approximately 2.5m wide.

An excerpt from the CBR Cycle Routes map in Figure 69, published by ACT Government Transport Canberra, illustrates the shared path on the southern verge of Camilleri Way. This shared path is classified as a local route, which provides connectivity to the on road cycle lanes along The Valley Avenue and Manning Clarke Crescent, located to the east of the site. Further to the west, the local shared path route extends through Delma View, continuing as an on road link and eventually connecting to the principal route, C1. Route C1 is a significant cycling route that connects the Gungahlin Town Centre to the City and stretches as far north as Taylor, ensuring an extensive network for pedestrians and cyclists in the region.

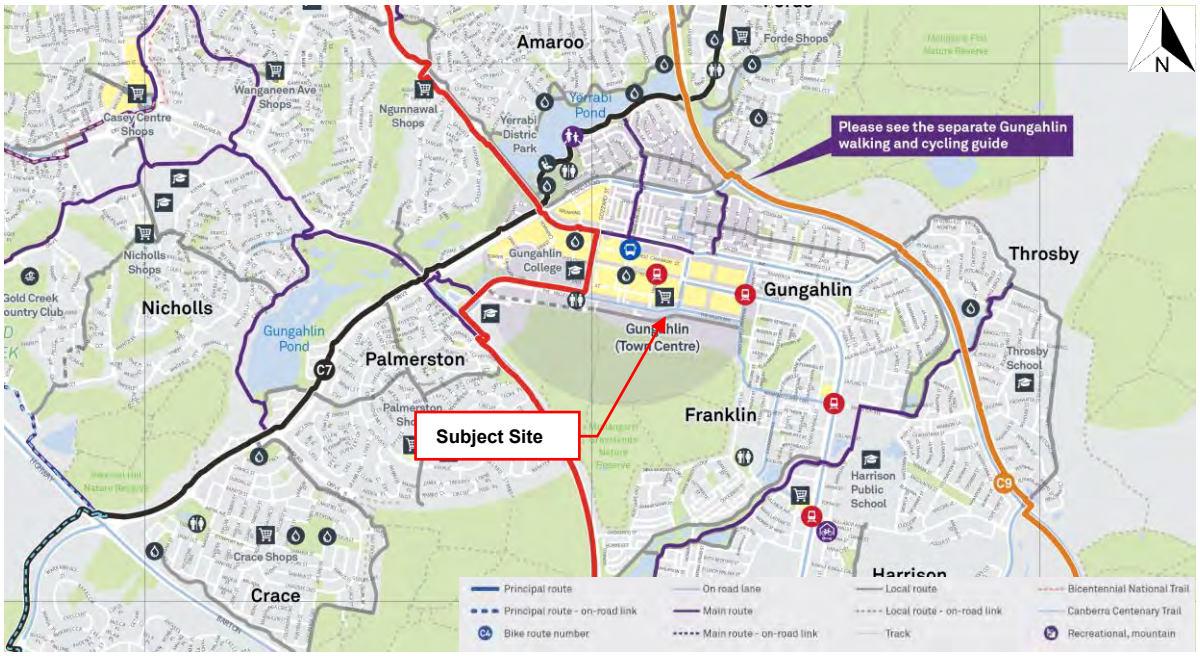


Figure 69 – CBR Cycle Routes (Transport Canberra, 2024)

Figure 70 – Footpath in Northern Verge of Camilleri Way

Figure 71 – Footpath South of Site in Camilleri Way

Figure 72 – Shared Path in Southern Verge of Camilleri Way

Figure 73 – Footpath Connections Looking Toward South East Corner of Site

Figure 74 – Footpath in West Kate Crace Street Verge

7.10.4 Transport Canberra and Bus Servicing

The subject site is located adjacent to the Gungahlin Town Centre, therefore there are a number of Transport Canberra bus stops in close proximity to the subject site within The Valley Avenue and Flemington Road.

The Gungahlin Interchange is also located nearby the subject site. There are several bus and light rail routes that service the area. These routes are:

- R1, which is a light rail route and services between Gungahlin Place to Alinga Street.
- Bus No. 21, which services between Gungahlin Place, Gungahlin, Palmerston, Franklin, Harrison, and Throsby.
- Bus No. 22, which services between Gungahlin Place, Throsby, Harrison, Franklin, Palmerston, and Gungahlin.
- Bus No. 23, which services between Gungahlin Place, Palmerston, Crace, Giralang, Kaleen, and Belconnen Town Centre.
- Bus No. 24, which services between Gungahlin Place, Nicholls, William Webb Drive, Evatt, and Belconnen Town Centre.
- Bus No. 18, which services between Gungahlin Place, Franklin, Harrison, Mitchell, and Dickson Interchange.

Bicycle cages and Park and Ride facilities are also available near the Gungahlin Interchange. These facilities are located north west of the subject site.

Refer to Figure 75 for an excerpt from the Transport Canberra bus route map showing these bus and light rail routes in relation to the subject site. Figure 76 and Figure 77 show photographs of bus stops on The Valley Avenue to the north west of the subject site.

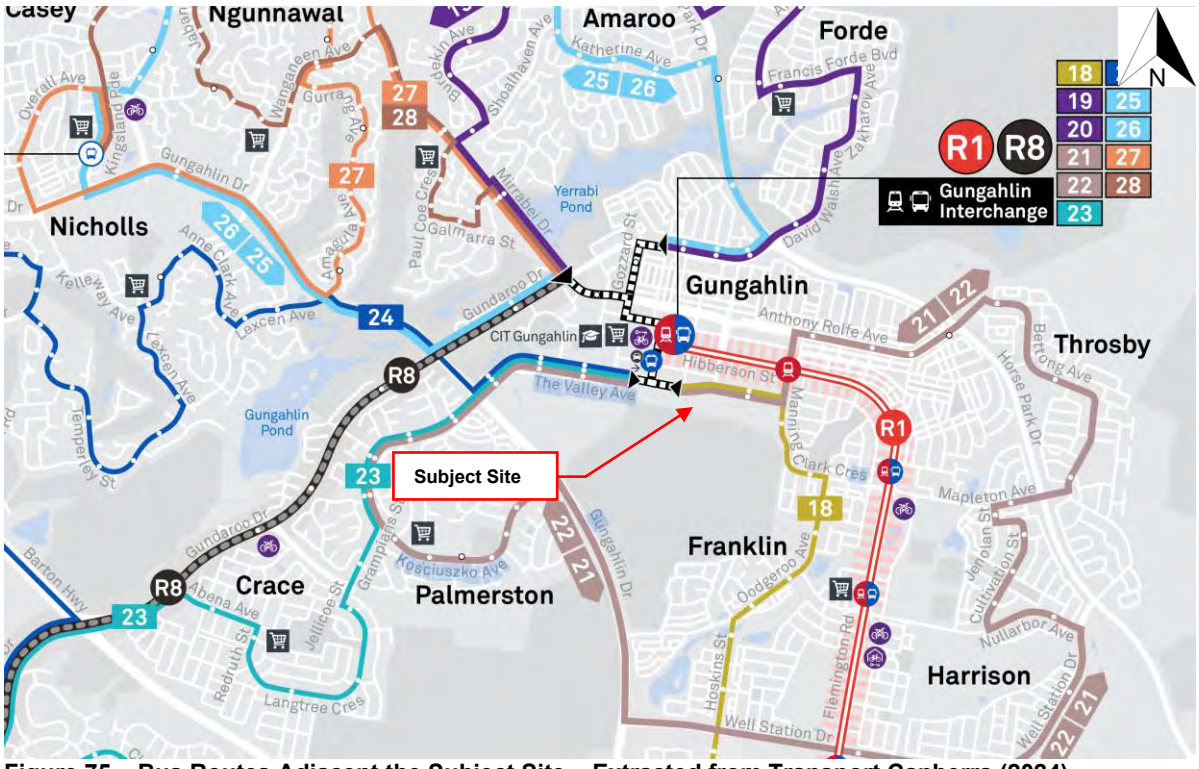


Figure 75 – Bus Routes Adjacent the Subject Site – Extracted from Transport Canberra (2024)

Figure 76 – Bus Rest and Stop Shelter on The Valley Avenue North East of the Subject Site

Figure 77 –Bus Stop on The Valley Avenue North East of the Site

7.11 Specialist Investigations

7.11.1 Heritage

A heritage assessment was not completed as part of this Site Investigation Report. However, reference was made to the ACTmapi database and the ACT Heritage Register located on the ACT Government Environment and Sustainable Development website (https://www.environment.act.gov.au/heritage/heritage_register/register-by-place).

ACTmapi mapping shows that there are final registered heritage values (Aboriginal quarry sites) in the Mulanggari Grasslands, to the south of the site, which can be seen in the below extract in Figure 78.

To validate the information sourced from ACTmapi and previous estate EDP heritage studies presented in Section 6.4 of this report, the ACT Heritage Council was consulted. The ACT Heritage Council advised that the review of the ACT Heritage Register confirms that the subject site does not contain any nominated or registered heritage places, nor any Aboriginal places or objects. However, the Council noted that there are registered Aboriginal places (Chert Quarries) located in nearby blocks opposite Camilleri Way. These sites are located more than 500 meters from the subject site and are unlikely to be encroached upon by any future development in Block 4 Section 235 Gungahlin.

The ACT Heritage Council advised that an inspection of historic aerial imagery indicates that since 2018, Block 4 Section 235 Gungahlin has been subject to widespread clearing and disturbance through earthworks and the ongoing urban development of the surrounding blocks. This activity has effectively reduced the archaeological potential of the site. Following their review, the ACT Heritage Council advised that there are no heritage constraints for future development within Block 4 Section 235 Gungahlin. Therefore, no further Council advice is required, subject to the condition that in the event that any unexpected Aboriginal places or objects are encountered during future construction works within Block 4 Section 235 Gungahlin, construction is to cease to allow for heritage assessment and management in accordance with Section 75 of the Heritage Act 2004. The discovery is to be reported to the Council within five working days, in accordance with Section 51 of the Heritage Act 2004, and managed in accordance with further Council advice.

Refer to Appendix C for the detailed response from the ACT Heritage Council.

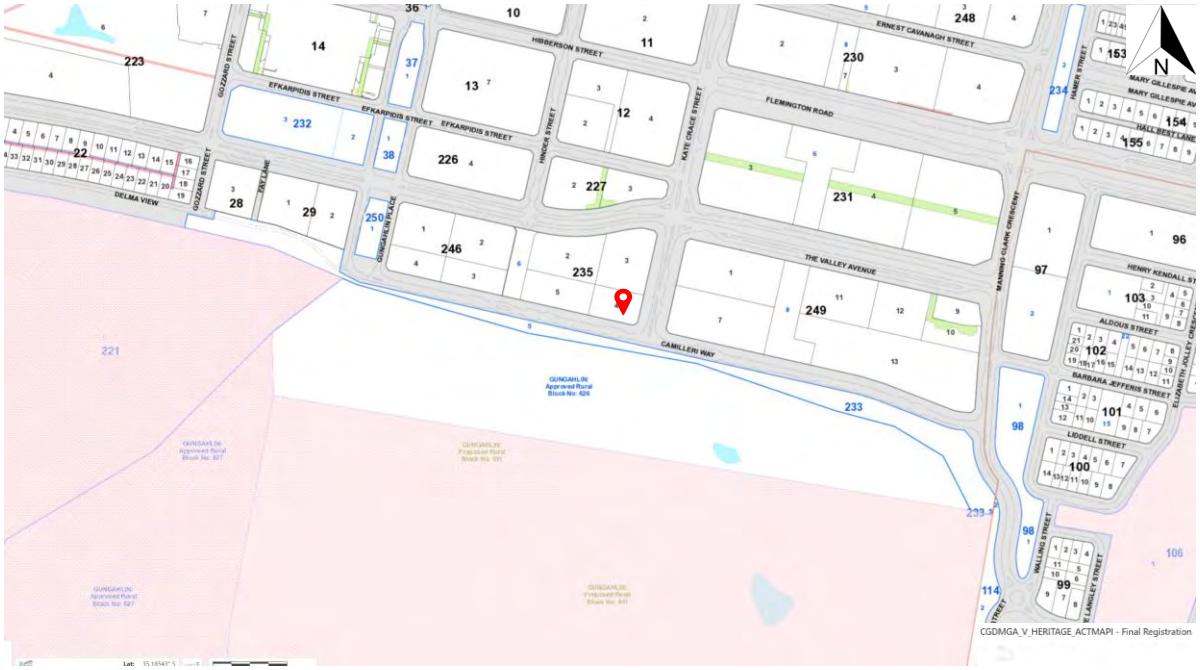


Figure 78 – Heritage Map (ACTmapi, 2024)

7.11.2 Ecological

Reviewing ACTmapi data indicates that there appears to be threatened habitat areas surrounding and within the subject site, showing up as Stiped Legless Lizard habitat. Refer to Figure 79 for an extract from ACTmapi that depicts this habitat area. It was also noted that potential threatened wood land and exotic/native grasslands are south of the site within the Mulanggari Grasslands as can be seen in Figure 80, further below.

The subject site is not within an Environmental Offset area.

The ACTmapi database shows that there are no registered trees within or in the immediate vicinity of the site.

The Conservator of Flora and Fauna were consulted to validate these findings and the advice received was that the block itself does not have any ecological values. However, when assessing the development proposal that is presented in Section 3 of this report, the Conservator also considers possible offsite impacts, noting that this site is adjacent to the Mulanggari Nature Reserve. The reserve supports populations of Striped Legless Lizard and Golden Sun Moth, as well as areas of Box Gum Woodland, a threatened ecological community. The Conservator of Flora and Fauna advised that shadowing of habitat can significantly impact the Striped Legless Lizard and Golden Sun Moth.

Based on this, the Conservator of Flora and Fauna requested modelling of the shadow cast by the proposed buildings to assess the level of impact on the values within the reserve and confirm whether an Environmental Significance Opinion (ESO) would be required. Hill Thalis subsequently undertook shadow modelling of the proposed development for various times during the winter solstice. This exercise indicated minimal shading in the reserve area, which can be seen in Figure 81 below. The outcome of the modelling was shared with the Conservator of Flora and Fauna, who advised that the modelling shows minimal impacts on Golden Sun Moth (GSM) and Striped Legless Lizard (SLL) habitat within the Mulanggari Nature Reserve, and therefore, an Environmental Significance Opinion (ESO) would not be triggered for this project.

Refer to Appendix C for the detailed response from the ACT Conservator of Flora and Fauna.

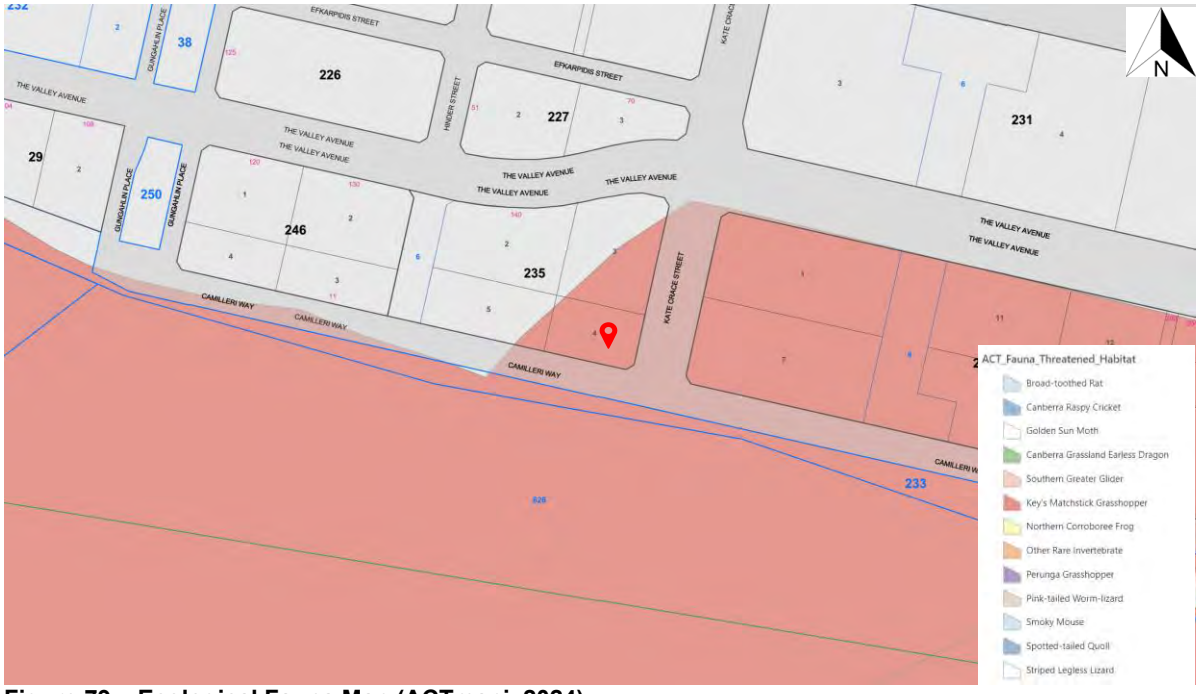


Figure 79 – Ecological Fauna Map (ACTmapi, 2024)

Figure 80 – Ecological Map (ACTmapi, 2024)

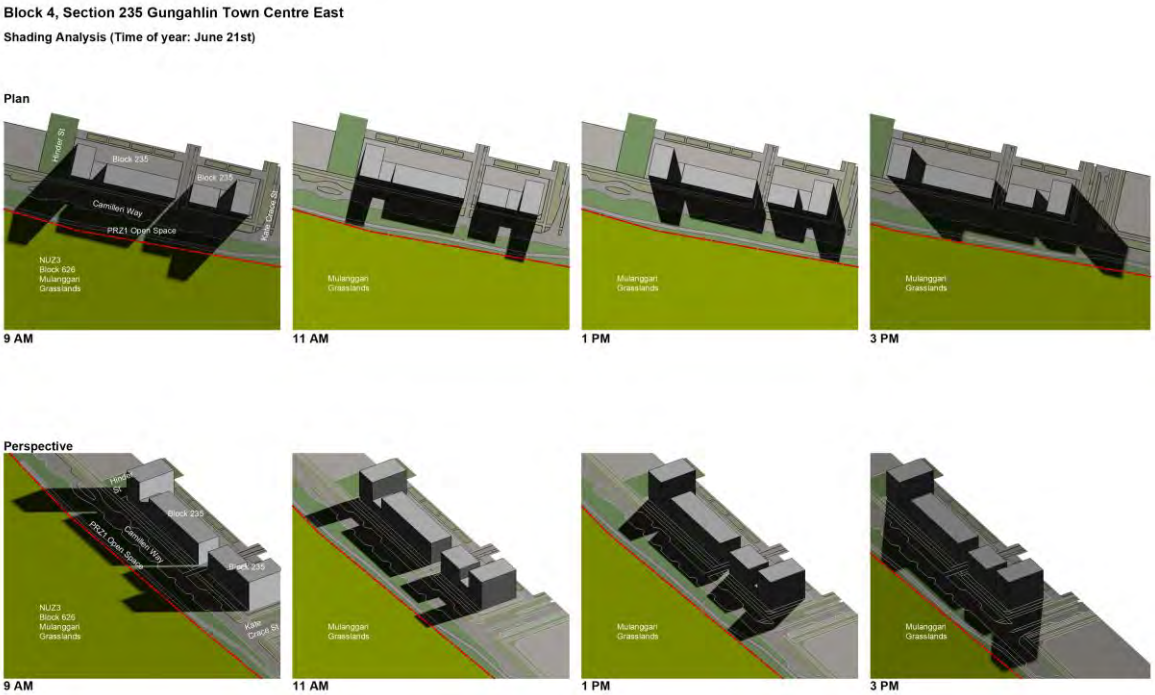


Figure 81 – Shadow Analysis on Block 4 Section 235 Gungahlin (Hill Thalis, 2024)

7.11.3 Environmental

A contaminated land search for the subject site was initiated to determine its respective contamination status with the ACT Environment Protection Authority (EPA). This was to gather an understanding of any potential development constraint on the site due to site contamination.

The EPA advised that the site's block is not recorded on the EPA's contaminated sites management database or geographic information system.

On 8 March 2012, the Environment Protection Authority (EPA) advised that they had reviewed the report titled 'Phase 2 Environmental Site Assessment for the Gungahlin Town Centre East Estate, ACT', which included the land now known as Gungahlin Section 235 Block 4. The report was dated 6 March 2012 and completed by Coffey Environments Pty Ltd. The EPA advised that they assessed the report and endorsed the consultant's findings that, based on the studies, the area subject to assessment in the above report is '...suitable for the land uses allowed under the Territory Plan...' subject to the following conditions:

- EPA advised that, prior to the commencement of redevelopment works at the site, the stockpile identified in the above report must be assessed by a suitably qualified environmental consultant for the purposes of beneficial reuse or waste disposal. No material from the stockpile is to be reused on or off-site or disposed of off-site without EPU approval.
- EPA advised that a site management plan incorporating an unexpected finds protocol must be prepared by a suitably qualified environmental consultant and endorsed by the EPA prior to the commencement of earthworks at the site.

The EPA advised that a site inspection carried out in June 2024 noted that development at the site had commenced.

The EPA has not issued any orders of assessment or remediation under sections 91C (1) or 91D (1) respectively, environment protection orders under sections 125 (2) or (3), requested an audit under section 76 (2) or received an audit notification under section 76A (1) of the Environment Protection Act 1997 (the Act) over the site and as a result the site is not recorded on the Register of contaminated sites under section 21A of the Act.

It's essential to note that the information provided is based on records maintained by the EPA and may not necessarily reflect the current condition of the site. The EPA currently possesses no data regarding contamination of the subject site, apart from what's detailed above. However, this should not be taken as an absolute guarantee that there is no contamination. To ensure complete assurance, the EPA recommended that independent tests are undertaken.

Refer to Appendix C for detailed correspondence with the ACT EPA on the subject site.

7.11.4 Bushfire

The current bushfire mapping listed on ACTmapi demonstrates that the subject site is within and in close proximity to a Bushfire Prone Area and Strategic Bushfire Management Zone. Refer to Figure 82 and Figure 83 for a bushfire prone area map and strategic bushfire management zone map, respectively, reproduced from ACTmapi in proximity to the subject site.

ACT Fire and Rescue were consulted and advised that the Fire Risk Type (FRT) in relation to this site and proposed development would be FRT3. This is consistent with Icon Water's Supplement to WSA Water Supply Code of Australia, where a Fire Risk Type of FRT3 is relevant to commercial land use and requires a flow rate of 60L/s for firefighting purposes. The minimum hydrant spacing in an FRT3 zone is at 60 metres along the mains, according to the Icon Water Supplement to WSA Water Supply Code of Australia. Additional advice from ACT Fire and Rescue suggests that the verification of the fire risk rating can be conducted during the development application stage, with particular consideration given to the size and type of development.

ACT Fire & Rescue advised that the bushfire assessment report outlined in Section 6.2 of this report was for the broad development of the Gungahlin Town Centre East Estate during its planning phase and does not apply to this specific development, as it references outdated standards. A new assessment, using the current standards, will be required for this development to outline all necessary bushfire protection measures.

ACT Fire & Rescue provided further advice on bushfire threat assessment and compliance pertaining the subject site as follows:

- This development is located within an area declared by the Emergency Services Agency (ESA) to be subject to the threat of bushfire.

- Appropriate bushfire protection measures are advised.
- An assessment of the proposal by an accredited Bushfire Consultant is required as part of the Development Application.

Refer to Appendix C for detailed correspondence with ACT Fire & Rescue.

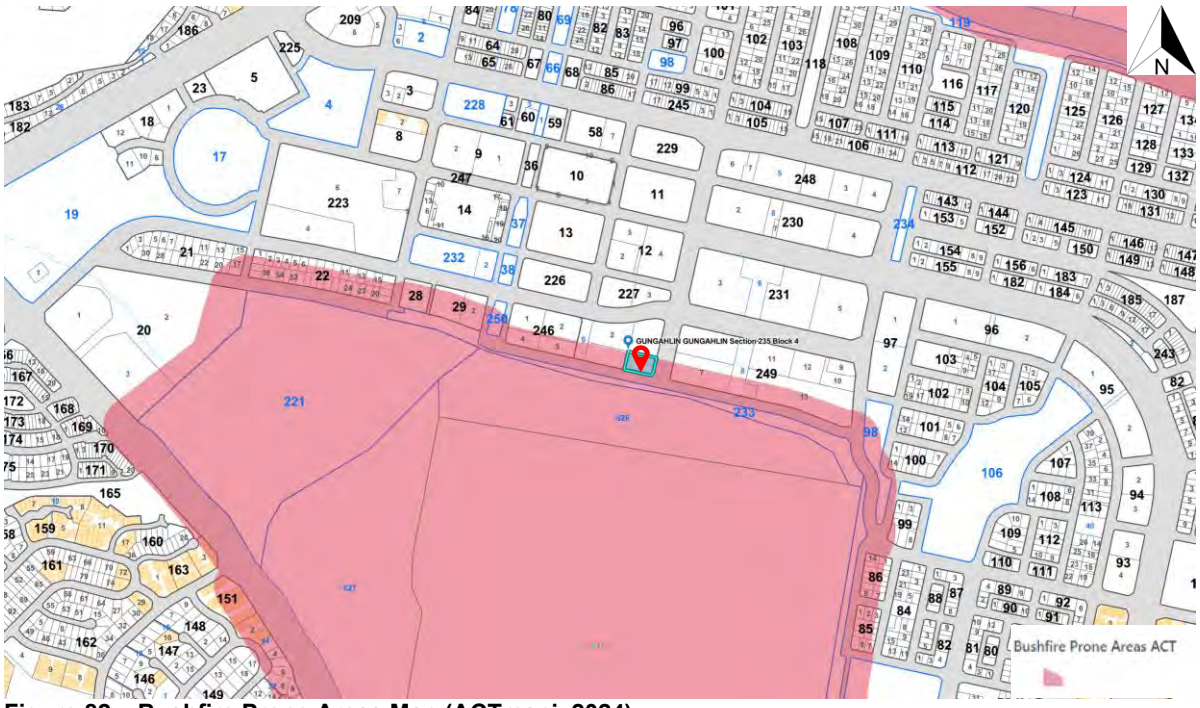


Figure 82 – Bushfire Prone Areas Map (ACTmapi, 2024)

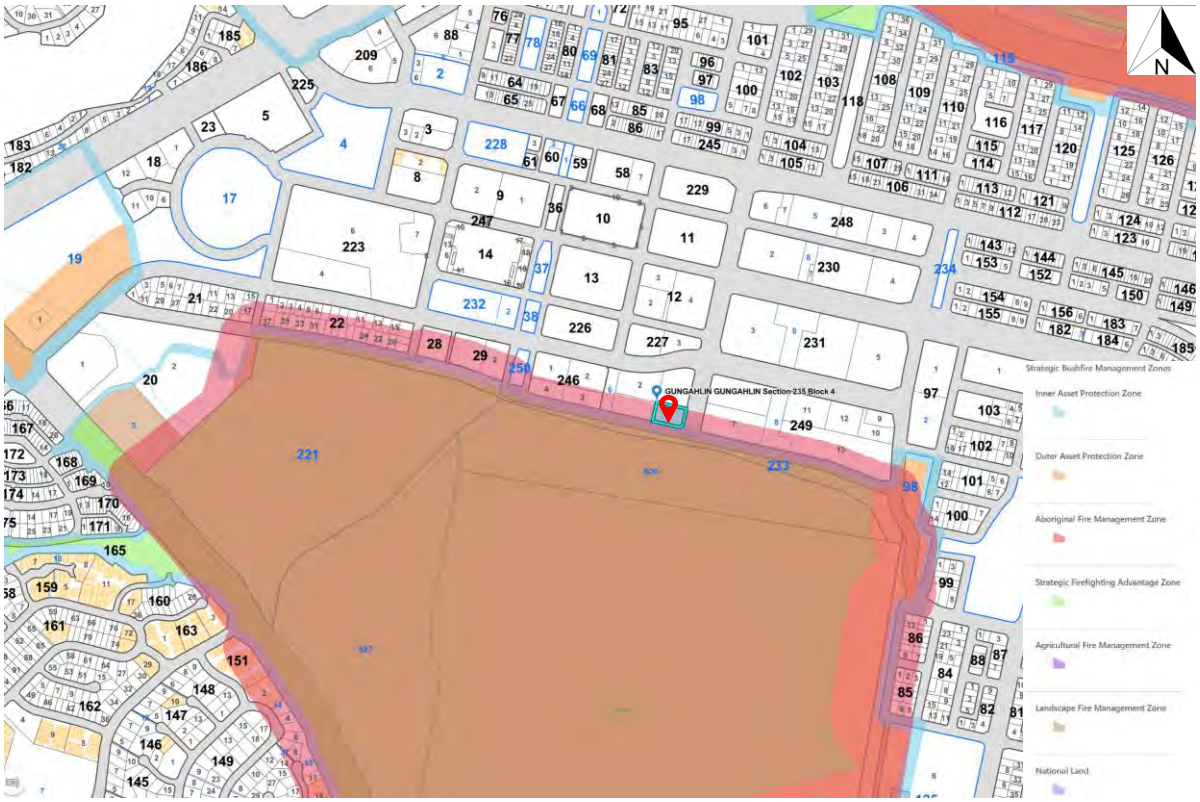


Figure 83 – Bushfire Strategic Management Zone Map (ACTmapi, 2024)

7.11.5 Tree Assessment

The following observations have been made on site and through an onsite inspection for existing trees on and within close vicinity of the subject site.

- Street trees lining the southern and northern verges of Camilleri Way are present south of the subject site. See Figure 85 and Figure 86 below for photos of these trees taken south of the site.
- Two rows of deciduous street trees were observed in the east and west verges of Kate Crace Street. See Figure 88 below for a photo that captures the location and maturity of these trees.
- A single large sized mature tree was noted in the north east corner of Block 2 Section 235 Gungahlin, to the north west of the site. A stone retaining wall was noted along the northern side of this tree to maintain the original ground levels to allow the construction of The Valley Avenue. Refer to Figure 87 below for a photo of this tree and retaining wall that provides an indication of level differences to The Valley Avenue.
- Based on ACTmapi information, none of these trees present on and in close proximity to the site are registered trees. Mature trees as of 2020 with approximate canopy spread and colour coded sizes are shown in ACTmapi mapping, as can be seen in Figure 84 below.
- Based on an initial onsite inspection and an aerial imagery review, few of the trees surrounding the site appear to meet the criteria of a regulated tree as defined in the Urban Forest Act 2023 (effective date 1 January 2024).
- A regulated tree is protected under the ACT Urban Forest Act 2023. A regulated tree is defined as:

  a living tree on leased land that:

  - *is at least 8m high; or*
  - *has a canopy at least 8m wide; or*

- *has 1 trunk that, 1.4m above natural ground level, has:*
  - *a circumference of at least 1m; or*
  - *a diameter of at least 318mm; or*
- *has 2 or more trunks and, 1.4m above natural ground level, the average circumference of the trunks is at least 625mm, and:*
  - *the sum of the circumferences of each trunk is at least 1m; or*
  - *the sum of the diameters of each trunk is at least 318mm; or*
- *regardless of the size of the tree:*
- *has been planted for not more than 5 years:*
  - *under a canopy contribution agreement; or*
  - *in accordance with a tree protection condition of a development approval; or*

a dead native tree on leased land that, 1.4m above natural ground level, has a trunk with:

- *a circumference of at least 1.88m; or*
- *a diameter of at least 600mm.*

- In accordance with the Urban Forest Act 2023, any construction work should be more than 2m away from the vertical projection of the tree canopy and 4m away from the area surrounding the trunk as measured at 1m above natural ground level.

A tree assessment has not been undertaken on the site, however, if any potential damaging activities will occur to any of the existing trees surrounding the site, a tree assessment will need to be carried out by an accredited arborist in conjunction with a tree survey. Following a tree assessment, the findings should be provided to the ACT Tree Protection Unit for comment/validation.

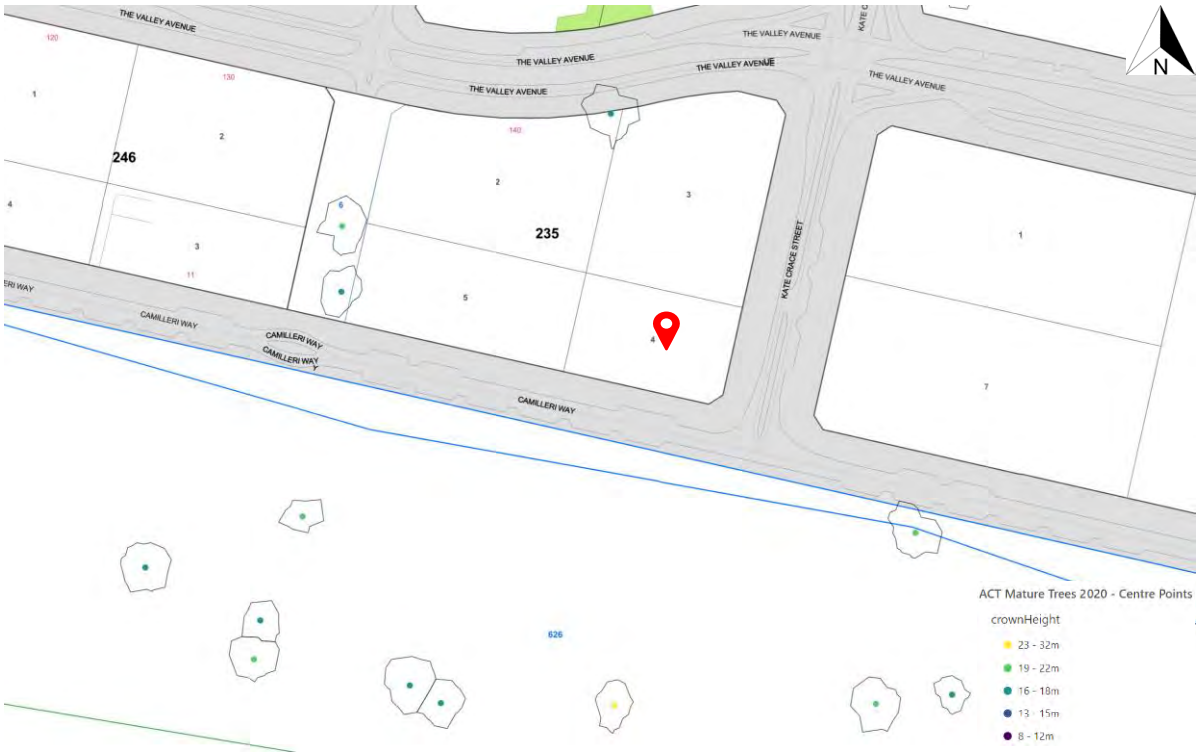


Figure 84 – Mature Tree Map (ACTmapi 2024)

Figure 85 – Tree in North Verge of Camilleri Way

Figure 86 – Tree in Southern Verge of Camilleri Way

Figure 87 – Large Mature Tree in North East Corner of Block 2 Section 235

Figure 88 – Street Trees in Kate Crace Street

7.11.6 Water Sensitive Urban Design

The proposed development will drain via newly provided TCCS's stormwater infrastructure into the piped network that drains toward the floodway and pond network in Franklin to the south east of the site, which conveys flows through nature reserves to Gungaderra Creek, and ultimately drains into Lake Ginninderra further south west. It is important the Developer is aware of this and complies with all legislative requirements with regards to stormwater runoff quality and quantity.

Stormwater design for the proposed development shall comply with the EPSDD ACT Biodiversity Sensitive Urban Design Guide, for which the requirements are summarised within the Commercial Zones Planning Technical Specifications (March 2024), including but not limited to the following requirements:

- Water mains use reduction of 40% in comparison to an equivalent development constructed in 2003.
- On site stormwater retention and detention.
- The developer must not increase the peak stormwater runoff from the development from the peak rate of runoff from an unmitigated site of the same area for minor and major storms.
- A summary of the minimum required WSUD targets and achievements are listed below:
    - Gross pollutants reduction ≥ 90%
    - Reduction in suspended solids ≥ 60%
    - Reduction in total phosphorous ≥ 45%
    - Reduction in total nitrogen ≥ 40%
    - Minimum permeable area of the site ≥ 15%
    - Effluent reuse is optional

The 'ACT Practice Guidelines for Water Sensitive Urban Design' (2018) document provides various methods that can assist in meeting these water sensitive urban design requirements for the proposed development. The following measures can be considered as part of the Development Application for the proposed development to achieve best practice in water sensitive urban design:

Water mains use reduction:

- Water efficient irrigation systems
- Use of stormwater to replace mains water for irrigation
- Water efficient landscaping
- Rainwater tanks for garden watering and internal uses, such as toilet flushing
- Use of greywater for irrigation and toilet flushing on individual dwellings
- Wastewater treatment and reticulation to commercial or industrial users who do not require water of a potable water mains standard

Stormwater management:

- Filter strips
- Swales and Bio-retention swales in lieu of piped drainage systems
- Downpipes and impervious surface areas not directly connected to the stormwater system, direct runoff across lawns and gardens
- Minimising impervious surfaces
- Installing on-site detention storage, which may be increased in size to allow for water harvesting
- Creating extended detention volume in ornamental ponds or landscaped depressions
- Direct connection of downpipes to a separate collection system to discharge to ornamental ponds to maintain water quality

Wastewater reuse:

- Use of greywater, treated or untreated

Construction of the proposed development will also be required to comply with the Environment Protection Authority's document, 'Environment Protection Guidelines for Construction and Land Development in the ACT' (August 2022).

8 Proposed Site Servicing

8.1 General

The following recommendations serve as a preliminary discussion of the site servicing options based on the constraints identified in this investigation. The location and size of the proposed services are to be confirmed following a planning design phase that can confirm a development's scale and extent. Therefore, in the context of this due diligence process, the existing services, infrastructure and other specialist components outlined in previous sections of this report have been considered for the site's proposed site servicing needs.

The advice provided in this section of the report is based on several aspects that necessitate a comprehensive evaluation of the proposed development.

Recommendations pertaining to additional servicing for the site, whilst based on sound engineering principles and judgement, are contingent on the completeness and accuracy of the available information regarding the existing services. Whilst every effort has been made to ensure the accuracy of this information, neither is guaranteed by JPS Engineering Consultants. It is recommended to physically verify the location and size of existing services before proceeding with detailed designs.

All site servicing requirements have been estimated for the proposed development scenario of a high density residential development as described in Section 3 of this report. This development scenario is conceptual and may differ from future proposals on the site, given the broad range of usage that is permittable on the site.

Refer to Appendix C for all relevant correspondence with services authorities that are referenced in this Section of the Site Investigation Report.

8.2 Sewer Supply

According to Work as Executed information a DN150 sewer tie is provided to the site in south east corner, being the lowest point of the block. The tie is recorded to be constructed with 4.0% grade and connects to the DN150 sewer main in Kate Crace Street and runs east in the northern verge of Camilleri Way.

Using the Icon Water Supplement to WSA Gravity Sewerage Code of Australia, the sewage flow rate for the proposed development has been calculated. The calculation was made for a residential yield of 63 and 80 dwellings for which the summary is provided in Table 4 and Table 5 below, respectively.

Table 4 – Sewer Loading Calculations Based on a Residential Yield of 63 Dwellings

Item	Classification	Unit	EP per Unit	Yield		EP
1	Shops and offices	Gross lettable floor space (Ha)	300	0.000	GFA	0
2	High Density Residential	per dwelling	2	63	dwellings	126

TEP =	126
ADWF =	0.265
PDWF =	0.951
NSA (res) =	0.508
NSA (commercial) =	0.000
A_{Eff} (res) =	0.508
A_{Eff} (commercial) =	0.000
GWI (res) =	0.007
GWI (commercial) =	0.000
RDI (res) =	0.365
RDI (industrial) =	0.000
DF =	1.323

Q = 1.323 L/s

Table 5 – Sewer Loading Calculations Based on a Residential Yield of 80 Dwellings

Item	Classification	Unit	EP per Unit	Yield		EP
1	Shops and offices	Gross lettable floor space (Ha)	300	0.000	GFA	0
2	High Density Residential	per dwelling	2	80	dwellings	160

TEP =	160
ADWF =	0.336
PDWF =	1.179
NSA (res) =	0.508
NSA (commercial) =	0.000
A_{Eff} (res) =	0.508
A_{Eff} (commercial) =	0.000
GWI (res) =	0.007
GWI (commercial) =	0.000
RDI (res) =	0.365
RDI (industrial) =	0.000
DF =	1.551

Q = 1.551 L/s

Icon Water was consulted to confirm whether the anticipated sewer flows can be accommodated by the sewer main network in Camilleri Way. Block 3 Section 235, currently vacant, has a sewer tie in

the south east corner of the block that drains into the sewer main in Kate Crace Street, which is the same sewer main that the subject site connects to. Consequently, Icon Water requested that the sewer loading from Block 3 Section 235 also be provided for a comprehensive assessment. The master planned yield for Block 3 Section 235, as determined by the Hill Thalis work in Section 3 of this report, includes 172 dwellings and 200m^2 of commercial gross floor area. The development plan for Block 3 Section 235 includes a 12 storey building, two 6 storey buildings, and one 4 storey building. Based on this yield, the sewer loading was calculated, as summarised in Table 6 below.

Table 6 – Sewer Loading Calculations for Block 3 Section 235

Item	Classification	Unit	EP per Unit	Yield		EP
1	Shops and offices	Gross lettable floor space (Ha)	300	0.020	GFA	6
2	High Density Residential	per dwelling	2	172	dwellings	344

TEP =	348
ADWF =	0.731
PDWF =	2.373
NSA (res) =	0.806
NSA (commercial) =	0.090
A_{Eff} (res) =	0.806
A_{Eff} (commercial) =	0.029
GWI (res) =	0.011
GWI (commercial) =	0.001
RDI (res) =	0.580
RDI (industrial) =	0.021
DF =	2.986

Q = 2.986 L/s

Icon Water advised that the existing sewer network is expected to accommodate the proposed foul flow. Icon Water advised that the existing sewer gravity main size does not align with the minimum pipe size requirement set by their design standards, which should be DN225 as a minimum for commercial flows. However, initial analysis indicated that hydraulically, the existing size of the gravity main will be sufficient considering the proposed scale of commercial development, which includes a small shop or café on Block 3 Section 235. Icon Water further advised that the assessment is based on the current proposed scale of commercial development. If loads increase significantly, the developer shall notify Icon Water for reassessment, and upsizing may be required. This calculation, once the actual development scenario is known, will be based on the proposed development's size, intended usage, and accurate site and sewer tie levels. This process is important to confirm the feasibility of connecting to the existing sewer tie, in coordination with Icon Water.

8.3 Potable Water Supply

According to the Work as Executed information, an existing water service tie is provided to the subject site in its south west corner. The water tie is DN25 HDPE class PN16.

Based on a high density residential development of between 63 and 80 dwellings, the peak water demand for both these scenarios were calculated and summarised in Table 7 and Table 8 below, respectively.

Table 7 – Potable Water Demand Calculations Based on a Residential Yield of 63 Dwellings

Development Type	Peak Day Demand Rate (L/day/tenement)	Peak Hour Demand Rate (L/day/tenement)	Comments	Relevant No. Dwellings / Tenement	Peak Hour Demand (L/s)	95th Percentile Demand (L/s)
Residential Super High Density	550	2200	Dwellings / Tenement	63	1.604	1.059
				Total Peak Demand	**1.604**	**L/s**

Table 8 – Potable Water Demand Calculations Based on a Residential Yield of 80 Dwellings

Development Type	Peak Day Demand Rate (L/day/tenement)	Peak Hour Demand Rate (L/day/tenement)	Comments	Relevant No. Dwellings / Tenement	Peak Hour Demand (L/s)	95th Percentile Demand (L/s)
Residential Super High Density	550	2200	Dwellings / Tenement	80	2.037	1.344
				Total Peak Demand	**2.037**	**L/s**

Based on these calculated potable water demands, Icon Water advised that their initial analysis indicated the existing water network has sufficient capacity, including fire flow, at the requested Fire Risk Type category.

Once the details of the proposed development on the site are known, Icon Water's Supplement to the WSA Water Supply Code of Australia is to be used to calculate the required water demand to service the development. This estimated peak demand, in addition to the Fire Risk Type FRT3 requirement, which is to achieve 60L/s at a minimum pressure head of 20m for firefighting and 30m for peak demand (in line with Icon Water's Supplement to the WSA Water Supply Code of Australia, Table IW.3), needs to be confirmed with Icon Water. Confirmation from Icon Water is needed to determine whether their external network has the capacity to meet this demand whilst meeting the minimum pressure requirements.

It is unlikely that the existing DN25 potable water service is sufficient to service a development as presented in Section 3 of this report, therefore, a new water tie connection to the site may need to be provided from either of the DN150 mains that are present within Camilleri Way or Kate Crace Street. The best main for connection will depend on the available pressure and peak demand of the proposed development.

To meet the hydrant coverage requirement for a Fire Risk Type FRT3, allowance needs to be made for a minimum spacing of 60m intervals between hydrants, as outlined in Table IW.8 of the Icon Water Supplement to WSA Water Supply Code of Australia. Given the current hydrant spacing of approximately 60 metres on the DN150 mains south and east of the site within Camilleri Way and Kate Crace Street, additional hydrants are not anticipated to be necessary on these mains. The FRT classification is to be confirmed with ACT Fire & Rescue once the actual development details on the site are known. This information will subsequently need to be relayed to Icon Water to ensure that their mains have sufficient capacity and hydrant coverage to meet ACT Fire & Rescue's requirements.

8.4 Stormwater Drainage

Work as Executed information on the site shows that a DN300 stormwater tie at 1.0% grade is provided near the lowest point of the block, in its south east corner. Preliminary calculations indicate that the size and grade of the existing stormwater tie is sufficient to drain a development as presented in Section 3 of this report. This calculation is based on the assumption of detention/retention requirements being met, in line with TCCS and EPSDD standards/technical specifications.

Once a proposed development scenario has been determined, the stormwater drainage requirements are to be assessed in accordance with TCCS Municipal Infrastructure Standards (MIS)

08 for Stormwater. The development site has been designated in accordance with the requirements of 'Town Centres' and assessed for the 5% AEP in the minor storm event, as per 'Table 8-3 Minor System Design AEP' within TCCS MIS 08.

The calculation of the impervious area, critical for this assessment, depends on the proposed land usage and layout, including any on site basement parking and pumping requirements. Furthermore, a survey to the north and east of the block, where a catchment has been identified to potentially flow toward the site, will also need to be carried out. A hydrological and hydraulic analysis, ensuring compliance with TCCS MIS 08 for the 1% AEP plus 300mm freeboard, is required to determine potential stormwater redirection at the northern boundary of the subject site, where there is potential for the northern catchment to drain toward and through the site. The ability to drain major flows away from this area will ensure safeguarding the development and block. This assessment is to be undertaken once the development's extent and site regrading has been determined.

Following the standards of TCCS MIS 08, a hydrological and hydraulic analysis must be conducted to determine the adequacy of the existing DN300 stormwater tie to the block for connection.

The design flows generated by the site are to be calculated using the Australian Rainfall and Runoff Guidelines and ACT Government MIS 08 Standards. Design rainfall intensities can be obtained from the Bureau of Meteorology Design Rainfall Data System (2019), which accounts for climate change.

Additionally, site detention and retention measures should be considered to manage and reduce site flows to pre-development levels, preventing any increase in flows to the adjacent roadways.

8.5 Telecommunications

NBN, Telstra, and TPG telecommunication lines are located relatively close to the site, to the north west in the northern section of Kate Crace Street, near The Valley Avenue. It is assumed that these services can be readily connected to, pending confirmation from the relevant service providers.

Once the specific scope of the development is defined, and a telecommunications/internet service provider is selected, the developer is to engage in consultation with either NBN, Telstra or TPG Telecom to establish the connection process for the site.

NBN necessitates the submission of a Development Application to request a telecommunication connection to their service.

8.6 Electricity

With reference to BYDA and WAE information, the site does not have a direct electrical service connection.

Based on the development presented in Section 3 of this report, the preliminary electrical demand for a 63 and 80 apartment complex has been estimated as 380kVA and 450kVA, respectively. This was based on the assumption of the following dwelling split:

- 21% Studio Residential Dwellings (6A per dwelling)
- 35% 1 Bed Residential Dwellings (6A per dwelling)
- 32% 2 Bed Residential Dwellings (7A per dwelling)
- 12% 3 Bed Residential Dwellings (8A per dwelling)

Electric vehicle charging was also allowed for in the estimated maximum electrical demand in both scenarios.

Evoenergy were consulted and advised that, based on the historical load of the existing 11kV feeders in the vicinity, there is currently spare capacity available to supply the expected demand. However, accurate advice can only be provided at the Preliminary Network Analysis (PNA) or connection application stage, as there are significant new developments occurring in the Gungahlin

Town Centre. Evoenergy must allocate available spare capacity based on the timing of the PNA or connection application.

During the PNA stage, Evoenergy will assess the existing load of substation S11554 and advise the least cost technically feasible solution to supply the development on the subject site. If a new substation is required within the block, the space requirement would be 14.2m x 6.2m.

Evoenergy referred to the following documents available through Evoenergy's Drawings and Standards on the evoenergy.com.au website:

- Minimum clearance, separation, and cover requirements
- Conduit and trench standards
- Padmount substation requirements
- Details for electricity connections and applications

The most appropriate location to connect to Evoenergy's electricity network will be determined when the developer submits their final electrical load details (to AS 3000) and final site plans.

If vulnerable usage is proposed as part of the future development on the site, it may be necessary to conduct a step and touch potential test due to the proximity of the substation (S11554) to the immediate south east of the site, to confirm earthing requirements.

8.7 Gas

While the site does not have a direct gas service connection, DN50 gas mains are situated within the verges of Camilleri Way and Kate Crace Street, adjacent the site. However, it's important to note that, as per the Climate Change and Greenhouse Gas Reduction Act, new gas network connections have been prohibited in all residential, commercial, and community facility land use zones since December 8, 2023.

8.8 Traffic and Parking

The subject site currently has a vehicular access gate located in the south west corner of the block. It is assumed that access from Camilleri Way is most appropriate to the site, given that full access can be provided. Kate Crace Street, adjacent the site has a central concrete median that would prevent right turns into and out of the development. Clearances to intersections, services and trees, sight distances, grades etc. in accordance with the requirements set out in TCCS Municipal Infrastructure Standards (MIS) 07 Driveways, will need to be complied to in establishing the location of the proposed driveway.

Parking numbers were calculated based on a high density residential development of between 63 and 80 dwellings, with the following split in dwelling type:

- 21% Studio Residential Dwellings
- 35% 1 Bed Residential Dwellings
- 32% 2 Bed Residential Dwellings
- 12% 3 Bed Residential Dwellings

Using the parking provisions outlined in the Planning (Commercial and Residential Zones) Technical Specifications 2024, the parking numbers for each development scenario were calculated. This calculation also included provisions for visitor parking. The total parking requirements for both development yields are as follows:

- 63 Dwellings – 84 car parking spaces + 16 visitor parking spaces = **100** total parking spaces.

- 80 Dwellings – 136 car parking spaces + 20 visitor parking spaces = **156** total parking spaces.

While the Technical Specifications outline ideal parking provision rates, considering the well connected public transport and active travel network within the town centre, the possibility of reducing parking numbers may be granted at the discretion of the Transport Canberra and City Services (TCCS).

As there are 31 on street car parking bays available within 100m of the site, the number of visitor parking allowed for on site may be able to be reduced. Any proposals for accommodating parking needs by using off site parking will need to be agreed to with TCCS prior to submitting a Development Application. The existing parking utilisation in the general Gungahlin Town Centre appears to have residual capacity to accommodate current demands. However, this situation may change in the future, and any replacement parking for that removed to allow development on the subject site will need to be agreed upon with TCCS.

The Canberra Strategic Transport Model (CSTM) forecasts that all roads near the subject site will have sufficient capacity to accommodate projected traffic volumes up to the year 2041. However, it was noted that the demographic data used in the model does not reflect the yield presented in the Hill Thalis master planning work for Gungahlin Town Centre East (refer to Section 3 of this report). To verify the surrounding road network's ability to accommodate the increased traffic from the proposed development, a full Transport Assessment Report (TAR) will be required, in accordance with the TCCS Guidelines for Transport Impact Assessment (April 2020). This traffic analysis and report is to be provided as part of a future Development Application.

9 Site Opportunities, Constraints and Risk Assessment

A table of constraints is prepared below for the site of Block 4 Section 235 Gungahlin based on the existing site services heritage, ecological, and environmental opportunities/constraints discussed within this report. A risk rating was established for each issue identified utilising the following risk matrix definitions.

Table 9 – Risk Matrix Rating Definitions

Risk Rating	Definition of Risk Rating Against Site Constraints
Insignificant	Sufficient, relevant and recent information to inform future development prospect, no additional work necessary at this stage.
Low	Information available is sufficient to inform future development with only minor works or investigations required to progress the design development. It is advised further investigation is undertaken to continue the development process.
Medium	Information available is lacking or absent. Significant risks reside in other investigations undertaken and the timing and cost of the proposed development. It is recommended that these investigations are undertaken.
High	Information available is severely lacking or absent. Major risks reside in other investigations undertaken and the viability of the proposed development. It is advised that these investigations are undertaken as a priority prior to recommended investigations that have been given a lower risk rating.
Extreme	Information is absent, not relevant or insufficient. The outcome of the investigation required is needed to determine whether a portion of the site is developable or unviable.

With respect to the relevant disciplines covered within this Site Investigation Report for the future development of the subject site, the following table has been developed, which incorporates the perceived issues, or gaps in information, the associated risk and a subsequent risk rating.

Table 10 – Assignment of Risk Rating to Identified Constraints

Description of Potential Constraint	Allocated Risk Rating
A site and development specific bushfire assessment to the 2023 Emergencies Bushfire Management Standards is not available.	High
If the actual development on the site is different to that reviewed in this report, the Conservator of Flora and Fauna is to be consulted for the need of an ESO.	Medium
The actual development's extent and purpose is not fully known and therefore servicing and infrastructure requirements may be subject to change.	Medium
Geotechnical information on the site is not available to inform a development, particularly for basement level parking.	Medium

Description of Potential Constraint	Allocated Risk Rating
Stormwater hydrological and hydraulic analysis for the proposed development has not been undertaken. The adequacy of overland flow management through the site is not fully known.	Low
Some trees that would fall under the category of being 'Regulated' in accordance with the ACT Urban Forest Act 2023 are located in road verges surrounding the southern and eastern areas of the site. All of these trees will need to be protected/considered as part of any development proposal. A professionally undertaken tree survey and arborist assessment is not available on the trees surrounding the site.	Low
Connection to the existing underground HV electrical services within the east verge of Kate Crace Street and any upgrade requirements to electrical infrastructure, including a substation on the site, is unknown. The existing substation is immediately to the south east of the site and may need assessment if vulnerable usage is expected on the site.	Low
The site currently does not have a driveway access. A driveway access to the site is most likely limited to Camilleri Way. Access to Kate Crace Street is constrained by its central median not allowing right turns in and out of the site.	Low
A proposed development will increase the traffic generation on the surrounding roads and the impact to the roads in future years will need to be assessed for compliance and whether any upgrades are necessary.	Low
A potable water service is available to the site, but is considered inadequate for the development assessed within this report. Peak demand and firefighting flow requirements are to be determined once the final development is understood. Current hydrant coverage meets Icon Water and ACT Fire & Rescue requirements, however, may change if the Fire Risk Type is reviewed to be higher.	Low
The capacity of the downstream stormwater infrastructure has not been checked for suitability to accept the site's discharge flows.	Low
Some existing service's exact locations are unconfirmed.	Low
Telecommunications services do not extend to the site.	Insignificant

When holistically considering the above noted constraints and risk ratings, the subject site possesses few serious constraints that may inhibit development in its current form. Therefore, the subject site is deemed viable for future development as a high density residential development, pending the recommendations provided in the following section.

10 Recommendations

Based on the level of risk, recommendations have been listed in order of priority, to assist in programming the recommended works. The priority listing has been developed by assessing the importance of the additional investigations recommended and the effect that this work would have on other reports. The aim is to provide a comprehensive prioritised list of recommended additional investigations to complete the assessment of the subject site and inform a future development on the site.

It is noted that a residual risk rating has not been provided, however, once recommended additional information and studies has been sought, the residual risk can be assessed based on the outcomes of these reports.

The proposed development of Block 4 Section 235 Gungahlin has been assessed in this Site Investigation Report based on an indicative development scenario, with a focus on compiling a Development Application submission. A summary of the recommendations and necessary actions required to enable this site for development with the associated risk colour coded to that which is presented in Section 9 of this report is provided below.

- **Bushfire Assessment:** Undertake a site and development specific Bushfire Threat Assessment and Compliance Report as the site is located inside the area declared by the ESA to be subject to the threat of bushfire. Bushfire protection measures for the proposed development and an assessment of the site to the 2023 ACT Bushfire Management Standards is to be carried out by an accredited Bushfire Consultant as part of a Development Application.

- **Ecological Assessment:** Liaise with the Conservator of Flora and Fauna once the actual development proposal is known to confirm whether an Environmental Significance Opinion (ESO) is to be completed by an accredited ecologist. The main constraint to be assessed is the potential impact a proposed development would have on the adjacent Mulanggari Grasslands to the south of the site.

- **Urban Planning and Architectural Design:** Undertake detailed architectural design and a massing study to comprehensively assess the impact and demand of the proposed development on services and infrastructure. This should also include an evaluation of how the development may interact with the adjacent blocks for their future development to ensure holistic compatibility. The proposal is to be made in accordance with Territory Plan requirements and EPSDD's Development Application process.

- **Geotechnical Investigation:** The site must undergo a development specific geotechnical investigation to provide detailed advice on the most suitable earthworks methodology, excavation conditions for basement construction, internal pavement designs, and support and footings appropriate for the site conditions.

- **Stormwater Management:** Undertake a stormwater hydrological and hydraulic analysis as an update to the Estate Development Plan stormwater masterplan, for the proposed development in line with TCCS MIS documents. This is to include the catchment and capacity analysis of the existing road reserves surrounding the site and catchment to the north that is currently conveyed through the site. Verify whether the size and grade of the existing DN300 stormwater tie to the site has sufficient capacity to accommodate the block's drainage needs together with any on site detention/retention initiatives. The adequacy of the downstream stormwater infrastructure to accommodate the proposed development's stormwater flows must be checked and validated with TCCS.

- **Trees and Vegetation:** Commission a tree survey and qualified arborist to assess the existing trees to ensure the protection of protected trees adjacent the subject site. Validate the tree assessment with the ACT Urban Treescapes Unit (TCCS) before

proceeding with any activities that could impact existing trees. Furthermore, if trees are proposed to be removed to accommodate a proposed development, replacement trees at a ratio and location agreed to with TCCS and EPSDD Climate Change and Energy will need to be considered.

- **Electrical Service:** Determine the best connection point to service the site, once actual development demands are calculated. Address any necessary upgrades to the electrical infrastructure to service the site. This is to be undertaken through collaborative consultation with Evoenergy. If vulnerable use is proposed on the site, seek advice from Evoenergy as to whether a step and touch potential test needs to be undertaken due to the nearby electrical substation, opposite Kate Crace Street, south east of the site.

- **Site Access Point:** Assess the most appropriate access point to the site given the constraints and limitations of Kate Crace Street with its central median not allowing right turns into and out of the site. The driveway to the site is to be designed in accordance with TCCS MIS 07 Driveways.

- **Traffic Impact:** In accordance with the TCCS Guidelines for Transport Impact Assessment, undertake a Transport Assessment Report (TAR). The traffic assessment will be dependent on the scale and intended use of the proposed development. Evaluate the potential impact of increased traffic on the existing transport network and parking requirements, including any on street parking.

- **Potable Water Supply:** For a potable water service to the site, work closely with Icon Water to establish a connection to their existing DN150 main either in Camilleri Way or Kate Crace Street. This is to be established once the development and its potable water demand, including firefighting water demand, is known. Determine if additional hydrants on existing mains are needed to meet a higher Fire Risk Type for the proposed development than that outlined in this report. Ensure compliance with all requirements and standards set by Icon Water and ACT Fire and Rescue throughout the preliminary and detailed design process.

- **Service Location Confirmation:** Confirm the exact locations of existing services to ensure accurate planning and prevent any conflicts during the development process. This is to be undertaken using non-destructive methods.

- **Telecommunications Service:** Liaise with NBN, Telstra or TPG Telecom for a telecommunications service connection to the site, if required.

Appendix A

Work As Executed Drawing

PIPE MATERIAL TABLE	
SEWER PIPES	SEWER PIPES SHALL BE CLASS SN8, SOLID WALLED PVC
SEWER TIES	100mm SEWER TIES SHALL BE CLASS SN10 SOLID WALLED PVC
WATER PIPES	WATER MAINS SHALL BE CLASS PN16 PVC-M UNLESS NOTED OTHERWISE
WATER TIES	WATER SERVICES SHALL BE 25Ø HDPE CLASS PN16 UNLESS NOTED OTHERWISE

JOINS SHEET 5678-20-151

JOINS SHEET 5678-20-153

614288N 614268N 614249N

211435E 211823E 211423E 211811E 211410E 211799E

THE VALLEY AV

KATE CRACE ST EXT

ROAD 1

REFER TO CARDNO DRAWINGS IN HATCHED AREA

PROVIDE TEMPORARY ENDCAP, HYDRANT AND THRUST BLOCK FOR FUTURE CONNECTION.

150x11.25° BEND

150x22.5° BEND

150x45° BEND

2x150 SV 150x150 TEE

627.908 300Ø 'RCP' 14.67m 7.00% 626.881

628.357 375Ø 'RCP' 54.73m 2.85% 626.800

626.831 300Ø '4' 10.76m 1.27% 626.694

626.859 150Ø SN8 4.35m 5.00% 626.641

626.644 375Ø 'RCP' 28.01m 7.0% 624.683

626.561 150Ø SN8 46.80m 5.00% 624.221

624.633 375Ø 'RCP' 14.87m 1.00% 624.485

624.520 150Ø SN8 8.72m 4.00% 624.171

625.027 300Ø 'RCP' 12.03m 1.00% 624.906

625.034 300Ø 'RCP' 17.33m 1.00% 624.860

625.151 150Ø SN8 66.95m 2.00% 623.812

625.173 300Ø 'RCP' 8.96m 1.00% 625.084

626.594 300Ø 'RCP' 11.85m 3.00% 626.238

625.361 150Ø SN8 4.35m 3.00% 625231

624.435 525Ø 'RCP' 28.98m .60% 624.261

624.141 150Ø SN8 75.66m 1.00% 623.385

623.355 150Ø SN8 98.42m 1.00% 622.371

624.810 300Ø '4' 9.20m 1.00% 624.718

625.873 300Ø '4' 41.17m 2.74% 624.744

626.188 300Ø '4' 9.90m 2.68% 625.923

625.435 300Ø '4' 8.21m 1.00% 625.352

625.302 300Ø '4' 53.81m 1.00% 624.764

624.856 300Ø '4' 9.20m 1.00% 624.764

624.619 375Ø '4' 16.85m .80% 624.485

624.714 300Ø 'RCP' 55.88m 1.00% 624.156

624.211 525Ø '4' 9.20m .60% 624.156

624.106 600Ø '4' 46.06m .60% 623.829

623.906 300Ø '4' 7.73m -1.00% 623.829

623.779 600Ø '4' 44.95m .60% 623.509

623.587 300Ø '4' 7.73m 1.00% 623.509

623.459 600Ø '4' 38.6m .58% 623.235

614052N 614032N 614013N

227 1

235 2

gd ge gf

FF fa fb

MU MAX(173)

No.	AMENDMENT	APPROVED	DATE	AMENDED BY
0	FOR CONSTRUCTION	AN	18.09.17	SR

A1 PLOT 500 10 0 5 10 15 20 A3 PLOT 1000

CLIENT

ACT Government Economic Development | Land Development Agency CANBERRA FIRST

INDESCO

CANBERRA
Level 1, Equinox 4,
70 Kent Street, Deakin, ACT 2600
Phone: (02) 6285 1022 Fax: 6285 2618

SYDNEY
Level 7,
80 George St Parramatta, NSW 2150
Phone: (02) 9633 2273 Fax: 6285 2618

CONSULT AUSTRALIA

AS/NZS ISO 9001 Certified
Davis Langdon Certification Services

APPROVED	VL	DATE	18.09.17
CHECKED	AN	DATE	18.09.17
DESIGNED BY	K. CUMING		
DRAWN BY	S.GILBERT		

CAD FILE H:\5678 Gungahlin Town Centre East Estate\Acad\Detailed Design\Civil\20 Estate works\5678-20-150 HYD.dwg

AS SHOWN

PROJECT

GUNGAHLIN TOWN CENTRE ESTATE WORKS

DRAWING TITLE

HYDRAULIC SERVICES SHEET 2

PROJECT No.	DRAWING No.	AMDT
5678-20	152	0

Appendix B

BYDA and Work as Executed Information

Contact Details

Contact	Contact number	Company	Enquirer ID
John Samoty	0417 434 996	JPS Engineering Consultants	3541136

Email
john.samoty@jpsengineering.com.au

Address
28 Barrallier Street
Griffith ACT 2603

Job Site and Enquiry Details

WARNING: The map below only displays the location of the proposed job site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

Enquiry date	Start date	End date	On behalf of	Job purpose	Locations	Onsite activities
22/05/2024	01/07/2024	31/07/2025	Other SLA	Excavation	Both Road, Nature Strip, Footpath	Mechanical Excavation, Non-Destructive Digging, Subdivision

Check that the location of the job site is correct. If not, you must submit a new enquiry.

If the scope of works change or plan validity dates expire, you must submit a new enquiry.

Do NOT dig without plans. Safe excavation is your responsibility. If you don't understand the plans or how to proceed safely, please contact the relevant asset owners.

User Reference	Address	Notes/description
140 The Valley Avenue	140 The Valley Avenue Gungahlin ACT 2912	-

Your Responsibility and Duty of Care

- **Lodging an enquiry does not authorise project commencement.** Before starting work, you must obtain all necessary information from all affected asset owners.
- If you don't receive plans within 2 business days, contact the asset owner & quote their sequence number.
- Always follow the 5Ps of Safe Excavation (page 2), and locate assets before commencing work.
- Ensure you comply with State legislative requirements for Duty of Care and safe digging.
- If you damage an underground asset, you MUST advise the asset owner immediately.
- By using the BYDA service, you agree to the Privacy Policy and Term of Use.
- For more information on safe digging practices, visit www.byda.com.au

Asset Owner Details

Below is a list of asset owners with underground infrastructure in and around your job site. It is your responsibility to identify the presence of these assets. Plans issued by Members are indicative only unless specified otherwise. Note: not all asset owners are registered with BYDA. You must contact asset owners not listed here directly.

Referral ID (Seq. no)	Authority Name	Phone	Status
239582353	Department of Finance	(02) 6226 3869	NOTIFIED
239582358	Evoenergy	(02) 6293 5770	NOTIFIED
239582357	Icon Water	(02) 6248 3111	NOTIFIED
239582352	NBN Co NswAct	1800 687 626	NOTIFIED
239582359	Optus and or Uecomm Nsw	1800 505 777	NOTIFIED
239582356	Telstra NSW South	1800 653 935	NOTIFIED
239582355	TPG Telecom (NSW)	1800 786 306	NOTIFIED
239582354	Transport Canberra and City Services	(02) 7801 3960	NOTIFIED

END OF UTILITIES LIST

The 5Ps of Safe Excavation

Plan

Plan your job. Use the BYDA service at least one day before your job is due to begin, and ensure you have the correct plans and information required to carry out a safe project.

Prepare

Prepare by communicating with asset owners if you need assistance. Look for clues onsite. Engage a skilled Locator.

Pothole

Potholing is physically sighting the asset by hand digging or hydro vacuum extraction.

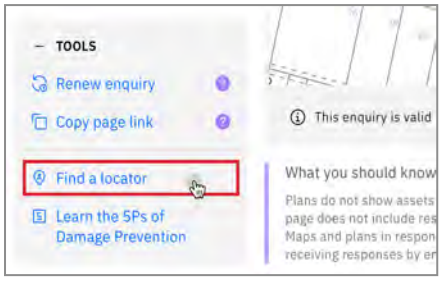
Protect

Protecting and supporting the exposed infrastructure is the responsibility of the excavator. Always erect safety barriers in areas of risk and enforce exclusion zones.

Proceed

Only proceed with your excavation work after planning, preparing, potholing (unless prohibited), and having protective measures in place.

Engage a skilled Locator



When you lodge an enquiry you will see skilled Locators to contact

Visit the Certified Locator website directly and search for a locator near you

dbydlocator.com/certified-locating-organisation

Book a FREE BYDA Session

BOOK NOW

BYDA offers two different sessions to suit you and your organisation's needs. The free sessions are offered in two different formats - online and face-to-face:

1. **Awareness Session:** Understand the role of BYDA, safe excavation practices, complying with asset-owner instructions, and the consequences of damages. Learn how to mitigate and avoid potential damage and harm and ensure a safe work environment.
2. **Plan Reading Session:** Develop the skills to interpret asset owners' plans, legends, and symbols effectively. Understand the complexities of plan interpretation to ensure smooth project execution.

To book a session, visit:
byda.com.au/contact/education-awareness-enquiry-form/

Working near nbn™ cables

nbn has partnered with Dial Before You Dig to give you a single point of contact to get information about **nbn** underground services owned by **nbn** and other utility/service providers in your area including communications, electricity, gas and other services. Contact with underground power cables and gas services can result in serious injury to the worker, and damage and costly repairs. You must familiarise yourself with all of the Referral Conditions (meaning the referral conditions referred to in the DBYD Notice provided by **nbn**).

Practice safe work habits

Once the DBYD plans are reviewed, the Five P's of Excavation should be adopted in conjunction with your safe work practices (which must be compliant with the relevant state Electrical Safety Act and Safe Work Australia "Excavation Work Code of Practice", as a minimum) to ensure the risk of any contact with underground **nbn** assets are minimised.

Plan: Plan your job by ensuring the plans received are current and apply to the work to be performed. Also check for any visual cues that may indicate the presence of services not covered in the DBYD plans.

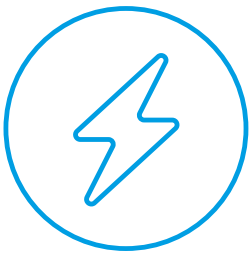
Prepare: Prepare for your job by engaging a DBYD Certified Plant Locator to help interpret plans and identify on-site assets. Contact **nbn** should you require further assistance.

Pothole: Non-destructive potholing (i.e. hand digging or hydro excavation) should be used to positively locate **nbn** underground assets with minimal risk of contact and service damage.

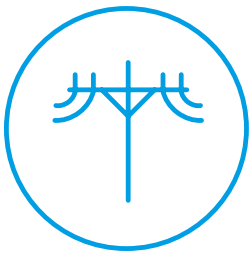
Protect: Protecting and supporting the exposed **nbn** underground asset is the responsibility of the worker. Exclusion zones for **nbn** assets are clearly stated in the plan and appropriate controls must be implemented to ensure that encroachment into the exclusion zone by machinery or activities with the potential to damage the asset is prevented.

Proceed: Proceed only when the appropriate planning, preparation, potholing and protective measures are in place.

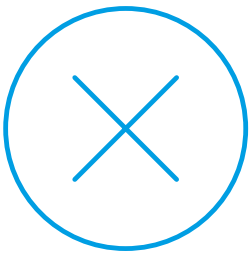
Working near **nbn**™ cables



Identify all electrical hazards, assess the risks and establish control measures.



When using excavators and other machinery, also check the location of overhead power lines.



Workers and equipment must maintain safety exclusion zones around power lines.

Once all work is completed, the excavation should be re-instated with the same type of excavated material unless specified by **nbn**. Please note:

- Construction Partners of **nbn** may require additional controls to be in place when performing excavation activities.
- The information contained within this pamphlet must be used in conjunction with other material supplied as part of this request for information to adequately control the risk of potential asset damage.

Contact

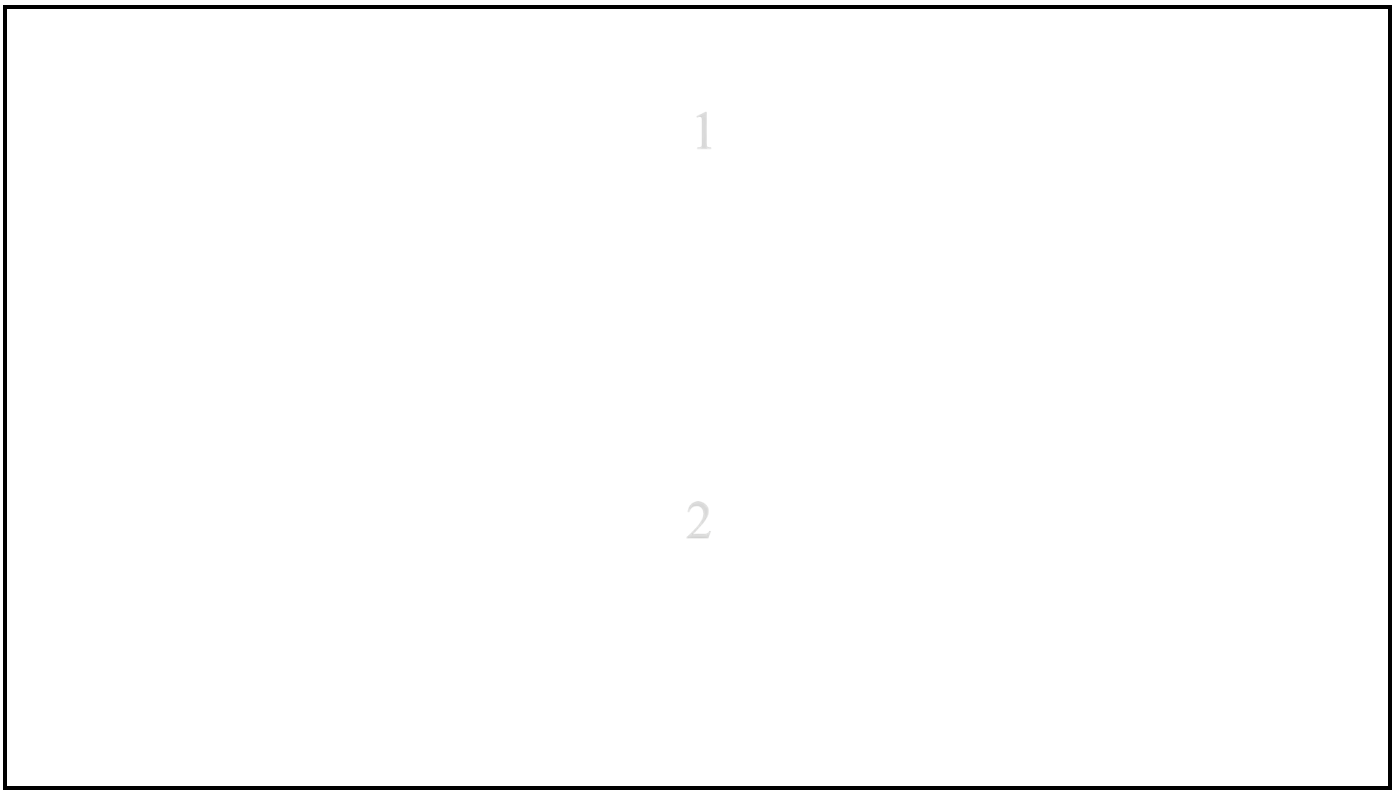
All **nbn**™ network facility damages must be reported online here.
For enquiries related to your DBYD request please call 1800 626 329.

DIAL BEFORE YOU DIG
www.1100.com.au

To:	John Samoty
Phone:	Not Supplied
Fax:	Not Supplied
Email:	john.samoty@jpsengineering.com.au

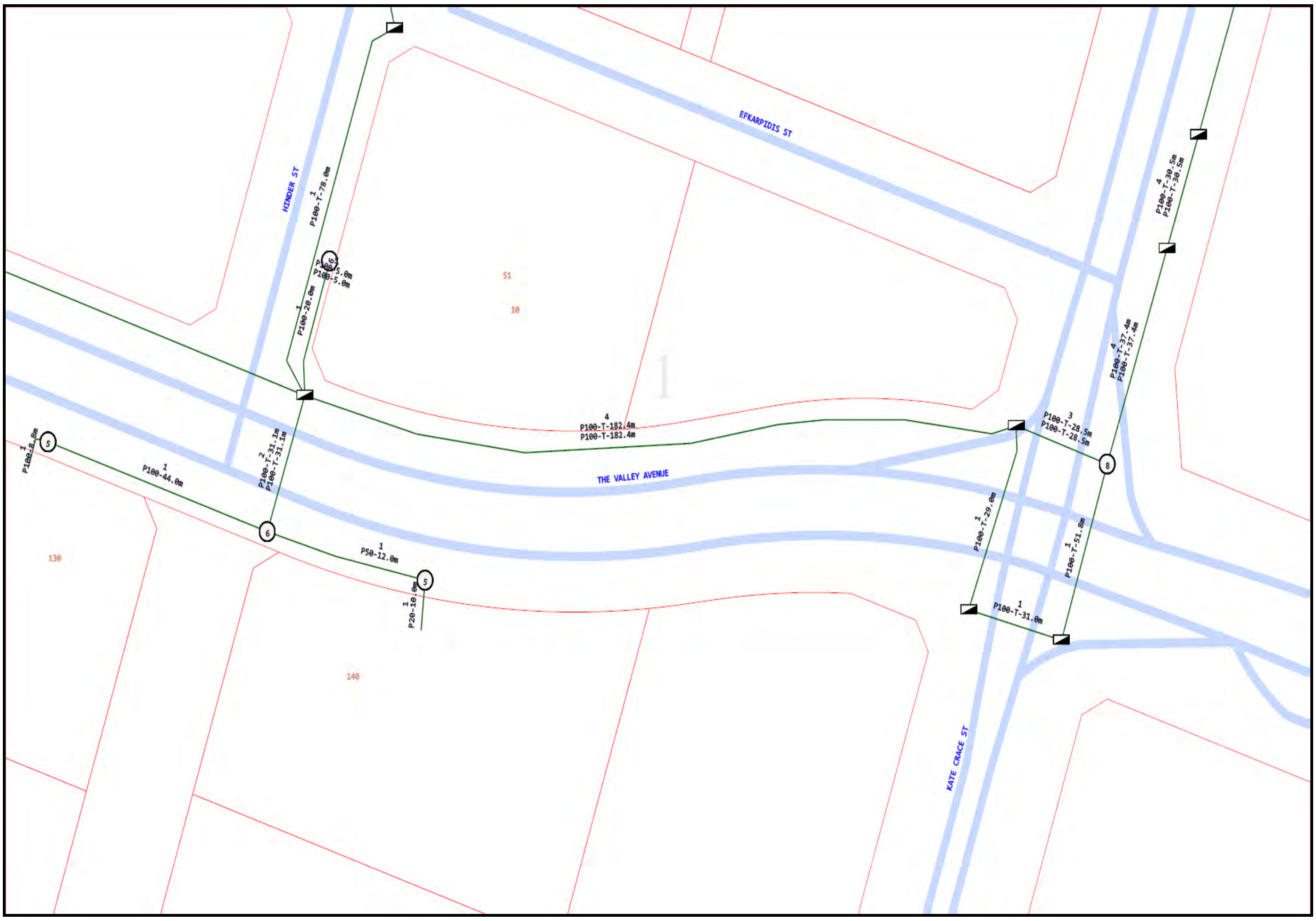
Dial before you dig Job #:	36741319	BEFORE YOU DIG www.byda.com.au Zero Damage - Zero Harm
Sequence #	239582352	
Issue Date:	22/05/2024	
Location:	140 The Valley Avenue , Gungahlin , ACT , 2912	

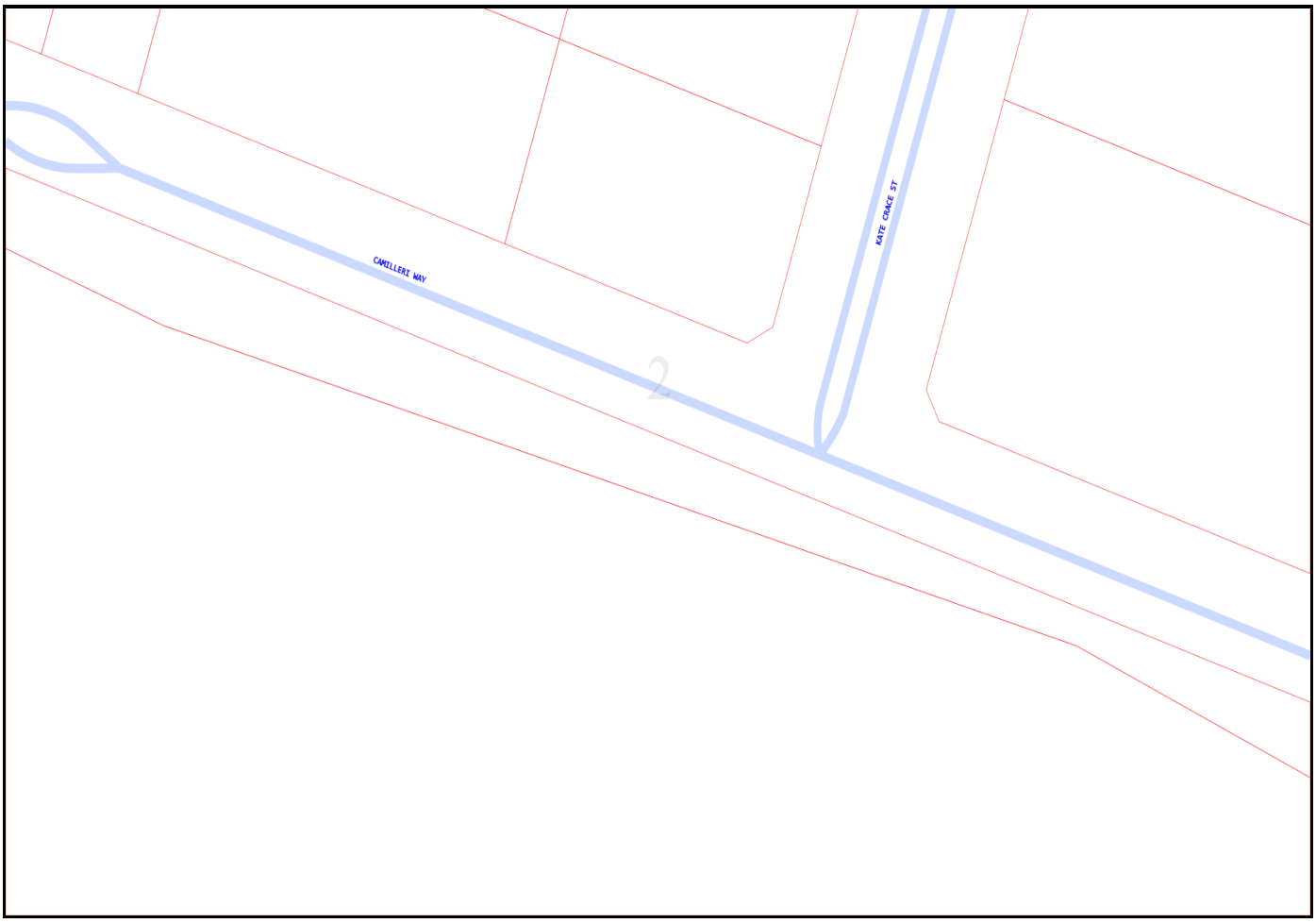
Indicative Plans



LEGEND

44	Parcel and the location
5	Pit with size "5"
2E	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
	Manhole
	Pillar
2 PO – T- 25.0m P40 – 20.0m 5 9	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
2 10.0m 5 9	2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.
5 9	Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Power) cables.
BROADWAY ST	Road and the street name "Broadway ST"
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m


EFKARPIDIS ST
HINDER ST
1
P100-T-78.0m
P100-5.0m
P100-5.0m
1
P100-20.0m
51
10
4
P100-T-182.4m
P100-T-182.4m
THE VALLEY AVENUE
2
P100-T-31.1m
P100-T-31.1m
1
P100-8.8m
1
P100-44.0m
1
P50-12.0m
1
P20-10.0m
130
140
4
P100-T-30.5m
P100-T-30.5m
4
P100-T-37.4m
P100-T-37.4m
3
P100-T-28.5m
P100-T-28.5m
1
P100-T-29.0m
1
P100-T-51.8m
1
P100-T-31.0m
KATE CRACE ST



Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

To:	John Samoty
Phone:	Not Supplied
Fax:	Not Supplied
Email:	john.samoty@jpsengineering.com.au

Dial before you dig Job #:	36741319	
Sequence #	239582352	
Issue Date:	22/05/2024	
Location:	140 The Valley Avenue , Gungahlin , ACT , 2912	

Information

The area of interest requested by you contains one or more assets.

nbn™ Assets	Search Results
Communications	Asset identified
Electricity	No assets

In this notice **nbn™ Facilities** means *underground fibre optic, telecommunications and/or power facilities, including but not limited to cables, owned and controlled by* ***nbn™***

Location of **nbn™** Underground Assets

We thank you for your enquiry. In relation to your enquiry at the above address:

- **nbn's** records indicate that there **ARE nbn™** Facilities in the vicinity of the location identified above ("Location").
- **nbn** indicative plan/s are attached with this notice ("Indicative Plans").
- The Indicative Plan/s show general depth and alignment information only and are not an exact, scale or accurate depiction of the location, depth and alignment of **nbn™** Facilities shown on the Plan/s.
- In particular, the fact that the Indicative Plans show that a facility is installed in a straight line, or at uniform depth along its length cannot be relied upon as evidence that the facility is, in fact, installed in a straight line or at uniform depth.
- You should read the Indicative Plans in conjunction with this notice and in particular, the notes below.
- You should note that, at the present time, the Indicative Plans are likely to be more accurate in showing location of fibre optics and telecommunications cables than power cables. There may be a variation between the line depicted on the Indicative Plans and the location of any power cables. As such, consistent with the notes below, particular care must be taken by you to make your own enquiries and investigations to precisely locate any power cables and manage the risk arising from such cables accordingly.
- The information contained in the Indicative Plan/s is valid for 28 days from the date of issue set out above.You are expected to make your own inquiries and perform your own investigations (including engaging appropriately qualified plant locators, e.g DBYD Certified Locators, at your cost to locate **nbn™** Facilities during any activities you carry out on site).

We thank you for your enquiry and appreciate your continued use of the Dial Before You Dig Service. For any enquiries related to moving assets or Planning and Design activities, please visit the **nbn** Commercial Works website to complete the online application form. If you are planning to excavate and require further information, please email dbyd@nbnco.com.au or call 1800 626 329.

Notes:

1. You are now aware that there are **nbn™** Facilities in the vicinity of the above property that could be damaged as a result activities carried out (or proposed to be carried out) by you in the vicinity of the Location.
2. You should have regard to section 474.6 and 474.7 of the *Criminal Code Act 1995* (CoA) which deals with the consequences of interfering or tampering with a telecommunications facility. Only persons authorised by **nbn** can interact with **nbn's** network facilities.
3. Any information provided is valid only for **28 days** from the date of issue set out above.

Referral Conditions

The following are conditions on which **nbn** provides you with the Indicative Plans. By accepting the plans,you are agreeing to these conditions. These conditions are in addition, and not in replacement of, any duties and obligations you have under applicable law.

1. **nbn** does not accept any responsibility for any inaccuracies of its plans including the Indicative Plans. You are expected to make your own inquiries and perform your own investigations (including engaging appropriately qualified plant locators, e.g DBYD Certified Locators, at your cost to locate **nbn™** Facilities during any activities you carry out on site).
2. You acknowledge that **nbn** has specifically notified you above that the Indicative Plans are likely to be more accurate in showing location of fibre optics and telecommunications cables than power cables. There may be a variation between the line depicted on the Indicative Plans and the location of any power cables.
3. You should not assume that **nbn™** Facilities follow straight lines or are installed at uniformed depths

along their lengths, even if they are indicated on plans provided to you. Careful onsite investigations are essential to locate the exact position of cables.

4. In carrying out any works in the vicinity of **nbn™** Facilities, you must maintain the following minimum clearances:
   - 300mm when laying assets inline, horizontally or vertically.
   - 500mm when operating vibrating equipment, for example: jackhammers or vibrating plates.
   - 1000mm when operating mechanical excavators.
   - Adherence to clearances as directed by other asset owner's instructions and take into account any uncertainty for power cables.
5. You are aware that there are inherent risks and dangers associated with carrying out work in the vicinity of underground facilities (such as **nbn™** fibre optic,copper and coaxial cables,and power cable feed to **nbn™** assets).Damage to underground electric cables may result in:
   - Injury from electric shock or severe burns, with the possibility of death.
   - Interruption of the electricity supply to wide areas of the city.
   - Damage to your excavating plant.
   - Responsibility for the cost of repairs.
6. You must take all reasonable precautions to avoid damaging **nbn™** Facilities. These precautions may include but not limited to the following:
   - All excavation sites should be examined for underground cables by careful hand excavation. Cable cover slabs if present must not be disturbed. Hand excavation needs to be undertaken with extreme care to minimise the likelihood of damage to the cable, for example: the blades of hand equipment should be aligned parallel to the line of the cable rather than digging across the cable.
   - If any undisclosed underground cables are located, notify **nbn** immediately.
   - All personnel must be properly briefed, particularly those associated with the use of earth-moving equipment, trenching, boring and pneumatic equipment.
   - The safety of the public and other workers must be ensured.
   - All excavations must be undertaken in accordance with all relevant legislation and regulations.
7. You will be responsible for all damage to **nbn™** Facilities that are connected whether directly, or indirectly with work you carry out (or work that is carried out for you or on your behalf) at the Location. This will include, without limitation, all losses expenses incurred by **nbn** as a result of any such damage.
8. You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.
9. Except to the extent that liability may not be capable of lawful exclusion, **nbn** and its servants and agents and the related bodies corporate of **nbn** and their servants and agents shall be under no liability whatsoever to any person for any loss or damage (including indirect or consequential loss or damage) however caused (including, without limitation, breach of contract negligence and/or breach of statute) which may be suffered or incurred from or in connection with this information sheet or any plans(including Indicative Plans) attached hereto. Except as expressly provided to the contrary in this information sheet or the attached plans(including Indicative Plans), all terms, conditions, warranties, undertakings or representations (whether expressed or implied) are excluded to the fullest extent permitted by law.

All works undertaken shall be in accordance with all relevant legislations, acts and regulations applicable to the particular state or territory of the Location. The following table lists all relevant documents that shall be considered and adhered to.

State/Territory	Documents
National	Work Health and Safety Act 2011
	Work Health and Safety Regulations 2011
	Safe Work Australia - Working in the Vicinity of Overhead and Underground Electric Lines (Draft)

	Occupational Health and Safety Act 1991
NSW	Electricity Supply Act 1995
	Work Cover NSW - Work Near Underground Assets Guide
	Work Cover NSW - Excavation Work: Code of Practice
VIC	Electricity Safety Act 1998
	Electricity Safety (Network Asset) Regulations 1999
QLD	Electrical Safety Act 2002
	Code of Practice for Working Near Exposed Live Parts
SA	Electricity Act 1996
TAS	Tasmanian Electricity Supply Industry Act 1995
WA	Electricity Act 1945
	Electricity Regulations 1947
NT	Electricity Reform Act 2005
	Electricity Reform (Safety and Technical) Regulations 2005
ACT	Electricity Act 1971

Thank You,

nbn DBYD

Date: 22/05/2024

ON SITE BOOKING REQUIRED- PLEASE CALL

Subject: Before You Dig Australia Request – Government Fibre Optic Network

Date: **23 May 2024**

Attention: John Samoty

Email: eboijng438cpyz.23t2n6r0pkgibk@smarterwx-mail.byda.com.au

Site Address: **140 The Valley Avenue, Gungahlin, ACT, 2912**

BYDA Seq#: **239582353**

From: **Yolanda Harris**

Thank you for conducting a Before You Dig Australia request. We manage the **Government Fibre Optic Network.**

THERE IS CRITICAL GOVERNMENT FIBRE OPTIC NETWORK ASSET IN ALL OF YOUR PROPOSED AREA- ONSITE BOOKING REQUIRED

We are writing to confirm an onsite service locate is required prior to your excavation commencing.

Please call Commence Communications on 02 6226 3869 to confirm a time for an on-site appointment prior to any works commencing.

Regards

Yolanda Harris
Commence Communications

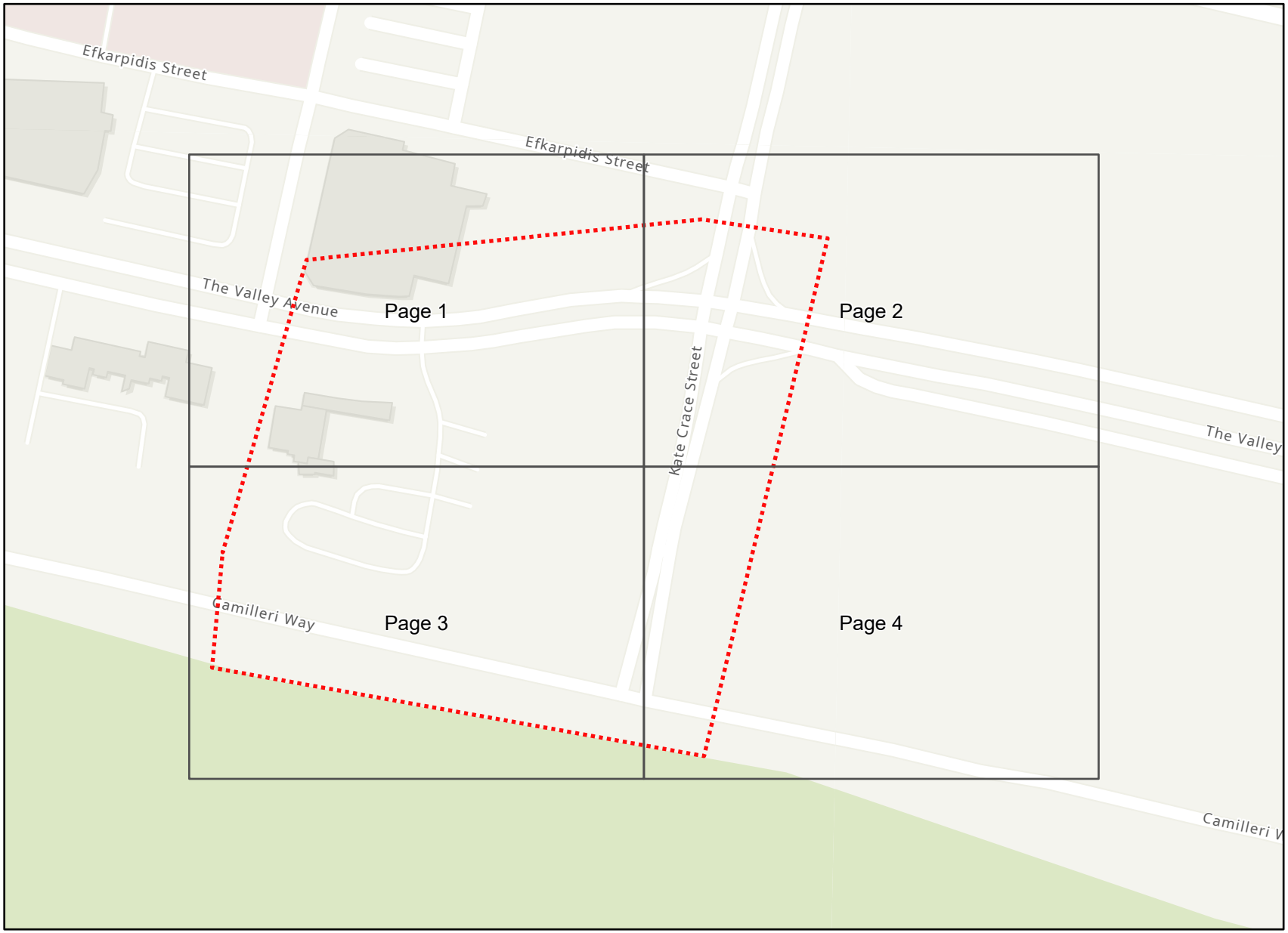
19 Shearsby Crescent, Yass NSW 2582
P 02 62263869
24hr emergency: 0438 649 487
E BYDAgovfibre@commencecomms.com.au
www.commencecomms.com.au
ABN 19 168 241 727

ACT Government
Transport Canberra and City Services

Job # 36741319
Seq # 239582354

Provided by Transport Canberra and City Services

BEFORE YOU DIG
www.byda.com.au



Legend

- BYDA Enquiry
- Detailed map page

In an emergency contact Transport Canberra and City Services on 13 22 81

Index Sheet

Plans generated by SmarterWX™ Automate

0 25 50 100 m

N

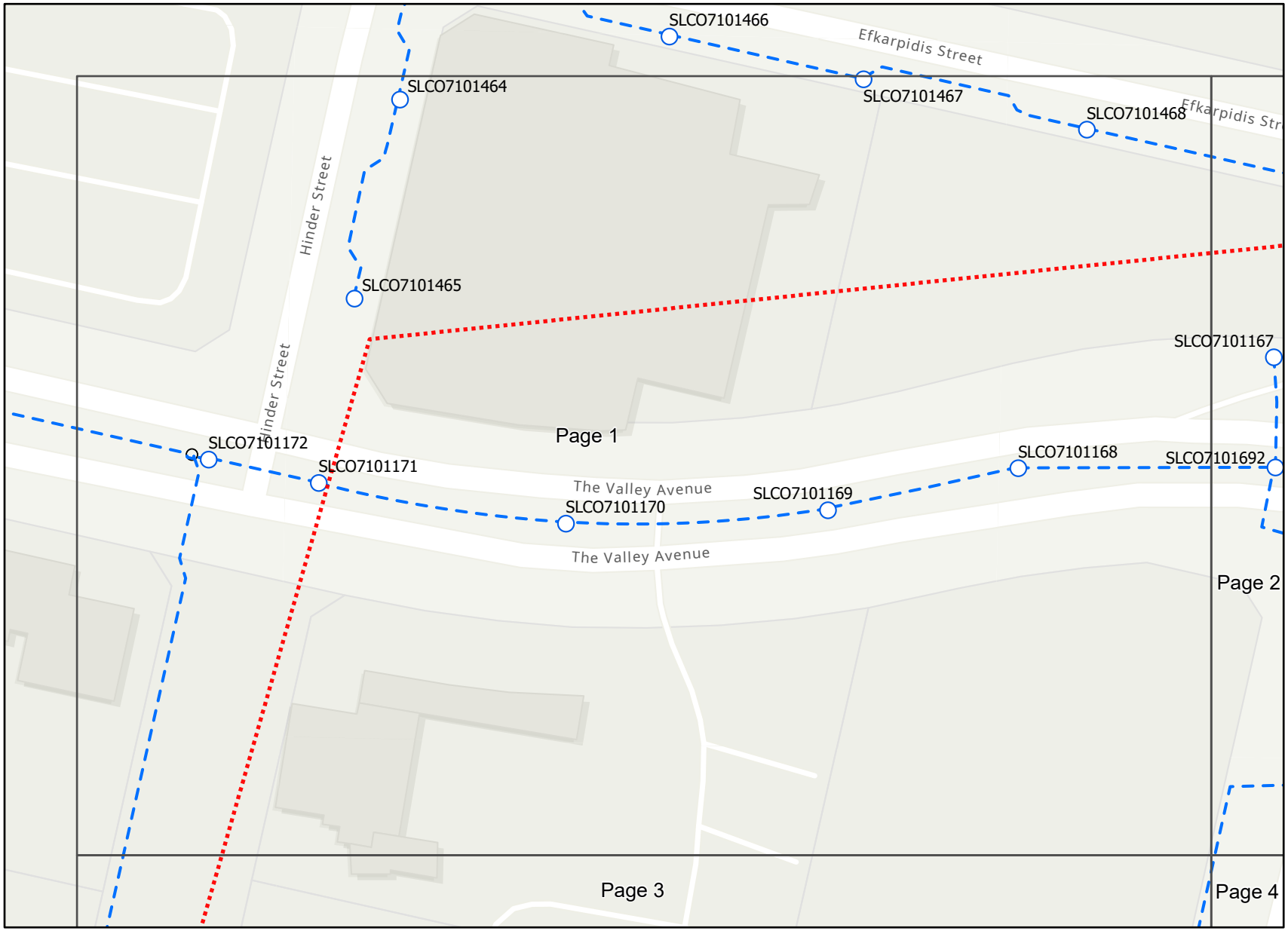
Scale 1:2,500

ACT Government
Transport Canberra and City Services

Job # 36741319
Seq # 239582354

Provided by Transport Canberra and City Services

BEFORE YOU DIG
www.byda.com.au



Legend

- BYDA Enquiry

Streetlighting Infrastructure

- Control Box
- Streetlight
- Underground Cable - In Service

In an emergency contact Transport Canberra and City Services on 13 22 81

22/05/24 (valid for 30 days)

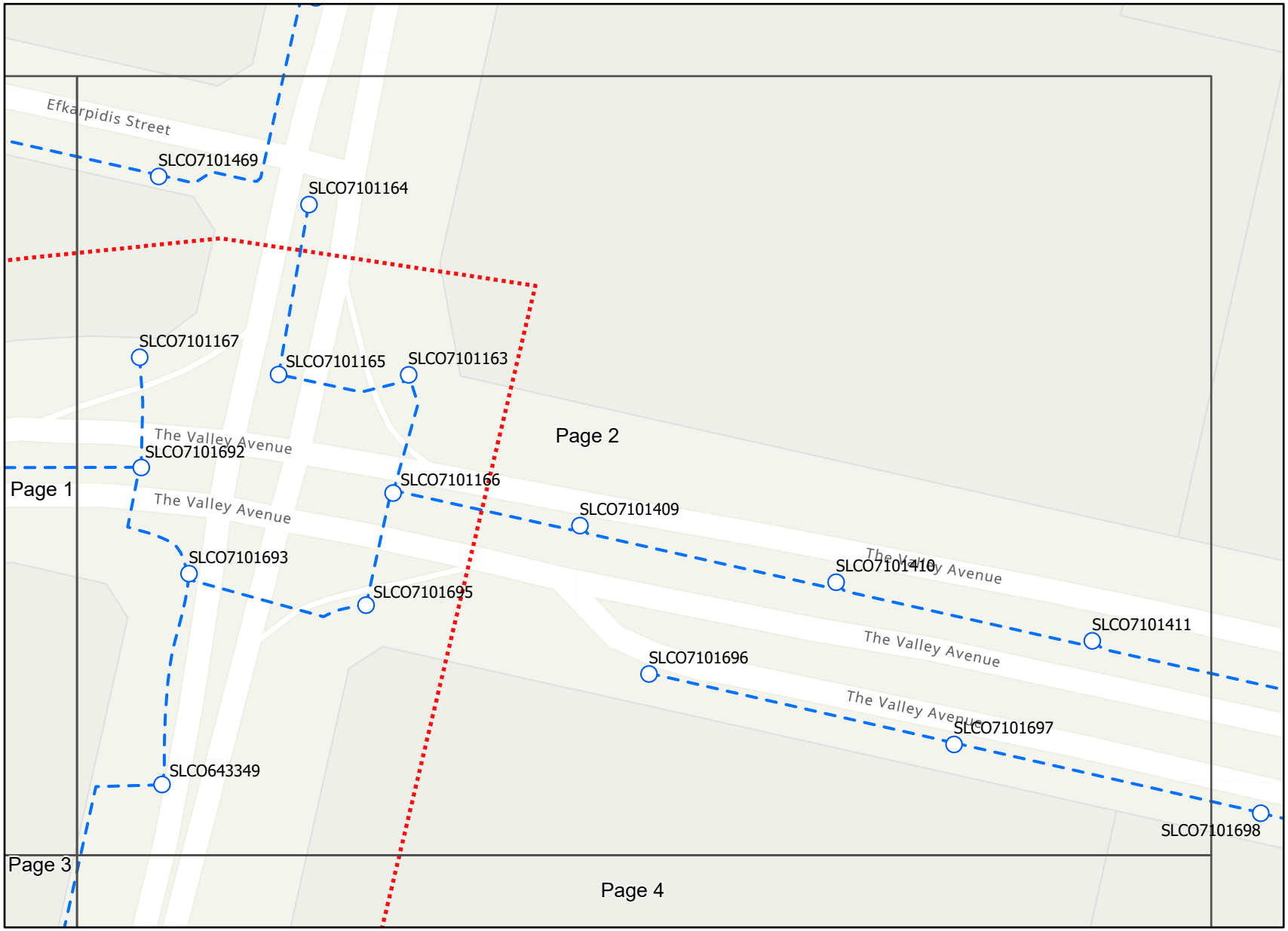
Plans generated by SmarterWX™ Automate

0 10 20 40 m

N

Scale 1:1,000

Job # 36741319
Seq # 239582354
Provided by Transport Canberra and City Services



Legend

- BYDA Enquiry
- Streetlighting Infrastructure
- Streetlight
- Underground Cable - In Service

In an emergency contact Transport Canberra and City Services on 13 22 81

22/05/24 (valid for 30 days)

Plans generated by SmarterWX™ Automate

0 10 20 40 m

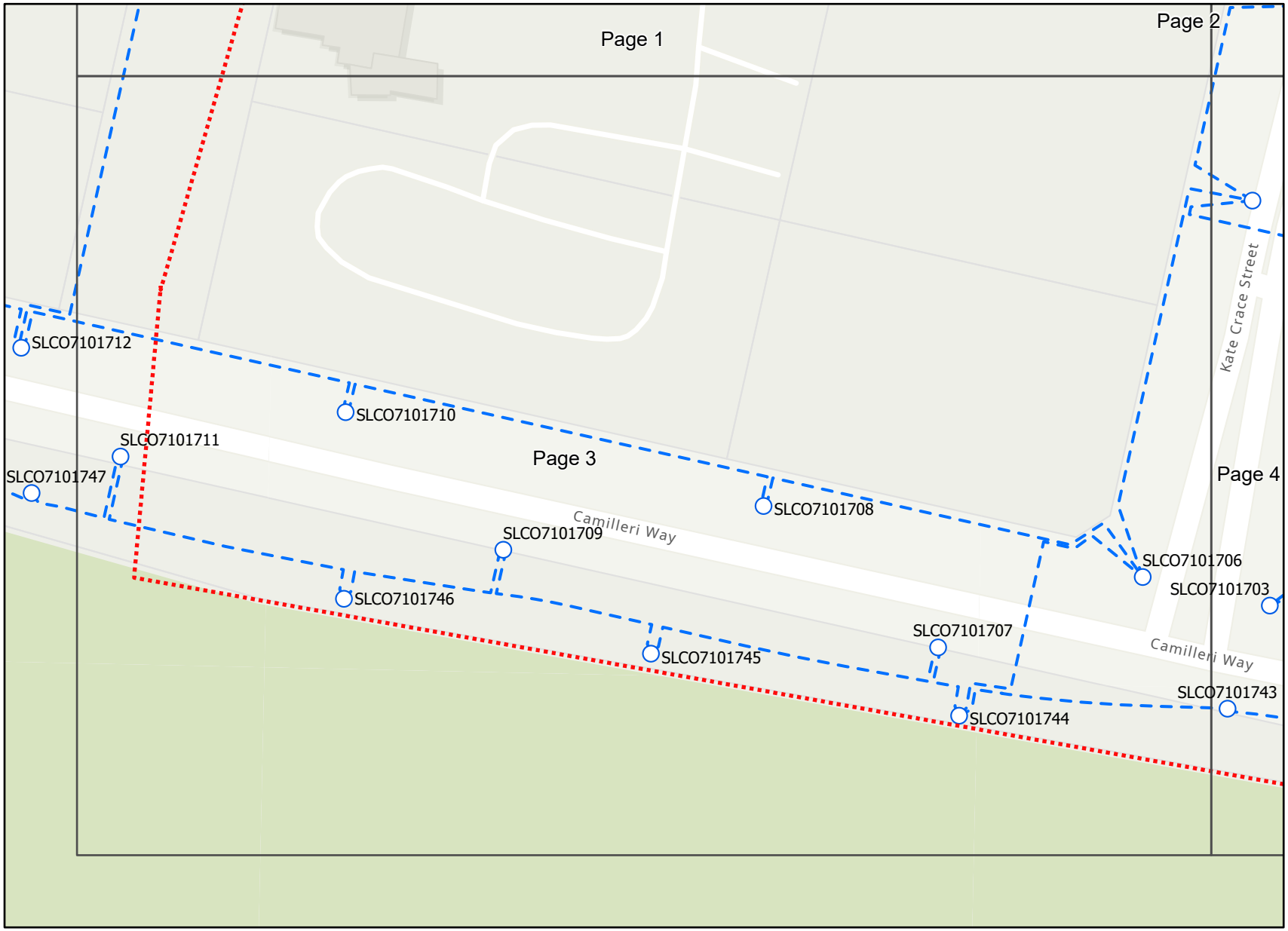
N

Scale 1:1,000

ACT Government
Transport Canberra and City Services

Job # 36741319
Seq # 239582354
Provided by Transport Canberra and City Services

BEFORE YOU DIG
www.byda.com.au



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- BYDA Enquiry

Streetlighting Infrastructure

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ACT Government
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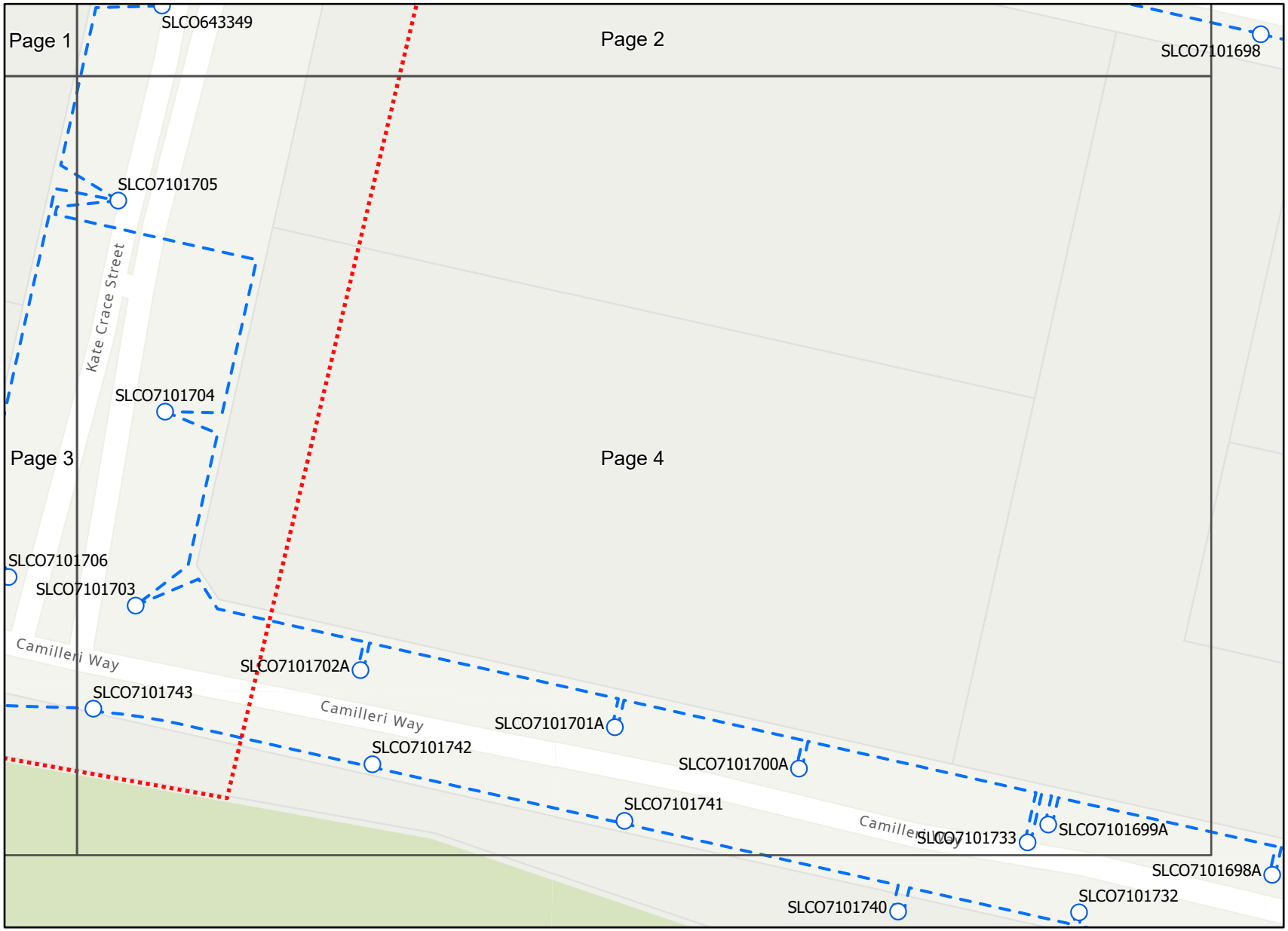

Legend

- BYDA Enquiry

Streetlighting Infrastructure

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Plans generated by SmarterWX™ Automate

0 10 20 40 m

N

Scale 1:1,000

ACT Government
Transport Canberra City Services

Before You Dig Australia (BYDA)
Location Information
Streetlights and related assets

Asset owner:

Streetlighting Unit
Roads ACT, Transport Canberra and City Services
GPO Box 158
Fyshwick ACT 2601

To:

John Samoty
28 Barrallier Street
Griffith ACT 2603

Enquiry Details	
Utility ID	90520
Job Number	36741319
Sequence Number	239582354
Enquiry Date	22 May 2024
Response	**AFFECTED**
Address	140 The Valley Avenue Gungahlin ACT 2912
Location in Road	Road, Nature Strip, Footpath
Activity	Mechanical Excavation,Non-Destructive Digging,Subdivision

Enquirer Details	
Customer ID	3541136
Contact	John Samoty
Company	JPS Engineering Consultants
Email	john.samoty@jpsengineering.com.au
Phone	+61417434996

PLEASE READ ALL THE INFORMATION AND DISCLAIMERS PROVIDED ON THE ATTACHED PAGES

General location only

- The approximate location of Streetlights and related assets (**the Assets**) in the nominated area are shown on the attached maps (**the Asset Plan**).
- The Asset locations provided with this response are based on the information available at the time and are only an indication of the presence of Assets within the nominated location. If the nominated area is not what you require, please resubmit another inquiry.
- The Asset Plans provided do not show the presence of any other assets, including private property assets.
- Please be aware that the location of the Assets may change to those indicated on the Asset Plan. The Asset locations shown on the attached Asset Plan are indicative only. Due to changes in surface levels and surrounding infrastructure, and works undertaken by other parties, Asset location may differ to those shown on the Asset Plan.
- *It is your responsibility to verify the location of the Assets shown on the Asset Plan through positive identification process*
- A new Asset Plan should be obtained every 28 days to ensure currency and accuracy. It is your responsibility to obtain a new Asset Plan if required.
- While every endeavour has been made to provide information that is accurate and reliable, complete accuracy cannot be guaranteed. Transport Canberra and City Services (TCCS) does not represent or warrant that you or any user of the Asset Plan will achieve any particular objective or guarantee any outcome.

Limitation of Liability

To the maximum extent permitted by law, TCCS and its officers, employees, contractors and agents accept no liability and are not responsible for any actions, liabilities, losses, damages (including consequential damages), costs, claims or expenses of whatever nature and regardless of the cause of action, whether in contract, tort (including negligence) or otherwise, arising out of or in connection with or as a consequence of any inaccuracies in the Asset Plan or the use of the information contained in the Asset Plan.

Without limiting the above, TCCS and its officers, employees, contractors and agents are not responsible to any person for:

- The currency, accuracy or completeness of the information provided in the Asset Plan; or
- Any delays in respect of delivery or supply by TCCS of the information sought in connection with the location of the Assets.

To the maximum extent permitted by law, TCCS specifically excludes any conditions, terms or warranties that may be implied into, or in respect of the provision of the Asset Plan and to the extent that any such condition, term or warranty or liability cannot be excluded, TCCS liability for breach of such implied term, condition or warranty is limited to the resupply of the Asset Plan provided by TCCS or the payment of the reasonable costs of having the Asset Plan supplied again.

Work to be carried out without interference or damage to Assets

Any work undertaken near the Assets, must be performed in a way that does not interfere with the reliability of or access to the Assets. Any work carried out that includes changing the surface level in any area where Assets are indicated must be carried out with care and you will be responsible for any damage caused through failure to exercise such care. TCCS may pursue the person or organisation responsible for causing any damage or interference to the Assets.

TPG Telecom Limited
ABN 76 096 304 620
Level 1, 177 Pacific Hwy
North Sydney NSW 2060
Phone: 1800 786 306 (24hrs)

Date: 22/05/2024

Enquirer Name:John Samoty
Enquirer Address:28 Barrallier Street
Email: john.samoty@jpsengineering.com.au
Phone: +61417434996

Dear John Samoty

The following is our response on behalf of each of the TPG carriers (listed below) to your Before You Dig Australia enquiry – Sequence 239582355

It is provided to you on a confidential basis under the following conditions and must be shredded or securely disposed of after use.

Assets Affected: 140 The Valley Avenue Gungahlin

Carriers (each a "TPG carrier") and assets affected:

TransACT

Location:

According to our records, the underground assets in the vicinity of the location stated in your enquiry are **AFFECTED**. Please read the below information and disclaimers in addition to the any attached plans provided prior to any construction activities.

IMPORTANT INFORMATION

- The information provided is valid for 30 days from the date of this response. If your work site area changes or your construction activity is beyond 30 days please contact Before You Dig Australia on 1100 or www.1100.com.au to re-submit a new enquiry.
- Due to the nature of underground assets and the age of some assets and records, our plans are indicative of the general location only and may not show all assets in the location. You should not solely rely on these plans when undertaking construction works. It is also inaccurate to assume depth or that underground network conduit and cables follow straight lines, and careful on-site investigations are essential to locate an asset's exact position prior to excavation. It is your responsibility to locate and confirm the exact location of our infrastructure using non-destructive techniques. We make no warranty or guarantee that our plans are complete, current or error free, and to the maximum extent permitted by law we exclude all liability to you, your employees, agents and contractors for any loss, damage or claim arising out of or in connection with using our plans.
- Please note that some of our conduits carry electrical cables and gas pipes. Please exercise extreme care when working within the vicinity of these conduit and take into account the minimum clearance distances under Duty Of Care below.
- You (and your employee and contractors) must not open, move, interfere, alter or relocate any of our assets without our prior approval.
- **Note** It is a criminal offence under the *Criminal Code Act 1995 (Cth)* to tamper or interfere with communication facilities owned by a carrier. Heavy penalties may apply for breach of this prohibition, and any damages suffered, or costs incurred by us as a result of such unauthorised works may be claimed against you.

DAMAGE

- You must report immediately any damage to our network on **1800 786 306** (24hrs). We will hold you liable and seek compensation for any loss or damage to our network, our property and our customers that is caused by or arises out of your activities.

DUTY OF CARE

You have a duty of care to carefully locate, validate and protect our assets when carrying out works near our infrastructure. For construction activities that may impact on or interfere with our network, you will need to call us on **1800 786 306** to discuss a suitable engineering solution, lead time and cost involved. The below precautions must be taken when working in the vicinity of our network:

- Contact us on **1800 786 306** to discuss and obtain relevant information and plans on our infrastructure in a particular location if the information provided in this response is insufficient.
- Physically locate and mark on-site our network infrastructure using non-destructive techniques i.e. pot holing or hand digging every 5 metres prior to commencing any construction activities. Assets located must be marked to AS5488 standard. **NO CONSTRUCTION WORK IS ALLOWED UNTIL THIS STEP IS COMPLETED**. You must use an approved telecommunications accredited locator, or we can provide a locator for you at your expense. If we provide you with a locator, and this locator attended the site and is proven to be grossly negligent in physically locating and marking our infrastructure, then to the extent any TPG carrier is liable for this locator's negligence, acts and omissions, the total liability aggregated for all TPG carriers is limited, at our option, to attend the site and re-mark the infrastructure or to pay for a third party to re-mark the infrastructure.
- If you require us to locate or monitor our infrastructure, please allow five business days' notice for us to respond.
- Ensure all information, including our network requirements and any associated plans provided by us are kept confidential and remain on-site throughout your construction works.

- Use suitably qualified and supervised professionals, particularly if you are working near assets that contain electricity cables or gas pipes.

- Ensure the below minimum clearance distances between the construction activities and the actual location of our assets are met. If you need clearance distances for our above ground assets, or if the below distances cannot be met, call **1800 786 306** to discuss.

  Minimum assets clearance distances.

  - 300mm when laying asset inline, horizontal or vertical.
  - 1000mm when operating vibrating equipment. Eg: vibrating plates. No vibrating equipment on top of asset.
  - 1000mm when operating mechanical excavators or jackhammers/pneumatic breakers.
  - 2000mm when performing directional bore in-line, horizontal and vertical.
  - No heavy vehicle over 3 tonnes to be driven over asset with less than 600mm of cover.

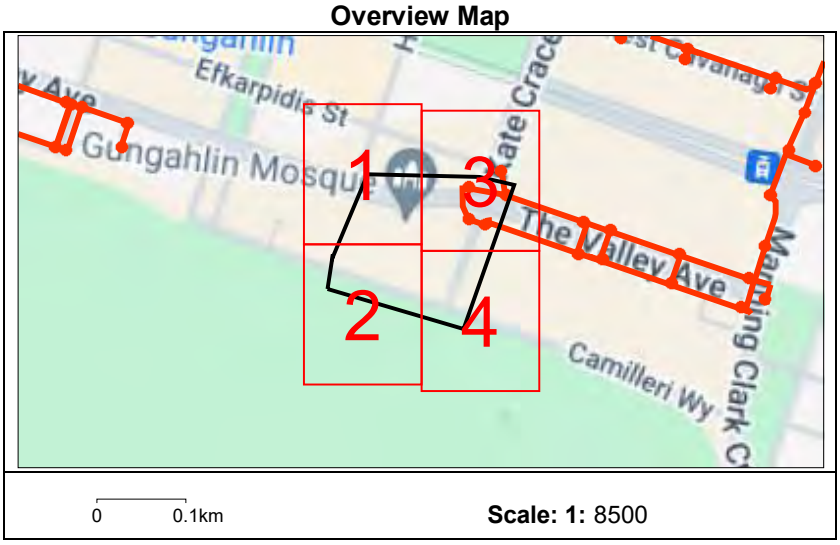
- Reinstate exposed TPG network infrastructure back to original state.

PRIVACY & CONFIDENTIALITY

- Privacy Notice – Your information has been provided to us by Before You Dig Australia to respond to your Before You Dig Australia enquiry. We will keep your personal information in accordance with TPG's privacy policy, see www.tpg.com.au/about/privacy.

- Confidentiality – The information we have provided to you is confidential and is to be used only for planning and designing purposes in connection with your Before You Dig Australia enquiry. Please dispose of the information by shredding or other secure disposal method after use. We retain all intellectual property rights (including copyrights) in all our documents and plans.

Overview Map



TPG Telecom Limited

Enquiry Number: 239582355

Map Sheet: 1

Scale: 1: 750

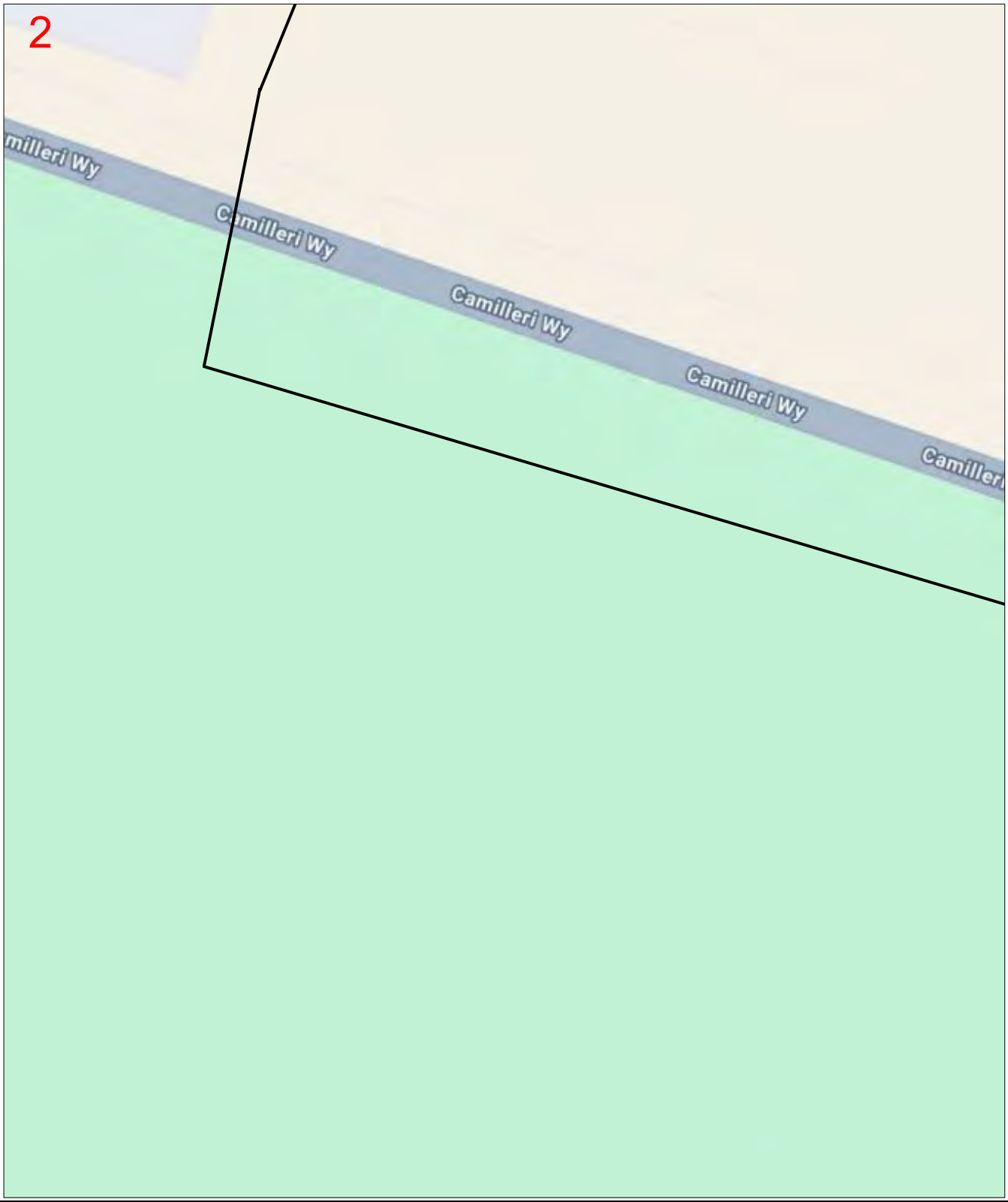
0 0.008km

N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct



Enquiry Number: 239582355

Map Sheet: 2

Scale: 1: 750

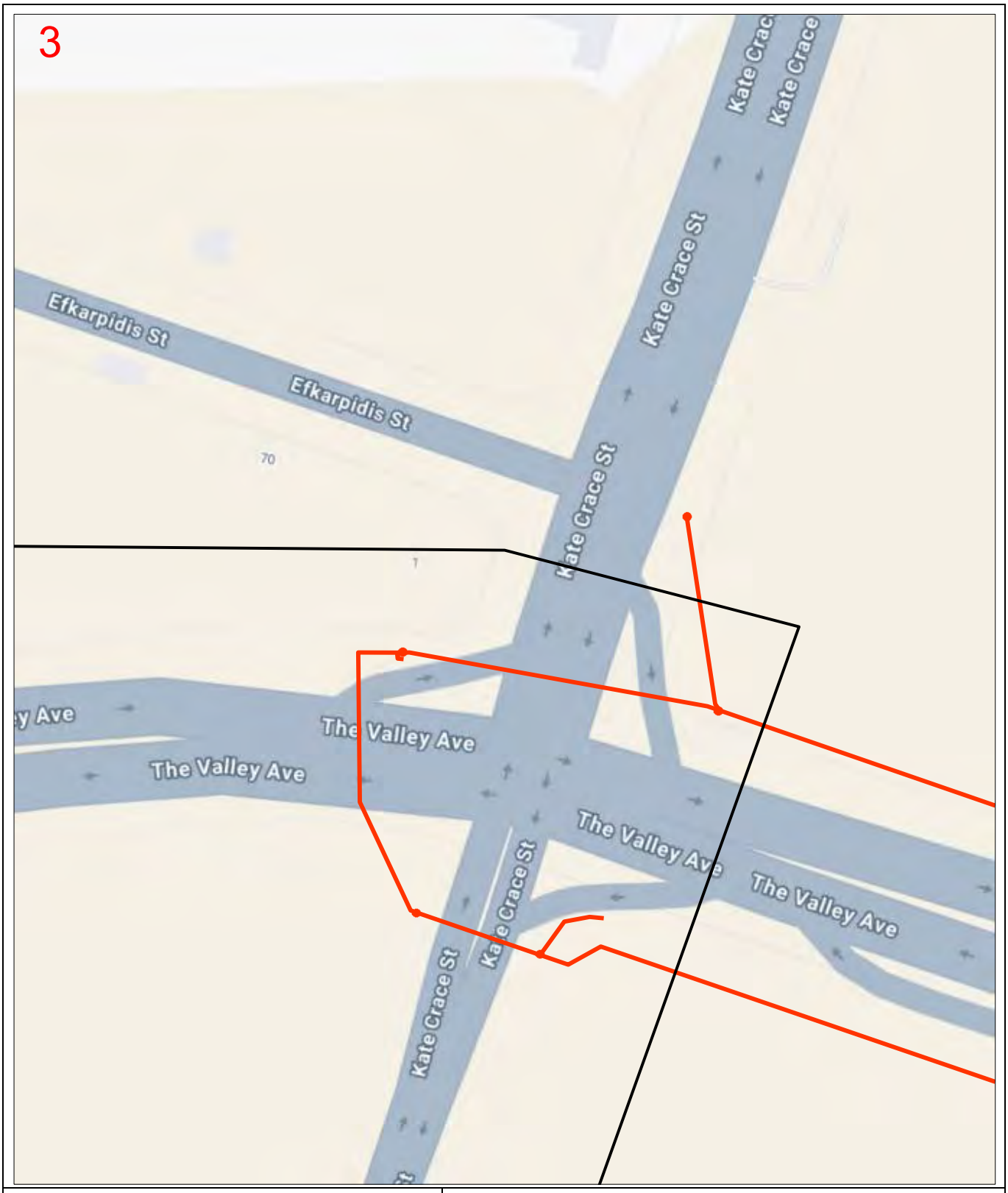
0 0.008km

N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct



Enquiry Number: 239582355

Map Sheet: 3

Scale: 1: 750

0 0.008km

N

LEGEND

BYDA Work Area	
AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

Enquiry Number: 239582355

Map Sheet: 4

Scale: 1: 750

0 0.008km

N

LEGEND

BYDA Work Area

AAPT/PowerTel Pit	TransACT Pit
AAPT/PowerTel Duct	TransACT Duct
DDA Pit	SOUL Pattinson Telecoms Pit
DDA Duct	SOUL Pattinson Telecoms Duct
Agile/Adam Pit	PIPE Networks Pit
Agile/Adam Duct	PIPE Networks Duct

Cable Plan

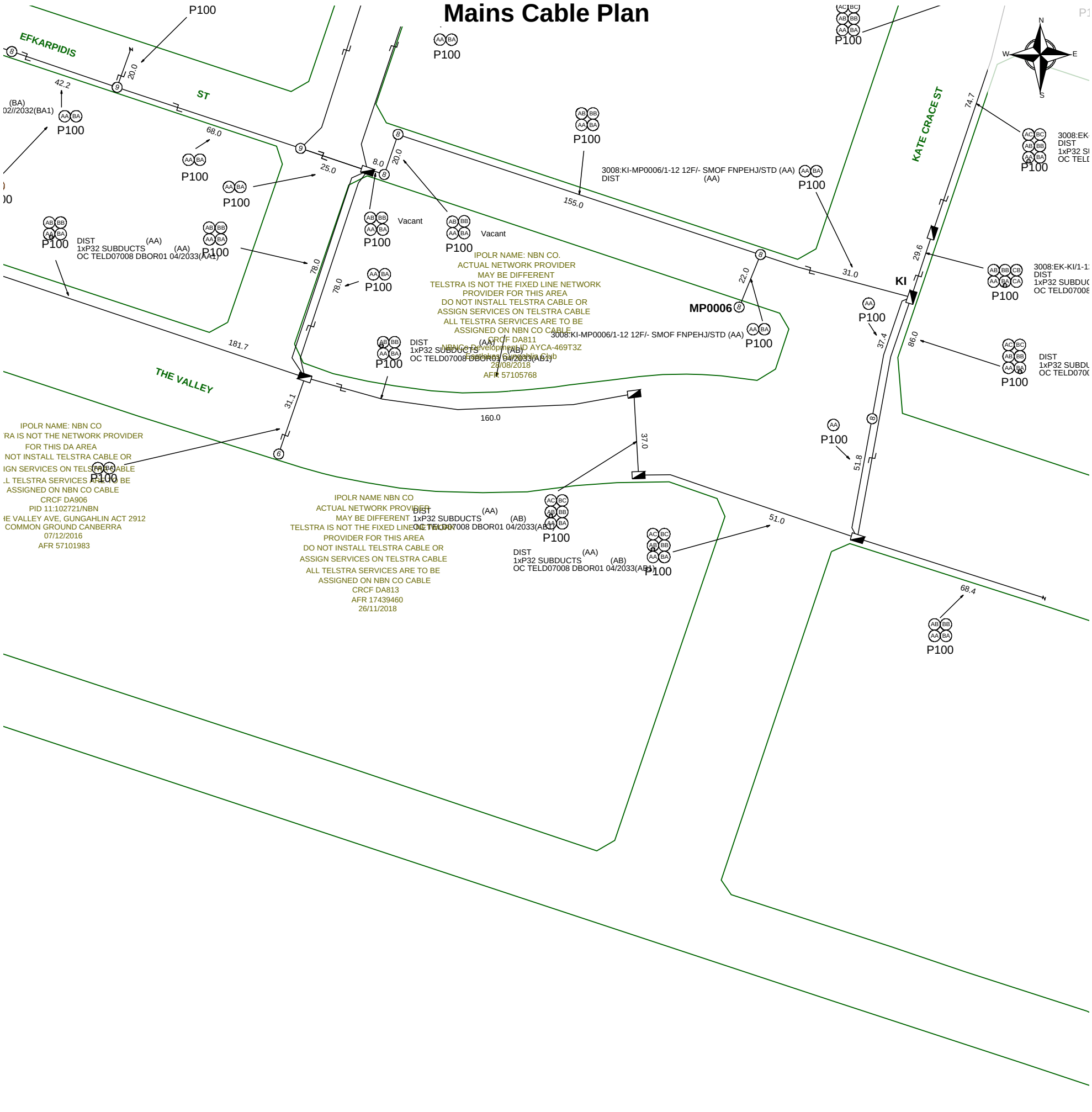
Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 239582356
TELSTRA LIMITED A.C.N. 086 174 781	CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.
Generated On 22/05/2024 19:32:06	

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

WARNING
Telstra plans and location information conform to Quality Level "D" of the Australian Standard AS 5488-Classification of Subsurface Utility Information.
As such,Telstra supplied location information is indicative only.Spatial accuracy is not applicable to Quality Level D.
Refer to AS 5488 for further details. The exact position of Telstra assets can only be validated by physically exposing it.
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

See the Steps- Telstra Duty of Care that was provided in the email response.

Mains Cable Plan



Report Damage: https://service.telstra.com.au/customer/general/forms/report-damage-to-telstra-equipment Ph - 13 22 03 Email - Telstra.Plans@team.telstra.com Planned Services - ph 1800 653 935 (AEST bus hrs only) General Enquiries	Sequence Number: 239582356
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Generated On 22/05/2024 19:32:09	

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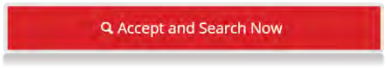
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

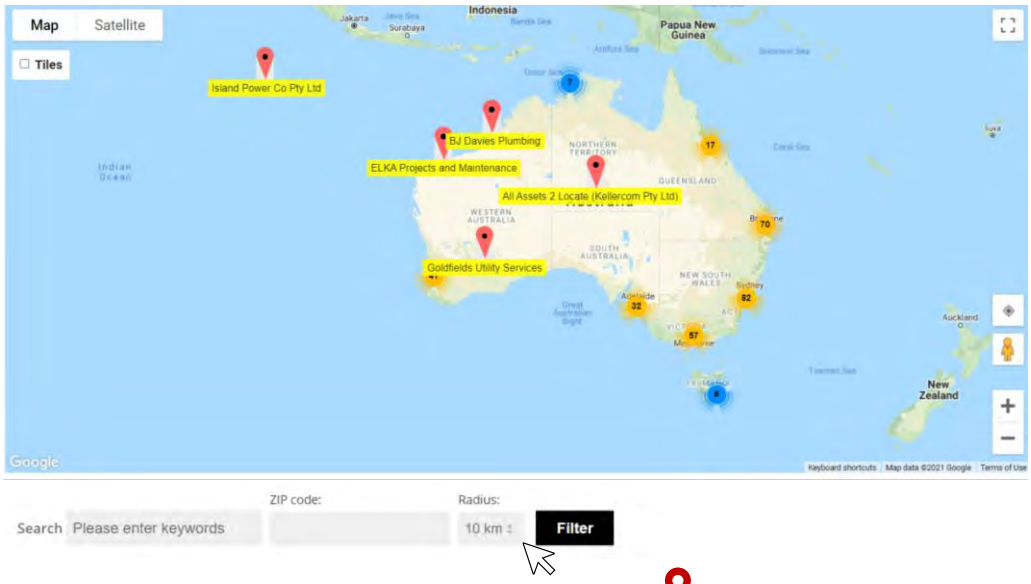
See the Steps- Telstra Duty of Care that was provided in the email response.

Certified Locating Organisations (CLO)

Find the closest CLO to your worksite on: https://dbydlocator.com/certified-locating-organisation/

Read the disclaimer and click: 

A national map and an A-Z list of Certified Locating Organisations is displayed.



Use the map to zoom to your work area and choose the closest Locator indicated.

OR search by entering the **postcode** of your work area.

1. **Enter the post/zip code**
2. **Choose your search radius**
3. **Click filter** (If there is no result, you may have to increase the search radius)
4. **Click on the closest for CLO details or view the results displayed below the map**

Locator skills have been tested, and the Organisation has calibrated location and safety equipment.

Telstra is aware of each Certified Locating Organisation and their employee locators.

Only a DBYD Certified Locator registered with a Certified Locating Organisation is authorised to access Telstra network for locating purposes.

Each Certified Locator working for a CLO is issued with a photo ID Card, authorising them to access Telstra pits and manholes for the purpose of cable and plant locations.

Please ask to see your Locators' CLO ID Card.

Before You Dig Australia

Think before you dig

This document has been sent to you because you requested plans of the Telstra network through Before You Dig Australia (BYDA).

If you are working or excavating near telecommunications cables, or there is a chance that cables are located near your site, you are responsible to avoid causing damage to the Telstra network.

Please read this document carefully. Taking your time now and following the steps below can help you avoid damaging our network, interrupting services, and potentially incurring civil and criminal penalties.

Our network is complex and working near it requires expert knowledge. Do not attempt these activities if you are not qualified to do so.

Useful information

Further Information

Cable Plan enquiries
1800 653 935 (AEST business hours only)

Telstra.Plans@team.telstra.com

Information on how to find cables and request asset relocations:

https://www.telstra.com.au/consumer-advice/digging-construction

Opening Digital Plan Attachments. Asset Plan Readers:

PDF Adobe Acrobat Reader DC Install for all versions
DWF Map Files (all sizes over A3)
Autodesk Viewer (Browser) or
Autodesk Design Review (Microsoft Windows)

Report any damage immediately

https://www.telstra.com.au/forms/report-damage-to-telstra-equipment

13 22 03
If you receive a message asking for an account or phone number say
"I Don't have one"
Then say, "Report Damage" and listen to the prompts.

Relocating Telstra Assets

If your project requires the relocation of a Telstra asset, please contact the Telstra Network Integrity Group:

1800 810 443 (AEST business hours only)

NetworkIntegrity@team.telstra.com

Never try to move or alter our network infrastructure without authorisation. By law, only authorised people can work on our assets or enter a facility owned or operated by us. Any interference, including unauthorised entry or tampering, may result in legal action.

Certified Locating Organisation (CLO)

Engage a CLO

Find your Closest CLO to identify , validate and protect Telstra Assets before you commence you work.
https://dbydlocator.com/certified-locating-organisation/

Your checklist

1. Plan

Plan your work with the latest plans of our network.

Plans provided through the BYDA process are indicative only*.

This means the actual location of our asset may differ substantially from that shown on the plans.

Refer to steps 2 and 3 to determine actual location prior to proceeding with construction.

2. Prepare

Engage a DBYD Certified Locating Organisation (CLO) via dbydlocator.com to identify, validate and protect Telstra assets before you commence work.

3. Pothole

Validate underground assets by potholing by hand or using non-destructive vacuum extraction methods.

Electronic detection alone (step 2) is not deemed to validate underground assets and must not be used for construction purposes.

If you cannot validate the Telstra network, you must not proceed with construction.

4. Protect

Protect our network by maintaining the following distances from our assets:

- 1.0m Mechanical Excavators, Farm Ploughing, Tree Removal
- 500mm Vibrating Plate or Wacker Packer Compactor
- 600mm Heavy Vehicle Traffic (over 3 tonnes) not to be driven across Telstra ducts or plant
- 1.0m Jackhammers/Pneumatic Breakers
- 2.0m Boring Equipment (in-line, horizontal and vertical)

5. Proceed

You can proceed with your work only once you have completed all the appropriate preparation, potholing and protection.

Disclaimer and legal details

*Telstra advises that the accuracy of the information provided by Telstra conforms to Quality Level D as defined in AS5488-2013.

It is a criminal offence under the Criminal Code Act 1995 (Cth) to tamper or interfere with telecommunications infrastructure.

Telstra will also take action to recover costs and damages from persons who damage assets or interfere with the operation of Telstra's networks.

By receiving this information including the indicative plans that are provided as part of this information package you confirm that you understand and accept the risks of working near Telstra's network and the importance of taking all of the necessary steps to confirm the presence, alignments and various depths of Telstra's network. This in addition to, and not in replacement of, any duties and obligations you have under applicable law.

When working in the vicinity of a telecommunications plant you have a "Duty of Care" that must be observed. Please read and understand all the information and disclaimers provided below.

The Telstra network is complex and requires expert knowledge to interpret information, to identify and locate components, to pothole underground assets for validation and to safely work around assets without causing damage. If you are not an expert and/or qualified in these areas, then you must not attempt these activities. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers. Construction activities and/or any activities that potentially may impact on Telstra's assets must not commence without first undertaking these steps. Construction activities can include anything that involves breaking ground, potentially affecting Telstra assets.

If you are designing a project, it is recommended that you also undertake these steps to validate underground assets prior to committing to your design.

This Notice has been provided as a guide only and may not provide you with all the information that is required for you to determine what assets are on or near your site of interest. You will also need to collate and understand all of the information received from other Utilities and understand that some Utilities are not a part of the BYDA program and make your own enquiries as appropriate. It is the responsibility of the entities undertaking the works to protect Telstra's network during excavation / construction works.

Telstra owns and retains the copyright in all plans and details provided in conjunction with the applicant's request. The applicant is authorised to use the plans and details only for the purpose indicated in the applicant's request. The applicant must not use the plans or details for any other purpose.

Telstra plans or other details are provided only for the use of the applicant, its servants, agents, or Certified Locating Organisation. The applicant must not give the plans or details to any parties other than these and must not generate profit from commercialising the plans or details.

Telstra, its servants or agents shall not be liable for any loss or damage caused or occasioned by the use of plans and or details so supplied to the applicant, its servants and agents, and the applicant agrees to indemnify Telstra against any claim or demand for any such loss or damage.

Please ensure Telstra plans and information provided always remains on-site throughout the inspection, location, and construction phase of any works.

Telstra plans are valid for 60 days after issue and must be replaced if required after the 60 days.

Data Extraction Fees

In some instances, a data extraction fee may be applicable for the supply of Telstra information. Typically, a data extraction fee may apply to large projects, planning and design requests or requests to be supplied in non-standard formats. For further details contact Telstra Planned Services.

Telstra does not accept any liability or responsibility for the performance of or advice given by a Certified Locating Organisation. Certification is an initiative taken by Telstra towards the establishment and maintenance of competency standards. However, performance and the advice given will always depend on the nature of the individual engagement.

Neither the Certified Locating Organisation nor any of its employees are an employee or agent for Telstra. Telstra is not liable for any damage or loss caused by the Certified Locating Organisation or its employees.

Once all work is completed, the excavation should be reinstated with the same type of excavated material unless specified by Telstra

The information contained within this pamphlet must be used in conjunction with other material supplied as part of this request for information to adequately control the risk of potential asset damage.

When using excavators and other machinery, also check the location of overhead power lines.

Workers and equipment must maintain safety exclusion zones around power lines

WARNING: Telstra plans and location information conform to Quality Level 'D' of the Australian Standard AS 5488 - Classification of Subsurface Utility Information. As such, Telstra supplied location information is indicative only. Spatial accuracy is not applicable to Quality Level D. Refer to AS 5488 for further details. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans. FURTHER ON SITE INVESTIGATION IS REQUIRED TO VALIDATE THE EXACT LOCATION OF TELSTRA PLANT PRIOR TO COMMENCING CONSTRUCTION WORK. A plant location service is an essential part of the process to validate the exact location of Telstra assets and to ensure the assets are protected during construction works. The exact position of Telstra assets can only be validated by physically exposing them. Telstra will seek compensation for damages caused to its property and losses caused to Telstra and its customers.

Privacy Note

Your information has been provided to Telstra by BYDA to enable Telstra to respond to your BYDA request. Telstra keeps your information in accordance with its privacy statement. You can obtain a copy at www.telstra.com.au/privacy or by calling us at 1800 039 059 (business hours only).

OPENING ELECTRONIC MAP ATTACHMENTS -

Telstra Cable Plans are generated automatically in either PDF or DWF file types, dependent on the site address and the size of area selected. You may need to download and install free viewing software from the internet e.g.

DWF Map Files (all sizes over A3)

Autodesk Viewer (Browser) (https://viewer.autodesk.com/) or

Autodesk Design Review (http://usa.autodesk.com/design-review/) for DWF files. (Windows PC)

PDF Map Files (max size A3)

Adobe Acrobat Reader (http://get.adobe.com/reader/)

Telstra BYDA map related enquiries email

Telstra.Plans@team.telstra.com

1800 653 935 (AEST Business Hours only)

REPORT ANY DAMAGE TO THE TELSTRA NETWORK IMMEDIATELY

Report online - https://www.telstra.com.au/forms/report-damage-to-telstra-equipment

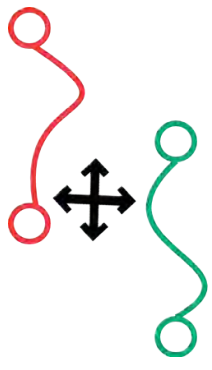
Ph: **13 22 03**

If you receive a message asking for a phone or account number say:

"I don't have one" then say "Report Damage" then press 1 to speak to an operator.

Telstra New Connections / Disconnections

13 22 00



Telstra asset relocation enquiries: 1800 810 443 (AEST business hours only).

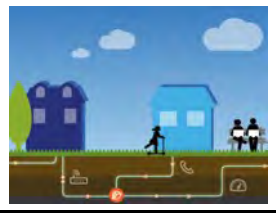
NetworkIntegrity@team.telstra.com

https://www.telstra.com.au/consumer-advice/digging-construction

Certified Locating Organisation (CLO)

https://dbydlocator.com/certified-locating-organisation/

Please refer to attached Accredited Plant Locator.pdf



Telstra Smart Communities
Information for new developments (developers, builders, homeowners)
https://www.telstra.com.au/smart-community

LEGEND

For more info contact a Certified Locating Organisation or Telstra Plan Services 1800 653 935

Exchange
(Major Cable Present)

Footway Access Chamber
(can vary from 1-lid to 12-lid)

or

Pillar / Cabinet
(above ground / free standing)

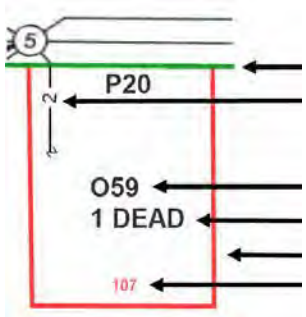
Above ground complex equipment housing (eg RIM)
Please Note: This equipment is powered by 240V Electricity

OC — Other Carrier Telecommunications Cable/Asset

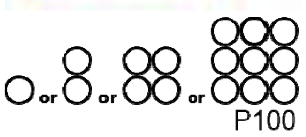
Dist — Distribution cables in Main Cable ducts

MC — Main Cable ducts on a Distribution plan

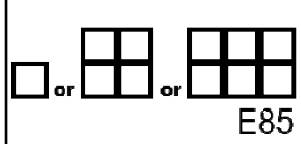
Blocked or damaged duct.



Roadside / Front Boundary
2 pair lead-in to property from pit in street 1
pair working (pair ID 059)
1 pair dead (i.e. spare, not connected)
Side / Rear Property Boundary
Property Number

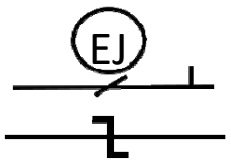


Single to multiple round conduit
Configurations 1,2,4,9 respectively
(attached text denotes conduit type and size)



Multiple square conduit
Configurations 2, 4, 6 respectively
(attached text denotes conduit type and size)

Cable Jointing Pit
(number / Letter indicating Pit Type)



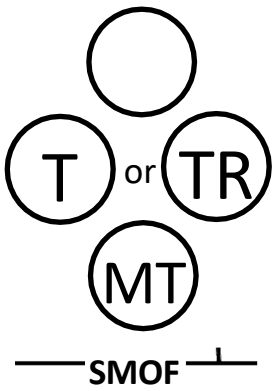
Elevated Joint
(above ground joint on buried cable)

Telstra Plant in shared Utility trench

Aerial Cable / Overhead (includes on wall)

Aerial Cable
(attached to joint Use Pole e.g. Power)

Direct Buried Cable



Marker Post Installed

Buried Transponder

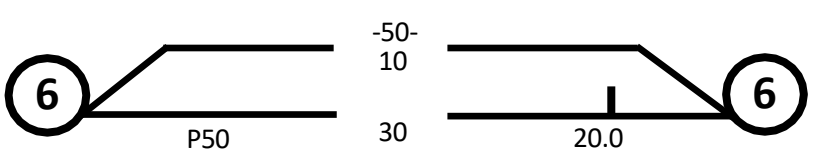
Marker Post, Transponder

Optical Fiber cable direct buried

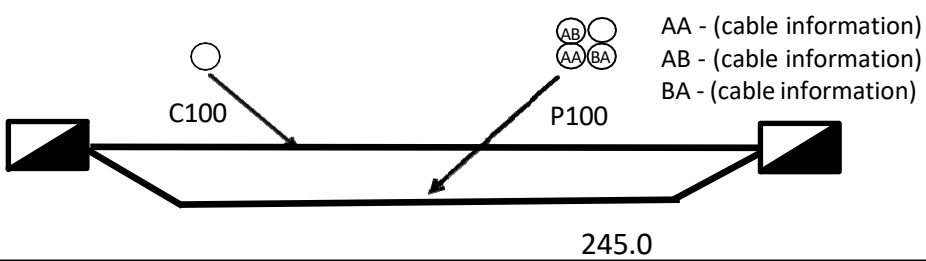
Some examples of conduit type and size:

A - Asbestos cement, P - PVC / Plastic, C - Concrete,
GI - Galanised iron, E - Earthenware
Conduit sizes *nominally* range from 20mm to 100mm
P50 50mm PVC conduit
P100 100mm PVC conduit
A100 100mm asbestos cement conduit

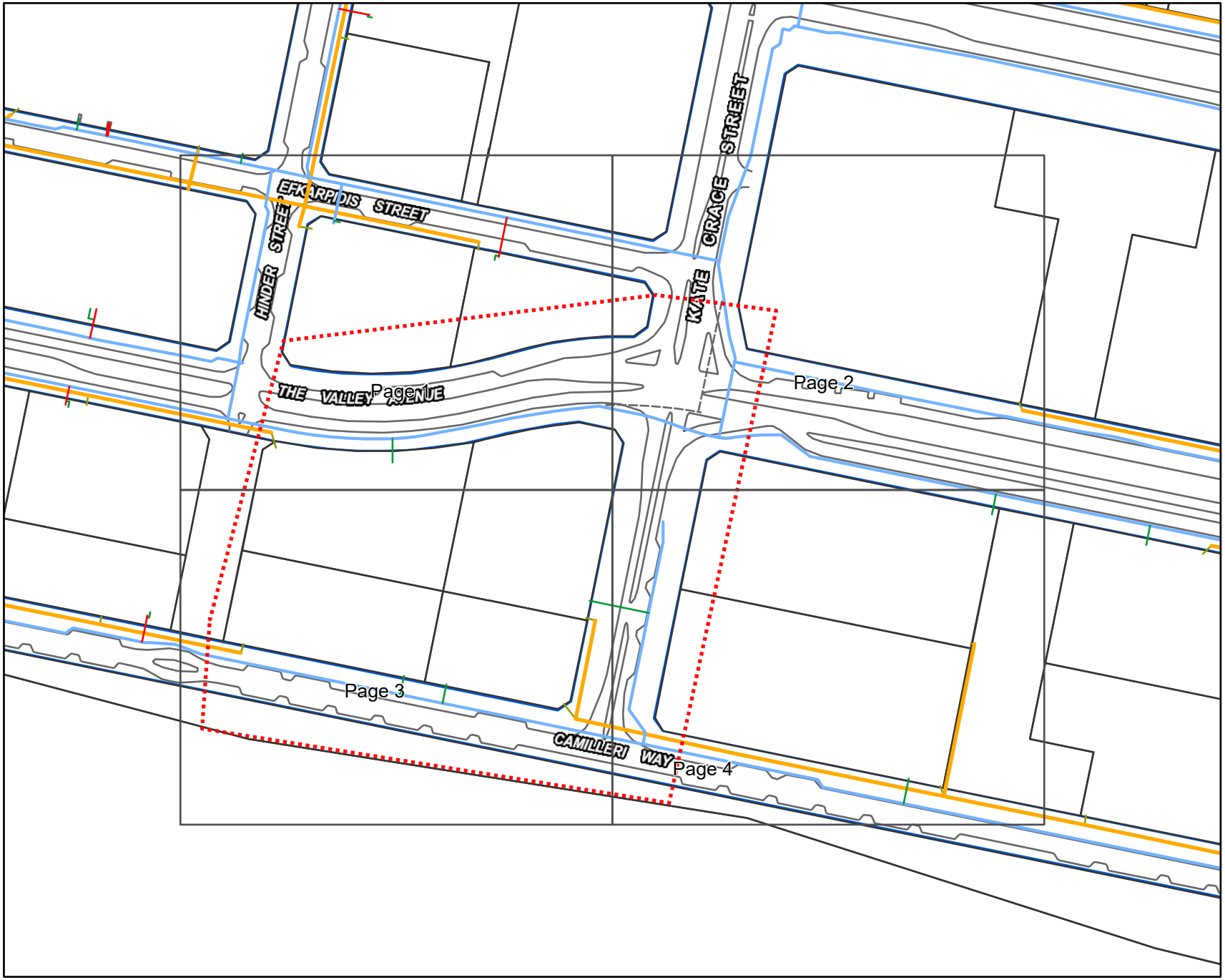
Some Examples of how to read Telstra Plans



One 50mm PVC conduit (P50) containing a 50-pair and a 10-pair cable between two 6-pits. approximately 20.0m apart, with a direct buried 30-pair cable along the same route



Two separate conduit runs between two footway access chambers (manholes) approximately 245m apart A nest of four 100mm PVC conduits (P100) containing assorted cables in three ducts (one being empty) and one empty 100mm concrete duct (C100)



22/05/24 **Index Sheet**

Job # 36741319
Seq # 239582357
Job site: 140 The Valley Avenue , Gungahlin ACT 2912

BYDA Enquiry

Detailed Map Page

N

0 10 20 40 60 80 m

Scale: 1:2,500

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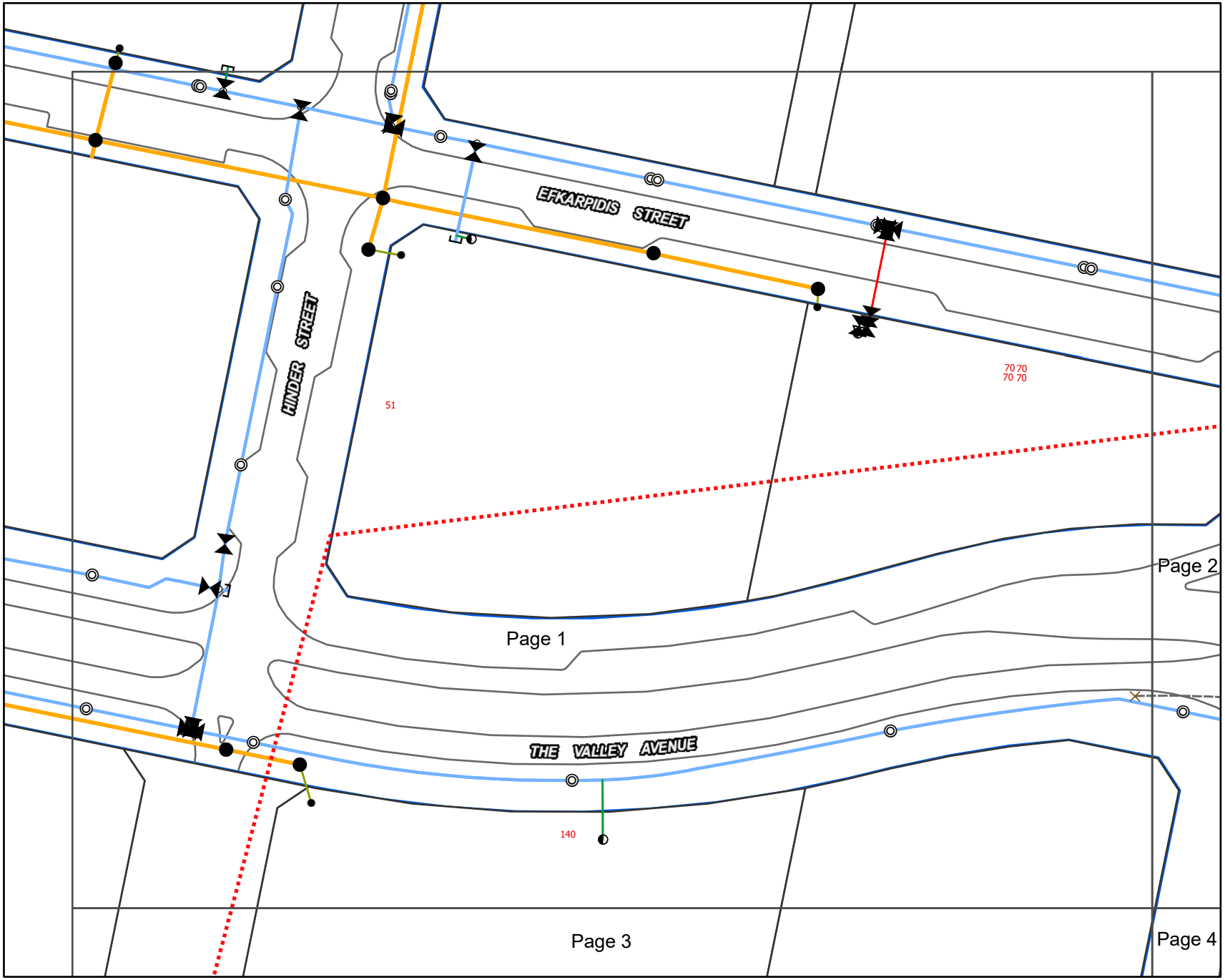

22/05/24 (valid for 30 days)

icon WATER

Water Network

Job # 36741319
Seq # 239582357
Job site: 140 The Valley Avenue , Gungahlin ACT 2912

BYDA Enquiry

N

0 4 8 16 24 32 m

Scale: 1:1,000

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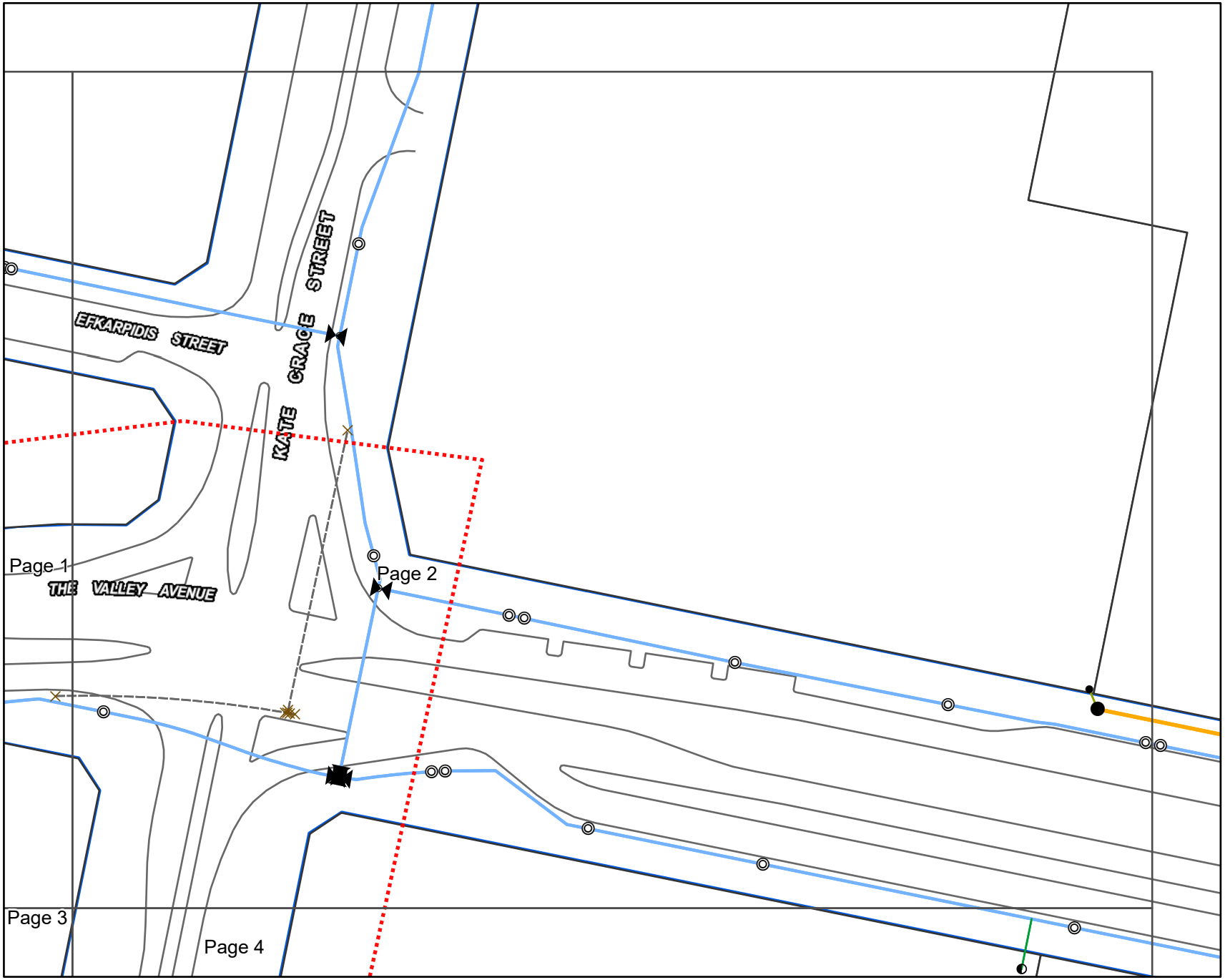

22/05/24 (valid for 30 days)

icon WATER

Water Network

Job # 36741319
Seq # 239582357
Job site: 140 The Valley Avenue , Gungahlin ACT 2912

BYDA Enquiry

N

0 4 8 16 24 32 m

Scale: 1:1,000

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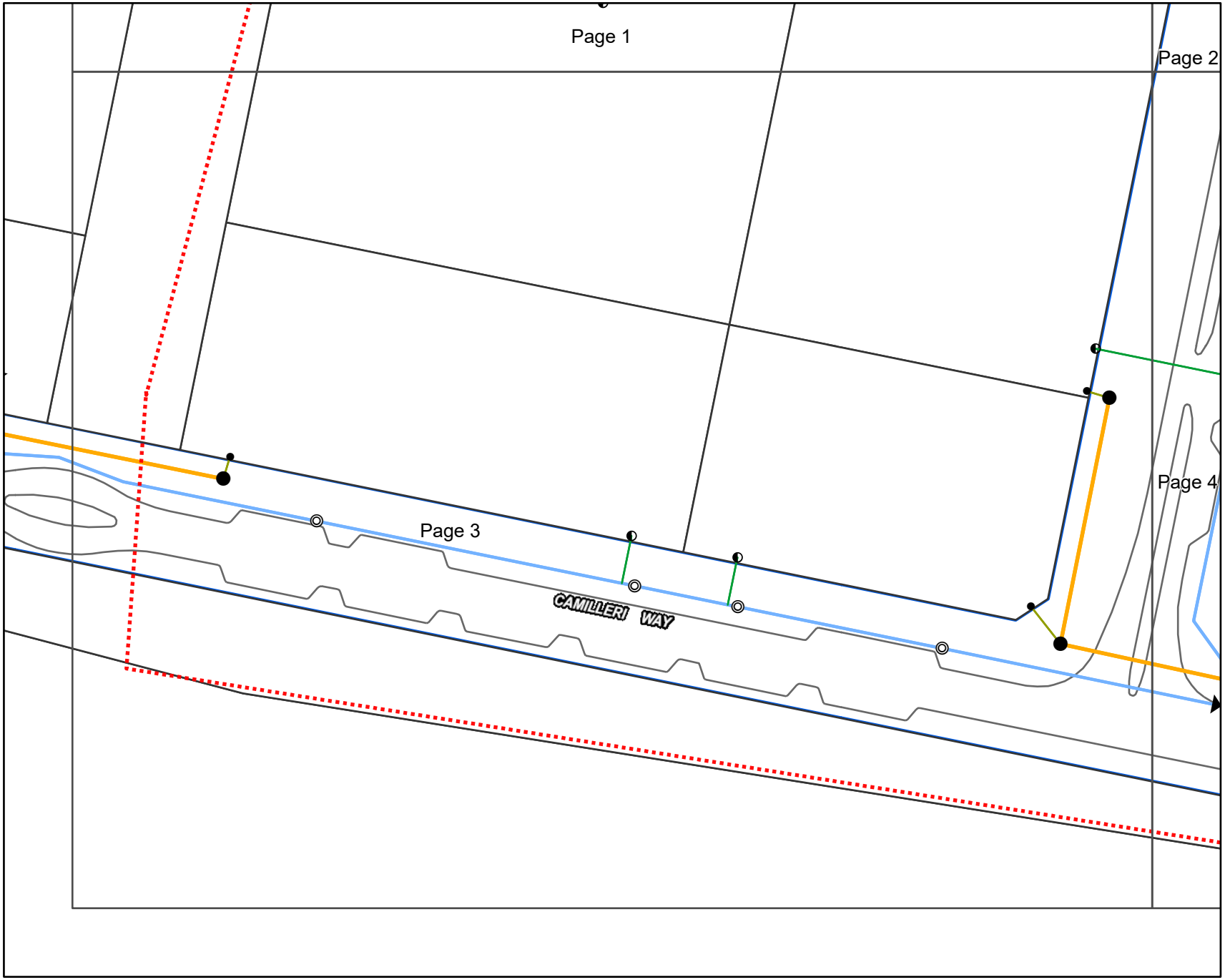

22/05/24 (valid for 30 days)

icon WATER

Water Network

Job # 36741319
Seq # 239582357
Job site: 140 The Valley Avenue , Gungahlin ACT 2912

BYDA Enquiry

N

0 4 8 16 24 32 m

Scale: 1:1,000

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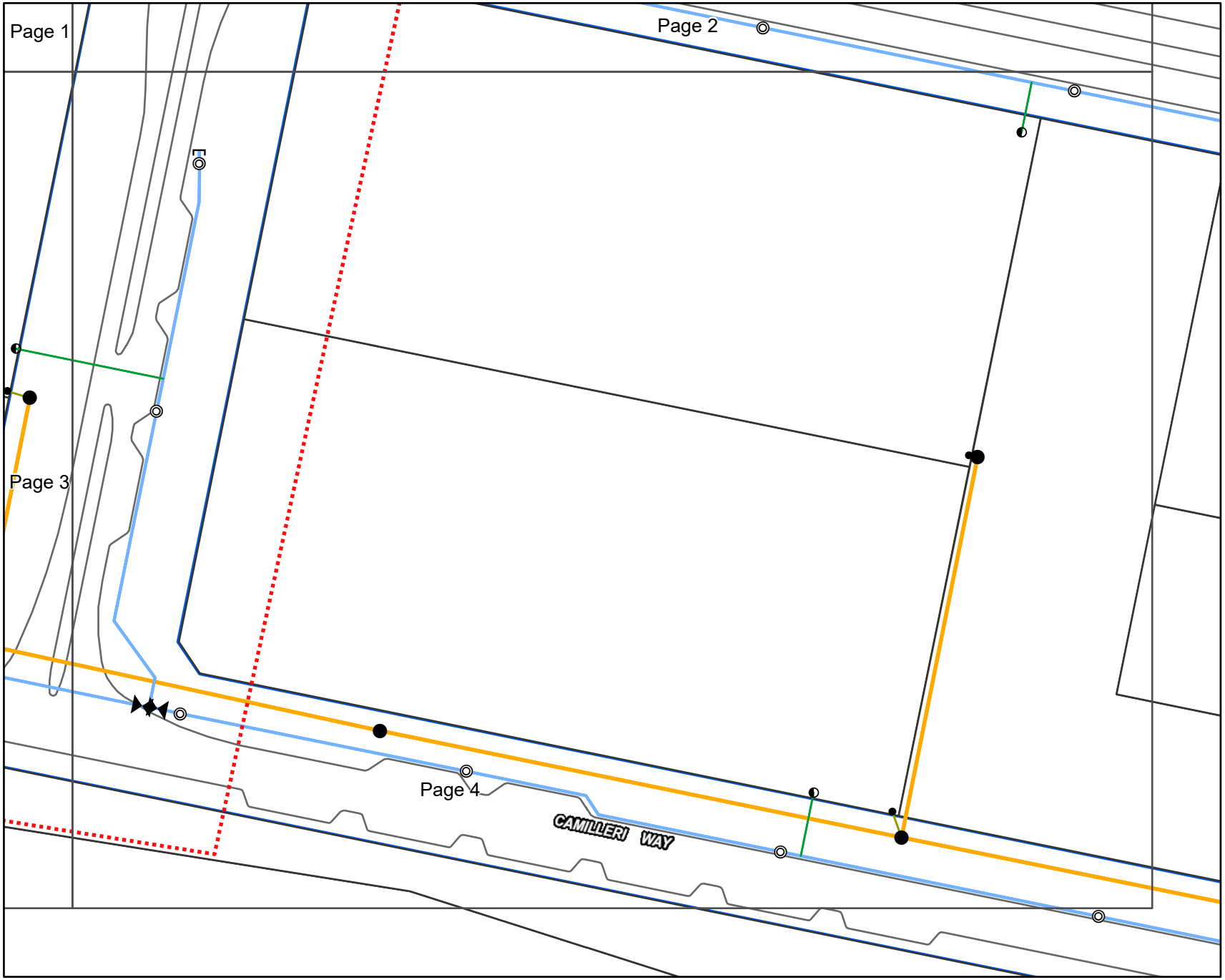

22/05/24 (valid for 30 days)

icon WATER

Water Network

Job # 36741319
Seq # 239582357
Job site: 140 The Valley Avenue , Gungahlin ACT 2912

BYDA Enquiry

N

0 4 8 16 24 32 m

Scale: 1:1,000

BEFORE YOU DIG www.byda.com.au

Applicant/Contractor: John Samoty
Job No: 36741319
BYDA Sequence No: 239582357

Work Details
Suburb: Gungahlin
Address: 140 The Valley Avenue
Description:
Enquiry Date: 22 May 2024

Company: JPS Engineering Consultants
Contact: John Samoty
Telephone: +61417434996
Address: 28 Barrallier Street Griffith 2912
Email: john.samoty@jpsengineering.com.au

Dear **John Samoty**,

The attached maps show the approximate location of our assets in the area of enquiry.

Please review these maps to check whether our assets are within your work area.

Refer to your *Before You Dig Australia* (BYDA) enquiry information to ensure that you have received Asset Plans from all relevant utility owners before commencing work.

Please note: there may be additional pages attached dependent on what assets are found in the area. Maps might also be on pages of different sizes.

This information is valid from **22/05/2024 to 21/06/2024**

To report damage to Canberra's water and wastewater network, please phone 02 6248 3111.

This document, and associated asset plans, must be kept at the work site.
Please ensure you read the disclaimer below in its entirety (following pages).

Disclaimer

1. General location only

The Applicant acknowledges that:

a) while Icon Water have used reasonable endeavours to keep asset location records current, Icon Water does not make any warranty, guarantee or representation as to the accuracy, currency or completeness of the information contained in the attached Asset Plans.
b) Asset Plans:
   i. may not show all assets in the work area;
   ii. show only the general and approximate location of assets;
   iii. may show the position of assets relative to fences, buildings, property lines, kerbs and/or other points of reference that existed at the time the assets were installed. Any subsequent alterations to those fences, buildings etc may not have been updated on the Asset Plans. Persons should not rely on such things as a point of reference to estimate location of the assets.

2. Limitation of liability

To the maximum extent permitted by law:
a) subject to paragraph 2(b), Icon Water and its officers, employees and agents accept no responsibility or liability for any loss, damage, liability, cost, expense, claim or proceeding of whatever nature and howsoever arising, incurred by or awarded against the Applicant or its officers, employees, agents, contractors or subcontractors, arising out of, connected with or as a consequence of use of the Asset Plans or any inaccuracies in the Asset Plans;
b) where:
   i. an Icon Water representative has at the Applicants request, attended the work site to mark the location of assets prior to commencement of any works on the work site, and
   ii. the Icon Water representative has been proven to be negligent in marking the asset location then Icon Water's, liability, and the liability of the officers, employees and agents of, is limited, at Icon Water's option, to re-attending the work site to re-mark the asset location or paying the costs of having a third party attend the work site to re-mark the asset location.

3. Location of assets may change

Assets may be moved, or additional assets may be installed at any time. Persons using the attached Asset Plans are advised to be alert for changed locations or new installations performed after the Issue Date. If work extends for a period of 3 months beyond the Issue Date, a new application MUST be made to Before You Dig Australia for up-to-date asset location information.

4. Work to be undertaken without interference or damage to assets

Any work undertaken near assets, including without limitation excavation, structures, material storage, heavy vehicle parking, blasting or change of surface level, must be performed in a way that does not interfere with the reliability of, or access to Icon Water assets, including plant.

Persons excavating are required to exercise care if assets are indicated on Asset Plans and will be held responsible for any damage caused through failure to exercise such care. Icon Water will pursue the person responsible for causing the damage or interference to their assets to recover costs and expenses incurred in remedying such damage or interference.

5. Asset location marking

You may request our representative to visit the work site to mark the approximate location of assets by calling **02 6248 3111 (Option 9) between 8:00am and 5:00pm, business days**.

Irrespective of any mandatory directions given in this notice, Icon Water recommends that a site visit be conducted before commencing any works near assets. Appointments will be accepted only if the BYDA Sequence Number is supplied.

The location and marking of assets will not take place unless the BYDA Sequence Letter and attached Asset Plans are in colour and to the same scale as supplied and are at the work site. Icon Water does not charge for these site visits. Alternatively, the Applicant may wish to engage a private underground asset locator, at the Applicant's expense.

You are responsible for maintaining the presence / visibility of all markings and to ensure that all workers on site are aware of:

- the presence of Icon Water infrastructure in the vicinity of the intended work and
- Icon Water requirements.

NB: Arranging for marking of approximate asset locations by either an Icon Water representative or private underground asset locator will not relieve the Applicant and persons working on their behalf of responsibility to exercise care when working near Icon Water assets or for any damage they cause to Icon Water assets while performing works.

6. Underground Assets must be located by potholing

Potholing or other non-destructive techniques must be used until underground assets are located. When located, excavation may commence provided that persons carrying out the excavation work must follow Icon Water's recommended specifications concerning minimum safety distances when excavating within the vicinity of Icon Water networks.

7. Critical Water, Sewer and Effluent Mains

Icon Water requires mandatory supervision by authorised Icon Water personnel when potholing and excavating within the vicinity of critical water and sewer network assets (as determined by Icon Water) or Icon Water mains with a diameter of 300mm and above. **All effluent mains are classified as critical assets.**

To arrange an inspection please call Icon Water 02 6248 3111, (Option 3), 8:00am to 5:00pm business days.

THIS DOCUMENT AND ASSOCIATED ASSET PLANS MUST BE KEPT AT THE WORK SITE.

Legend

Maintenance Hole
- Active
- De-Commissioned

Service Connection
- Service Connection

Inspection Shaft
- Special Inspection Shaft
- Standard 225 Inspection Shaft

Clean Out Point
- Clean Out Point

Control (Protection) Valve
- Air Valve
- Reflux Valve

Storage Tank / Vault
- Storage Tank / Vault

System Control Valve
- Scour Valve

Sewer Structures
- Odour Scrubber
- Sewer Fan
- Vent

Weir
- Weir

Abandoned Point
- Abandoned Point

Sewer Abandoned Mains and Lateral Lines
- Sewer Abandoned Mains and Lateral Lines

Water Effluent Abandoned Mains and Lateral Lines
- Water Effluent Abandoned Mains and Lateral Lines

Hydrant
- HighCapacity
- MillCock
- OverheadFillingPoint
- PillarHydrant
- SpringHydrant

System Valve
- Scour Valve
- Needle Valve
- Globe Valve
- Gate Valve
- Cone Valve
- Butterfly Valve
- Ball Valve

Fitting
- Outlet
- Inlet
- Blank Flange
- Cross
- Dual Service Tee
- End Cap
- Gibault Joint
- Maintenance Hole
- Open End
- Orifice Plate
- Reducer
- Service Tee
- Tapping Band Bend
- Tee
- Service Connection (Meter)

Test Station
- Pressure Recording Device
- Flow Recording Device
- Sampling Point
- Pump

Control (Protection) Valve
- Double Air Valve
- Double Check
- Enhanced Double Air Valve
- Float Valve
- Pressure Relief Valve
- Reduced Pressure Zone
- Reflux Valve
- Single Air Valve

Network Structure
- Service Reservoir
- Treatment Plant Reservoir
- Minor Tanks
- Effluent Reuse / NonPotable Reservoir

Water Main - Critical
- Water Main - Critical

Water Main
- Water Main

Water Lateral Line
- Domestic Service
- Fire Service
- System Protection Lines

Effluent Main - Critical
- Effluent Main - Critical

Effluent Lateral Line - Critical
- Irrigation
- System Protection Lines

Pressure Main - Critical
- Pressure Main - Critical

Gravity Main - Critical
- Gravity Main - Critical

Gravity Main
- Gravity Main

Sewer Lateral Line
- Property Service Line
- Scour Line

Water Structure
- Dam
- Pipe Bridge
- Pump Station
- Reservoir Structure
- Treatment Plant
- Valve Chamber

Sewer Structure
- Diversion Chamber
- Diversion Point
- Pump Station
- Split Manhole
- Storage Basin
- Treatment Plant
- Discharge Structure
- Pipe Bridge
- Septage Facility
- Valve Chamber

icon WATER

Asset location information

evoenergy

Applicant/Contractor **Job No.** **36741319** **BYDA Sequence No.** **239582358**

Company: JPS Engineering Consultants
Contact: John Samoty
Telephone: +61417434996
Address: 28 Barrallier Street Griffith ACT 2603

Work Details

Suburb: Gungahlin
Address: 140 The Valley Avenue

Description:

Enquiry Date: 22-May-2024 Issue Date: 22-May-2024

WARNING - HIGH PRESSURE GAS PIPELINE IN THE VICINITY

The records of Evoenergy Gas Networks indicate that High Pressure Underground Assets/Pipes **are** present in the vicinity of and/or surrounding area of the above enquiry. Please read all the information and conditions below and overleaf.

No excavations within 15 metres of this asset are permitted without the prior approval of Zinfra PHONE 1300 503 237

Conditions for works in the vicinity of Evoenergy gas network assets

Any information provided is valid only for 30 days from the date of issue. If the work operation extends beyond this period, or if the designs are altered in any way, you are requested to re-submit your proposal for re-assessment.

Consistent with the requirements of Part 2 General – Section 8 of the Utility Networks (Public Safety) Regulations 2001 No. 28, Evoenergy require that:

- The requestor shall ensure that all workers on site are aware of the presence of natural gas.
- The requestor shall ensure that under no circumstances will mechanical excavation be carried out within 1.0 metres of a gas main without there being a Zinfra Representative on site.
- The requestor shall be responsible to maintain the presence / visibilities of all gas markings.
- **No live or Isolated gas pipes shall be cut, altered or removed without APPROVAL from Zinfra.**

Note: Individual customer gas connections are generally not shown on the accompanying maps. For information regarding individual gas connections we recommend that you request a site meeting / inlet service location.

You can obtain additional information or arrange a site meeting by contacting Zinfra on **1300 503 237. Note that 24 hours notice is required for site meetings.**

For an emergency or to report damage
13 10 93 electricity | **13 19 09** gas | 24 hours

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Please read the following important information (overleaf)

1. High Pressure Pipelines

No excavations or heavy construction are permitted within 15m of these pipelines without notification to and authorisation from Jemena. If separation distance is 15m or less, you are required to notify Jemena of your works.

Prior to commencing works near or over the High Pressure Gas Mains you must supply Jemena with your proposal of works including design plans. You must allow four weeks for Jemena to review your works. Please mail your proposed works details to:

Jemena Asset Management Pty Ltd
Land Services Dept
PO Box 1220 North Sydney, NSW, 2059

or email: lands@jemena.com.au

Once Jemena has reviewed your proposal and design plans and you have received Jemena's approval to proceed, you must organise for a Pipeline Technician to be on Stand-by during your works (charges may apply).

To arrange for a Pipeline Technician to be on site please call the High Pressure Coordinator on **1300 503 237** two working days prior to the works commencing.

2. High Pressure Steel and Large Diameter Medium Pressure Plastic Pipelines

You **must** contact a Pipeline Technician to conduct a survey **before** commencing any work in this area. You can arrange a survey by contacting the High Pressure Response Coordinator on **1300 503 237**. **Please note that two working days notice is required to arrange a survey.** For all works in the vicinity of High Pressure Gas Mains you are required to arrange for a Pipeline Technician to attend. Charges apply for attendance of any works outside the hours of 7am to 4pm, Monday to Friday ("Standard Business Hours") and for any attendance during Standard Business Hours that is longer than 2 hours.

WARNING. It is essential that ALL these documents be handed to the principal contractor carrying out the work. A photocopy may be taken for office records. All documents must be on site at the time of excavation. The information provided is to be used as guide only and does not absolve third parties in their "Duty of Care" obligations to take additional precautions where the work has the potential to impact on gas assets and the safety of people.

All work that may impact upon the Evoenergy Gas Network should be carefully planned with notification to Jemena (Zinfra) well in advance of commencement. This includes excavation of gas pipelines, crossings of pipelines by other underground infrastructure (drains, power cables, etc), road works or structural installations.

Evoenergy plans have been provided to show the position of underground gas mains and equipment in public gazetted roads only. Individual customers' services are not generally included on these plans. These plans have been prepared solely for Evoenergy's own use and indicate the position of underground mains and installations relative to boundaries and kerbs as at the time the mains were installed, and do not necessarily reflect any subsequent changes eg: changes to road alignments.

Evoenergy and / or Jemena (Zinfra) will accept no liability for inaccuracies in the information or lack of information on such plans for any cause whatsoever arising. Persons excavating or carrying out other earthworks will be held responsible for any damage caused to underground mains and equipment, and the costs associated with replacement or repair.

Please note that the information contained on the map provided is not a method of determining gas availability for the purposes of connection to a natural gas supply. Please contact a gas retailer to determine the availability of gas as an energy source.

IN THE EVENT OF A GAS EMERGENCY CALL 13 19 09 (24 hours)

Extinguish all sources of ignition and keep the area clear of all persons. Any attempt by third parties to repair damaged gas mains or services may result in prosecution under the Utility Networks (Public Safety) Regulations 2001.

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evoenergy

Asset location information

evoenergy

Applicant/Contractor **Job No.** **36741319** **BYDA Sequence No.** **239582358**

Company: JPS Engineering Consultants
Contact: John Samoty
Telephone: +61417434996
Address: 28 Barrallier Street Griffith ACT 2603

Work Details

Suburb: Gungahlin
Address: 140 The Valley Avenue

Description:

Enquiry Date: 22-May-2024 Issue Date: 22-May-2024

High pressure critical gas network assets detected within your search area

As High Pressure critical gas assets are present, you must not commence any works without first emailing Jemena Land Services at lands@jemena.com.au (see Item 12 in the Disclaimer).

Check for underground transmission line assets within your search area

Check the attached map for the location of underground transmission lines. If the map indicates there are underground transmission lines in the vicinity of the search area, you must not commence any works without first contacting Evoenergy (see Item 14 in the Disclaimer).

Information

The approximate location of Evoenergy assets in the area-of-enquiry are shown on the attached maps. Review all attached maps to check for utility assets in your work area.

Please refer to your Before You Dig Australia (BYDA) enquiry information to ensure you have received asset maps from all relevant utility owners before you commence work. There may be additional pages attached dependent on what assets are found in the area; and maps might be on pages of different sizes.

Individual customer gas connections are generally not shown on any attached Evoenergy Gas Network map. For information regarding individual gas connections we recommend you request a site meeting / inlet service location as per Item 7 in the Disclaimer.

This information is valid from **22-May-2024** to **21-Jun-2024**

For an emergency or to report damage
13 10 93 electricity | **13 19 09** gas | 24 hours

Please read the following important information (overleaf)

BEFORE YOU DIG www.byda.com.au

evoenergy

Disclaimer

1. General location only

The Applicant acknowledges that:

a. Evoenergy have used reasonable endeavours to keep Asset location records current but does not make any warranty, guarantee or representation as to the accuracy, currency or completeness of the information contained in the attached Asset Plans.

b. Asset Plans:

   i. may not show all assets in the work area;

   ii. show only the general and approximate location of Assets;

   iii. may show the position of Assets relative to fences, buildings, property lines, kerbs and/or other points of reference that existed at the time the Assets were installed. Any subsequent alterations to those fences, buildings etc may not have been updated on the Asset Plans. Persons should not rely on such things as a point of reference to estimate location of the Assets.

2. Limitation of liability

To the maximum extent permitted by law:

a. subject to paragraph 2(b), Jemena and Evoenergy and the officers, employees and agents of each accept no responsibility or liability for any loss, damage, liability, cost, expense, claim or proceeding of whatever nature and howsoever arising, incurred by or awarded against the Applicant or its officers, employees, agents, contractors or subcontractors, arising out of, connected with or as a consequence of use of the Asset Plans or any inaccuracies in the Asset Plans;

b. where:

   i. a Jemena or Evoenergy representative has, at the Applicants request, attended the work site to mark the location of Assets prior to commencement of any works on the work site, and

   ii. the Jemena or Evoenergy representative has been proven to be negligent in marking the Asset location

then Jemena and Evoenergy's liability, and the liability of the officers, employees and agents of each, is limited, at Jemena / Evoenergy's option, to re-attending the work site to re-mark the Asset location or paying the costs of having a third party attend the work site to re-mark the Asset location.

3. Evoenergy Authorisation and Accreditation for Working on or near the Electricity Network

Accreditation is the process of ensuring that a company or person, wishing to carry out work on or near Evoenergy electricity network, has the necessary level of skills, resources and insurance to undertake the work in a safe and reliable way. Evoenergy has obligations under the Utilities (Management of Electricity Network Assets Code) Determination 2013 to ensure that anyone working on or near its electricity network is adequately and safely trained. Evoenergy takes these obligations seriously.

Anyone working on or near Evoenergy's electricity network must have the appropriate accreditation and authorisation to do so prior to commencing works.

To gain authorisation to work on or near the electricity network you will need to:

1. Ensure you or your company is accredited with Evoenergy by making an application with Evoenergy. The application form can be found on the Evoenergy website: www.evoenergy.com.au
2. Wait for Evoenergy to assess your application and notify you of the outcome.
3. Receive your Compliance tool login and QR code from Evoenergy as proof of authorisation. The QR code is required to be available at all times when working on or near the network.

For further information contact:
accreditations@evoenergy.com.au

4. Electricity cables to be treated as LIVE

ALL electricity cables and conductors identified on the attached Asset Plans, including those marked as 'Abandoned', **MUST** be treated as 'LIVE' and dangerous until such time that they are tested and proven to be 'DE-ENERGISED'. Evoenergy recommends that cables identified as 'Abandoned' and which may be impacted, severed, damaged and/or removed by excavation works be proven 'DE-ENERGISED' and safe before commencing full-scale excavations.

5. Location of Assets may change

Assets may be moved, or additional Assets may be installed at any time. Persons using the attached Asset Plans are advised to be alert for changed locations or new installations performed after the Issue Date. If work extends for a period of 30 days beyond the Issue Date, a new application MUST be made to Before You Dig Australia for up to date Asset Location Information.

6. Work to be undertaken without interference or damage to assets

Any work undertaken near Assets, including without limitation excavation, structures, material storage, heavy vehicle parking, blasting or change of surface level, must be performed in a way that does not interfere with the reliability of, or access to Evoenergy Assets, including electricity lines or plant. Persons excavating are required to exercise care if Assets are indicated on Asset Plans and will be held responsible for any damage caused through failure to exercise such care. Evoenergy will pursue the person responsible for causing the damage or interference to their Assets to recover costs and expenses incurred in remedying such damage or interference.

7. Asset location marking

You may request our representative to visit the work site to mark the approximate location of Assets by calling **02 6293 5770** (Electricity – excluding streetlight assets) or **1300 503 237** (Gas) between 7:30 am and 4 pm. For water assets you will need to call Icon Water on **02 6248 3111**. Irrespective of any mandatory directions given in this notice, Evoenergy recommends that a site visit be conducted before commencing any works near Assets.

Appointments will be accepted only if the Asset Location Information Sequence Number is supplied. The location and marking of Assets will not take place unless the Asset Location Advice and attached Asset Plans are in colour and to the same scale as supplied, and are at the work site. Evoenergy does not charge for these site visits. Alternatively, the Applicant may wish to engage a private underground Asset locator, at the Applicant's expense.

You are responsible for maintaining the presence / visibility of all markings and to ensure that all workers on site are aware of:

- the presence of Evoenergy infrastructure in the vicinity of the intended work and
- Jemena and Evoenergy's requirements.

NB: Arranging for marking of approximate Asset locations by either an Evoenergy representative or private underground asset locator will not relieve the Applicant and persons working on their behalf of responsibility to exercise care when working near Evoenergy Assets or for any damage they cause to Evoenergy Assets while performing works.

8. Underground Assets must be located by potholing

Potholing or other non-destructive techniques must be used until underground Assets are located. When located, excavation may commence provided that persons carrying out the excavation work must follow Evoenergy's recommended specifications concerning minimum safety distances when excavating within the vicinity of Evoenergy's networks. Unless otherwise approved by Jemena, **under no circumstances can mechanical excavation be carried out within 1.0 metres of a gas main without a Jemena Representative on site.**

9. Substation Earthing Conductors

The information does not include details of substation earthing conductors. These are installed within the vicinity of pole and ground mounted substations. Earthing conductors extend 1.0m in each direction from the substation. However, please be aware that site-specific requirements mean earthing conductors may be installed beyond this distance. Further information can be provided upon request.

10. Indications of the Presence of Cables

The presence of cables or conduits may be indicated by the following warning and marking devices

- Letter "E" inscriptions on Kerbs or "Electrical" inscriptions on pit lids
- Danger signs on above ground posts, walls etc
- Thin Orange "Caution Electrical Cables" Warning Tape
- Orange /Black PLASTIC Polymeric slab (3-6mm thick x 200mm wide)
- Concrete Bricks or slabs (approx 200mm x 500mm)
- Orange PVC or white Asbestos Cement (AC) Conduit or Galvanized Pipe
- Cylindrical concrete "ACTEA Electric Cable" markers
- Weak Concrete encasement directly around cables / conduits
- Texture/ colour change of excavated material (bedding sand, cracker dust, clean fill)

Note that some cables may have been installed without the presence of such marking devices.

11. Gas mains

a. Evoenergy gas mains are managed by Jemena Asset Management Pty Ltd and operated by Zinfra.

b. Mandatory stand-by / supervision by Zinfra personnel is required when excavating within the vicinity of critical gas network assets OR where mechanical excavation is required within 1.0 metres of the gas network. Your activity around critical gas assets will be supervised by Zinfra at no charge for the first two hours. This supervision is to ensure the integrity of Evoenergy's assets is maintained.

Note: Charges may apply if stand-by is required for longer than two hours.

Please contact Zinfra on **1300 503 237** between 7.30 am and 4 pm if you require a stand-by person.

12. High Pressure Gas Network Assets

You must supply Jemena with your proposal of works including a written outline of your works and design plans for review. It may take up to four weeks for Jemena to review your works proposal. Following review, we will advise you of Jemena's requirements for protecting the High Pressure gas main. Please mail your proposed works details to:

Jemena Asset Management Pty Ltd
Attention: Land Services Department
PO Box 1220 North Sydney NSW 2059

or email lands@jemena.com.au

Please note that a duty of care exists to ensure that this gas main is not compromised or damaged during future development or construction work.

13. Streetlight Assets

Streetlight assets in the ACT are owned and maintained by the ACT Government. You expressly acknowledge and agree that

a. Evoenergy does not maintain streetlight asset information; and

b. any such information provided by Evoenergy may not be up to date, reliable or complete and is provided strictly on an "as is" basis without any warranty of any kind. Please contact Transport Canberra and City Services on **13 22 81** during business hours if you require further information.

14. Underground Transmission Line Assets

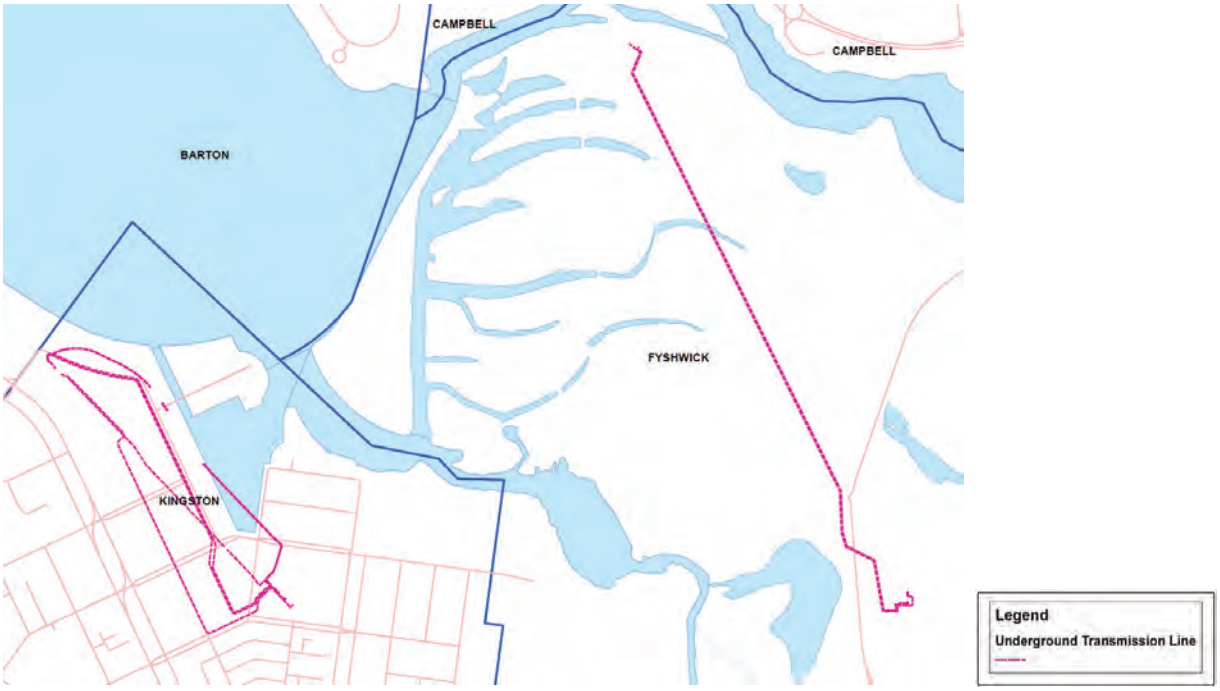
You must supply Evoenergy with your proposal of works including a written outline of your works and design plans for review.

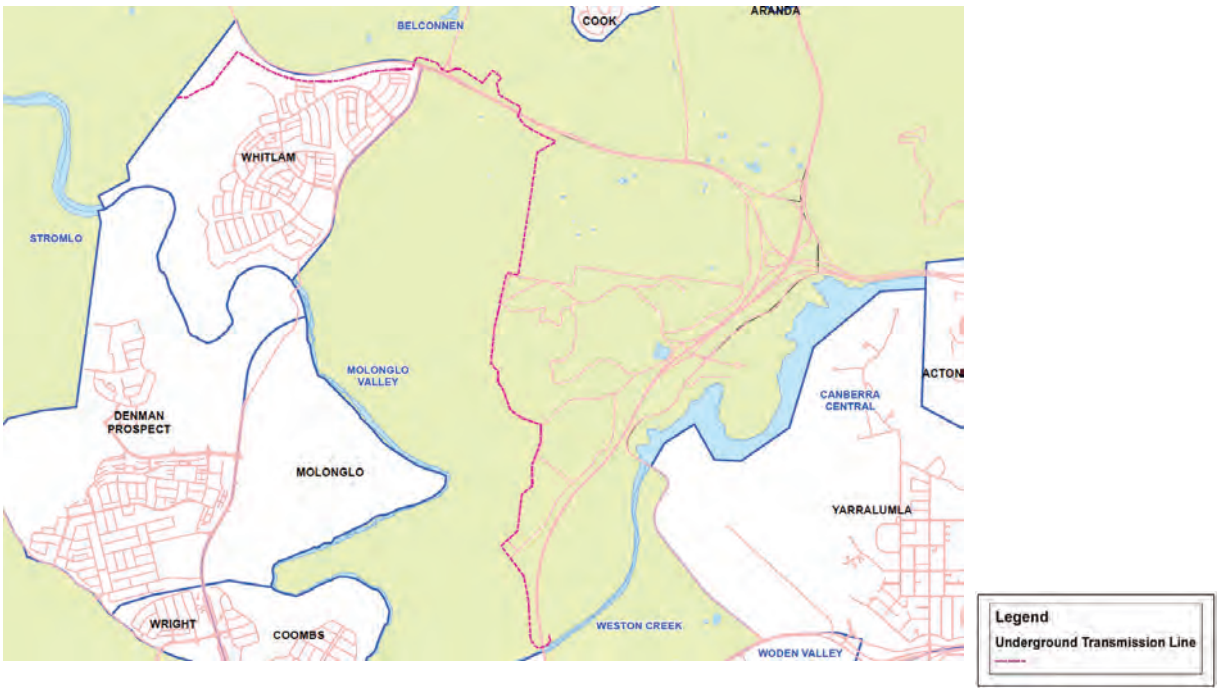
It may take up to four weeks for Evoenergy to review your works proposal. Following review, we will advise you of Evoenergy's requirements for protecting the Underground Transmission Line Assets.

Please email your proposed work details to:
Network.ConnectionAdvice@evoenergy.com.au

Please note that a duty of care exists to ensure that this Electrical Asset is not compromised or damaged during future development or construction work.

THIS DOCUMENT AND ASSOCIATED ASSET PLANS MUST BE KEPT AT THE WORK SITE.





ELECTRICITY NETWORK LEGEND

Support Structure (Distribution)
- Pole
- Streetlight-Only Pole

Support Structure (Transmission)
- Pole
- Tower
- Yard Structure

Underground Structure
- Pit

Recloser
- Recloser

Building
- Zone Building
- Standalone Chamber

Switches
- Air Break
- Load Break
- Overhead Link

Fuse
- Drop Out Fuse

Service Point
- Service Point

Streetlight
- Streetlight Controller

Joint
- Cable Joint

Underground Earth Cable
- Underground Earth Cable

Fibre Optic Cable
- Overhead Fibre Optic Cable
- Underground Fibre Optic Cable

Copper Communication Cable
- Pilot Cable

Streetlight
- Streetlight
- Streetlight Controller
- Streetlight Photoelectric Controller
- Other Streetlight Support
- Streetlight Column

Streetlight Cable
- Overhead Streetlight Line
- Underground Streetlight Line, In Service
- Underground Streetlight Line, Abandoned

Transmission Line
- Overhead Transmission Line
- Underground Transmission Line, In Service
- Underground Transmission Line, Abandoned

HV Electric Lines
- Overhead HV Electric Line
- Underground HV Electric Line, In Service
- Underground HV Electric Line, Abandoned

LV Electric Lines
- Overhead LV Electric Line

Underground LV Electric Line <= 50 mm
- Underground LV Electric Line, In Service
- Underground LV Electric Line, Abandoned

Underground LV Electric Line > 50 mm
- Underground LV Electric Line, In Service
- Underground LV Electric Line, Abandoned

Service Lines
- Overhead Service Line

Underground Service Line <= 50 mm
- Underground Service Line, In Service
- Underground Service Line, Abandoned

Underground Service Line > 50 mm
- Underground Service Line, In Service
- Underground Service Line, Abandoned

Underground Route
- Duct

DuctBank
- <all other values>
- Conduit
- DepthIndicatorDeep
- DepthIndicatorShallow

Ground Mounted Structure
- Streetlight Control Cubicle
- Distribution Box
- Point-Of-Entry Cubicle
- HV Switching Station
- Kiosk
- Padmount
- Link Pillar
- Micro Pillar
- Mini Pillar
- Pregnant Column
- Communication Cubicle
- SCADA Cubicle

Electric Supply Site
- 132kV Switching Station
- Bulk Supply Station
- Mobile Zone Substation
- Zone Substation
- Overhead Substation
- Chamber Substation
- Stockade

IMPORTANT NOTE:

- The term 'ABANDONED' is utilised to identify an underground cable that has been physically disconnected from the Evoenergy electricity network, is not in service and cannot readily be put back into service without specific augmentation and/or reconnection works. Cable(s) identified by Evoenergy as 'ABANDONED' have been discarded in-situ by Evoenergy. ALL cables should be treated as 'LIVE' and Dangerous until proven de-energised and safe.

evoenergy

BEFORE YOU DIG www.byda.com.au

GUNGAHLIN
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HINDER STREET
EFKARPIDIS STREET
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4
EASTLAKE CLUB
51
2
227
S 11119
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70
3
SIERRA
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231
THE VALLEY AVENUE
5.7
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THE VALLEY AVENUE
KATE CRACE STREET
THE VALLEY AVENUE
2143601
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2
246
2
3
6
235
1
3
5
249
CAMILLERI WAY
7
CAMILLERI WAY
S 11554
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626
611

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Evoenergy Electricity Network

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DIAL BEFORE YOU DIG www.1100.com.au
The Essential First Step

Seq #: 239582358

140 The Valley Avenue, Gungahlin

Template: ElectricityA1Portrait

Creation Date: 22-May-2024

GAS NETWORK LEGEND

GasStation CRITICAL

- DistrictRegulator
- TrunkReceivingStation
- PrimaryRegulatingStation
- BulkMeteringStation
- PressureMonitoringStation
- ScraperStation
- BR BoundaryRegulatorSet
- BRS SecondaryBoundaryRegulatorSet
- ValveStation

GasDevice

- <all other values>
- IsolationValve
- Odouriser
- Siphon
- WaterbathHeater
- Filter
- Catalyst Heater
- Silencer
- Regulator

GasDevice High Risk Valve CRITICAL

- HighRiskAreaIsolation

GasMeter

- DomesticMeter
- IndustCommMeter
- SecondaryMeterSet

GasFitting

- EndCap
- Tee
- ExpansionJoint
- Flange
- Reducer
- Cross
- ServiceSaddle
- InsulationJoint
- GaugingPoint

CPAnode

- AnodeGroundBed
- SacrificialAnode

CPRectifier

- R TransformerRectifier

CPCable

- CPRectifierCable
- CPGroundBedCable

Conduit

- Conduit

GasStructure

- <all other values>
- CPKiosk
- Pit
- StationStructure

GasService

- <all other values>
- Gas Service IN USE
- Gas Service NOT IN USE

GasService STEEL or MAOP>=1050 OR DIA >=75mm CRITICAL

- Gas Service IN SERVICE
- Gas Service NOT IN SERVICE

GasPipe

- <all other values>
- DistributionMain, Nylon, InService
- Gas Pipe NOT IN USE
- DistributionMain, PE, InService
- DistributionMain, Copper, InService

GasPipe STEEL OR MAOP>=1050 OR DIA>=75mm CRITICAL

- DistributionMain, Copper, InService
- DistributionMain, Nylon, InService
- DistributionMain, PE, InService
- PrimaryMain, Steel, InService
- PrimaryMain, Steel, Proposed
- SecondaryMain, Steel, InService
- SecondaryMain, Steel, Proposed
- TransmissionMain, Steel, InService
- Gas Pipe NOT IN USE

R 10.0 = DISTANCE TO ROAD
B 10.0 = DISTANCE TO BOUNDARY
E 10.0 = DISTANCE TO END
C 10.0 = DISTANCE TO CHANGE OF DIRECTION

4.4 = DISTANCE FROM MAIN TO KERB
0.6 = DISTANCE FROM MAIN TO BOUNDARY

DIAL BEFORE YOU DIG www.1100.com.au The Essential First Step

evoenergy

Evoenergy Gas Network

Seq #: 239582358

140 The Valley Avenue, Gungahlin

N W E S

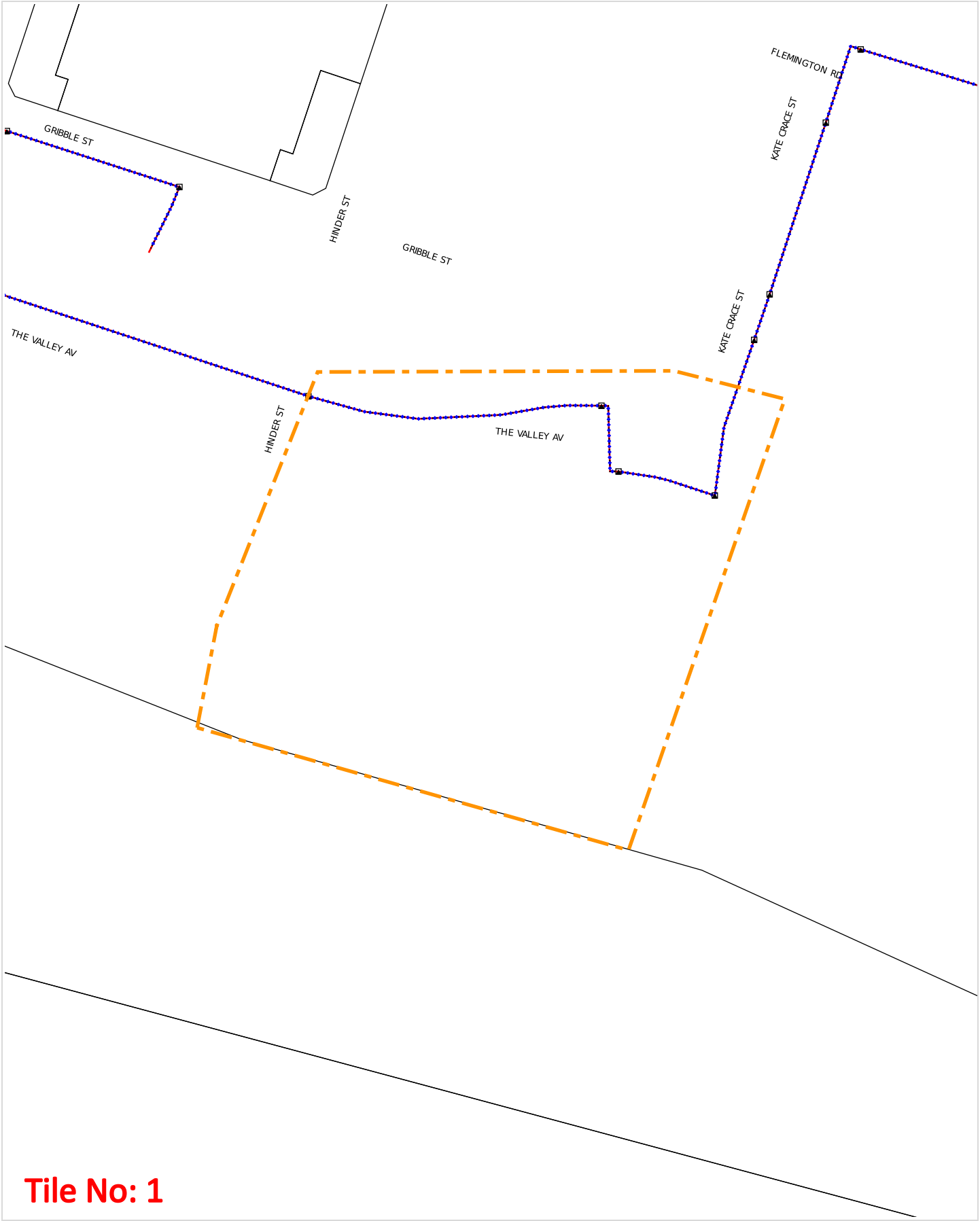
0 5 10 20 30 40 M

DIAL BEFORE YOU DIG www.1100.com.au
The Essential First Step

evoenergy

Template: GasA3Landscape

Creation Date: 22-May-2024



Tile No: 1

Sequence Number: 239582359

Date Generated: 22 May 2024

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

OPTUS

BEFORE YOU DIG www.byda.com.au

Optus Contract Management Team
Unit 9, 677 Springvale Road
Mulgrave, Victoria, 3178

Date: 22 May 2024
To: John Samoty
Company: JPS Engineering Consultants
Address: 28 Barrallier Street
Griffith, ACT 2603

ENQUIRY DETAILS
Location: 140 The Valley Avenue, Gungahlin, ACT 2912
Sequence No.: 239582359
BYDA Reference: 36741319

In relation to your enquiry concerning the above location, Optus advises as follows:

Optus records indicate that there ARE underground Optus FIBRE OPTIC TELECOMMUNICATIONS ASSETS in the vicinity of the above location as per the attached drawing(s).

PLEASE NOTE that any interference with these assets may be considered an offence under the Criminal Code Act 1995 (Cth). Optus reserves the right to seek compensation for loss or damage to its assets including consequential loss.

This reply is valid for a period of 30 days from the date above.

IMPORTANT INFORMATION
Asset location drawings provided by Optus are reference diagrams and are provided as a guide only. The completeness of the information in these drawings cannot be guaranteed. Exact ground cover and alignments cannot be provided with any certainty as these may have altered over time. Depths of telecommunications assets vary considerably as do alignments. It is essential to identify the location of any Optus assets in the vicinity prior to engaging in any works.

All Optus assets in the vicinity of any planned works will need to be electronically located to ascertain their general location. Depending on the scope of planned works in the vicinity, the assets may also need to be physically located.

YOU MUST ENGAGE THE SERVICES OF ONE OF THE OPTUS ASSET ACCREDITED LOCATORS TO CARRY OUT ASSET LOCATION (REFER LIST OF ACCREDITED LOCATORS AT THE END OF THIS OPTUS RESPONSE).

Unless otherwise agreed with Optus, where an on-site asset location is required, the requestor is responsible for all costs associated with the locating service including (where required) physically exposing the Optus asset.

DUTY OF CARE
When working in the vicinity of telecommunications assets you have a legal "Duty of Care" and non-interference that must be observed.

It is your responsibility as the requesting party (as a landowner or any other party involved in the planned works) to design for minimal impact to any existing Optus asset. Optus can assist at the design stage through consultation.

It is also your, as the requesting party (or your representative's), responsibility to:

a) Obtain location drawings (through the Before You Dig Australia process) of any existing Optus assets at a reasonable time before any planned works begin;

b) Have an Optus Accredited Asset Locator identify the general location of the Optus asset and physically locate the asset where planned works may encroach on its alignment; and

c) Contact Optus for further advice where requested to do so by this letter.

DAMAGE TO ANY OPTUS ASSET MUST BE REPORTED TO 1800 505 777 IMMEDIATELY

You, your head contractor, and any relevant subcontractor are all responsible for any Optus asset damage as a result of planned activities in the vicinity of Optus assets.

This applies where works commence prior to obtaining Optus drawings, where there is failure to follow instructions or during any construction activities.

Optus reserves the right to recover compensation for loss or damage to its assets including consequential loss. Also, you, your head contractor and any relevant subcontractor may also be liable for prosecution under the Criminal Code Act 1995 (Cth).

ASSET RELOCATIONS

You are not permitted by law to relocate, alter or interfere with any Optus asset under any circumstance. Any unauthorised interference with an Optus asset may lead to prosecution under the Criminal Code Act 1995 (Cth). Enquiries relating to the relocation of Optus assets must be referred to the relevant Optus Damages and Relocations Team (refer to "FURTHER ASSISTANCE").

APPROACH DISTANCES

On receipt of Optus asset location drawings and prior to commencing any planned works near an Optus asset, engage an Optus Accredited Locator to undertake a general location of the Optus asset.

Physical location of the Optus asset by an Optus Accredited Locator will also be required where planned works are within the following approach distances of the general location of the Optus asset:

a) In built up metropolitan areas where road and footpaths are well defined by kerbs or other features a minimum clear distance of 1 meter must be maintained from the general location of the Optus asset.

b) In non-established or unformed metropolitan areas, a minimum clear distance of 3 meters must be maintained from the general location of the Optus asset.

c) In country or rural areas where wider variations may exist between the general and actual location of an Optus asset may exist, then a minimum clear distance of 5 meters must be maintained from the general location of the Optus asset.

If planned works are parallel to the Optus asset, then the Optus asset must be physically located by an Optus Accredited Locator at a minimum of 5 meter intervals along the length of the parallel works prior to work commencing.

Under no circumstances is crossing of any Optus asset permitted without physical location of the asset being carried out by an Optus Accredited Locator. Depending on the asset involved an Optus representative may be required onsite.

The minimum clearances to the physical location of Optus assets for the following specific types of works must be maintained at all times.

Note: Where the clearances in the following table cannot be maintained or where the type of work differs from those listed then advice must be sought from the relevant Optus Damages and Relocations Team (refer to "FURTHER ASSISTANCE").

Type of Works	**Clearance to Physical Location of Optus Asset**
Jackhammers / Pneumatic Breakers	Not within 1 meter.
Light duty Vibrating Plate or Wacker Packer type compactors (not heavy road construction vibrating rollers etc.)	500mm compact clearance cover before a light duty compactor can be used over any Optus conduit. No compaction permitted over Optus direct buried cable without prior approval from Optus.
Boring Equipment (in-line, horizontal and vertical)	Not within 5 meters parallel of the Optus asset location without an Accredited Optus Asset Locator physically exposing the Optus asset and with an Optus representative onsite. Not to cross the Optus asset without an Accredited Optus Asset Locator physically exposing the Optus asset and with an Optus representative onsite.

Type of Works	Clearance to Physical Location of Optus Asset
Heavy vehicle Traffic (over 3 tonnes)	Not to be driven across Optus conduits with less than 600mm of cover. Not to be driven across Optus direct buried cable with less than 1.2 meters of cover. Once off crossings permitted, multiple crossing (e.g. road construction or logging) will require Optus approval. Accredited Optus Asset Locator to physically expose the Optus asset to verify actual depth.
Mechanical Excavators, Farm Ploughing, Vertical Hole installation for water bore or fencing etc.	Not within 1 meter. Accredited Optus Asset Locator to physically expose the Optus asset to verify actual location.

ASSET CLEARANCES AFTER COMPLETION OF WORKS

All Optus pits and manholes must be a minimum of 1 meter from the back of any kerb, 3.5 meters of the road surface without a kerb or not within 15 meters of street intersection.

In urban areas Optus conduit must have the following minimum depth of cover:

- Footway 600mm;
- Roadway 1 meter at drain invert and at road centre crown.

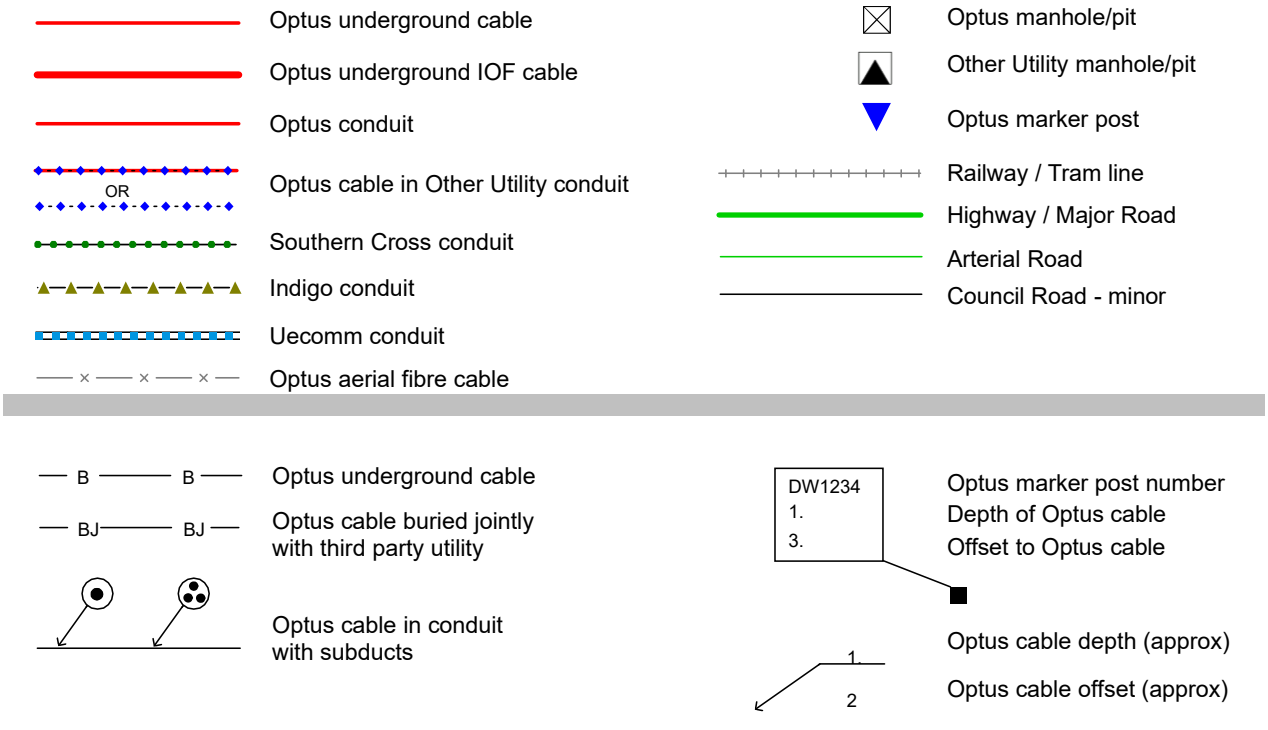
In rural areas Optus conduit must have a minimum depth of cover of 1 meter and direct buried cable 1.2 meters.

In cases where it is considered that the above clearances cannot be maintained at the completion of works, advice must be sought from the relevant Optus Damages and Relocations Team (refer "Further Assistance").

FURTHER ASSISTANCE

Further assistance on asset clearances, protection works, or relocation requirements can be obtained by contacting the relevant Optus Damages and Relocations Team on the following email address:
NFODamages&RelocationsDropbox@optus.com.au
Further assistance relating to asset location drawings etc. can be obtained by contacting the Optus Network Operations Asset Analysis Team on 1800 505 777.

OPTUS ENGINEERING DRAWING SYMBOLS



OPTUS

Optus Accredited Asset Locators

Name	Company Name	Phone	Email	State	Region/Service Area
Drew Misko	Australian Subsurface Pty Ltd	0427 879 600	admin@australiansubsurface.com	ALL	ALL
Andrew Watson	Subsurface Mapping Solutions Pty Ltd	0408 839 723	admin@subsurfacems.com.au	ALL (Not TAS)	South East QLD + Aus wide
Chris Gordon	Heavy Construction Solutions	1300 859 027	chris.gordon@heavycs.com.au	VIC,NSW,QLD,SA TAS	All
Alan Cordner	Alcom Fibre Services Pty Ltd	0400 300 337	alcomfibre@bigpond.com	NSW	Sydney, NSW
Brad McCorkindale	Bradmac Locating Services	0434 157 409	info@bradmaclocating.com.au	NSW	NSW
Shane Buckley	Cable & Pipe Locations Pty Ltd	0408730430	shane@cableandpipelocations.com.au	NSW	North Coast , Mid North Coast, Central West, Northern Rivers
Annabelle Pegler	Down Under Detection Services (DUDS)	0418 267 964	apegler@duds.net.au	NSW	All
Bruce Whittaker	Optical Fibre Technologies	0402 354 322	opticaltek1@aol.com	NSW	Sydney/Wollongong
George Koenig	Downunder Locations	0438243856	downunderlocations@gmail.com	NSW	Tweed Heads/Gold Coast
Michael Grant	M&K Grant Bega Bobcats Pty Ltd	0427 260 423	zzbobcat@bigpond.net.au	NSW	Bega, Far South Coast
Antony Critcher	Geotrace Australia Pty Ltd	0417 147 945	antony@geotrace.com.au	NSW	All Areas, Sydney, Wollongong, Newcastle, ACT
Sarah Martin	Hydro Digga	0447 774 000	admin@hydrodigga.com	NSW	Mid North Coast
Nathan Ellis	Utility Locating Services	0404 087 555	nathan@uls.com.au	NSW	Sydney
Scott O'Malley	Coastal Cable Locators Pty Ltd	0427 975 777	skomalley@bigpond.com	NSW	South Coast- Snowy Mountains- Southern Highlands
Liam Bolger	Brandon Construction Services	0438 044 008	liam.bolger@hotmail.com	NSW	Sydney

Laura Elvery	Durkin Construction Pty Ltd	02 9712 0308	info@durkin.au	NSW	NSW
Shireen Sidhu	Locate & Map	(02) 8753 0049	admin@loca-teandmap.com.au	NSW	Sydney & Regional NSW only
Ken Browne	Riteway Traffic Control Pty Ltd	0419 212 969	kbrowne@ritewaytc.com.au	NSW	Central Coast, Hunter
Jean-Max Monty	Civilscan	1300 575 488	john@civilscan.com.au	NSW	Sydney, Central Coast, Newcastle, Wollongong, Hunter Valley, Blue Mountains
Scott Hunter	Hunter Ground Search	0409327345	admin@hunter-groundsearch.net.au	NSW	Hunter, Upper Hunter, Central Coast, Newcastle
Damien Black	Mid North Coast Hydro Digging & Service Locating P/L	0418 409 465	djblack1@bigpond.com	NSW	Mid North Coast
Brendan Duggan	Utility Mapping NSW	1300 627 746	bduggan@utilitymapping.com.au	NSW	All NSW
Joseph Restuccia	ProLocate	0415 633 393	joe.restuccia@prolocate.com.au	NSW	NSW Wide
Barry Maloney	Online Pipe & Cable Locating	1300 665 384	Office@onlinepipe.com.au	NSW	Sydney, Central Coast, Canberra, Wollongong, Newcastle
Sam Romano	Locating Services	0403 065 510	sam.romano@locatingservices.com.au	NSW	NSW All
Scott Allison	Crux Surveying Australia	02 9540 9940	sydneyoffice@cruxsurveying.com.au	NSW	Sydney Metro & Surrounding Areas
Donna Wullaert	Commence Communications Pty Ltd	02 6226 3869	admin@commencecomms.com.au	NSW	Canberra/ Yass / Bungendore/ Goulburn and surrounding regional areas
Grant Pearson	Warrabinya Services	0423 651 615	sales@warrabinya.com.au	NSW	Sydney Metro & Surrounding Areas
Stephen Fraser	Advanced Ground Locations	(02) 4930 3195	steve_agl@hotmail.com	NSW	Newcastle, Hunter Valley, Central Coast, Taree & Surrounding Areas
Andrew Findlay/ Anthony Hart	LiveLocates	0429 899 777	info@livelocates.com.au	NSW	South Coast/ACT, Snowy Mountains
Graeme Teege	Armidale Electrical	02 6772 3702	office@armidale-electrical.com.au	NSW	Armidale
Samantha Guptill	Australian Locating Services	1300 761 545	admin@locating.com.au	NSW	Sydney / Central Coast

Clay Laneyrie	Laneyrie Electrical	0411142627	bindy@laneyrieelectrical.com.au	NSW	Illawarra, South Coast, Shoalhaven, Southern Highlands
Reece Gainsford	East Coast Locating Services	0431 193 111	eastcoastlocating@hotmail.com	NSW	Sydney, Maitland, Newcastle, Hunter, Port Stephens, Central Coast
Craig Vallely	Aqua Freeze & Locate Pty Ltd	0458 774 440	service@aquafreeze.com.au	NSW	Sydney only
Jason Vane	Smartscan Locators PTY Ltd	1300 778 923	Admin@sslocators.com.au	NSW	Sydney
Alex Farcash	Newcastle Locating Services Pty Ltd	0410698599	Admin@newcastlelocatingservices.com.au	NSW	Newcastle, Hunter Valley, Central Coast, Taree & Surrounding Areas
Amer El Chami	Site Scan Pty Ltd	0449 992 520	office@sitescan.net.au	NSW	All NSW
Ian Brown	A1 Locate Services	0400 484 828	Ian.brown@a1locate.com.au	NSW	All NSW
Paul Wallis	Beveridge Williams	0431 458 878	wallisp@bevwill.com.au	NSW	Newcastle Sydney Wollongong
Cameron Handley	Wombat Underground Services	0407477038	accounts@wombatundergroundservices.com.au	NSW	ALL
Samantha Cupiado	Geoscope Utility Detection Services Pty Ltd	1300 750 350	info@geoscopelocating.com.au	NSW	All regions
Laurence Mead	Astrea Pty Ltd	1300 009 346	admin@astrea.com.au	NSW	Sydney Only
Braydon Greenwood	City Coast Services	0422432813	braydon.greenwood@live.com.au	NSW	NSW
Jim Morrison	Absolute Utilities Pty Ltd	0429 496 375	jim@absoluteutilities.com.au	NSW	Mid North Coast
Declan Dowd	Dowds Pipe And Cable Locating	0434 635 134	accounts@pipeandcable.com.au	NSW	Sydney/Wollongong/South Coast / Highlands/Soth west Sydney
Nicholas Schneider	Subsurface Utility Solutions	0421157372	nick@subsurf.com.au	NSW	Sydney only
Ricky Evans	Riverina Cable Locating	0411444980	ricky@riverinacablelocating.com.au	NSW	Riverina, Murray
Adrian Ruane	Road and Rail Excavations Pty Ltd	0414 594 063	cody@roadandrailexcavations.com.au	NSW	Sydney only

Billy Cameron	Locate Down Under Pty Ltd	0431275034	info@lo-catedownunder.com.au	NSW	Central Coast/ Sydney
Daniel Hudson	Geosurv Locating Pty Ltd	1300 554 675	dan@geosurv.com.au	NSW	Sydney only
Roneel Chand	JDG Civil	0416506891	sadhunaam@gmail.com	NSW	Sydney only
Tim Briggs	Deetect Locating Ser-vices	0411396369	deetect.locating@out-look.com	NSW	ACT / NSW
Sean Ferriter	Utech Solutions Pty Ltd	1300 427 614	seanf@vaughancivil.com.au	NSW	Sydney only
Mark Restuccia	Direct Connect Locating PTY LTD	0400507690	info@dclocating.com.au	NSW	NSW only
Patrick Billingham	OzDetect Pty Ltd	0497700667	patrick@ozdetect.com.au	NSW	NSW
Euan Gow	Jurovich Surveying	1300 750 000	egow@jurovichsurvey-ing.com.au	WA/NSW/SA	All state
Jason Steger	Steger & Associates Reg-istered Land Surveyors	0400 008 641	jason.steger@steger.com.au	ACT/NSW	ACT & Surrounds
Samuel Hathaway	Landmark Surveys	02 6280 9608	admin@landmarksur-veys.com.au	NSW/ACT	ACT & Sourthen NSW
Kaisar sefian	Australian Utility Search Pty Ltd	0424 841 888	kaisar@aususearch.com.au	NSW/ACT	All NSW, ACT
Daniel Fox	Epoca Environmental Pty Ltd	1300 376 220	daniel@epocaenvironmen-tal.com.au	NSW & ACT	All NSW & ACT
Scott Tancred	SureSearch Underground Services	1300 884 520	Scott.Tan-cred@suresearch.com.au	NSW/ACT QLD	NSW, Sydney, Northern NSW, Canberra, QLD, South East QLD.
Justin Martinez	LCG GLOBAL PTY LTD	0401749007	J.martinez@lcgsolu-tions.com.au	NSW, ACT, QLD, VIC	All regions
Troy Redden	On Point Utility Locating	1300 66 76 46	Troy@onpointlocating.com.au	NSW/QLD	Throughout both states
Geoff Campbell	CLS Locating	0450759497	geoffrey@campbellslocat-ing.com.au	NSW/QLD	All QLD, Northern Rivers, NSW
Alexander Bog-danoff	Expert Service Locating	0420346477	info@expertservicelocat-ing.com.au	NSW/QLD	Brisbane, Gold Coast, Sunshine Coast Northern Rivers NSW
Patrick Popovic	Site And See Pty Ltd	0479 162 692	patrick@siteandsee.com.au	QLD/NSW	South East QLD & Northern NSW
Rhys Lambert	Provac / one find cables	1300 734 772	rhys@provac.net.au	QLD	South East QLD

Paul Beaton	Cairns Asset Locations	0448 157 227	paul.beaton@clarketrenching.com.au	QLD	FNQ to NT Border
Chris Hall	D C Locators Pty Ltd	0419 679 741	dcloc@powerup.com.au	QLD	Brisbane, Ipswich
Benji Lee	LADS	0478 915 237	benji@ladsqld.com.au	QLD	South East QLD
Ian Lambert	Lambert Locations Pty Ltd	07 5562 8400	admin@lambertlocations.com.au	QLD	South East QLD & Northern NSW
Ross Clarke	FNQ Cable Locators Pty Ltd	0428 775 655	onlineco@bigpond.net.au	QLD	QLD REGION
Col Greville	Bsure Locators	0488 520 688	admin@bsurelocators.com.au	QLD	Wide Bay & Burnett; Central and Western QLD; Western Downs
Matthew Carr	Pensar	0405609739	matty.carr@pensar.com.au	QLD	Brisbane
Jimmy Wilkins	GeoRadar Asutralia Pty Ltd	0425057722	jimmy@georadar.net.au	QLD	Emerald, Bundeaberg
Craig Waite	C Locate	0437 808 444	clocate@bigpond.com	QLD	Brisbane GC SC
Jeffrey Lenehan	Syndicate Communications	0404 151 270	Jlenehan@syndicate.com.au	QLD	Brisbane
Toni O'Dell	Utility Location Services	1300 001 857	qldops@utilitylocationservices.com.au	QLD	South East QLD
Jack Martin	Utility Mapping Pty Ltd	1300 627 746	jmartin@utilitymapping.com.au	QLD	All QLD
Jenny Dziduch	1300 Locate Pty Ltd	1300 562 283	admin@1300locate.com.au	QLD	All Queensland, Northern NSW
Brendon Smith	Advanced Locating PTY LTD	0424678823	admin@advancedlocating.com.au	QLD	Gold Coast
Samuel Hazel	Utility ID Underground Service Locators	0401 202 515	sam@utilityid.com.au	QLD	Darling Downs, South West QLD and South East QLD
Bruce Normyle	Dynamic Hydro Excavations	0434 731 933	admin@dynamicexcavation.com.au	QLD	QLD
Michael Koschel	Precision Service Locating	07 46462845	paul@pslocating.com.au	QLD	All QLD / North West NSW/South East QLD
Robert Rutledge	Safe Dig Services	+61 7 3376 0856	rrutledge@safedig.com.au	QLD	Brisbane

Ben Stephens	DTS Group TA Electroscan	0434 140 556	ben.s@electroscanqld.com.au	QLD	Queensland
Adam Lloyd	Aussie HydroVac Services	07 3287 7818	adam.lloyd@aussiehydrovac.com.au	QLD	All
Michael Prentice	Onsite Utility Locations	0437 172 601	admin@onsiteutilitylocations.com.au	QLD	SEQ
Roland Mollison	LandPartners Pty Ltd	0439 488 545	roland.mollison@landpartners.com.au	QLD	South East Queensland
Duncan McGrath	Abletech Underground Group	0418 511 767	duncan@abletechunderground.com.au	QLD	QLD Wide
Daniel Poppi	Ace Cable Locations	0431517837	acecablelocations@bigpond.com	QLD	Wide Bay Burnett
Carl Molloy	Provac Melbourne	0451 104 611	melbourne@provac.net.au	VIC	Melbourne Region
Olivier Davies	Central Locating PTY LTD	0439 995 894	ollie@centrallocating.com.au	VIC	Melbourne & Western Victoria
Tina Brereton	D-Tech Ground & Overhead	03 9544 8933	tina@d-tech.net.au	VIC	ALL
Josh Taylor	Advanced Locations Victoria Pty Ltd	0427846716	josh@advancedlocationsvic.com.au	VIC	All Victoria
Ben Minutoli	Geelong Cable Locations	1800 449 543	ben@geelongcablelocations.com.au	VIC	Melbourne, Geelong, Country Victoria
Mick McGoldrick	Locate Cables	0404 241 679	mick@locatecables.com	VIC	Western Victoria
Adam Miriklis	Utility Mapping Pty Ltd	1300 627 746	amiriklis@utilitymapping.com.au	VIC	All VIC
Phi Nguyen	Asset Detection Services Pty Ltd	1300 300 100	Phi.nguyen@assetdetection.com.au	VIC	Melbourne/VIC
Maurice Tobin	Drain Solutions	0412 111600	info@drainsolutions.com.au	VIC	Melbourne Metro
Kate Ficker	Seeker Utility Engineering	1300 733 583	admin@seekerutilityengineering.com.au	VIC	All Victoria
Leigh French	Veris Australia VIC	(03) 7019 8400	melbourne@veris.com.au	VIC	Melbourne

Ben Wooldridge	Controltech Solutions	0447 760 759	ben.wooldridge@controltech-solutions.com.au	VIC	Melbourne
Chris Sandlant	Access Utility Engineering P/L	03 9799 8788	Chris.sandlant@accesue.com.au	VIC	Victoria & Regional
Shaun Stephen	STS Locating Services	0405 181 734	stslocatingservices@gmail.com	VIC	All VIC
Glen Foreman	Underground Services Detection Pty Ltd	0402 748 889	undergroundservices@bigpond.com	VIC	Victoria
Clinton Carver	Insight Underground Pty Ltd	0468 900 273	clinton@insightunderground.com.au	VIC	Victoria
Lindsay Botha	L B Underground Service Locations & Engineering	0499 658 677	lb.locations.engineering@gmail.com	VIC	Metro and Regional Victoria
Damien Nielsen	ELS Environmental Location Systems Pty Ltd	0499 499 137	bookings@elsvic.com.au	VIC	Victoria only
Tyler Blake	CHS Group	0409 437 750	tyler.blake@chsgroup.com.au	VIC	Horsham VIC
Ashley Stevens	ABS HYDRO Pty Ltd	0422 798 476	ashley.stevens@abshydro.com.au	NSW/VIC	All of VIC, Regional NSW
Eddie Santos	Taylors Development Strategists	0488 700 155	m.tasker@taylorsds.com.au	VIC/SA/TAS	Victoria
Taryn van Dyk	Trenchless Pipelaying Contractors (TPC)	08 8376 5911	tpc@trenchlesspipelaying.com.au	SA	All
Marc Rose	SADB	0488190699	marc@sadb.com.au	SA	Adelaide only
Matthew Lewis	Adelaide Pipeline Maintenance services	0431 870 471	matt.apms@gmail.com	SA	South Australia
Deninis Stray	Pinpoint Services Mapping	(08) 8130 1600	hello@pinpointsm.com.au	SA	SA and western VIC
Liam Gill	Michael Grear Surveys	08 82788732	ugsl@mgsurveys.com.au	SA	SA
Mattew Cooper	Fulton Hogan	0447 320 581	Matthew.Cooper@fultonhogan.com.au	SA	South Australia
Liam Catchpole	APEX SERVICE LOCATING PTY LTD	0458 924 471	liam@apexvacsolutions.com.au	SA	Adelaide
Bradley Gosling	Engineering Surveys	0433506880	bgosling@engsurveys.com.au	SA	Adelaide

Jason Revill	MME/Platinum Locating Services	08 94080625	jason.revill@platinumlocating.com.au	WA	Perth
Henry Westbrook	Cable Locates & Consulting	08 9524 6600	admin@cablelocates.com.au	WA	All WA
Cameron Swift	Mikcomm Communication	08 9337 1125	cswift@mikcomm.com.au	WA	All
Tobi Lawrence-Ward	Abaxa	08 9256 0100	enquiries@abaxa.com.au	WA	Perth, Southwest, Western Australia
Ben Upton	TerraVac Vacuum Excavation	0433 374 802	locations@terravac.com.au	WA	Perth
Dale Shearsmith	Subtera	1300 046 636	dale@subtera.com.au	WA	WA
Cheron Ingram	Bunbury Telecom Service Pty Ltd	08 9726 0088	cheron@btswa.com.au	WA	WA
Krzysztof Stec	Utility Mapping	1300 627 746	kstec@utilitymapping.com.au	WA	All WA
Edel O'Connor	Kier Contracting	0456 190 910	edel@kier.com.au	WA	Perth Metro & greater region; Regional WA
Nigel Nunn	CCS Group / Utility Locating Solutions	08 9385 5000	enquiry@ccswa.com.au	WA	Perth
Jeremy Brown	Spotters Asset Locations Pty Ltd	0459 130 677	jeremy@spottersassetlocations.com.au	WA	All
Reece Topham	Prime Locate	0400 888 406	reece@primelocate.com.au	WA	All
Rhyce Murphy	RM Surveys	08 9457 7900	rhyce.murphy@rmsurveys.com.au	WA	All
James Horton	Westscan Pty Ltd	1300 858 404	westscan1@gmail.com	WA	All
Ashleigh Austin	Veris WA	0419 024 696	perth@veris.com.au	WA	Perth Metro & Regional
Suhairee Suhaimi	BCE Spatial	08 9791 7411	harry@bcespatial.com.au	WA	WA
Tim Daws	Award Contracting Pty Ltd	0411 878 895	info@awardcontracting.com.au	WA	Metro & Country Regions
Stephen Steart	Cabling WA Pty Ltd	0422 845 586	ssteart@cablingwa.com.au	WA	Perth Metro

Adam Williams	Utility Mapping	1300 627 746	awilliams@utilitymap-ping.com.au	NT	All NT
Stuart Speckman	FYFE	08 8944 7888	Stuart.Speck-man@fyfe.com.au	NT/SA/NSW	NT/SA/NSW
Wayne Parslow	Danisam	0417 089 865	danisam@westnet.com.au	NT	Darwin NT and Surrounds
Scott Crerar	Paneltec Group	0400 895 637	scott@paneltec.com.au	TAS	All

Appendix C

Correspondence

From: ACTF&R Risk & Planning
To: John Samoty
Subject: RE: Fire Advice and Risk Rating - Block 4 Section 235 Gungahlin
Date: Friday, 5 July 2024 2:51:48 PM
Attachments: image001.png
image002.png
image003.png

OFFICIAL

Hi john,

Thanks for reaching out.

The bushfire assessment report you referred to was for the broad development of the estate at the time of planning. It does not apply to this specific development and refers to old standards. The development will require its own assessment using contemporary standards. This assessment will outline everything that is required from a bushfire perspective.

I offer the standard commentary here –

> Bushfire Threat Assessment and Compliance Report:
> This development is located inside the area declared by the ESA to be subject to the threat of bushfire. The application of appropriate bushfire protection measures are advised, and an assessment of the proposal by an accredited Bushfire Consultant is required as part of a development application.

In reply to your water supply request, ACTF&R can confirm fire risk type FRT3 is applicable to this development - Block 4 Section 235, GUNGAHLIN.

Regards,

395 Station Officer Jeff Dau
Bushfire and Development Assessment Officer
ACT Fire & Rescue | Community Safety
62078472

From: John Samoty <John.Samoty@jpsengineering.com.au>
Sent: Tuesday, July 2, 2024 9:27 PM
To: ACTF&R Risk & Planning <ACTF-RRisk-Planning@act.gov.au>
Subject: Fire Advice and Risk Rating - Block 4 Section 235 Gungahlin

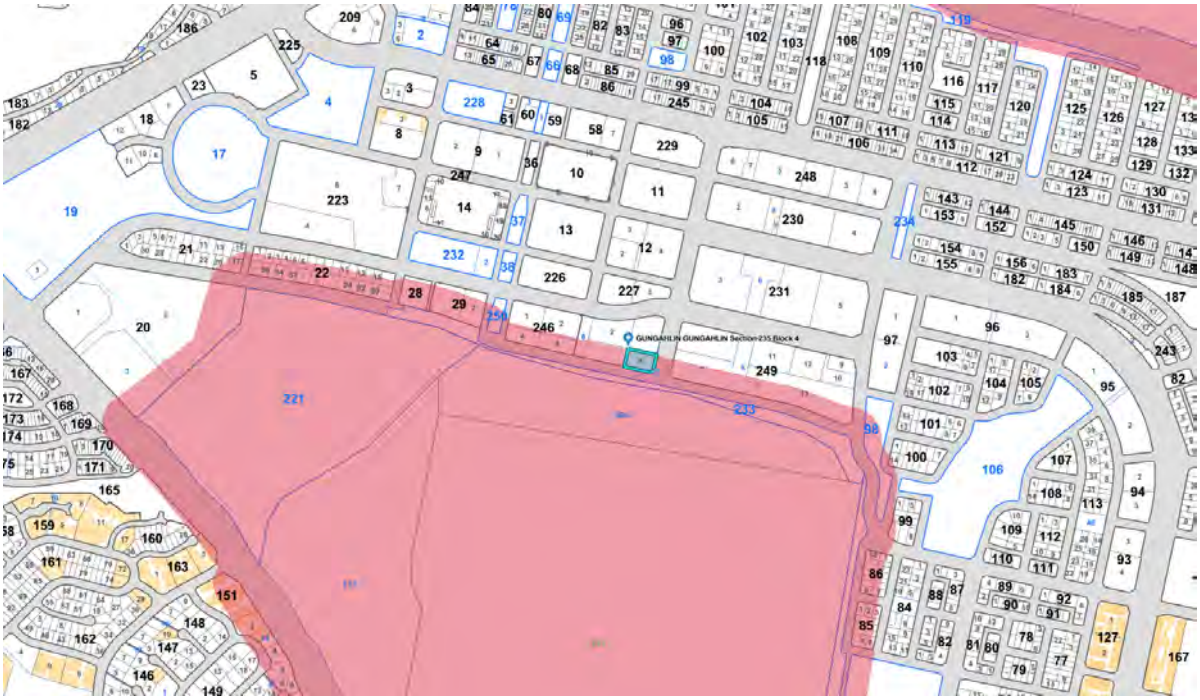
Dear ACT Fire & Rescue Team,

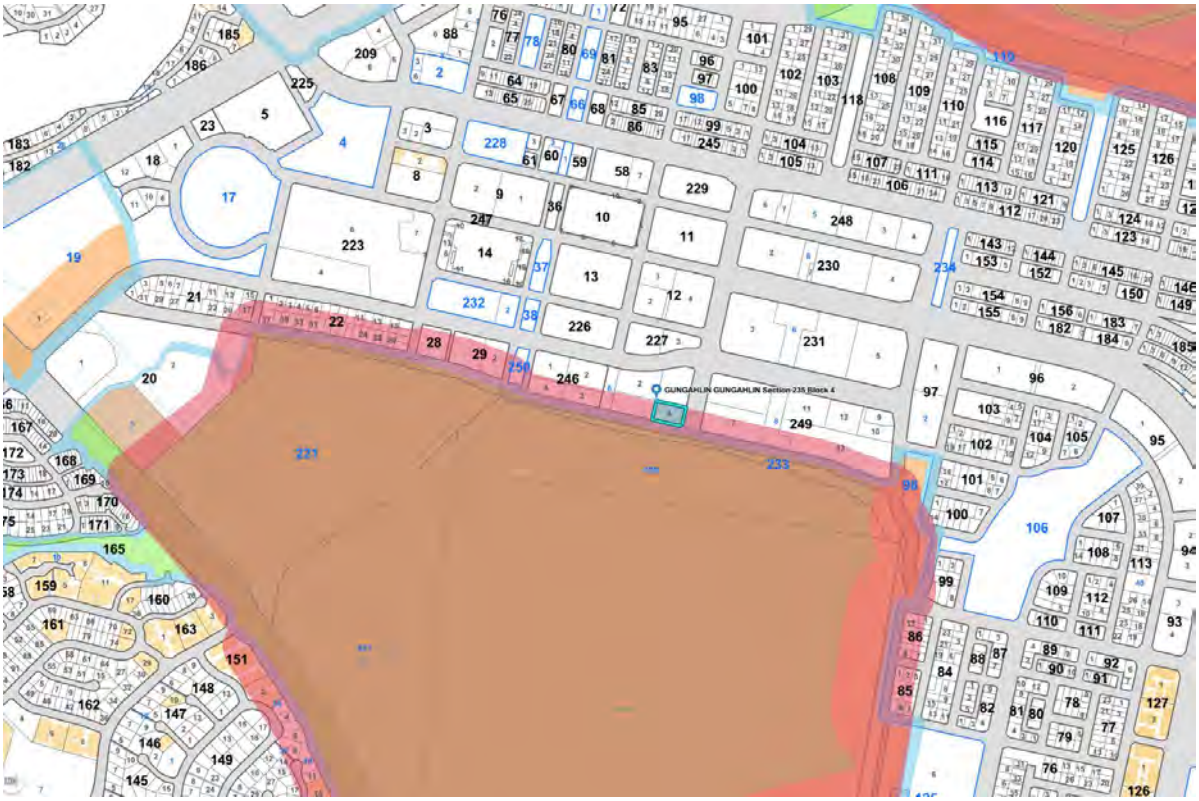
JPS Engineering Consultants are currently engaged by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 235 Gungahlin. See below an image of the site outlined and highlighted in blue.

The SLA are undertaking this due diligence report to understand the risks and opportunities to allow a proposed housing development with the potential of a small shop/cafe. The intended yield for Block 4 Section 235 Gungahlin is in the range of 63-80 dwellings up to a maximum of 8 storeys.

ACTmapi indicates that there is a nearby bushfire prone area along the southern boundary as part of the Mulanggari Grasslands, and that there is a strategic bushfire management zone that runs through the block. See below relevant extracts from ACTmapi.

I have also sourced the attached bushfire report that was undertaken to support the subdivision of the area in Gungahlin Town Centre East. It refers to a 20m wide IAZ south of the site.





Based on this information, can you please advise whether there would need to be any special bushfire mitigation allowances incorporated into any proposed development on the site and whether the proposed development would have any restrictions? Also, could you please confirm what the most appropriate Fire Risk Type (FRT) would be for the proposed development, and any other concerns that ACT Fire & Rescue may have toward future development within this site?

Kind regards,

John Samoty, MIEAust, CPEng, NER, RPEQ, APEC Engineer, IntPE(Aus)
Director

JPS Engineering Consultants

28 Barrallier Street, Griffith, ACT 2603
M 0417 434 996
E John.Samoty@JPSEngineering.com.au

From: Russell, Meaghan
To: John Samoty
Cc: Bensley, Dianne
Subject: ACT Heritage Council advice - Block 4 Section 235 Gungahlin - Site investigation report
Date: Friday, 5 July 2024 3:40:52 PM
Attachments: image001.png
image002.png

Hello John,

Thank you for seeking ACT Heritage Council (the Council) advice in relation to a Site Investigation Report for Block 4 Section 235 Gungahlin within Gungahlin Town Centre East.

Review of the ACT Heritage Register confirms that the subject block does not contain any nominated or registered heritage places, nor any Aboriginal places or objects.

However, as you mention in your email, there are registered Aboriginal places (Chert Quarries) located in nearby blocks across from what is now Camilleri Way. These sites are located greater than 500m from the subject block and as such, are unlikely to be encroached upon by any future development in Block 4 Section 235 Gungahlin.

An inspection of historic aerial imagery indicates that since 2018, Block 4 Section 235 Gungahlin has been subject to widespread clearing and disturbance through earthworks and the ongoing urban development of the surrounding blocks, effectively reducing the archaeological potential of the site.

Following review, and as a delegate of the Council, I can confirm that there are no heritage constraints for future development within Block 4 Section 235 Gungahlin, and therefore no further Council advice is required subject to the following condition:

1. In the event that any unexpected Aboriginal places or objects are encountered during future construction works within Block 4 Section 235 Gungahlin; construction is to cease to allow for heritage assessment and management (in accordance with Section 75 of the *Heritage Act 2004*); and the discovery is to be reported to the Council within five working days (in accordance with Section 51 of the *Heritage Act 2004*); and the discovery is to be managed in accordance with further Council advice.

Regards,
Meaghan

Meaghan Russell | Director, Approvals and Advice, ACT Heritage: as delegate for the ACT Heritage Council
Phone: 13 22 81 I Email: meaghan.russell@act.gov.au
Environment, Planning and Sustainable Development Directorate **I ACT Government**
480 Northbourne Avenue, Dickson I GPO Box 158 Canberra ACT 2601
www.environment.act.gov.au

From: John Samoty <John.Samoty@jpsengineering.com.au>
Sent: Thursday, July 4, 2024 10:54 AM
To: Heritage <Heritage@act.gov.au>
Cc: Bensley, Dianne <Dianne.Bensley@act.gov.au>
Subject: Block 4 Section 235 Gungahlin - ACT Heritage Council Advice

Dear Heritage Council,

JPS Engineering has been engaged by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 235 Gungahlin, in what is commonly referred to as Gungahlin Town Centre East. See below an image of the site outlined and highlighted in blue.

The SLA are undertaking this due diligence report to understand the risks and opportunities to allow a proposed housing development with the potential of a small shop/cafe. The intended yield for Block 4 Section 235 Gungahlin is in the range of 63-80 dwellings up to a maximum of 8 storeys.

Following a review of ACTmapi records, there are final registered heritage values (Aboriginal quarry sites) in the Mulanggari Grasslands, to the south of the site, which can be see in the below image. However, I have also sourced the attached heritage advice provided during the Estate Development Plan process for Gungahlin Town Centre East estate.

Based on this, I would like to confirm if any heritage factors need to be considered as part of the proposed development in this location on Block 4 Section 235 Gungahlin. I would greatly appreciate a response at your earliest convenience.

Kind regards,

John Samoty, MIEAust, CPEng, NER, RPEQ, APEC Engineer, IntPE(Aus)
Director

JPS Engineering Consultants

28 Barrallier Street, Griffith, ACT 2603
M 0417 434 996
E John.Samoty@JPSEngineering.com.au

From: Coghill, Stacee on behalf of ConservatorFloraFauna
To: John Samoty
Subject: RE: Block 4 Section 235 Gungahlin - Flora and Fauna Review
Date: Friday, 5 July 2024 2:38:58 PM
Attachments: image001.png
image002.png
image003.png

OFFICIAL

HI John
Thanks for your enquiry.

The block itself doesn't have any ecological values however, when assessing the proposal we also consider possible offsite impacts and this site is adjacent to the Mulanggari Nature Reserve. The reserve supports populations of Striped Legless Lizard and Golden Sun Moth as well as areas of Box Gum Woodland threatened ecological community. Shadowing of habitat can have a significant impact on Striped Legless Lizard and Golden Sun Moth.

We would need to see modelling of the shadow cast by the proposed building to be able to assess the level of impact of the values within the reserve and confirm whether an ESO would be required.

Many thanks
Stacee Coghill
Conservation Officer
Conservator Support | Environment, Heritage & Parks
Environment, Planning and Sustainable Development Directorate, ACT Government
Phone 02 6205 9274 | Stacee.Coghill@act.gov.au
Level 2, 480 Northbourne Ave, Dickson ACT 2604
www.environment.act.gov.au |

From: John Samoty <John.Samoty@jpsengineering.com.au>
Sent: Thursday, July 4, 2024 10:33 AM
To: ConservatorFloraFauna <ConservatorFloraFauna@act.gov.au>
Cc: Taylor, Karen <Karen.Taylor@act.gov.au>
Subject: Block 4 Section 235 Gungahlin - Flora and Fauna Review

Dear Conservator of Flora and Fauna,

JPS Engineering has been engaged by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 235 Gungahlin, in what is commonly referred to as Gungahlin Town Centre East. See below an image of the site outlined and highlighted in blue.

The SLA are undertaking this due diligence report to understand the risks and opportunities to allow a proposed housing development with the potential of a small shop/cafe. The intended yield for Block 4 Section 235 Gungahlin is in the range of 63-80 dwellings up to a maximum of 8 storeys.

Based on a review of ACTmapi records, there appears to be nearby threatened habitat areas within the site – showing up as Stiped Legless Lizard habitat (shown in the first image below). It is also noted that potential threatened wood land and exotic/native grasslands are south of the site within the Mulanggari Grasslands (second image below). Some mature native trees were also noted near the site during a site inspection.

I've sourced the attached S211 exemption signed off by the Minister in November 2013, which enabled the subdivision of Gungahlin Town Centre East.

Based on this information and your records, could you please confirm whether there are any ecological constraints for future development on Block 4 Section 235 Gungahlin?

Kind regards,

John Samoty, MIEAust, CPEng, NER, RPEQ, APEC Engineer, IntPE(Aus)
Director

JPS Engineering Consultants

28 Barrallier Street, Griffith, ACT 2603
M 0417 434 996
E John.Samoty@JPSEngineering.com.au

From:	Jennings, RussellC
To:	John Samoty
Cc:	Contaminated Sites
Subject:	RE: Contaminated Land Search - Application, MW7J2J4D, John Samoty [SEC=UNCLASSIFIED, DLM=Sensitive: Personal]
Date:	Wednesday, 10 July 2024 11:48:02 AM

OFFICIAL

Dear Mr Samoty

RE: CONTAMINATED LAND SEARCH

Thank you for your search form request of 05/07/2024 enquiring about:

Block 4 Section 235 Gungahlin Gungahlin

Records held by the Environment Protection Authority (EPA) for the above block(s) indicate the following:

The block is not recorded on the EPA's contaminated sites management database or geographic information system.

8 March 2012, The Environment Protection Authority (EPA) reviewed the report titled "Phase 2 Environmental Site Assessment For the Gungahlin Town Centre East Estate, ACT" (this included the land which is now GUNGAHLIN SECTION 235 BLOCK 4) dated 6 March 2012 by Coffey Environments Pty Ltd.The EPA assessed the report and endorsed the consultant's findings that on the basis of the studies the area subject to assessment in the above report is "… suitable for the land uses allowed under the Territory Plan … " subject to the following conditions:

Prior to the commencement of redevelopment works at the site the stockpile identified in the above report must be assessed by a suitably qualified environmental consultant for the purposes of beneficial reuse or waste disposal. No material from the stockpile is to be reused on or off-site or disposed off-site without EPU approval;

- A site management plan incorporating an unexpected finds protocol must be prepared by a suitably qualified environmental consultant and endorsed by the EPA prior to the commencement of earthworks at the site;

A site inspoection carried out in June 2024 noted that development at the site had commenced.

The EPA has not issued any orders of assessment or remediation under sections 91C (1) or 91D (1) respectively, environment protection orders under sections 125 (2) or (3), requested an audit under section 76 (2) or received an audit notification under section 76A (1) of the Environment Protection Act 1997 (the Act) over the site and as a result the site is not recorded on the Register of contaminated sites under section 21A of the Act.

The information detailed above only relates to records held by the EPA and may not represent the actual condition of the site.

At present the EPA has no information on contamination of the above block(s) other than as detailed above. However, this does not absolutely rule out the possibility of contamination and should not be interpreted as a warranty that there is no contamination.

I appreciate that this does not absolutely rule out the existence of contamination of the soils. If you or your clients wish to be completely sure you, or they, should arrange to conduct independent tests.

Yours sincerely

Russell C. Jennings | **Environment Protection Officer**
Phone: **02 6207 2157**| Email: russellc.jennings@act.gov.au
Access Canberra | Chief Minister, Treasury and Economic Development Directorate | ACT Government
Fourth Floor 480 Northbourne Ave. Dickson 2602 ACT | GPO Box 158 Canberra ACT 2601 | http://www.act.gov.au/accesscbr

We acknowledge the Traditional Custodians of the ACT, the Ngunnawal people. We acknowledge and respect their continuing culture and the contribution they make to the life of this city and this region.

From: smartforms@act.gov.au <smartforms@act.gov.au>
Sent: Friday, July 5, 2024 9:35 PM
To: Contaminated Sites <ContaminatedSites@act.gov.au>
Subject: Contaminated Land Search - Application, MW7J2J4D, John Samoty [SEC=UNCLASSIFIED, DLM=Sensitive: Personal]

Contaminated Land Search - Application

Form data summary

Customer details	John Samoty
Reference code	MW7J2J4D

For issues or questions relating to SmartForms please contact the Payment Services Integration Team on *5 4607 or email smartforms.admin@act.gov.au.

From:	Chandika Dassanayake
To:	John Samoty
Cc:	Network Connection Application; NetworkPlanning
Subject:	RE: Block 4 Section 235 Gungahlin - Electrical Advice
Date:	Monday, 15 July 2024 9:20:31 AM
Attachments:	image001.png image003.png image004.png image005.png

Hi John,
Good morning.
As per the historical load of the existing 11kV feeders in the vicinity, there is spare capacity available to supply the expected demand. However, an accurate advice can be provided at the PNA or connection application stage as there are significant new developments occurring in the Gungahlin suburb and Evoenergy has to allocate available spare capacity based on the PNA or connection application timing.

Also, during the PNA stage, Evoenergy will assess the existing load of S11554 and advise the least cost technically feasible solution to supply this development.
If new substation required within the block the space requirement would be 14.2m x 6.2m.

Please refer below documents through Drawings and Standards (evoenergy.com.au)

- Minimum clearance, separation & cover requirements
- Conduit and trench standards
- Padmount substation requirements
- Details for electricity connections & applications

Thank you
Kind Regards

Chandika Dassanayake (he/him)
Senior Network Planning Engineer
Strategy and Operations
T 02 6293 5871
M 0459 882 179
evoenergy
Facebook | Twitter | Instagram | LinkedIn

POWERED BY SAFETY

From: John Samoty <John.Samoty@jpsengineering.com.au>
Sent: Friday, July 5, 2024 8:54 PM
To: Chandika Dassanayake <Chandika.Dassanayake@evoenergy.com.au>
Cc: Network Connection Application <Network.ConnectionApplication@evoenergy.com.au>
Subject: Block 4 Section 235 Gungahlin - Electrical Advice

Hi Chandika,

JPS Engineering has been engaged by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 235 Gungahlin, in what is commonly referred to as Gungahlin Town Centre East. See below an image of the site outlined and highlighted in blue.

The SLA are undertaking this due diligence report to understand the risks and opportunities to allow a proposed housing development with the potential of a small shop/cafe. The intended yield for Block 4 Section 235 Gungahlin is in the range of 63-80 dwellings up to a maximum of 8 storeys.

The preliminary electrical demand for a 63 apartment and 80 apartment complex has been estimated as 380kVA and 450kVA, respectively. These figures are very preliminary and we request that Evoenergy validate the demand that is characteristic for this type and scale of development. Electric vehicle charging is also expected for each development scenario in line with the latest ACT Government Residential Zones Planning Technical Specification of one space per unit. This would mean 63 and 80 EV charging spaces for each scenario.

I have noted during a site inspection that there is an existing substation on the other side of Kate Crace Street, on Block 7 Section 249. A photo of this substation is shown below.

Based on this information, could you please confirm that the existing electrical infrastructure has sufficient capacity to service this site or any augmentations that may be required?

Kind regards,

John Samoty, MIEAust, CPEng, NER, RPEQ, APEC Engineer, IntPE(Aus)
Director

JPS Engineering Consultants

28 Barrallier Street, Griffith, ACT 2603
M 0417 434 996
E John.Samoty@JPSEngineering.com.au

'.

From: Coghill, Stacee on behalf of ConservatorFloraFauna
To: John Samoty
Subject: RE: Block 4 Section 235 Gungahlin - Flora and Fauna Review
Date: Friday, 19 July 2024 2:31:52 PM
Attachments: image001.png
image002.png
image003.png

OFFICIAL

Afternoon John – I hope you are feeling better. Thanks for providing this modelling of shadow cast. The modelling shows minimal impacts on GSM and SLL habitat within Mulanggari Nature Reserve. An ESO would not be triggered for this project.

Many thanks
Stacee Coghill
Conservation Officer
Conservator Support | Environment, Heritage & Parks
Environment, Planning and Sustainable Development Directorate, ACT Government
Phone 02 6205 9274 |Stacee.Coghill@act.gov.au
Level 2, 480 Northbourne Ave, Dickson ACT 2604
www.environment.act.gov.au |

From: John Samoty <John.Samoty@jpsengineering.com.au>
Sent: Thursday, July 11, 2024 5:20 PM
To: Coghill, Stacee <Stacee.Coghill@act.gov.au>
Cc: ConservatorFloraFauna <ConservatorFloraFauna@act.gov.au>
Subject: RE: Block 4 Section 235 Gungahlin - Flora and Fauna Review

OFFICIAL

Hi Stacee,

As a follow up to your email below, my Client at the SLA has undertaken the attached shading analysis with the conceptual yield on Block 4 Section 235 Gungahlin. It appears that the shade over the Mulanggari Grasslands is minimal, but I would appreciate if you could advise whether this would trigger the need for an ESO?

Kind regards,

John Samoty, MIEAust, CPEng, NER, RPEQ, APEC Engineer, IntPE(Aus)
Director

JPS Engineering Consultants

28 Barrallier Street, Griffith, ACT 2603
M 0417 434 996
E John.Samoty@JPSEngineering.com.au

From: Coghill, Stacee <Stacee.Coghill@act.gov.au> **On Behalf Of** ConservatorFloraFauna
Sent: Friday, 5 July 2024 2:39 PM
To: John Samoty <John.Samoty@jpsengineering.com.au>
Subject: RE: Block 4 Section 235 Gungahlin - Flora and Fauna Review

OFFICIAL

HI John
Thanks for your enquiry.

The block itself doesn't have any ecological values however, when assessing the proposal we also consider possible offsite impacts and this site is adjacent to the Mulanggari Nature Reserve. The reserve supports populations of Striped Legless Lizard and Golden Sun Moth as well as areas of Box Gum Woodland threatened ecological community. Shadowing of habitat can have a significant impact on Striped Legless Lizard and Golden Sun Moth.

We would need to see modelling of the shadow cast by the proposed building to be able to assess the level of impact of the values within the reserve and confirm whether an ESO would be required.

Many thanks
Stacee Coghill
Conservation Officer
Conservator Support | Environment, Heritage & Parks
Environment, Planning and Sustainable Development Directorate, ACT Government
Phone 02 6205 9274 |Stacee.Coghill@act.gov.au
Level 2, 480 Northbourne Ave, Dickson ACT 2604

www.environment.act.gov.au |

From: John Samoty <John.Samoty@jpsengineering.com.au>
Sent: Thursday, July 4, 2024 10:33 AM
To: ConservatorFloraFauna <ConservatorFloraFauna@act.gov.au>
Cc: Taylor, Karen <Karen.Taylor@act.gov.au>
Subject: Block 4 Section 235 Gungahlin - Flora and Fauna Review

Dear Conservator of Flora and Fauna,

JPS Engineering has been engaged by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 235 Gungahlin, in what is commonly referred to as Gungahlin Town Centre East. See below an image of the site outlined and highlighted in blue.

The SLA are undertaking this due diligence report to understand the risks and opportunities to allow a proposed housing development with the potential of a small shop/cafe. The intended yield for Block 4 Section 235 Gungahlin is in the range of 63-80 dwellings up to a maximum of 8 storeys.

Based on a review of ACTmapi records, there appears to be nearby threatened habitat areas within the site – showing up as Stiped Legless Lizard habitat (shown in the first image below). It is also noted that potential threatened wood land and exotic/native grasslands are south of the site within the Mulanggari Grasslands (second image below). Some mature native trees were also noted near the site during a site inspection.

I've sourced the attached S211 exemption signed off by the Minister in November 2013, which enabled the subdivision of Gungahlin Town Centre East.

Based on this information and your records, could you please confirm whether there are any ecological constraints for future development on Block 4 Section 235 Gungahlin?

Kind regards,

John Samoty, MIEAust, CPEng, NER, RPEQ, APEC Engineer, IntPE(Aus)
Director

JPS Engineering Consultants

28 Barrallier Street, Griffith, ACT 2603
M 0417 434 996
E John.Samoty@JPSEngineering.com.au

From:	Dahal, Nabin
To:	John Samoty
Cc:	Hydraulic Asset Acceptance
Subject:	RE: Block 4 Section 235 Gungahlin - Potable Water and Sewer Advice
Date:	Friday, 26 July 2024 4:01:03 PM
Attachments:	image004.png image005.png image006.png image007.png image008.png

Good afternoon John,

Please see response below:

Sewer Capacity

It is expected that existing sewer network will be able to cater proposed foul flow. Please note that, existing sewer gravity main size doesn't align with minimum pipe size requirement by Icon Water's design standard. However, initial analysis indicated that hydraulically existing size of gravity main will be sufficient considering proposed scale of commercial development (small shop/cafe) . Please note that:

- The assessment is based on current proposed scale of commercial development.
- If loads increase significantly, the developer shall notify Icon Water for reassessment and upsizing may be required.

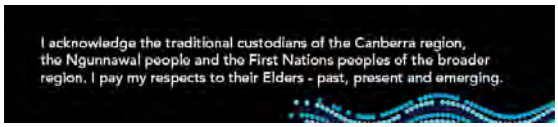
Water Capacity

Initial analysis indicated that existing water network has sufficient capacity including fire flow at requested category.

Regards,

Nabin Dahal
Senior Technical Officer, Developer Services
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
M 0448 420 948
iconwater.com.au | Twitter | YouTube | LinkedIn



From: John Samoty <John.Samoty@jpsengineering.com.au>
Sent: Friday, July 5, 2024 4:14 PM
To: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Subject: Block 4 Section 235 Gungahlin - Potable Water and Sewer Advice

Dear Icon Water Team,

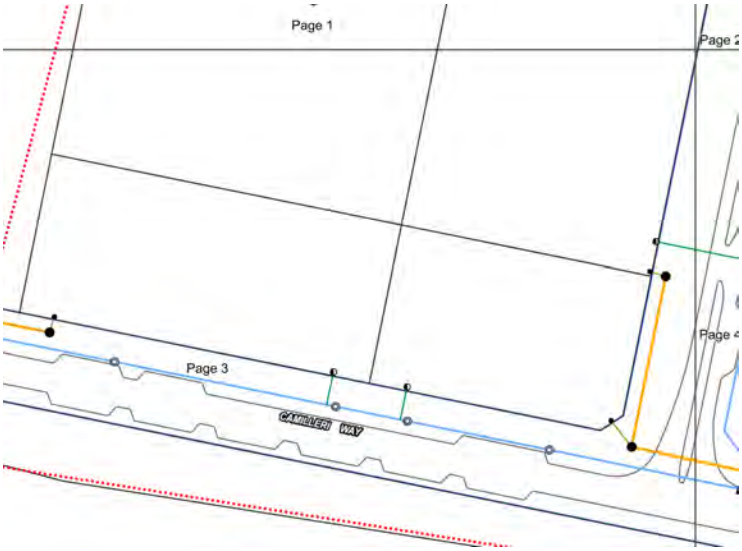
JPS Engineering has been engaged by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 235 Gungahlin, in what is commonly referred to as Gungahlin Town Centre East. See below an image of the site outlined and highlighted in blue.

The SLA are undertaking this due diligence report to understand the risks and opportunities to allow a proposed housing development with the potential of a small shop/cafe. The intended yield for Block 4 Section 235 Gungahlin is in the range of 63-80 dwellings up to a maximum of 8 storeys.

Potable Water

ACT Fire & Rescue has confirmed that the site falls into the Fire Risk Type 3 category i.e. 60L/s.

An existing water tie and meter were identified on site in the south west corner of the block. This can be seen in the Before You Dig extract below. It would be intended that this connection point was maintained.



Based on the abovementioned preliminary yield study, the potable water demand has been estimated as follows for the 63 dwelling and 80 dwelling options:

Development Type	Peak Day Demand Rate (L/day/tenement)	Peak Hour Demand Rate (L/day/tenement)	Comments	Relevant No. Dwellings / Tenement	Peak Hour Demand (L/s)	95th Percentile Demand (L/s)
Residential Super High Density	550	2200	Dwellings / Tenement	63	1.604	1.059
				Total Peak Demand	**1.604**	**L/s**

Development Type	Peak Day Demand Rate (L/day/tenement)	Peak Hour Demand Rate (L/day/tenement)	Comments	Relevant No. Dwellings / Tenement	Peak Hour Demand (L/s)	95th Percentile Demand (L/s)
Residential Super High Density	550	2200	Dwellings / Tenement	80	2.037	1.344
				Total Peak Demand	**2.037**	**L/s**

Sewer

An existing sewer tie has been provided to the block in its south east corner, which can be seen in the above Before You Dig extract.

Based on the preliminary yield study, see below estimated sewage flows for each block in each of the development scenarios:

63 Dwellings Option

TEP =	126
ADWF =	0.265
PDWF =	0.951
NSA (res) =	0.508
NSA (commercial) =	0.000
A_{Eff} (res) =	0.508
A_{Eff} (commercial) =	0.000
GWI (res) =	0.007
GWI (commercial) =	0.000
RDI (res) =	0.365
RDI (industrial) =	0.000
DF =	1.323

Q = 1.323 L/s

80 Dwelling Option

TEP =	160
ADWF =	0.336
PDWF =	1.179
NSA (res) =	0.508
NSA (commercial) =	0.000
A_{Eff} (res) =	0.508

A_{Eff} (commercial) =	0.000
GWI (res) =	0.007
GWI (commercial) =	0.000
RDI (res) =	0.365
RDI (industrial) =	0.000
DF =	1.551

Q = 1.551 L/s

Please note that the net sewer area has been estimated as per the below catchment as 5,075m^2.

Based on these flows, could you please confirm that the proposed connection points are acceptable and that the receiving mains and broader network has the capacity to accept these flows.

Kind regards,

John Samoty, MIEAust, CPEng, NER, RPEQ, APEC Engineer, IntPE(Aus)
Director

JPS Engineering Consultants

28 Barrallier Street, Griffith, ACT 2603
M 0417 434 996
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Appendix D

Site Photos

Photo #1

Photo #2

Photo #3

Photo #4

Photo #5

Photo #6

Photo #7

Photo #8

Photo #9

Photo #10

Photo #11

Photo #12

Photo #13

Photo #14

Photo #15

Photo #16

Photo #17

Photo #18

Photo #19

Photo #20

Photo #21

Photo #22

Photo #23

Photo #24

Photo #25

Photo #26

Photo #27

Photo #28

Photo #29

Photo #30

Photo #31

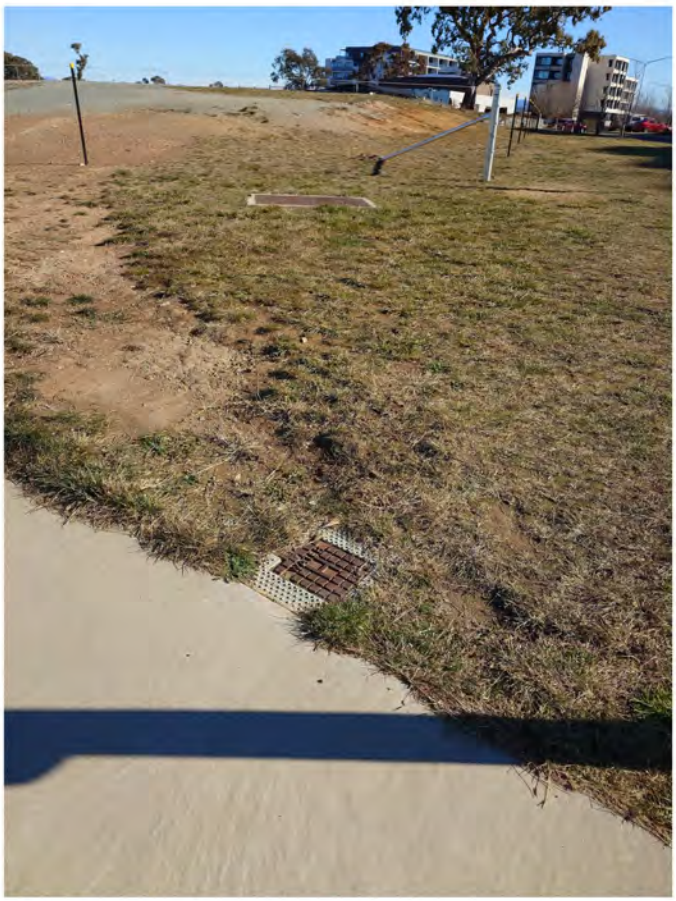

Photo #32

Photo #33

Photo #34

Photo #35

Photo #36

Photo #37

Photo #38

Photo #39

Photo #40

Photo #41

Photo #42

Photo #43

Photo #44

Photo #45

Photo #46

Photo #47

Photo #48

Photo #49

Photo #50

Photo #51

Photo #52

Photo #53

Photo #54

Photo #55

Photo #56

Photo #57

Photo #58

Appendix E

Indesco EDP Report for Gungahlin Town Centre East Estate

GUNGAHLIN TOWN CENTRE EAST ESTATE DEVELOPMENT PLAN REPORT

November 2016

In association with

SPACELAB
CREATING TIMELESS PLACES

CANBERRA
Level 1, Equinox 4
70 Kent Street
DEAKIN ACT 2600
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ABN: 37 008 581 066
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Web: www.indesco.com.au
Email: indesco@indesco.com.au

PROJECT TITLE: Gungahlin Town Centre East Estate PROJECT NUMBER: 5678-01			
Prepared by:	John Piechowski	Date:	11 November 2016
Reviewed by:	Anna Nagalingam	Date:	11 November 2016
Approved by:	Viet Le	Date:	11 November 2016

REVISION CONTROL			
Document	**Issue Date**	**Recipient**	**Details**
Version 1	24 June 2015	LDA – Peter Griffiths ACTPLA – Bob Taylor	Document check
Version 2	20 July 2015	LDA – Peter Griffiths ACTPLA – Bob Taylor	EDP Submission 1
Version 3	20 June 2016	LDA – Peter Griffiths ACTPLA – Bob Taylor	Document check
Version 4	12 July 2016	LDA – Peter Griffiths ACTPLA – Bob Taylor	EDP Submission 2
Version 5	11 November 2016	LDA – Peter Griffiths ACTPLA – Bob Taylor	Agency Endorsement

Base Template:	Version: A May 2013

Contents

List of Appendices

1. INTRODUCTION

This report has been prepared for the development application of the second EDP submission for the Gungahlin Town Centre (GTC) East Estate Development Plan. Agency comments to the first EDP submission and second EDP submission have been received and responded to as part of this resubmission. The consolidated responses to the agency comments are included within Appendix A.

1.1 PRECINCT CODE

The Gungahlin Precinct Code establishes the planning and infrastructure requirements for GTC East. The town has been developed in two stages; west and east. The GTC West is largely established and serves the growing population within the Gungahlin district. GTC East is currently open space grassland and is the subject of this Estate Development Plan. The site is approximately 38 Ha.

The Gungahlin Precinct Code has informed detailed subdivision planning. It has been proposed that GTC East will accommodate office, community facilities, open space and mixed use areas. The estate will also include major roads, public transport corridors and shared paths.

1.2 GUNGAHLIN STRATEGIC ASSESSMENT

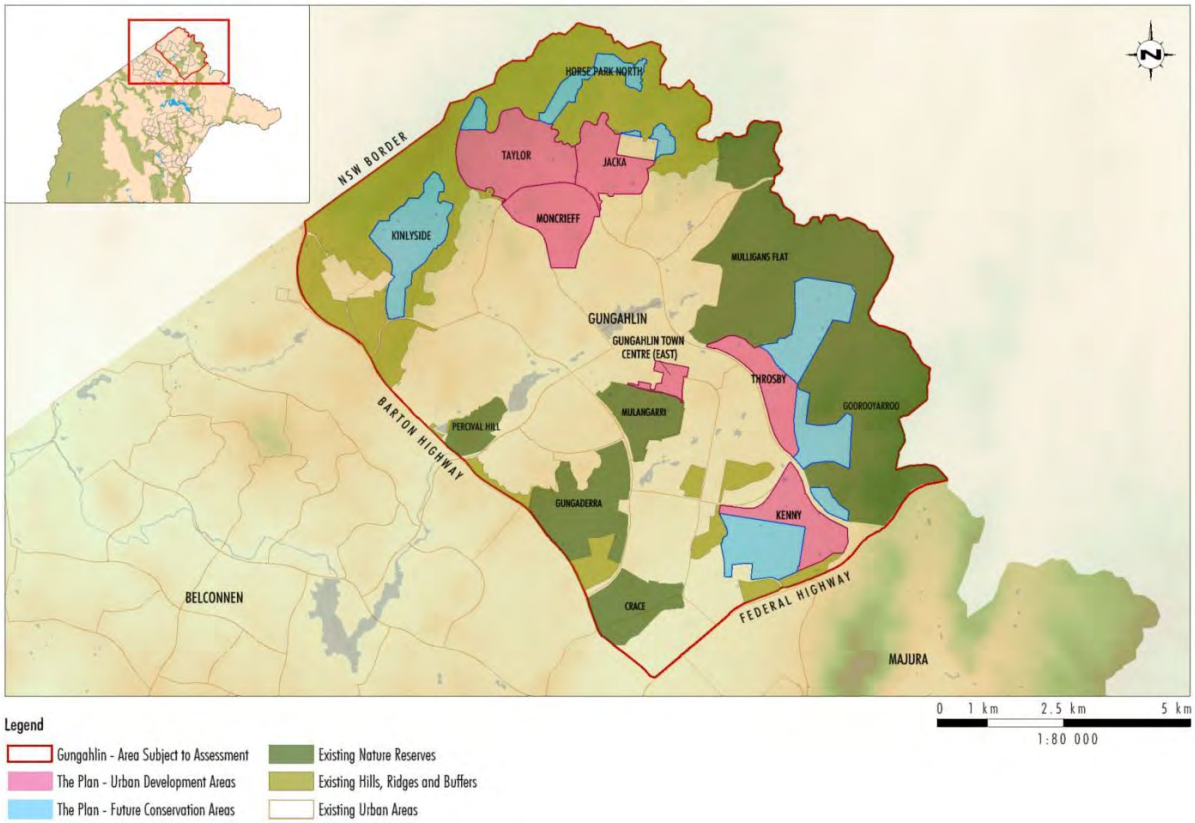
The site has been subject to a Strategic Assessment under the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) on Matters of National Environmental Significance (MNES) protected under the EPBC Act. This includes nationally and internationally important flora, fauna, ecological communities and heritage places. Actions for the development of Gungahlin within the Gungahlin Strategic Assessment (GSA) are described by the Biodiversity Plan (the Plan).

The GSA included the future urban development areas within GTC East, identifying approximately 14 Ha of low to moderate quality potential Striped legless lizard habitat, refer to Figure 1. Land offsets, referred to as Future Conservation Areas, have been identified under the Plan.

The design of the Estate is consistent with the intentions of the Strategic Assessment. The road layout has adopted an edge road (Road 1) that acts as a buffer between the town centre and Mulangarri Grasslands. The boundary will be fenced with stock fencing to deter animals and pedestrians from entering the area. No direct opportunities for vehicle access to the Mulangarri Grasslands have been created through the design of the Estate.

In addition to the completion of the assessment under the EPBC Act, the ACT Government has also completed an assessment under the Planning and Development Act 2007 (P&D Act) to exempt the development from requiring an Environmental Impact Statement (EIS). This was granted by the ACT Minister for the Environment and Sustainable Development on 20 November 2013 (refer to Attachment F).

Figure 1 GSA: Overview of the Plan



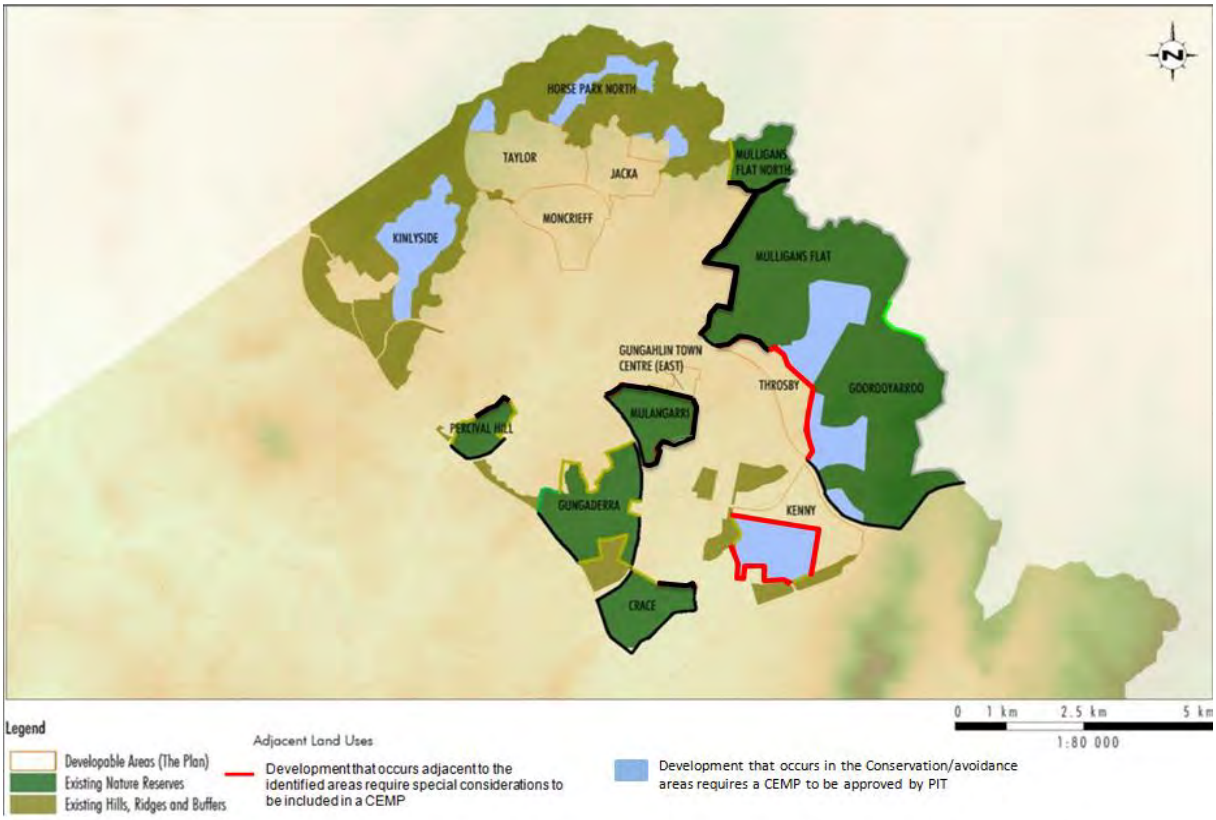
Translocation of striped legless lizards from GTC East to a location near Bredbo was undertaken between October and November 2015 on behalf of the ACT Environment and Planning Directorate.

This Estate Development Plan has been referred to and endorsed by the PIT.

The assessment also requires a Construction Environment Management Plan (CEMP) to be prepared for all construction contracts within the Plan area. The CEMP will include pre-clearing ecological inspections and procedures to be followed for wildlife rescue and relocation.

The approved *Framework for Construction Environment Management Plans for areas of Gungahlin subject to the Gungahlin Strategic Assessment 2013* defines specific Development and Conservation Areas that require a CEMP approval as part of the Development Application. GTC East is not located within these Development and Conservation Areas, as demonstrated within Figure 2 below.

Figure 2 Areas that require special considerations for a CEMP



1.3 ESTATE DEVELOPMENT PLAN

This Estate Development Plan (EDP) report outlines the key planning objectives and principles upon which the GTC East is planned. The report provides the important planning requirements as the basis of future detail planning and development of the estate.

The EDP is supported by the subject plans listed in Table 1. These drawings demonstrate the EDP meets the requirements of the Estate Development Code, 4 October 2013.

The following plans have been assessed as being not required within this submission:

- On-Street Parking Plan: On-site parking is proposed for all residential developments. Therefore an On-Street Parking Plan has not been required.
- Waste Collection Plan: Commercial on-site waste collection is proposed for all developments. Therefore a Waste Collection Plan has not been required.
- Building Envelope Plan: No single dwelling blocks are proposed.

Refer to the following page for the list of supporting drawings.

Table 1: Estate Development Plan Drawing List

DRAWING TITLE	DRAWING	PLAN NUMBER	REVISION
Overall Development Status Plan	EDP-ENG-DSP	001	G
Estate Development Plan	EDP-UD-EDP	002-005	G
Aerial Plan	EDP-ENG-AP	006	G
Staging Plan	EDP-ENG-SP	010	G
Fencing Plan	EDP-ENG-FP	011	G
Block Details Plan	EDP-UD-BDP	012	H
Land Use Plan	EDP-UD-LUP	013	I
Planning Control Plan	EDP-UD-PCP	014	G
Development Intentions Plan	EDP-UD-DIP	015-017	G, DD
Chainage Plan	EDP-ENG-CP	020-021	G
Bushfire Risk Assessment & Management Plan	EDP-ENG-BF	025	G
Environmental Management & Concept Plan	EDP-ENG-EMCP	030	G
Road Hierarchy Overall Plan	EDP-ENG-RHP	035	G
Road Hierarchy Characteristics Table	EDP-ENG-RHP	036	G
Heavy Vehicle Route Plan	EDP-ENG-HVP	040	G
Road Details Plan	EDP-ENG-RDPP	045-047	G
General Notes & Legend		GNL-801-802	B, C
Road Details Plan		IDP-360-361	F
Road Details Plan		IDP-870-873	D, B
Turning Templates Layout Plan	EDP-ENG-TT	060	G
Turning Templates	EDP-ENG-TT	061-068	G
Turning Templates		VTP-365-366	C
Turning Templates		VTP-950	B
Typical Cross Sections	EDP-ENG-TCP	080-082	G, E, B
Typical Cross Sections		TYP-330 & 830-832	D,B
Road Long Sections	EDP-ENG-RLS	085-087	G
Road Long Sections		PPR-370-371 & 886-889	E & C, C , B. B
Public Transport Network & Off Road Movements Systems Plan	EDP-ENG-PT	095	G
Shared Path Network	EDP-ENG-PT	100	G
Slope Analysis Plan	EDP-ENG-SAP	105	G
Cut Fill Plan	EDP-ENG-CFP	106	G
Utilities Service Plan	EDP-ENG-USP	110	G
Electrical Masterplan Plan	EDP-ENG-EP	115	G
Stormwater Master Plan Node Table	EDP-ENG-SWMP	120	G
Stormwater Master Plan Layout Plan	EDP-ENG-SWMP	121-124	G
Water Sensitive Urban Design Outcomes Plan	EDP-ENG-WSUD	130	G
Sewer Master Plan	EDP-ENG-SMP	140	H
Sewer Master Plan Table	EDP-ENG-SMP	141-145	H, I, H, H, H
Water Supply Master Plan	EDP-ENG-WMP	150	I
Water Supply Master Plan Layouts	EDP-ENG-WMP	151-154	H, H, I, H
Water Supply Table	EDP-ENG-LMP	155	I
Landscape Master Plan	EDP-LA-DSP	160-164	G
Tree Management Plan	EDP-LA-TMP	170-174	G
Tree Impact Plan	EDP-LA-TIP	180-181	G, C

1.4 LOCATION

The development area is located in the northern side of the ACT in the District of Gungahlin, and is bounded by Anthony Rolfe Avenue, Manning Clark Cr, the Mulangarri Grasslands and the existing GTC West.

1.5 TOPOGRAPHY, DRAINAGE AND ELEVATION

The majority of Gungahlin topographic landform is of a gentle undulating nature. It is comprised of hills and valleys. The site encompasses a number of catchments, draining to the north (Yerrabi Pond), south (Mulangarri Grasslands and Gungaderra Creek (ponds)) and west (The Valley Ponds).

The site is scattered with a number of established trees of varying quality. Whilst this feature presents a significant opportunity to create a unique place, the constraints of a town centre and future land uses have also been considered. Green networks have been created to celebrate vistas and provide ecological connections through the layout.

1.6 EXISTING VEGETATION

A comprehensive tree assessment has been undertaken during December 2010 by Scenic Landscape Architecture and December 2013 by Indesco. The below tree assessment summary is from the 2013 Tree Assessment Report.

1.6.1 Tree Assessment Summary 2013

The site contains large, widely spaced trees and occasional groups of remnant vegetation typical of the farming practices within the area. There are 3 distinct areas on the site.

- Large open paddock trees;
- Clumps of young regrowth;
- A linear group of mature trees possibly located along a road or travelling stock reserve.

The large paddock trees are Eucalyptus blakelyi or E. melliodora. They are generally of relatively poor from a silvicultural perspective but have considerable habitat value at the present time. The habitat values are for the most part diametrically opposed to the safety of the trees in an urban setting. If any are retained they will require pruning and monitoring throughout their life. The life of the trees may be shortened when development changes the hydrological and soil characteristics of the soil profile around them.

Tree 168 is notably different and has been rated ‘E’ exceptional.

The group of young regrowth trees within Block bb are generally small and of poor form. As individuals they are of little value but as a group they could form a role in the built up areas. To achieve this they would require the careful removal of many of the poor formed trees.

The long linear group of more mature trees within Block ha are a valuable asset. Again as individuals these trees are generally of modest characteristics, but as a group they rate highly.

1.6.2 Updated Tree Assessment

Tree 167, a large Eucalyptus melliodora was reassessed in January 2014, following large branch drop and it was reduced to a poor quality rating due to weakness through main structure.

1.6.3 ACT Tree Register

Within the study area the following tree has been placed on the ACT Tree Register.

Tree PTR501 (Tree 168) *Eucalyptus melliodora* is included on the ACT Tree Register. The tree is registered for its size, stature, habitat value and aesthetic landscape contribution.

Tree PTR154 (Tree 349) *Eucalyptus melliodora* has been included on the Provisional Tree Register. Provisional registration was extended on 20 February 2015.

Tree group PTR155 - Group has been included on the Provisional Tree Register. Provisional registration was extended on 29 May 2015. Species comprise Eucalyptus melliodora, E. blakelyi, E. bridgesiana and E. dives. This group is representative of the Yellow Box/Red Gum grassy woodland.

1.6.4 Tree Management

Within the study area a Tree Management Plan has been craeted to recommend tree retention and removals and the potential impact on trees.

.

1.7 CONSTRAINTS

The constraints are listed below;

- Staging of the development to meet current (residential) and future (employment centre) land use requirements.
- An existing road network that was developed prior to contemporary codes, guidelines and transportation needs (such as light rail).
- Existing development and road configurations that are inconsistent, incomplete or incompatible with the proposed land uses.
- The site is scattered with a number of established trees.
- Interface with Flemington Road and future integration of light rail facilities.
- Interface with ongoing Capital Works projects (The Valley Avenue, Ernest Cavanagh Street, Manning Clark Crescent).

1.8 OPPORTUNITIES

The site offers many opportunities for the creation and delivery of a well connected neighbourhood within the Gungahlin District.

- Access to public transport and active travel facilities, including the future integration of light rail facilities.
- The natural landform and proximity to the Mulangarri Grasslands presents an opportunity to create strong ecological connections and green networks throughout the urban layout, providing significant neighbourhood amenity.
- Opportunity to retain prominent vistas towards the Black Mountain spire.
- Opportunity to reinforce the Open Space connections to existing networks.

1.9 HERITAGE

A series of Aboriginal and cultural heritage investigations have been undertaken within the study area. These reports are listed as follows:

- Biosis, May 2012, Gungahlin East Stage 2 Aboriginal and Historical Cultural Heritage Study.
- Biosis, December 2015, Review of Gungahlin Construction Site.
- CHMA, February 2016, Manning Clark Crescent Extension Sub-Surface Test Pitting Program and Statement of Heritage Effects.
- GML, June 2015, ACT Light Rail Stage 1 – City to Gungahlin, Heritage Impact Assessment.
- Parsons Brinckerhoff Australia, 2015, Capital Metro Light Rail Stage 1 – Gungahlin to Civic. Environmental Impact Statement Addendum Report

Biosis (2012) did not identify any Aboriginal or cultural heritage constraints within the study area. It was noted that the alignment of Well Station Track poses moderate cultural heritage value warranting its recording for historical purposes. A shared path is proposed along this alignment, parallel to Road 1 and the Access Track.

Subsequent to the Biosis (2012) assessment of the larger GTC East area, GML (2015) identified Block 1, Section 230, Gungahlin as an area of archaeological potential, a conclusion supported by Biosis (2015). The ACT Heritage Council endorsement of the GML report was conditional, and noted that further information on the archaeological potential of the locality was required. GML (2015) also identified a possible Aboriginal Scarred Tree on Block 1, Section 234, Gungahlin. Assessment of this tree is ongoing.

Additional archaeological testing of Block 1, Section 234 and part of Block 1, Section 230, Gungahlin was undertaken as part of the Manning Clark Crescent extension project (CHMA, 2016). This assessment found that the locality was very disturbed and failed to locate Aboriginal places or objects. The ACT Heritage Council (the Council) has endorsed the findings and recommendations of this study, subject to the following condition:

- Should the unanticipated discovery protocols in Section 6 be implemented, a qualified heritage practitioner and RAOs should be engaged to provide advice on any suspected Aboriginal places or objects encountered.

Additional archaeological testing of other areas within (part) Block 1, Section 230, Gungahlin is anticipated in 2017. These investigations will be in relation to the use of the site by CMA as a construction compound for the ACT Light Rail project. The subsequent development of Block 1, Section 230, Gungahlin as part of the GTC East Estate will be informed by these future CMA investigations.

Additional heritage investigations as part of the GTC East Estate works are not proposed at this time. These would only be required should area/s of archaeological potential be identified within Block 1, Section 230, Gungahlin, and those area/s of archaeological potential not be impacted by the ACT Light Rail project.

Further advice will be required from the Council following completion of the CMA studies and prior to construction of the GTC East Estate works. Any requirements identified by the Council at that time will be adhered to.

Appendix E contains advice from the Council on this matter.

1.10 LAND CONTAMINATION

A Stage 2 Contamination Investigation of the GTC was undertaken in March 2012 by Coffey Environments. The report has been assessed and endorsed by the Environment Protection Authority, subject to the following conditions:

- Prior to the commencement of redevelopment works at the site the stockpile identified in the above report must be assessed by a suitably qualified environmental consultant for the purposes of beneficial reuse or waste disposal. No material from the stockpile is to be reused on or off site or disposed off site without EPU approval;
- A site management plan incorporating an unexpected finds protocol must be prepared by a suitably qualified environmental consultant and endorsed by the EPU prior to the commencement of earthworks at the site.

The site stockpiles are indicatively located on the Cut and Fill Plan. A Stockpile Beneficial Reuse Assessment and Waste Classification of the site stockpiles was undertaken in May 2012 by Coffey Environments. The report identified that the material is suitable for beneficial reuse within a commercial/industrial land use.

All works shall be carried out in accordance with Environment Protection Guidelines for Construction and Land Development in the ACT, March 2011. The Contractor will be required to hold an Environmental Authorisation or enter into an Environment Protection Agreement with the Environment Protection Authority (EPA) prior to works commencing.

A site management plan incorporating an Unexpected Finds Protocol will be required. This must be prepared by a suitably qualified environmental consultant and implemented during earthworks at the site. A Pollution Control Plan will also be required to be endorsed by the EPA prior to works commencing on site.

Attached in Appendix G is the EPU endorsement.

1.11 BUSHFIRE PROTECTION MEASURES

A Bushfire Risk Assessment Review was prepared by Australian Bushfire Protection Planners Pty Ltd. The report is attached at Appendix C.

The Bushfire Plan presents the proposed bushfire protection measures for this estate.

Any proposed dwellings requiring specific controls are noted on the Planning Control Plans.

1.12 AGENCY LIAISON AND CONSULTATION

During the planning process and preliminary engineering design, there has been ongoing liaison and consultation with agency representatives from ICON Water, ActewAGL, ACTPLA, CMA, Roads ACT (and their consultants), EDD (and their consultants) and TaMS in the development of the layout and servicing of the Estate.

1.13 STAGING

It is proposed to construct the LDA works in a single stage. This will occur after Capital Works and Capital Metro Agency projects have been completed. Staging has considered existing infrastructure to service the site and the various parties involved in the project.

The proposed staging is shown on the Staging plan.

2. PLANNING

2.1 PLANNING PRINCIPLES

This EDP has been prepared to comply with the relevant requirements of all applicable Codes and Plans contained within the Territory Plan, including;

- the Gungahlin Town Centre Structure Plan
- the Gungahlin Precinct Code
- the Estate Development Code
- the Crime Prevention Through Environmental Design General Code

A series of planning principles were developed for the estate as part of the planning process. The principles reflect best planning practice and embrace the overarching planning objectives, principles and policies for sustainable and liveable developments identified in the above plans and codes.

- The development of the suburb shall be sustainable in terms of social, cultural and economic.
- The neighbourhood is based on high pedestrian areas and integrated connections to public transport routes and activity nodes such as employment centres or open spaces.
- There shall be an integrated cycling and pedestrian network that links to trunk routes.
- The road hierarchy should be legible and provide good and safe access for all users and encourage high levels of public transport usage.
- Design for flexibility for diverse modes of public transport, including the proposed light rail.
- Incorporate Water Sensitive Urban Design elements such as retardation basins and swales for sustainable stormwater management and achieve targets identified in the Waterways – Water Sensitive Urban Design General Code.

2.2 COMPLIANCE WITH PLANNING CODES

Under the Territory Plan, land within the estate is zoned: CZ1 – Core, CZ2 – Business, CZ5 – Mixed Use, CFZ – Community Facilities and PRZ1 – Urban Open Spaces. The EDP has been prepared to ensure that those five zones are allocated in accordance with the Territory Plan map.

As indicated in Section 2.1 of this Report, there are four Territory Plan Codes and Plans which apply to the land within the Estate, those being: the *Gungahlin Town Centre Structure Plan*, the *Gungahlin Precinct Code*, the *Estate Development Code* and the *Crime Prevention Through Environmental Design General Code*. The EDP has been prepared in accordance with the principles set out in the *Gungahlin Town Centre Structure Plan*, and has been prepared to ensure compliance with the applicable rules or consistency with the applicable criteria contained within the *Gungahlin Precinct Code*, the *Estate Development Code* and the *Crime Prevention Through Environmental Design General Code*. Thorough assessments of the EDP's compliance and or consistency with those Codes are provided at Appendix A.

2.3 NOISE ASSESSMENT

Two existing noise assessments provide an overview of the area. The *Road Traffic Noise Assessment: Gungahlin Town Centre Roads* provided a preliminary assessment of traffic noise in the estate and the *Capital Metro EIS Noise and Vibration Assessment* evaluated the noise impact of the light rail during construction and at completion. These reports are included within Appendix I and the Disc .

Estimated noise level for a facade of the Mixed Use developments close to the property boundary is around 63 dBA. The Gungahlin Town Centre Roads traffic noise report indicated the 63dBA contour would be located within building areas which have been nominated as noise affected on the Planning Controls Plan It is recommended that the noise impact on the buildings be reassessed once the layout has been determined. Mitigation can be achieved by requiring the facades of those buildings facing The Valley Avenue and Manning Clarke Street to be designed to ensure that the internal noise levels comply with AS/NZS 2107:2000.

The light rail noise assessment found no issues with daytime airbourne noise however night time noise was above the nominated levels in some areas. Feasible measures for noise attenuation were recommended to be investigated as part of detailed design of the light rail.

2.4 BLOCK YIELD

The developable potential of land within Gungahlin East Estate is controlled by the Territory Plan and in particular:

- Gungahlin Precinct Map and Code (GPMC)
- Commercial Zones Development Code (CDC)
- Multi Unit Housing Development Code (MUHC)

Other codes then apply in hierarchal order to any development proposed on the land.

In 2010 ACTPLA made development forecasts for Gungahlin East. These yields were subsequently utilized within the Land Release Strategy December 2014 prepared by CBRE for the LDA.

As part of this EDP SPACELAB have reviewed the Development Yields based on the proposed layout, desired planning outcomes as outlined in the GPMC and recent examples of similar developments. As such yield calculations are related to projected future uses of the Town Centre including more intensive development associated with a mix of commercial, retail and residential uses along the proposed light rail route, and the close proximity of the Gungahlin Terminus.

The GFA figures listed in Table 3 are based on the following;

- 5 storey developments. All sites were assessed on the perimeter 18 metre maximum height limits (set down in the GPMC) which allows for 5 storeys.
- Site coverage on blocks within Precinct 1a and Precinct 2a of 65% at ground level. 65% site coverage has been adopted to provide increased opportunity for open space and solar access.
- Site coverage on blocks within Precinct 4a of between 40% and 45% based on suitability of the individual sites to accommodate built form with maximum 20m depth floor plate at ground level, and sufficient space between buildings to meet solar access and interface requirements.
- Site coverage on Mixed Use blocks within Precinct 4b of between 45% and 65% based on suitability of the individual sites to accommodate built form with maximum 20m depth floor plate at ground level, and sufficient space between buildings to meet solar access and interface requirements.
- Site coverage on Community Facility block in Precinct 4b of 65% based on suitability of the individual sites to accommodate built form with sufficient space between buildings to meet solar access requirements.
- Residential yields are based on 20m wide buildings with residential use limited to 3 or 4 levels of development; dependent on whether office, retail or other usage is planned on the ground and first levels. Residential yields are calculated on 80% efficiency and 75m^2 per dwelling.

Table 2: Block Yield

Block sizes	Number of blocks	Percentage (Combined Area/ Total Area)	Combined GFA (m2)	Combined Dwellings
CZ1, CZ2				
0.9-1.5 Ha	4	18%	93,940	0
1.5-2.5 Ha	3	19%	79,272	0
CF, CZ5				
0.2-0.5 Ha	6	9%	22,605	241
0.5-0.8 Ha	7	16%	35,422	351
0.8-1.2 Ha	4	16%	33,734	529
Open Space				
0.2-0.8 Ha	8	22%	0	0
Total	32	100%	264,973	1118

Table 3: Block Summary

Block	Area (m2)	Office GFA (m2)	Retail GFA (m2)	Other GFA (m2)	Number of Dwellings	Zoning
aa	11,883	9,820	500		154	CZ5
ba	5,942	4500	500		75	CZ5
bc	5,005	6,600	3,300	3,300		CFZ
bd	5,005	2,000	2,200		70	CZ5
be	4,996	2,000	2,200		77	CZ5
ca	16,342	15,200	7,600	7,600		CZ1
da	12,254	32,650	600			CZ2
dc	10,970	28,900	510			CZ2
dd	9,395	30,720	560			CZ2
ea	16,725	23,432	500			CZ2
ec	14,207	18,016	420	6,145		CZ2
ed	15,585	18,285	420	6,235		CZ2
fa	8,997	6,600	3,300	3,300		CFZ
fb	8,994	3,300		2,970	173	CZ5
fd	5,593	4,200	2,100	2100		CFZ
fe	6,822	2,552			131	CZ5
ff	5,527	2,070			75	CZ5
fg	10,519	3,944			202	CZ5
fh	4,959	1,890			60	CZ5
ga	2,705	1,350			46	CZ5
gb	3,035	1,565			58	CZ5
gd	4,075	2,000	2,000	4,000		CFZ
ge	5,617	2,000	2,500	6,700		CFZ
gf	2,895	1,000	1,400	3,200		CFZ
bb	8,208					PRZ1
db	2,481					PRZ1
eb	7,340					PRZ1
fc	5,506					PRZ1
gc	2,407					PRZ1
ha	24,889					PRZ1
ia	3,675					PRZ1
ja	2,358					PRZ1
total	254,911	222,494	31,425	49,150	1121	

Notes:

- Gross Floor Area- as per the ACTPLA definition.
- 20 metre building width allows for a typical east/west facing development with a central access corridor with individual apartment depths of approx. 7-9 metre depth either side of the access corridor.

- 80% efficiency is below industry standards for residential multi storey development, however this allows for ACTPLA specific rules regarding measurable GFA on balconies, storage areas and GFA of common areas to be readily accommodated.
- Average 75m^2 per dwelling will allow a unit mix of studio, 1, 2 and 3 bedroom dwellings all in excess of the minimum m^2 requirements for each unit type as detailed in the MUHC.
- The GPMC does not specifically limit site coverage, and therefore a development with 100% site coverage within setbacks and building envelopes is achievable.

2.5 PLANNING DRAWINGS

2.5.1 Land Use Plan

This section to be read in conjunction with Land Use Plan drawing number 5678-EDP-LUP-013, which shows the proposed zoning for the site.

The proposed land use is generally consistent with the relevant parts of the Territory plan, in particular the Gungahlin Precinct Map and Code. The proposed mix and distribution of land use has been developed to complement the existing town centre and support future development, providing diversity of uses, activation of key intersections and encouraging utilisation of open space.

The proposed Estate arrangement refines the indicative Land Use Zoning shown on the Territory Plan under the FUA overlay, primarily adjacent Block 2 Section 235 and includes:

- the extension of Kate Crace Street and proposed CFZ in this area.
- shifting the existing PRZ1 within the EDP area to blocks within the commercial core (proposed Blocks ‘bb’, ‘db’, ‘eb’ and ‘fc’). This ensures continuity and legibility of the road network, improves active transport connectivity and appropriately locates additional PRZ1 area within the commercial core. This willalso helps retaining a significant stand of existing regulated trees (Block ‘bb’).
- The adjustment in provision of overall PRZ1 area, is negative 8,100m^2. However, it should be noted that the indicative areas under the Territory Plan FUA area does not include TSZ1 areas for the southern edge road (Road 1), the extension of Ernst Cavanagh Street and the extension of Gungahlin Place, which account for most of the difference in total PRZ1 area.

32,182m^2 of CFZ have been located in the proposed development spread across 6 blocks of varying size providing opportunity for a range of facilities and scales of community facility developments. 5 of the CFZ blocks are provided adjacent The Valley Avenue and adjacent existing CFZ Block 2 Section 235, and facing the existing open space providing for complimentary facilities and uses.A CFZ block (Block ‘bc’) is proposed fronting Anthony Rolfe Avenue and the open space of block ‘bb’ facilitating community use in the northern portion of the site and taking advantage of pedestrian links through the open space to Hibberson Street.

CFZ Blocks ‘ge’, ‘gf’ and ‘gd’ are located adjacent the existing Mosque (Block 2 Section 235) and are appropriately sized to allow for future developments which can adequately address potential overlooking and noise concerns for the mosque site. Any future development on

these sites, shall treat the mosque site equal to private open space, providing adequate screening and site distances to protect the amenity of the mosque. these potential overlooking and noise concerns for the existing mosque (Block 2 Section 235) shall be subject to future DA for subsequent blocks (Blocks 'ge', 'gf' and 'gd').

The land use has also been informed by commitments to deliver blocks for Housing ACT. To facilitate release of blocks that meet Housing ACT time frame, two proposed CZ5 blocks must be able to obtain construction access from existing road infrastructure. As such blocks 'ba' and 'fh' must be CZ5 to meet these requirements.

A Right of Way Easement is proposed through Block 'ea', Block 'ec' and Block 'ed'. The Easement shall facilitate pedestrian mid-block access through the deep blocks (127m) and providefor break and permeability in the built form. The Easement must incorporate deep root planting to allow trees and other greenery to soften the space. A minimum of 2m wide path will facilitate pedestrian connectivity. The width is set at a minimum of 10m. The easement on Block 'ec' and Block 'ed' shall provide continuous path of travel 24/7. Any future development must not present any blank wall longer then 8m without properly addressing the easement. Openings must provide direct access and overlooking opportunities (passive surveillance) to the easement.

2.5.2 Development Intentions Plan

The Development Intention Plan shows the built form outcome achievable for multi-unit sites based on block size, orientation and zoning. The Development Intention Plan shows notional building footprints and demonstrates that buildings can be provided with suitable orientation to street and open space frontage, maximise solar access and allow appropriate pedestrian and vehicular access including waste collection. The Development Intention Plan shows shadows cast at midday on the winter solstice. The Development Intention Plan shows notional internal driveways and car parking.

2.5.3 Bushfire Asset Protection Zone Blocks

Bushfire affected blocks that require special bushfire construction in accordance with AS 3959 are identified on the Bushfire Management Plan. R34A of the Multiunit Housing Development Code applies to multi-unit blocks.

2.5.4 Acoustic Impact Blocks

All residential development within the proposal are subject to R67 of theMulti-Unit Housing Development Code and will need to comply with AS/NZ 3671, AS/NZ 2107 and the ACT Environment Protection Regulation 2005.

Development along The Valley Avenue and Ernest Cavanagh Streetto be assessed for acoustic requirements on an individual basis.

Development along Flemington Roadto be assessed for acoustic requirements on an individual basis taking into account consideration for the future light rail corridor and associated stops.

2.5.5 Stormwater Management blocks

Blocks 'fa', 'fb', 'fe', 'ge'&'gf' shall include measures to ensure stormwater from a 1-in-3 month ARI storm event is retained on site for later reuse. Release of retained storm water is

prohibited below the 1-in-3 month ARI storm water events. Refer to section 6.2 Proposed Stormwater Management for details.

3. TRAFFIC ANALYSIS AND ROAD HIERARCHY

A traffic study has been prepared by Indesco to assess the internal traffic movements, key internal intersection configuration and the impact on connection to the existing network.

A summary of the traffic volumes are presented on the Road Hierarchy Plan.

A summary of the findings follows:

- The proposed layout has a mix of commercial and residential dwellings;
- The additional traffic volumes generated does not reduce the operational performance of the existing road network;
- Parking demand generated by the development will be accommodated on block;
- A number of four-way intersections will be created which will require signalisation.

A copy of the traffic report is included in Appendix B.

3.1 TRAFFIC GENERATION

Traffic generation rates have been adopted in accordance with Table 1A of the Estate Development Code. Traffic generation rates adopted for the study were:

- For multi unit blocks a traffic generation rate of 6 vehicle movements per day per dwelling.
- Peak hour traffic generation rates used are 10% of daily traffic volumes

Traffic generation and traffic volumes for each road are shown on the Road Hierarchy Plans, and also in the Traffic Report included in Appendix B.

3.2 TRAFFIC DISTRIBUTION

The road network is consistent with the requirements of the Gungahlin Precinct Code. A north-south road between Ernest Cavanagh Street and The Valley Avenue was not required for site access based on the proposed block layout. Road 1 was provided as an edge road and for access to the southernmost blocks.

3.3 INTERSECTION ANALYSIS

A review of the existing road network has been undertaken based on modelled peak hour traffic volumes using both Journey To Work data and modelling undertaken by the Capital Metro Agency. Intersection capacity analysis was undertaken and the proposed intersections were assessed to operate at an acceptable level.

4. ROADS

All streets have been designed in accordance with the Estate Development Code. Refer to road hierarchy characteristics table for details.

4.1 MAJOR COLLECTOR ROADS

There are no new Major Collector roads proposed within the estate.

Existing Major Collector roads are Anthony Rolfe Avenue, Flemington Road, Manning Clark Crescent and The Valley Avenue.

The Valley Avenue extension is not within the scope of this submission. This is a Captial Works project being undertaken by Cardno on behalf of EDD. This has been approved within a previous development application. A copy of the approved design is included within Appendix H.

The Manning Clarke Street extension is not within the scope of this submission and will be part of a future development application. This is a Captial Works project being undertaken by Cardno on behalf of EDD.

A summary of the scope for this submission is provided on the Overall Development Status Plan.

4.2 MINOR COLLECTOR ROADS

Road 1 and Ernest Cavanagh St extension are minor collector roads.

Kate Crace Street extension and Gungahlin Place extension are also minor collector roads.

4.3 ACCESS STREETS

There are no new Access Streets proposed within the estate.

4.4 FIRE ACCESS

A Fire Access is proposed between Road 1 and Delma View. This will be gated to prevent unauthorised access/rat running.

4.5 PUBLIC TRANSPORT CORRIDOR

The public transport corridor utilises The Valley Avenue, Manning Clark Crescent and Flemington Road. Consultation with Roads ACT on behalf of ACTION has been undertaken as part of this EDP. It is noted that a future bus layover area may be located within GTC East. At the time of reporting, final requirements had not been established.

No new bus stops are proposed. The site is located within the proposed light rail route and close to the Gungahlin light rail terminus. A light rail stop is also proposed near the intersection of Flemington Road and Manning Clark Crescent. Consultation with the Capital Metro Agency has been undertaken as part of this EDP.

4.6 TURNING MOVEMENTS

Turning movements have been provided at proposed intersections to demonstrate a representation of turning movements for design and checking vehicles.

4.7 HEAVY VEHICLE ACCESS

The proposed routes for heavy vehicles is shown in the Heavy Vehicle Route Plan. Parking bays within northern lane of Road 1 have been designed to be 3m wide to accommodate future Loading Zones.

4.8 SIGNALIZED INTERSECTIONS

A signalized intersection is proposed at the intersection of Gungahlin Place and The Valley Avenue. The proposed layout is shown on the Road details plans.

A signalized intersection is proposed at the intersection of Kate Crace Street and The Valley Avenue. This proposed intersection treatment is not within the scope of this submission and will be part of a revised development application for the Capital Works projects.

A modified signalized intersection is proposed at the intersection of Flemington Road and Manning Clark Crescent. This proposed intersection treatment is not within the scope of this submission and will be part of a development application for the Capital Works projects.

A signalized intersection is proposed at the intersection of Kate Crace Street and Flemington Road. This proposed intersection treatment is not within the scope of this submission and will be part of a separate development application on behalf of the Capital Metro Agency.

4.9 PARKING

A provision for public car parking is proposed within Section AA Block aa, in accordance with the requirements of the Gungahlin Precinct Code. This is a temporary car park and in the future will be redeveloped as a mixed use development that provides public carparking on a commercial basis.

Indented parking has typically been provided along minor collector roads.

Visitor parking is provided along the kerbside edge of all roads, where space is available. The estate will provide 3 on-street disabled spots, 2 on Road 1 and 1 on Ernest Cavanagh Street, which will provide half of the requisite disabled parking for the development. It is intended that the future development of blocks will provide additional parking to satisfy the proposed developments.

Parking is not provided along Flemington Road in accordance with CMA designs and the Gungahlin Precinct Code.

On-street parking has been designed to be 3 m in some areas in order to accommodate future Loading Zones which may be required within the town centre. This is demonstrated on the Heavy Vehicle Route Plan.

4.10 STREET LIGHTING

The underground electricity reticulation and street lighting design will be undertaken in accordance with the current AS1158 and TaMS Design Standards for Urban Infrastructure, all paths within the estate will have lighting.

Collector roads will be designed to Category P3. The streetlight poles have been positioned 1.7m minimum behind the kerb line on roads. Additional lighting along the open space path south of Road 1 will be investigated and may be added in detailed design.

4.11 WASTE COLLECTION

All sites will require commercial on-site waste collection facilities.

5. CYCLE, PEDESTRIAN SYSTEMS

5.1 ON ROAD CYCLING

On road cycling has been catered for within the carriageway of Major Collector roads. At this time pavement markings are proposed to delineate lanes. There are no new Major Collector roads proposed within this EDP. All Major Collector Roads within the estate are either existing or will be constructed as a Capital Works Project and subject to a separate Development Application.

5.2 OFF ROAD CYCLE PATHS / MAJOR PATHS

An off road trunk path is proposed between Road 1 and The Mulangarri Grasslands. This path will be aligned east-west along the old alignment of the Well Station Track.

An off road trunk path is proposed through the north-south open space spine between Anthony Rolfe Avenue and Road 1. This path will connect to existing trunk paths to the north of Anthony Rolfe Avenue and to the proposed east-west path to the south of Road 1.

5.3 SHARED PATHS

The estate contains shared paths in all road reserves. In high pedestrian areas fully paved verges have been recommended. The proposed shared path widths are in accordance with the Estate Development Code.

6. STORMWATER CONCEPT PLAN

6.1 EXISTING STORMWATER DRAINAGE

Formal stormwater infrastructure within the GTC East Estate consists of a number of roads, open channels and headwall crossings to allow flow through the undeveloped blocks. The site can be divided into eight catchments that each flow out at a different location:

- North-west catchment
- North catchment
- North-east catchment
- South-east catchment
- South catchment
- South-west catchment 1
- South-west catchment 2
- West catchment

6.1.1 North-west catchment

This catchment comprises block aa and part of Ernest Cavanagh (Ext A) and Kate Crace Streets. The catchment grades west to the intersection of Ernest Cavanagh and Hinder Streets. Once outside the site boundary, flow from the catchment continues to the west towards Gungahlin Pond.

6.1.2 North catchment

This catchment comprises blocks ba, bb and bc. The catchment grades north to Anthony Rolfe Avenue. Once outside the site boundary, flow from the catchment goes north along a swale in the median next to Ian Potter Crescent towards Yerrabi Pond.

6.1.3 North-east catchment

This catchment comprises blocks bd, be, da, db, dc, dd, de and part of Ernest Cavanagh (Ext B) and Hamer Streets. The catchment grades to the intersection of Flemington Road and Hamer Streets. Once outside the site boundary, flow from the catchment goes to the east along Flemington Road to the nearby low point and then south along the existing floodway towards ponds in Franklin.

6.1.4 South-east catchment

This catchment comprises blocks ea, eb, ec, ed, fk, fm, fn and parts of Flemington Road, Manning Clarke Crescent, The Valley Avenue, and proposed Road 1. The catchment grades east to Manning Clarke Crescent and then south along this road with excess flows spilling into the neighbouring floodway. Once outside the site boundary, flow from the catchment continues south along Manning Clarke Crescent to the existing floodway towards ponds in Franklin.

6.1.5 South catchment

This catchment comprises blocks fa, fb, fc, fe, ge, gf and part of Kate Crace Street (Ext) and proposed Road 1. The catchment grades south to the low point in proposed Road 1 and the

proposed retarding basin. Once outside the site boundary, flow from the catchment continues south into the Mulangarri Grasslands.

6.1.6 South-west catchment 1

This catchment comprises blocks ga, gb, gc, gd and part of proposed Road 1. The catchment grades west to the low point in proposed Road 1 and the proposed retarding basin. Once outside the site boundary, minor flow from the catchment continues west to Delma View and major flow continues south into the Mulangarri Grasslands.

6.1.7 South-west catchment 2

This catchment comprises three existing blocks (Block 1, Section 246; Block 2, Section 246; Block 2, Section 235) and part of The Valley Ave and Gungahlin Place (Ext). The catchment grades to the west along The Valley Ave with any flows overtopping the crest diverted to the north. Once outside the site boundary, flow from the catchment continues to the west towards The Valley Ponds.

6.1.8 West catchment

This catchment comprises block ca and part of Hibberson and Kate Crace Streets. The catchment grades west to the intersection of Hibberson and Hinder Streets. Once outside the site boundary, flow from the catchment continues to the west towards The Valley Ponds.

6.2 PROPOSED STORMWATER MANAGEMENT

Stormwater master plans have been prepared for GTC East Estate. The stormwater masterplans illustrate the overland flow plan for the major storm event and schematic stormwater pipe layout for the minor storm event within the development.

The detailed stormwater design will be in accordance with the Design Standards for Urban Infrastructure. Flows up to and including the 20 year ARI event are generally to be piped whilst the major system comprising roads conveys the 100 year ARI flows.

Servicing of blocks will generally utilise direct connection to stormwater pipes. Roads will be serviced with tree pits in addition to stormwater sumps to promote Water Sensitive Urban Design principles.

Water quantity retardation will be provided by two retardation basins. These stormwater treatment facilities incorporate extended detention storage in order to provide water quality benefits as well as retardation.

Retardation Basin 1 is located to the west of Road 1 and will discharge into the underground stormwater system on Delma View for minor flows and to the Mulangarri Grasslands for major flows. This will service South-west catchment 1.

Retardation Basin 2 is located to the south of Road 1.. The public road reserve will generate 83m³ of stormwater in a 3 month ARI event with the retarding basin having capacity to store the runoff. A level spreader will be used to deenergise and disperse any concentrated minor flow from the basin. Further to this blocks fa, fb, fe, ge & gf will be required to have onsite detention tanks (min. 150,000L for relevant blocks) to store runoff from a minor event (approx 120,000L for 3 month ARI event) and a requirement for reuse will be added to the PCP.

The levels of the paths around the site are above the 2 year ARI level.

6.3 OVERLAND FLOW MANAGEMENT

When stormwater flows exceed the capacity of the piped system stormwater runoff will travel overland along the road and floodway network.

All open spaces convey minor flows overland to a plantation type sump prior to road corridors. In a major storm event flows overtopping the sump will enter the road and join other overland flows.

The south and south-west catchments flow towards low points in proposed Road 1. In a major storm event ponding at this location will purposely overtop the kerb and enter the two retardation basins. The height of kerb at these locations will be adjusted to allow for this in detailed design.

In a major storm event ponding will occur in Kate Crace Street south of the intersection with Hibberson Street. Stormwater will be conveyed overland through the intersection prior to overtopping the kerb, i.e. there is no inflow to the block from the road. However, additional pit and pipe capacity could be provided at detailed design at this location to reduce the risks of ponding.

In a major storm event ponding will occur in the open space to the north of The Valley Avenue. Stormwater will then be conveyed overland into The Valley Avenue and continue east along the road reserve. The existing registered tree and minimum grades for The Valley Avenue have contributed to this situation.

Overland flows have been designed to meet the following criteria:

- To prevent flow up to the 100 year ARI from entering leased blocks;
- To ensure velocity depth criteria is less than 0.4m^2/s in road reserves;
- To ensure flow does not exceed a depth of 50mm above the top of kerbs in road reserves; and
- To ensure velocity of flows in less than 2m/s in swales to prevent scour.

6.4 WATER SENSITIVE URBAN DESIGN

The WSUD Outcome Plan demonstrate the use of retarding basins, stormwater tanks and existing swales, GPTs and WQCPs to capture and filtrate low flows from the development prior to discharge. A MUSIC model was developed for the water quality assessment for the site. The results from the model are included on the WSUD Outcome Plan and the WSUC Checklist.

It should be noted that the analysis allows for six of the eight catchments to be treated at existing downstream infrastructure.

6.4.1 Stormwater Quality

Pre-development and post development loads of Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN) were determined from modelling using MUSIC (Version 6.0). The required reduction targets for these pollutants were achieved with the use of rainwater tanks, swales and retardation basins.

6.4.2 Stormwater Quantity

Water quantity retardation is provided in the two retarding basins and the onsite detention identified above. They will provide retardation of developed peak runoff to pre-developed 100 year ARI peak flows before leaving the site.

7. SEWER CONCEPT PLAN

7.1 EXISTING SEWER INFRASTRUCTURE

Existing sewer infrastructure surrounds the site in preparation for this development. The existing connections that are proposed to be used for this development are:

- 150 mm diameter sewer pipe on the north side of Hibberson Street, west of the Kate Crace Street intersection.
- 150 mm diameter sewer pipe on the south side of Anthony Rolfe Avenue, west of the Kate Crace Street intersection.
- 150 mm diameter sewer pipe crossing Anthony Rolfe Avenue in line with Cantamessa Avenue.
- 225 mm diameter sewer pipe on the west side of Manning Clarke Crescent connecting to the north side of Barbara Jefferis Street.
- 300 mm diameter sewer pipe on the west side of Bayonas Place downstream of Marie Pitt Street crossing.
- 225 mm diameter sewer pipe on the north side of The Valley Avenue, at the intersection with Gungahlin Place.

7.2 PROPOSED SEWER INFRASTRUCTURE

7.2.1 Catchment A

This catchment includes block ca and will discharge into the 150 mm diameter sewer pipe on the north side of Hibberson Street. The tie point is at the intersection with Hinder Street.

7.2.2 Catchment B

This catchment includes block aa and will discharge into the 150 mm diameter sewer pipe on the south side of Anthony Rolfe Avenue. The tie point is at the intersection with Hinder Street.

7.2.3 Catchment C

This catchment includes blocks ba, bc and will discharge into the 150 mm diameter sewer pipe crossing Anthony Rolfe Avenue. The connection point is in line with the sewer pipe running along the west side of Cantamessa Avenue.

7.2.4 Catchment D

This catchment includes blocks bd, be, da, dc, dd, ec, ed, fk, fm and will discharge into the 225 mm diameter sewer pipe on the west side of Manning Clark Crescent. The two connection points and two ties are either side of The Valley Avenue.

7.2.5 Catchment E

This catchment includes blocks ea, fh, fi, fl, fn and will discharge into the 300 mm diameter sewer pipe on the west side of Bayonas Place.

Due to the capacity of the existing sewer system to the east of site, The connection point will be downstream of Marie Pitt Street crossing. This connection point will require a new 225 mm sewer line to be constructed along the west side of Manning Clark Crescent crossing a number of existing stormwater pipes. These are noted on the Sewer Master Plan and should be in accordance with Icon Water clearance requirements.

7.2.6 Catchment F

This catchment includes blocks fa, fb, fd and will discharge into the 225 mm diameter sewer pipe on the north side of The Valley Avenue. The connection point is at the intersection with Gungahlin Place.

8. WATER SUPPLY CONCEPT PLAN

8.1 EXISTING WATER SUPPLY INFRASTRUCTURE

GTC East will be wholly serviced from the intermediate zone (NTW 685) of Gungahlin.

The Water Supply Master Plan indicates that there is sufficient pressure through the site for design demands (peak and fire demands).

8.2 PROPOSED WATER SUPPLY INFRASTRUCTURE

GTC East will have eighteen connections to the existing water supply system.

The mains and connections along The Valley Avenue and Kate Crace Street are all 225 mm diameter. The remaining network is made up of 150 mm diameter mains.

The flow demand of 100 l/s has been provided to meet the Fire Risk Type F3 (large offices) classification of the CZ1 and CZ2 parts of the development (blocks either side of Flemington Road). Hydrants have been placed at 45 m spacing along mains with double hydrants placed every 135 m in these areas.

The flow demand of 60 l/s has been provided to meet the Fire Risk Type F4 (higher risk residential areas) classification of the CZ5 and CF parts of the development. Hydrants have been placed at 60 m spacing along mains in these areas.

9. UTILITIES

Utilities will be provided via shared trenches and connected to the service providers' backbones located along Flemington Road.

The developer will fund the excavation and backfill of the shared trenches, and each utility will provide cables/conduits as required. The shared trenching throughout the development will be in accordance with the Service Authorities' shared trench agreement.

Three-way trenching for electricity, gas and telecommunications are proposed and are shown on the typical road cross sections. Three-way trenching will be located on both verges.

ActewAGL will provide underground electricity reticulation and street lighting to TAMS standards.

10. LANDSCAPE MASTER PLAN

10.1 CHARACTER

The urban open space for GTC East is an extension of the existing Town Centre landscape. Street tree species and verge treatment in the same streets have been extended. Strong connectivity and linkages for pedestrians and cyclists has been provided including access to the proposed light rail stop.

The north south open space that runs centrally through the site will form the 'spine' of the open space network. Linkages north south and to the east and west will enable Town Centre users and residents to access a range of open spaces including active frontages, urban seating areas, transport, recreational areas, fitness activities, open grass for kick-around / ball sports, nature discovery, passive relaxation, active running / biking, picnicking and congregation.

The open space is located to retain and protect Registered and Provisionally Registered Trees. The existing vegetation will form the framework for these areas of open space areas and be supplemented by complimentary plantings of native and deciduous tree species.

The tree selection for streetscapes and urban open space will be predominantly deciduous trees so as to not impede solar access to urban spaces and buildings. Species have been selected to help reinforce the road hierarchy and therefore the legibility of the Town Centre. The group of Provisionally Register Trees in the northern parkland will be reinforced with matching eucalypt tree species.

The design maximises the opportunity for people to identify with the Town Centre their immediate neighbourhood and to link with their adjacent neighbourhoods and the district networks. Clarity to way finding orientation, connections, movement, and visual identity underpin the design;

The southern end of the study area affords some expansive views over the grasslands to central Canberra, Black Mountain and hills beyond so to respond to this a lookout picnic area will be created at the edge of the Mulanggari Grasslands Nature Reserve.

The Mulanggari Grasslands Nature Reserve provides contrast to the busier urban environment as well as habitat, linkage corridor and refuge for flora and fauna. Interpretation signage to educate people of the reserve and its role is to be incorporated at picnic areas with views to the grasslands, hills and mountains.

Old Well Station Track connects the Well Station Heritage Precinct (located in suburb of Harrison) with the Gungaderra Homestead, and Red Hill Heritage Site through to the GTC. Formalised entry pillars to track at Manning Clarke Crescent to be consistent with other parts of the track. Planting will be with informal stands of native tree species so as to compliment the character of the existing vegetation. Planting has been designed in accordance with bushfire and TaMS maintenance requirements in terms of species selection and spacing.

10.2 STREETSCAPE CHARACTER

Street tree species selection provides continuity with the existing parts of the Town Centre and provides hierarchy to the Town Centre. Major linking streets are proposed to be planted with large scale exotic street trees and local and edge streets are proposed to be planted with a mix of large and small scale exotic street trees.

The street trees are arranged as driveway access, street lighting and sight lines permit. The proposed street trees are shown on the Landscape Masterplan.

11. GEOTECHNICAL STRUCTURE AND SITE GRADING

11.1 GEOTECHNICAL INVESTIGATION

A detailed geotechnical investigation has not yet been conducted Preliminary geotechnical information has been provided in the Report Proposed Residential/Commercial Development East GTC, February 2014 by Douglas Partners. The report concluded that the majority of the site would be classified as H1 (Highly reactive), some areas of rock were also identified.

There are no significant issues preventing the proposed urban development in the area.

Further geotechnical investigation will be carried out to support the detailed design phase.

11.2 SITE GRADING

The design of the estate follows the natural grading of the site.

Draft longitudinal gradings have been prepared for all roads within the estate and indicated on the Road Long Sections Plans. Preliminary grading across the blocks has also been reviewed and, in some areas, fill has been defined on blocks for the following reasons:

- To ensure block grading relates to road cross section;
- To ensure that the existing ground levels around retained trees are not disturbed; and
- To address localized depressions on the blocks and to manage overland flow paths.

12. OFFSITE WORKS

The following off site works areas are required for the estate and will be required to be undertaken as part of the estate works:

- Connection to the existing trunk sewer to the south on Manning Clark Crescent.
- Path upgrades where nominated to provide appropriate connections.
- Roadworks at intersection of Manning Clark Crescent and Barbara Jefferis Street due to the widening of Manning Clark Crescent.

Appendix A

Consolidated Comments EDP Submission 1
Gungahlin Precinct Code Response Table
Estate Development Code Response Table
CPTED General Code Response Table.

Appendix B

Traffic Report

Appendix C

Bushfire Report – Australian Bushfire Protection Planners

Appendix D

Water Sensitive Urban Design Checklist

Appendix E

Heritage advice – ACT Heritage Council

Appendix F

Section 211 EIS Exemption

Appendix G

Phase 2 Environmental Site Assessment Endorsement

Appendix H

The Valley Avenue Extension
Development Application Approval

Appendix I

Acoustic Reports

Disc

Tree Assessment Documentation
Stockpile Assessment – Coffey Environmental
Light Rail Noise and Vibration Report

Appendix F

ABPP Bushfire Risk Assessment

UPDATED

BUSHFIRE RISK ASSESSMENT

FOR

THE GUNGAHLIN TOWN CENTRE

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE

LAND DEVELOPMENT AGENCY [LDA].

Australian Bushfire Protection Planners Pty Limited.
ACN 083 085 474

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UPDATED

BUSHFIRE RISK ASSESSMENT

FOR

THE GUNGAHLIN TOWN CENTRE

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE

LAND DEVELOPMENT AGENCY [LDA].

Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
B152636	Final	1.2.2012	17.2.2016	*G.L.Swain*

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EXECUTIVE SUMMARY

In 2009 *Australian Bushfire Protection Planners Pty Ltd* (ABPP) was engaged by ACTPLA to prepare a Bushfire Risk Assessment for the future commercial, office and residential development within that part of the Gungahlin Town Centre precinct which adjoins the northern boundary of the Mulangarri Grassland Reserve and to the north of the north-eastern corner of the Hills, Ridges and Buffers Zone within Block 221 located to the west of the Mulangarri Grasslands Reserve Gungahlin.

The 2009 Bushfire Risk Assessment was updated in February 2012 at the request LDA in readiness for the engagement of a consultant to draft a Master Plan and draft EDP for the precinct known as Gungahlin Town Centre Town Centre East Estate. Indesco were commissioned by the LDA to undertake the preparation of the Draft Estate Development Plan which was subsequently submitted to ACT Emergency Services Agency [ACTESA] for review and comment.

ACTESA responded on the 1st September 2015, raising a number of issues, including the fact that the 2012 report predated the 2014 Strategic Bushfire Management Plan [SBMP]. Other matters relate to the Asset Interface Classification determined in the 2012 Bushfire Risk Assessment and the resultant Asset Protection Zone requirements, including the Asset Protection Zones and construction standards to buildings.

Australian Bushfire Protection Planners Pty Ltd (ABPP) has been engaged by Indesco to undertake a review of the ACTESA comments and Gungahlin Town Centre Precinct Code and prepare an updated report that addresses these matters.

Section 1 of the updated report outlines the background to the assessment and describes the site and details the site inspection carried out on the 19th January 2012.

Section 2 of the report provides a description of the site and the precinct [study area] it is contained within. It examines the topography as well as the vegetation both within and external to the site. **Section 3** examines the context of bushfire risk within the ACT.

Section 4 outlines a range of factors influencing bushfire risk and identifies the broad strategies to manage the risk. **Section 5** undertakes an assessment of the potential bushfire risk to the proposed development and determines the level of risk to the future Community Facilities and Mixed Use development.

The details of the bushfire protection measures required to be put in place and fully implemented to reduce the level of risk to the assets are provided in **Section 6**. This Section describes the measures recommended in the Gungahlin Town Centre Precinct Code and examines:

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- Provision of complying Asset Protection Zones;
- Summary of compliance with APZ requirements and provision of alternate solutions
- Construction standards;
- Access and water supplies for fire-fighting operations; and
- Management of Pocket Parks.

The conclusions to the assessment are outlined in **Section 7** of the report.

These include:

- The recommendations of the Precinct Code comply with the requirements of *Strategic Bushfire Management Plan for the ACT 2014;*

- The updated report addresses the matters raised by the ACT Emergency Services Agency [ACTESA] in correspondence dated 1st September 2015.

Graham Swain,
Managing Director

Australian Bushfire Protection Planners Pty Limited.

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TABLE OF CONTENTS.

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SECTION 1

INTRODUCTION

1.1 Background.

Indesco has commissioned *Australian Bushfire Protection Planners Pty Limited* to review the comments on the Gungahlin Town Centre East, Draft Estate Development Plan provided by ACT Emergency Services Agency [ACTESA] and prepare an updated Bushfire Risk Assessment, taking into account the comments of the ACTESA and the provisions of the ACT Strategic Bushfire Management Plan – Version 3 – 2014.

The Territory Plan Variation 300 amended the Territory Plan for the Gungahlin Town Centre by making the following changes:

- Rezone land, including sites currently covered by an FUA overlay;
- Establish the Gungahlin Town Centre Precinct Code;
- Establish the Gungahlin Town Centre Structure Plan and substitute the existing Gungahlin Town Centre and Central Area Structure Plan with the Gungahlin Central Area Structure Plan, which omits reference to policies relevant to Gungahlin Town Centre;
- Remove Gungahlin-specific provisions, which are included in the precinct code for the town centre, from the Town Centres Development Code

The variation proposal meets the future land needs for retail, office accommodation and community facilities. Provisions inserted via the precinct code enable development of entertainment facilities and a larger mix of uses in the town centre.

Gungahlin Town Centre is the major hub for employment, shopping, social activities and public transport particularly servicing suburbs within the Gungahlin district. Gungahlin Town Centre (as shown in Figure 1) is bounded by Gundaroo Drive to the north-west, Gozzard Street and Anthony Rolfe Avenue to the north-east, Manning Clark Crescent and Mulangarri Grasslands Nature Reserve to the south-east, and open paddocks and Gungahlin Drive to the south west.

Planning policies seek to promote the town centre as a vibrant and viable commercial centre with various services and facilities and employment, and provide opportunities for high density residential development.

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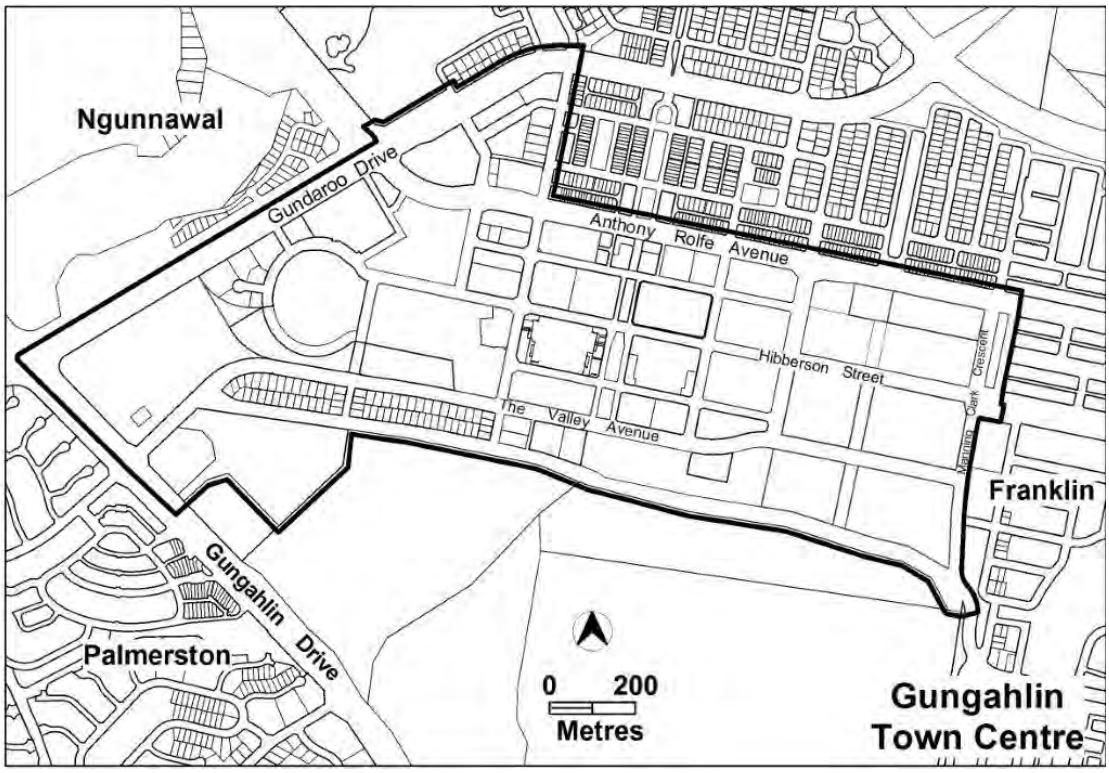
Figure 1 – Plan of the Gungahlin Town Centre.



The Territory Plan Variation 300 identifies the landuse zones within the area subject to variation as CZ1 [Core Business Zone]; CZ2 [Services]; CZ5 [Mixed Use Zone]; CFZ [Community Facility] and Urban Open Space.

Refer to *Figure 2 – Territory Plan Variation showing the proposed zoning within the Gungahlin Town Centre.*

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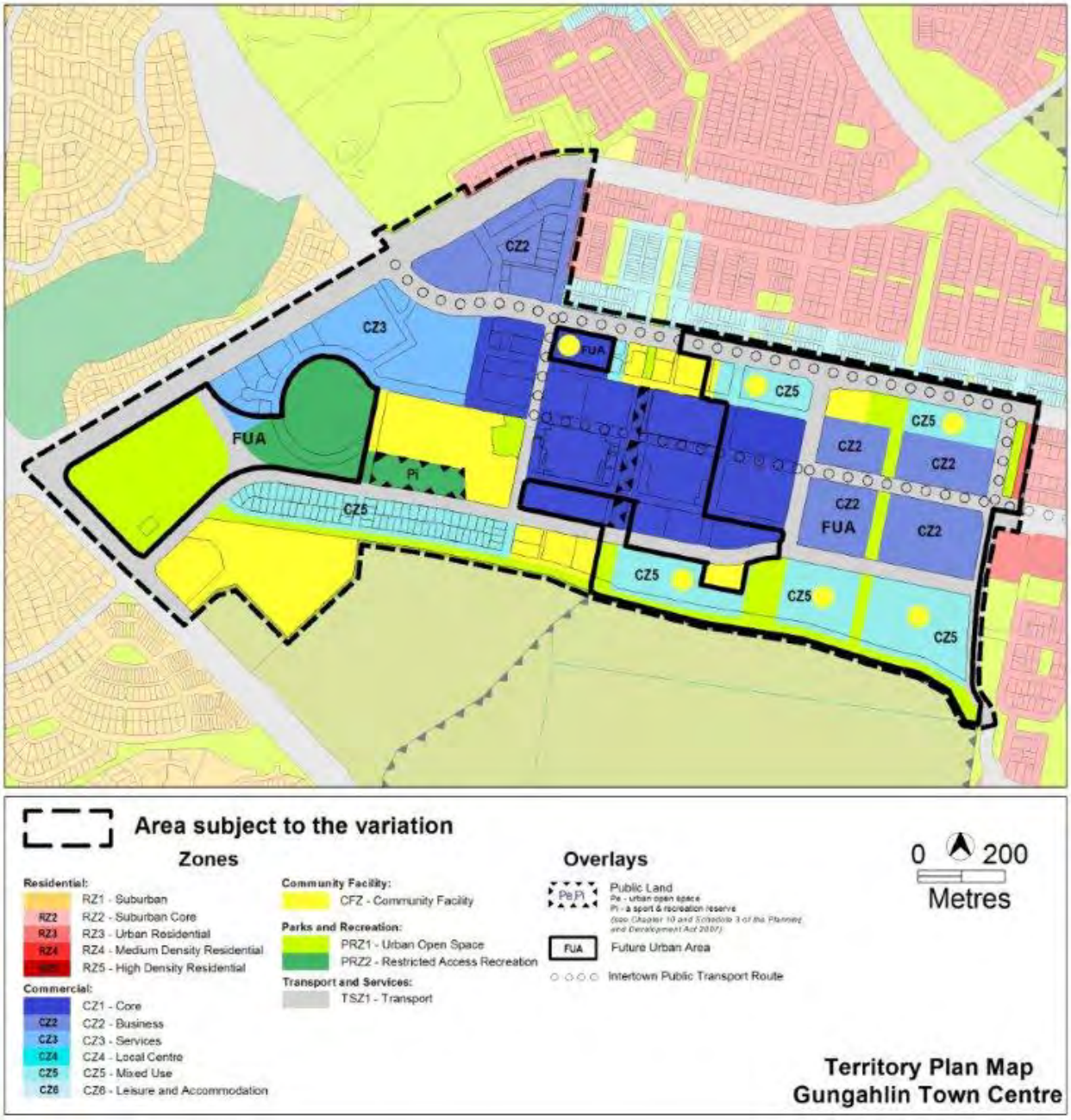
Figure 2 – Territory Plan Variation showing the proposed zoning within the Gungahlin Town Centre.



The land which is the subject of this updated Bushfire Risk Assessment consists of Urban Approved Blocks 1, 2 and 3; Block 2 Section 235 and Blocks 1 & 2 Section 29 and occupies the vacant land extending north from Wells Station Track to The Valley Avenue and Anthony Rolfe Avenue.

The precinct extends west to Gozzard Street and east to the residential land within the suburb of Franklin – refer to *Figure 3 – Gungahlin Town Centre East Estate Site*.

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Figure 3 – Gungahlin Town Centre East Estate Site Area.

The land to the north of Gungahlin Town East Site contains existing residential development, existing and future Commercial and Mixed Use [Retail]. The land to the east consists of recently completed residential land within the Gungahlin and Franklin Urban Release Areas. The land to the west of the site contains existing and future commercial development with the land to the west of the 'western' leg of the site containing existing residential development.

These areas are not deemed to contain bushfire prone vegetation.

1.2 Aim of this Assessment.

The aim of this up-dated Bushfire Risk Assessment is to determine the potential risk to the future mixed use and community facilities within that part of the Gungahlin Town Centre precinct which adjoins the northern boundary of the Mulangarri Grassland Reserve and Hills, Ridges and Buffers Zone within Block 221, from a grass fire event in this reserve and to address the comments of the ACT Emergency Services Agency [ACTESA] provide in the letter dated 1st September 2015.

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1.3 Objective of the Brief.

The objective of the brief is to identify constraints on the development of the lands for Mixed Use and Community Facility landuse, including any building or landscaping requirements to meet relevant bushfire regulations and guidelines.

1.4 Study Area.

For the purpose of this report, the boundaries of the study area are defined by the land within the Mulangarri Grasslands Reserve [Blocks 611 & 626], the Hills, Ridges and Buffer Zone [Block 221] to the west of the Mulangarri Grasslands Reserve, south of the development precinct; Franklin Estate to the east and the existing/proposed Commercial/Business/office landuse to the north of The Valley Avenue.

1.5 Site Inspection.

A detailed site inspection was undertaken by Graham Swain of *Australian Bushfire Protection Planners Pty Limited* on the 25.2.2009.

The inspection identified physical features and vegetation communities within the study area; existing land management activities; exposure to severe fire weather and potential fire paths.

A further site inspection was undertaken on the 19th January 2012.

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SECTION 2
DESCRIPTION OF SITE & STUDY AREA

2.1 Site Description.

The land which is the subject of this updated Bushfire Risk Assessment consists of Urban Approved Blocks 1, 2 and 3; Block 2 Section 235 and Blocks 1 & 2 Section 29 and occupies the vacant land extending north from Wells Station Track to The Valley Avenue and Anthony Rolfe Avenue.

The precinct extends west to Gozzard Street and east to the residential land within the suburb of Franklin – refer to *Figure 4 – Site Location.*

Figure 4 – Site Location.

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Figure 5 – Block Plan.

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Figure 6 - Aerial Photograph of Site & Study Area.

2.2 Existing Land Use.

Existing Community Facility development occupies Block 2 Section 29 and the land between Faye Lane and Gozzard Street. The remaining land is vacant.

2.3 Surrounding Land Use.

The land to the north of the development precinct contains existing residential development to the north of Anthony Rolfe Avenue. The land to the east consists of recently completed residential land within the Gungahlin and Franklin Urban Release Area.

The land to the west of the site contains existing and future Commercial development with existing residential development located to the west of the existing Community Facility on Gozzard Street.

These areas are not deemed to contain bushfire prone vegetation.

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The Mulangarri Grasslands Reserve within Blocks 611, 626 & 627, to the south, and the Hills, Ridges and Buffer Zone land within Block 221 to the west of the Mulangarri Grasslands Reserve, contain grassland vegetation which will support future wildfire events.

A bushfire which occurs within these reserves has the potential to spread, under south-western winds, from Gungaderra Drive, upslope towards the future mixed use and community facilities located adjacent to the southern edge of the site.

The south-eastern corner of the Mulangarri Grasslands is also exposed to ignition by ember attack from a fire which occurs in the Gungaderra Grasslands Nature Reserve, which is located to the southwest of Gungaderra Drive.

2.3 Site Photographs

Photograph No. 1 – Looking east across the future Mixed Use & Community Facilities Zone to the new urban development within the Franklin Estate.

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Photograph No. 2 – Looking north from the future Mixed Use/Community Facilities Zone across The Valley Avenue

Photograph No. 3 – Looking northwest from the future Mixed Use/Community Facilities Zone across The Valley Ave to the existing Commercial development.

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Photograph No. 4 – Taken looking east along northern boundary of the Mulangarri Grasslands Reserve with Franklin Estate in the back ground.

Photograph No. 5 – Looking east/south/east across Mulangarri Grasslands Reserve.

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Photograph No. 6 – Looking southeast across Mulangarri Grasslands Reserve.

Photograph No. 7 – Looking east along the northern boundary of Mulangarri Grasslands Reserve - Wells Station Track is on the left [behind Road Closed sign].

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Photograph No. 8 – Looking south from Wells Station Track to Mulangarri Grasslands Reserve.

Photograph No. 9 – Taken looking to the southwest across the Hills, Ridges and Buffer Zone on Block 221 to the existing residential development within the suburb of Palmerston

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2.5 Topography.

2.5.1 Within the Site.

The land within the northern and central portions of the site forms the level land on top of a broad ridgeline which slopes to the east, south, southwest and west. The Mixed Use/Community Facility zoned land located between The Valley Way and the southern boundary of the site falls to the west whilst the eastern portion of the Mixed Use/Community Facility zoned land falls to the east and southeast.

2.5.2 Beyond the Site.

a) North

The topography of the land within the Gungahlin Town Centre slopes to the north whilst falling towards the west/north/west at < 5%.

b) East

The topography of the land within the Franklin Residential Estate to the east of the development precinct rises to the east to a knoll within the north-eastern corner of the Estate.

c) South

The topography of the land within the Mulangarri Grasslands Reserve, to the south of the site, falls to the south of the eastern portion of the Mixed Use and Community Facility zoned land and rises to the south of the western portion of the Mixed Use and Community Facility zoned land.

The land within the Hills, Ridges and Buffer Zone to the south of the existing Community Facilities located within the western portion of the site, falls to the southwest towards Gungaderra Drive.

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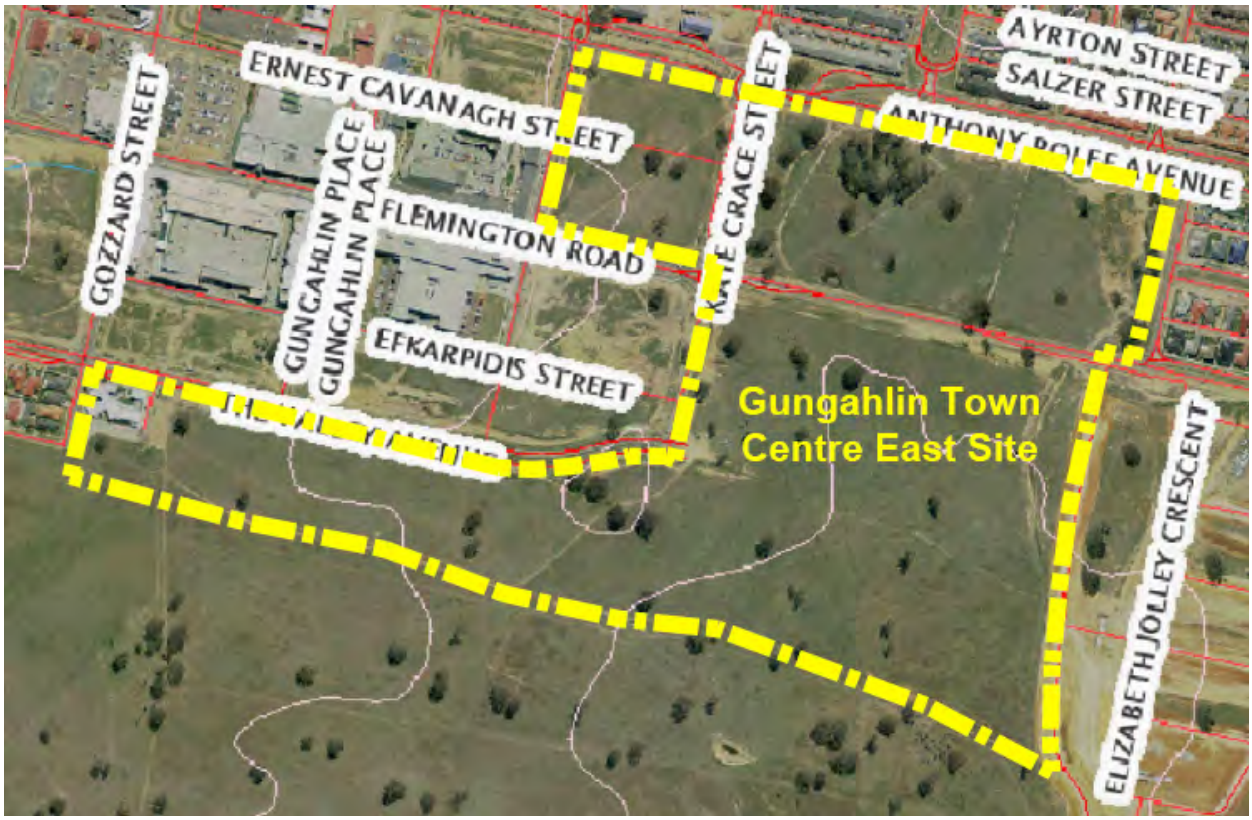
Figure 7 – Topographic Map.



Contour Intervals 10m

2.6 Vegetation within the Site.

The vegetation within the Gungahlin Town Centre East site, at the time of the site inspection on the 19th January 2012, consisted of mown grass.

2.7 Vegetation on Adjoining Lands.

(a) North

The vegetation on the residential land to the north of the site consists of managed landscaped gardens.

b) East

The vegetation within the adjoining Franklin Estate, to the east of the site, has been cleared as part of the subdivision works.

c) South

The vegetation within the Mulangarri Grasslands and the Hills, Ridges and Buffer Zone consists of native grassland. At the time of the site inspection the height of the grass was between 500 – 800mm high. Woodland trees are scattered as shade trees throughout the grasslands.

d) West

The vegetation on the vacant commercial zoned land to the west of the site consists of mown grass.

[Refer Site Photographs]

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SECTION 3.

CONTEXT OF THE BUSHFIRE RISK ASSESSMENT

The ACT Government enacted the *Emergencies Act 2004,* as part of its response to the needs identified by the McLeod Inquiry to replace the *Bushfire Act 1936* and sets the legislative basis for bushfire related planning.

Resulting from the changes in legislation, the ACT Planning & Land Authority prepared *"Planning for Bushfire Risk Mitigation",* a guideline adopted under the Territory Plan, that provides guidance to mitigate adverse impacts from bushfires in the ACT.

The Guideline is one of many documents that informs planning and development in the ACT and is taken into account by the ACT Planning & Land Authority when determining development applications and is complementary to the ACT Emergency Services Authority's *Strategic Bushfire Management Plan,* a strategic document outlining measures for the Prevention, Preparedness, Response and Recovery from bushfire in the ACT.

A *Bushfire Prone Area* for the ACT was declared through the *Building Regulations* and came into effect on the 1st September 2004. Under the declaration, all parts of the ACT outside the defined urban area have been designated bushfire prone and the Authority, under Part A (Consideration of Land Use and Development Proposals) of the Territory Plan, can require a site specific bushfire risk assessment to be undertaken during the planning/design process.

This Bushfire Risk Assessment addresses this requirement and has been undertaken using the *Australian Standard for Risk Management* AS/NZS ISO 31000:2009 and AS 3959 - 2009.

The site inspection undertaken on the 25.2.2009 revealed that the development precinct is located in an area of the Gungahlin Town Centre which is bushfire prone with the bushfire threat to the proposed development coming from the grassland vegetation within the Mulangarri Grasslands Reserve and the Hills, Ridges and Buffers Reserve on Block 221, adjoining the southern boundary of the site.

Therefore, the following Risk Assessment and resultant recommendations seek to address the protection of the future Mixed Use and Community Facilities located adjacent to the southern boundary of the Gungahlin Town Centre East site from future unplanned fire events that may occur within the adjoining grassland vegetation.

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SECTION 4

BUSHFIRE RISK

4.1 Introduction.

The Australian Standard AS/NZS ISO 31000:2009, the ACT Government Enterprise-wide risk management framework and the Emergency Management Australia (EMA) emergency risk management process provide the framework for establishing the context, analysis, evaluation, treatment, monitoring and communication of risk.

Risk has two elements: likelihood, the chances of a bushfire occurring and consequence, the impact of a bushfire when it occurs.

Bushfire risk is defined as the chance of a bushfire occurring that will have harmful consequences to human communities and the environment. Bushfire risk is usually assessed through consideration of the likelihood of ignition and consequences of a bushfire occurring. Risk reduction can be achieved by reducing the likelihood of a bushfire, the opportunity for a bushfire to spread or the consequence of a bushfire (on natural and built assets).

Bushfire management should have a clear objective to reduce both the likelihood of bushfires and reduce the negative impacts of bushfires. It should also consider the costs, inconvenience and dangers of measures taken to reduce the risk of bushfires.

The consequences of bushfire management activities and the failure to implement programs also need to be considered. A range of factors influence bushfire risk – these include:

- The likelihood of human and natural fire ignitions, as influenced by time, space and demographics;
- The potential spread and severity of a bushfire, as determined by fuel, topography and weather conditions;
- The proximity of assets vulnerable to bushfire fuels, and likely bushfire paths; and
- The vulnerability of assets including natural assets, or their capacity to cope with, and recover from bushfire.

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4.2 Management Strategies.

Broad strategies to manage bushfire risk include:

- Eliminate the bushfire risk (make the land-use decision first by asking the question about whether development should or should not proceed in a given area);

- Design or substitution (review boundary locations and shape, change the types of land-use policy);

- Engineering controls (infrastructure, building standards and landscaping) and

- Administration and organisation; (community preparedness measures).

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SECTION 5

BUSHFIRE RISK ASSESSMENT

5.1 Introduction.

An assessment of bushfire risk must firstly define the problem. This involves the identification of the nature and scope of issues to be addressed and defining the possible boundaries for the assessment *(Emergency Risk Management – Applications Guide. (EMA Echo Press, 2000), and* AS/NZS ISO 31000:2009*).*

For the purpose of analysing fire risks that might emerge in the ACT, a dangerous and damaging fire has the potential to occur when the following conditions prevail:

- Continuous available fuel – fuel at moisture content sufficiently low to enable rapid combustion, arising from drought effects or the maturing and drying, of grasslands;

- Exposure of vulnerable assets. The 'catchment' for such fires may be within several hundred metres or many (60-70) kilometres from the asset/s;

- A combination of weather conditions that generate a forest or grass fire danger index of Very High (24) or greater. Typically in the ACT, prevailing adverse fire weather will have a strong northerly, through to south-westerly wind influence;

- A fire in the landscape which is not effectively suppressed.

In the case of the Gungahlin Town Centre East site the problem is the potential exposure of the future mixed use and community to grassland fires that may occur on the adjoining the grassland vegetation in the Mulangarri Grassland Reserve and within the Hills, Ridges and Buffers Reserve on Block 221.

The following part of the risk assessment process identifies the potential risk by examining:

- Fire History;
- Exposure to possible ignition / fire sources;
- Vegetation type and likely fuel loads and fire hazards arising using the "Overall Fuel Hazard Guide" – Fourth Edition (DSE July 2010);
- The impact of climate and likely fire runs during severe fire danger periods;
- Wind effects;
- The impact of surrounding land uses and fuel loads.

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5.2 Fire History of the ACT.

Natural fires have long been part of the ACT landscape. A combination of inherently inflammable vegetation, dry summers, periodic drought and lightning ignitions, resulted in fires of small and large size, of high and low intensity, with periodic conflagrations that have covered the landscape. Much of the native vegetation in the ACT is subject to periodic fires; particularly the dry forest, woodland and grassland communities, and many are fire-adapted ecosystems. Recurrent bushfires and management burning have shaped the condition of the existing plant communities. *[Strategic BFMP – Version 2]*

Version 2 of the Strategic Bushfire Management Plan for the ACT states: "*The ACT has a history of severe damaging bushfires with large areas burnt in the bushfire seasons of 1919/20; 1925/26; 1938/39; 1951/52; 1978/79; 1982/83; 1984/85; 2000/01 and in 2002/03".*

A review of the large fire history data within Version 2 of the Strategic Fire Management Plan for the ACT, for the Gungahlin area has identified that the last large fire event occurred in 1979 and started on land to the southwest of the Barton Highway, near the ACT/NSW Border and spread to the east under westerly wind influences. This fire event occurred prior to the development of suburbs such as Palmerston, Nicholls and Ngunnawal and it is therefore not likely for the Gungahlin Town Centre precinct to be impacted by a similar fire event.

However, local fires in the grassland vegetation still have the potential to impact on the southern edge of the Gungahlin Town Centre East site.

5.3 Ignition / Fire Sources.

Bushfires, including those in the ACT, are natural or human caused. Human causes can be categorised as:

- Malicious – including arson;
- Careless – such as escaped campfires, children and burning off without a permit; and
- Accidental – uncommon but includes motor vehicle and industrial accidents.

The only common natural cause of bushfires in the ACT is lightning. The vast majority of ACT bushfires are human caused with many classified as arson.

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Accidental ignition of the grassland vegetation, especially from management practices [e.g. slashing of the grassland verges to Gungaderra Drive] will present a threat to the future Mixed Use and Community Facilities located adjacent to the southern boundary of the site during periods of drought with prevailing south-westerly wind influences.

Ignition of the grassland vegetation along the western edge of the suburb of Franklin has the potential to also spread upslope towards the southern boundary of the site, burning under south-easterly wind influences.

Ignition of the grassland vegetation, by embers from fires burning further to the west and southwest, in NSW, is also a possible cause of fire ignition in the grassland reserve.

Malicious fire ignition can occur wherever humans operate. Deliberately lit (arson) fires are probable within the grasslands vegetation.

5.4 Climate and Weather.

5.4.1 Temperature/Rainfall & Fire Danger Index:

The fire season in the ACT corresponds with the summer months' high temperatures and low rainfall, and can occur from September to April with a proclaimed bushfire danger period from October to March. There is significant variability from year to year. Fire seasons may be serious in three out of every 15 years, but this can vary considerably.

Extreme and uncontrollable bushfires typically occur when the fire danger rating is over 50, a rating of Extreme. Many of the major house loss events have occurred at fire danger ratings over 70, on a scale of 0 to 100.

Analysis of 1951 – 2004 meteorological records identified the days of Very High and Extreme fire danger from the Forest Fire Index (FFDI) at Canberra airport:

- 0.1% of days (19 Days in 53 years) had a FFDI exceeding 70
- 0.5% of days (94 days in 53 years) had a FFDI exceeding 50
- 18% of January days had Very High FFDI, and 2% of January days had Extreme FFDI

The Very High and Extreme Forest Fire Danger conditions mainly occur between November and March. *[Strategic BFMP]*

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5.4.2 Wind:

Wind is an important factor in bushfire behaviour as it influences the rate of spread of the fire front and spreads burning embers / sparks, providing ignition sources for spot fires to distances up to 35 kilometres ahead of the main fire front.

The southern edge of the Gungahlin Town Centre East site will be exposed to strong, hot and dry south-westerly wind influences. These winds can spread burning embers from both large and small fires over long distances and ignite cured grassland vegetation and other combustible fuels.

Fires that may occur in the grassland vegetation to the south of the site have the potential to rapidly burn upslope across the open, undulating cured grassland vegetation within the Mulangarri Grasslands Reserve and the Hills, Ridges and Buffer Zone Reserve, towards the southern edge of the future Mixed Use / Community Facilities. Fires lit adjacent to the western edge of Franklin Estate also have the potential to spread upslope towards the southern edge of the site, under dry south-easterly wind changes.

5.5 Slope & Fire Paths.

Slope is a critically important factor when assessing fire risk and likely behaviour. The rate of fire propagation doubles up a slope of 10 degrees (18%) and increases almost fourfold up a slope of 20 degrees (40%).

The rate of progress downslope tends to slow at a corresponding rate however wind direction in the lee of hills/ridgelines tends to be unpredictable and can cause fires to change direction unpredictably.

The topography of the land to the south of the site creates an upslope fire path from the south and southeast toward the eastern portion of the site. The higher knoll to the south of the middle section of the southern boundary of the site creates a downslope fire path from the south which turns into an upslope fire path from the southwest, across the Ridges and Buffer Zone Reserve.

The calculated rate of spread across this undulating landscape is 1.48 km/h upslope whilst a downslope burning fire burning in the grassland vegetation has a rate of spread of 0.85 km/h.

Figure 8 on Page 28 provides a graphical representation of the potential fire path identified by ACTESA as the likely fire to impact upon the proposed land use located adjacent to the southern boundary.

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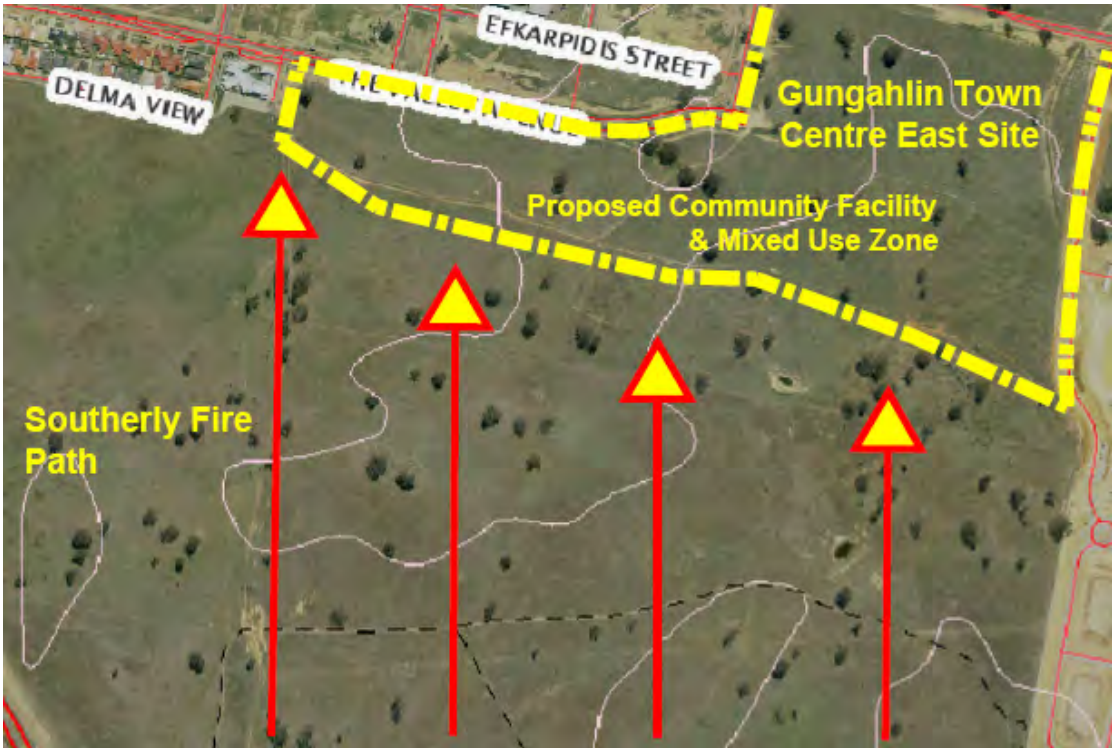
Figure 8 – Fire Path – South [Source ACTESA.



5.6 Bushfire Fuels.

Fuel is a critical element in bushfire risk management, as it is the one factor relating to fire behaviour that can be managed.

Fuel in forests, woodlands and shrubland can be divided into four layers, each based on its position on the vegetation profile. They relate to the distribution and nature of combustible material within a vegetated environment and are defined by the DSE Overall Fuel Hazard Guide [Fourth Edition July 2010] as:

- Bark fine fuel;
- Elevated fine fuel;
- Near Surface fine fuel; and
- Surface fine fuel.

Bark on the tree trunks and branches has the potential to travel significant distances in a fire situation (spotting) and act as a ladder between surface fuels and the forest crown. Bark contributes to fire hazard when it is loose and fibrous, present in large quantities and in long loose ribbon forms.

Elevated material is defined as shrubs, heath and suspended material greater than 0.5 metres above ground.

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Elevated fuel hazard is highest when the foliage, twigs and other fuel particles are very fine; proportion of dead material is high; fuels are arranged with high level of density and/or horizontal and vertical continuity that promotes the spread of fire and the live foliage has low fuel moisture content.

Near surface fine fuel exists where live and dead fuels effectively touch the ground but do not lay on it. Fuel has a mixture of vertical and horizontal orientation; either the bulk of the fuel is closer to the ground than the top of this layer, or is distributed fairly evenly from the ground up, sometimes contains suspended leaves, bark or twigs and cover varies from continuous to having gaps many times the size of the fuel patch.

Surface fine fuels are defined as the litter bed [leaves, twigs, bark and other fine fuel] lying on the ground. Predominantly horizontal in orientation and includes the partly decomposed fuel [duff] on the soil surface.

Grasses add to the near surface fine fuels and therefore need to be taken into account when assessing the hazard. The risk is higher where greater depth and volume of litter and surface material are present.

5.7 Assessment of Fuel Hazard.

An overall Fuel Hazard for vegetation within the grassland can be determined from an assessment of the contributing fuel hazards.

The vegetation which will create the most significant fire impact on the development precinct will be the cured, unmanaged grassland vegetation within the Mulangarri Grasslands Reserve and on the Hills, Ridges & Buffers Reserve to the south of the site.

5.7.1 *Grassland vegetation.*

Using the methodology provided within the DSE Overall Fuel Hazard Guide, the following Fuel Hazard observation was determined for the grassland vegetation on the land to the south of the development site:

Surface Fine Fuel Hazard:

Surface Fine Fuel Hazard is assessed by measuring litter-bed height and can vary, depending on the land management practices.

The estimated litter bed height for unmanaged grassland vegetation is 15 - 25mm and due to the extent of “near-surface fuels” – i.e. grass tussocks or wire grass up to 0.9m – 1.2m high, the Surface Fine Fuel Hazard Rating can increase from High to Very High for unmanaged grassland vegetation.

The Overall Fuel Hazard for the grassland vegetation is high to very high for unmanaged grassland vegetation.

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5.8 Likely Fire Scenarios.

The following fire scenario has been identified by ACTESA as a probability for impact on the development site:

- ***Fire Scenario :***
  A fire spreading, under the influence of southerly winds, upslope through the unmanaged grassland vegetation, toward the southern boundary of the site and impacting on the Mixed Use / Community Facilities. This occurrence is possible during consecutive fire seasons when conditions are such that the grassland vegetation has not been grazed and the Fire Danger Index is Extreme (FDI > 50);

5.9 Asset Interface Classification [AIC].

The ACT Rural Fire Service have developed a methodology for determining the classification of potential exposure of the urban edge to severe bushfires and introduces Asset Interface Classification [AIC], which is defined as the boundary between an asset and the bushfire paths that approach it. The AIC is determined by an assessment of:

- The maximum fire size an asset may be subject to;
- The part of the fire [head, flank, back] an asset maybe subject to recognizing the major fire threat from the north and west;
- The fire run length criteria and the length of fire run.

The following table provides an Asset Interface Classification [AIC], at a broader scale for the urban edge of Canberra;

Table 1: Asset Interface Classification

	Length of Fire Run to Asset Interface (through unmanaged vegetation)		
Aspect of Fire Run	<100	100 – 350	>350
N	**Secondary**	**Primary**	**Primary**
NW	**Secondary**	**Primary**	**Primary**
W	**Secondary**	**Primary**	**Primary**
SW	**Lee**	**Secondary**	**Primary**
S	**Lee**	**Secondary**	**Secondary**
SE	**Lee**	**Lee**	**Lee**
E	**Lee**	**Lee**	**Secondary**
NE	**Lee**	**Lee**	**Secondary**

An examination of the Asset Interface Classification at a precinct level for the site identifies the following classifications:

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Table 2: Asset Interface Classification – Precinct Assessment.

	Length of Fire Run to Asset Interface (through unmanaged vegetation)		
Aspect of Fire Run	<100m	100 – 350m	>350m
South – Unmanaged grassland vegetation - > 350m wide			**Secondary**

The precinct assessment of Asset Interface Classification has determined that the southern aspect to the Community Facility/Mixed Use zone located adjacent to the southern boundary of the site has a Secondary Asset Interface Classification. This has been confirmed by ACTESA in the comments on the Gungahlin Town Centre East Draft Estate Development Plan dated 1st September 2015.

5.10 Risk Statement.

AS/NZS ISO 31000:2009*) – 'Risk Management'* provides a methodology for establishment of risk including qualitative measures of consequence and likelihood. Table 3, below, provides a list of qualitative measures of consequence [or impact] of future bushfires on the development precinct whilst Table 4 provides a list of qualitative measures of the likelihood of a bushfire impacting upon the development precinct.

Table 3 – Qualitative Measures of Consequence or Impact.

Level	Descriptor	Detail Description
1	Insignificant	No public safety injuries or impact to buildings
2	Minor	No public safety injuries – minor impact to buildings
3	Moderate	Burns and Respiratory Issues – moderate damage to buildings
4	Major	Death of people exposed to radiant heat & major property damage
5	Catastrophic	Death of people exposed to radiant heat and total destruction of buildings

Table 4 – Qualitative Measures of Likelihood.

Level	Descriptor	Detail Description
A	Almost Certain	Is expected to occur during severe fire danger periods
B	Likely	Will probably occur during severe fire danger periods
C	Possible	May occur during severe fire danger periods
D	Unlikely	Unlikely to occur during severe fire danger periods
E	Rare	Will rarely occur during severe fire danger periods

Table 5 provides a qualitative risk analysis matrix – used to determine the level of risk in Table 6.

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Table 5 – Qualitative Risk Analysis Matrix

Likelihood	Risk Rating / Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A – almost certain	High	High	Extreme	Extreme	Extreme
B – likely	Moderate	High	High	Extreme	Extreme
C – possible	Low	Moderate	High	Extreme	Extreme
D – unlikely	Low	Low	Moderate	High	Extreme
E – rare	Low	Low	Moderate	High	High

Table 6 provides a statement of risk for each fire scenario that may impact the development precinct, prior to mitigation measures, and assigns risk levels reflecting identified levels of likelihood and consequences for a 'worst case' fire occurrence which may occur in the Mulangarri Grasslands Reserve and the Hills, Ridges and Buffer Zone Reserve, during severe fire weather conditions.

Table 6 – Bushfire Risk Register – Severe Bushfire Event – if high levels of combustible fuels/unmanaged vegetation exist in the landscape.

The Risk What can happen?	The consequences of an event happening Consequences	Likelihood	Adequacy of existing protection measures	Consequence Rating	Likelihood Rating	Level of Risk
Fire Scenario: Grassland fires burning upslope towards the Mixed Use & Community Facility Zone from the south	Moderate	Possible	Currently no Asset Protection Zones /construction standards are in place	3 [Moderate]	C [Possible]	High risk rating

5.11 Summary of Bushfire Risk.

Fire ignitions that occur within the grassland vegetation on the Mulangarri Grasslands Reserve [Blocks 611, 626 & 627] and on the Hills Ridges & Buffers Reserve [Block 221] have the potential to spread rapidly toward the southern edge of the Community Facility/Mixed Use Zone land located adjacent to the southern boundary of the Gungahlin Town Centre East site.

If this fire event occurs when the grasslands vegetation contains excessive amounts of cured grassland vegetation the bushfire risk to the Community Facility/Mixed Use development is high.

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SECTION 6

BUSHFIRE PROTECTION MEASURES.

6.1 Introduction.

The Gungahlin Town Centre Precinct Code contains controls that apply to *blocks* in addition to the development and general codes for particular zones in the Territory Plan.

The purpose of the Precinct Code is to:

a) Guide the design and assessment of *estate development plans* (subdivision proposals) in **Gungahlin Town Centre;**

b) Inform the allocation of final zones at the time when a parcel of land ceases to have a Future Urban Area (FUA) overlay (refer to note below) following subdivision;

c) Guide the development of individual *blocks* in concert with other relevant codes under the *Territory Plan;*

d) Support zone objectives and assessable uses in the development tables;

e) Guide the development and management of the public realm.

Part A of the Code applies to land with a Future Urban Area overlay in the town centre and provides advice on Land Use Zones.

Figure 9 on Page 34 provides a copy of Figure 2 of the Gungahlin Town Centre Precinct Code which shows the location of land use zones.

Figure 10 on Page 34 provides a copy of Figure 3 of the Gungahlin Town Centre Precinct Code which shows the location of Trunk walking and cycling network.

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Figure 9 – Location of Landuse Zones.

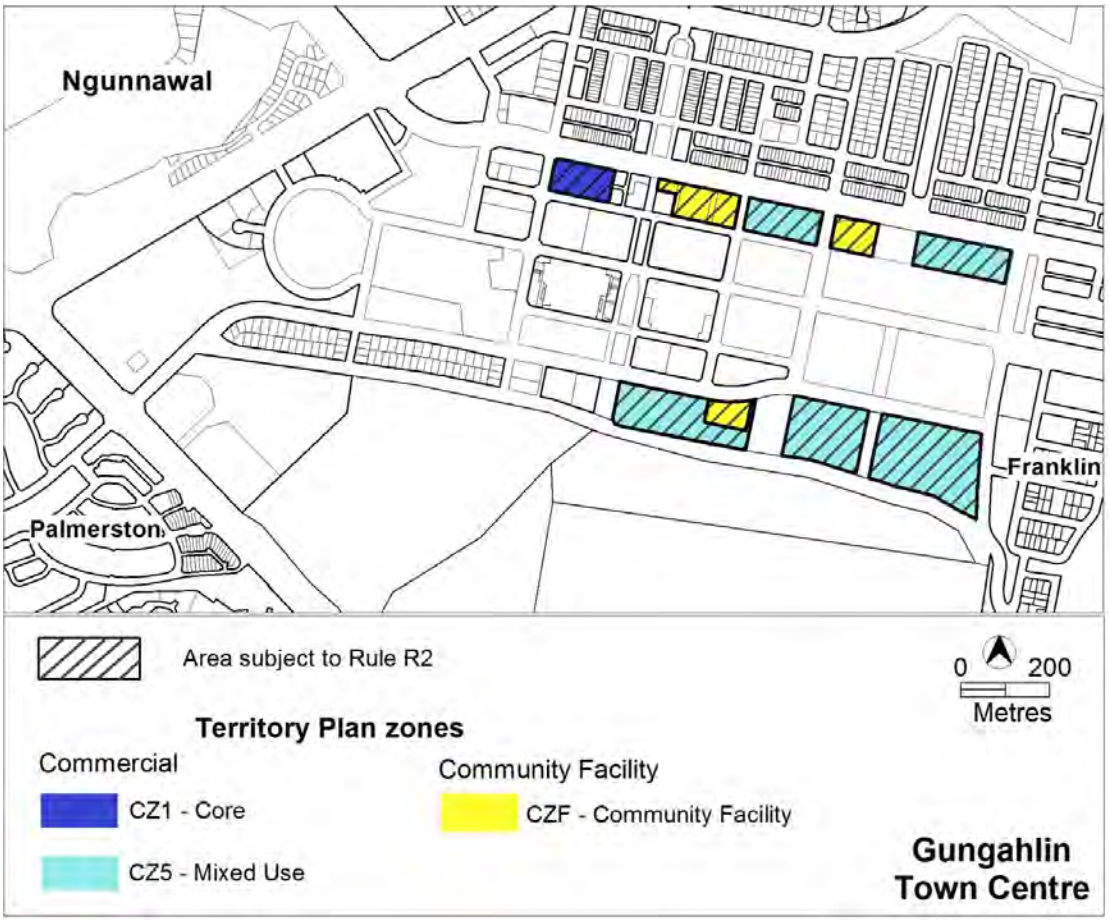
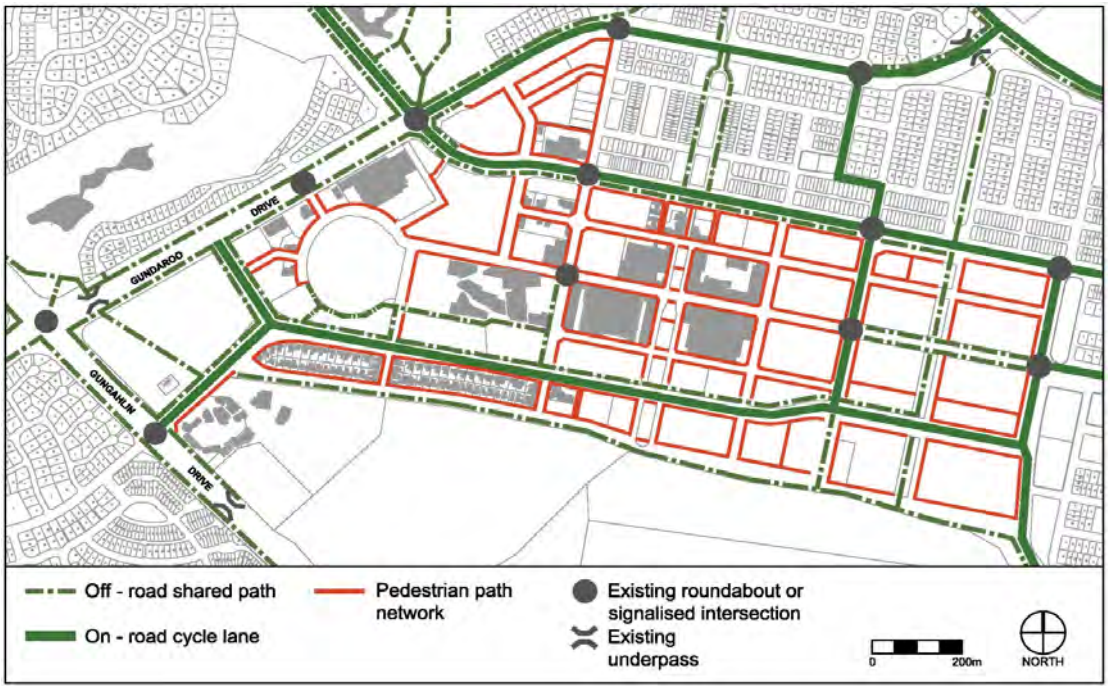


Figure 10 – Trunk walking and cycling network



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Rule 3.5 – Bushfire Protection provides the rules and criteria for the development of the Gungahlin Town Centre:

Table 7 – Bushfire Protection Measures – Gungahlin Town Centre Precinct Code

Rules	Criteria
3.5 Bushfire protection	
R5 Development in Area A complies with all of the following (see Figure 5): a) Any development in Area A complies with *Planning for Bushfire Risk Mitigation General Code* b) A perimeter road is to be provided along the southern edge of Area A. All roads constructed within this area need to comply with ACT Fire Brigade standards c) Well Station Track is to be maintained as a fire trail and provide access gates from the perimeter road. d) Fencing between Well Station Track and Mulangarri Grassland is to comply with *Planning for Bushfire Risk Mitigation General Code* and be endorsed by the relevant land manager e) Hydrants are to be provided along the perimeter road to the satisfaction of ACT ESA f) Open space adjacent to the bushfire interface area within the town centre is maintained in accordance with the Strategic Bushfire Management Plan. A bushfire risk assessment plan endorsed by the ACT Emergency Services Agency (ESA) and TAMS is required for any development within or adjacent to the bushfire prone area identified in Figure 5 as a 20m wide Inner Asset Protection Zone (IAPZ) within the Well Station Track reserve. The plan must not impose any bushfire management strategies within Mulangarri Grasslands. The bushfire management strategies identified in the bushfire risk management plan must be consistent with the standards specified in the Strategic Bushfire Management Plan (SBMP).	C5 Development within or adjacent to the bushfire prone area identified in Figure 5 is endorsed by ESA, TAMS and any other relevant Government agencies. In making its assessment ESA, TAMS and any other relevant Government agencies will consider all of the following: a) Vegetation types and management; b) Access for emergency vehicles; c) Management objectives and values on the land to be effected by the proposed bushfire management strategies. Development within this area must not impose any bushfire management strategies within Mulangarri Grasslands. If the proposed bushfire management strategies do not meet the standards specified in the Strategic Bushfire Management Plan, justification is required for any differences (for instance, reduced risk or alternative but equivalent strategy).

The following sections of this report examine the adequacy of the bushfire protection measures recommended by the Precinct Code for the Gungahlin Town Centre and provides recommendations of those measures required to address the bushfire risk and the requirements of the *Strategic Bushfire Management Plan for the ACT – 2014.*

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6.2 Asset Protection Zone to the south of the Gungahlin Town Centre Precinct.

The Precinct Code recommends the provision of a 20 metre wide Inner Asset Protection Zone to the south of the Gungahlin Town Centre Precinct [refer to Figure 11 on Page 37]. A further recommendation is that NO bushfire protection measures shall be located within Mulangarri Nature Reserve.

The *Strategic Bushfire Management Plan for the ACT 2014* provides recommendations on the provision of Asset Protection Zones to development located in a bushfire prone area and which is likely to be subject to bushfire attack. These provisions are detailed in Tables 8 & 9 below:

Table 8 – *Outer Asset Protection Zone:*

Vegetation Type	AIC	OAPZ Width
South Unmanaged grassland vegetation within the Mulangarri Grasslands Reserve - > 350m wide fire path	**Secondary to the south**	**Nil**

Table 9 – *Inner Asset Protection Zone:*

Vegetation Type	AIC	IAPZ Width
South Unmanaged grassland vegetation within the Mulangarri Grasslands Reserve - > 350m wide fire path	**Secondary to the south**	**20 metres**

Table 8 confirms that there is no requirement to provide an Outer Asset Protection Zone to the southern aspect of the Gungahlin Town Centre precinct. Table 9 confirms that the Asset Protection to the Gungahlin Town Centre precinct, as required by the *Strategic Bushfire Management Plan for the ACT 2014,* is a 20 metre wide Inner Asset Protection Zone along the southern aspect of the precinct.

This also complies with the recommendations of the Gungahlin Town Centre Precinct Code.

Refer to Figure 11 on Page 37, which is a copy of Figure 5 - Bushfire Protection, of the Gungahlin Town Centre Precinct Code. This has been endorsed by ACTESA in correspondence dated 1st September 2015.

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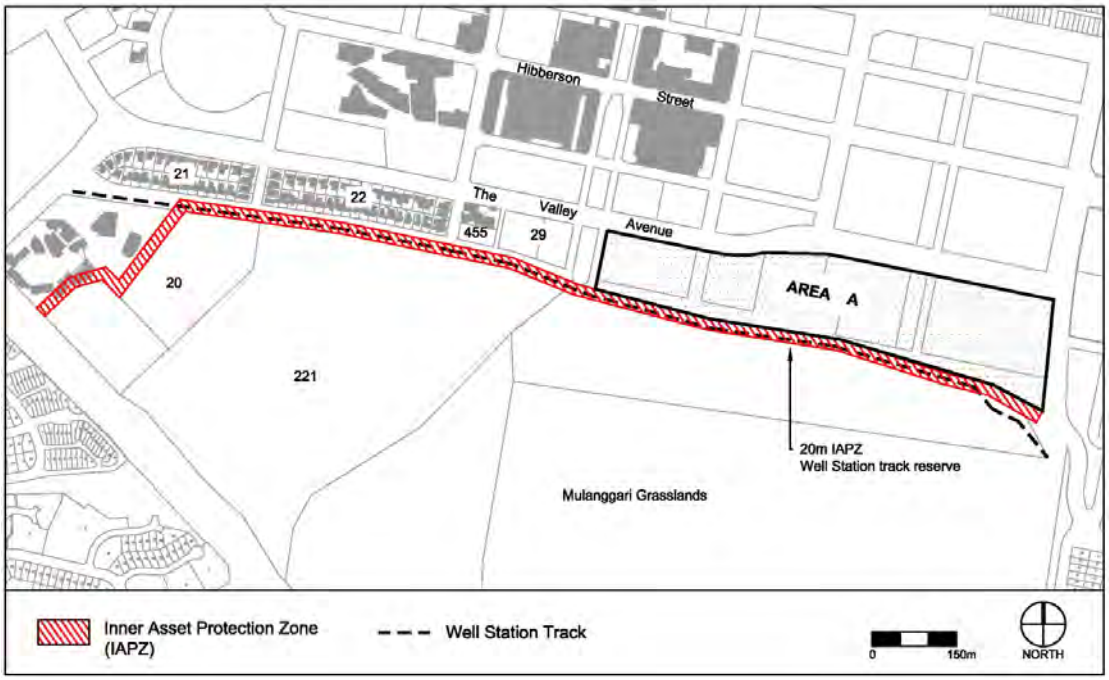
Figure 11 – Plan of Bushfire Protection measures recommended in the Precinct Code for the Gungahlin Town Centre.



6.3 Construction Standards to Buildings.

Section 11 of the *Strategic Bushfire Risk Management Plan for the ACT 2014* identifies that buildings located adjacent to bushfire prone areas [BPA] shall be required to be assessed under A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'* and in minimum standard of construction under A.S. 3959 – 2009 will be required to be undertaken to the lowest level of BAL 12.5.

The determination of relevant levels of construction of the future Community Facilities and residential component of the Mixed Use zone shall be undertaken when it is known whether the Outer Asset Protection Zone can be achieved as required.

Table 11 summarises the results of the assessment of the radiant heat exposure on the southern edge of the Gungahlin Town Centre precinct.

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Table 11. Assessment of Radiant Heat Flux on the southern aspect of the Gungahlin Town Centre Precinct. Fire Danger Index [FDI] for the site is 100

Aspect	Vegetation within 140m of development	Predominant Vegetation Formation Class *[Table A2.3* A.S. 3959 – 2009*]*	Effective Slope of land within 100 metres of the building	Width of Inner Asset Protection Zone [IAPZ]	Radiant Heat Flux [Table 2.4.1 of A.S. 3959 – 2009]
South	Unmanaged grassland within the Mulanggari Grasslands Nature Reserve	Group G Unmanaged Grassland [21 & 22]	< 5 degrees downslope	Minimum 20 metres to south	19kW/m^2 [BAL 19 construction]

The results of the assessment to determine the radiant heat rating on the buildings located adjacent to the southern edge of the Gungahlin Town Centre precinct has identified that the southern elevations of the future buildings shall be designed and constructed to comply with Section 3 and Section 6 [BAL 19] of A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.*

The non-exposed elevations of these buildings and all buildings located within 100 metres of the bushfire hazard interface shall be designed and constructed to comply with Section 3 and Section 5 [BAL 12.5] of A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.*

6.4 Access for Fire-fighting Operations.

Figure 12 on Page 39 is taken from the Precinct Code and shows the proposed road hierarchy within the Gungahlin Town Centre.

This layout does not provide a perimeter or 'edge road' between the proposed Community Facility/Mixed Use zoned land and the Mulangarri Grassland Reserve.

The 'Rules' under 3.5 – Bushfire Protection states that a "perimeter road shall be provided along the southern edge of Area A and that all roads constructed within this area need to comply with ACT Fire Brigade Standards".

A perimeter road shall therefore be provided along the southern edge of the Community Facility/Mixed Use and Business development precinct. The Wells Station Track shall be maintained as a fire trail within the Inner Asset Protection Zone with access gates provided from the perimeter road.

The internal road network within the new development precinct [Community Facility/Mixed Use and Business Zone] shall be designed and constructed to ACT Fire & Rescue standards so as to allow heavy emergency service vehicles to manoeuvre quickly and efficiently in both response and normal operating modes.

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Figure 12 – Road Hierarchy

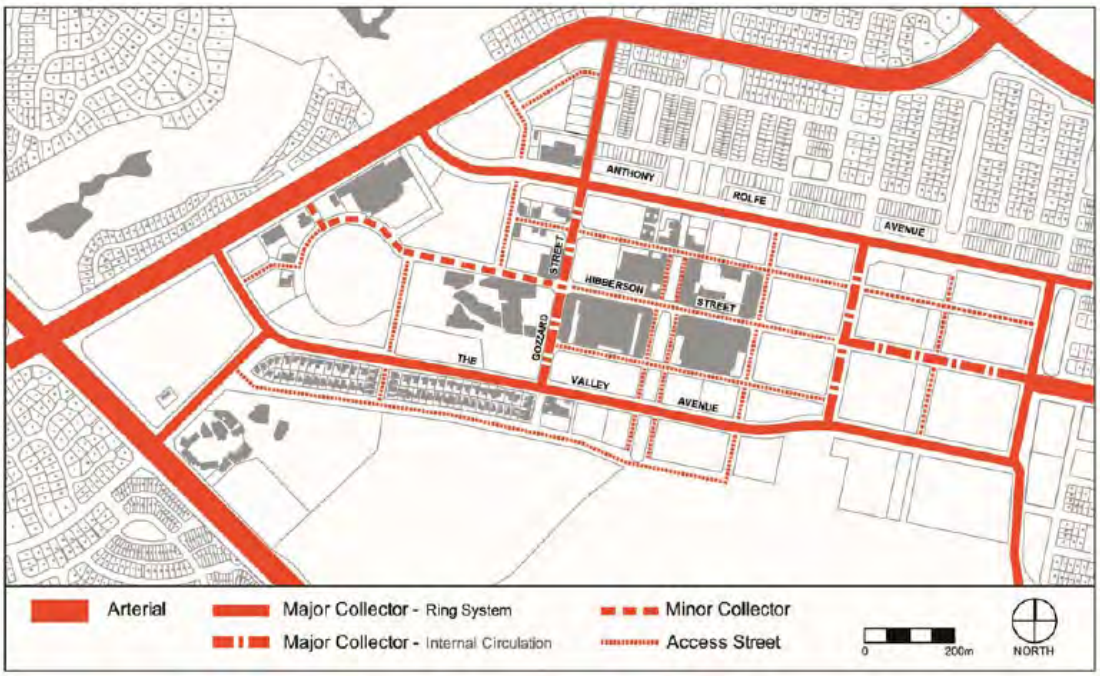
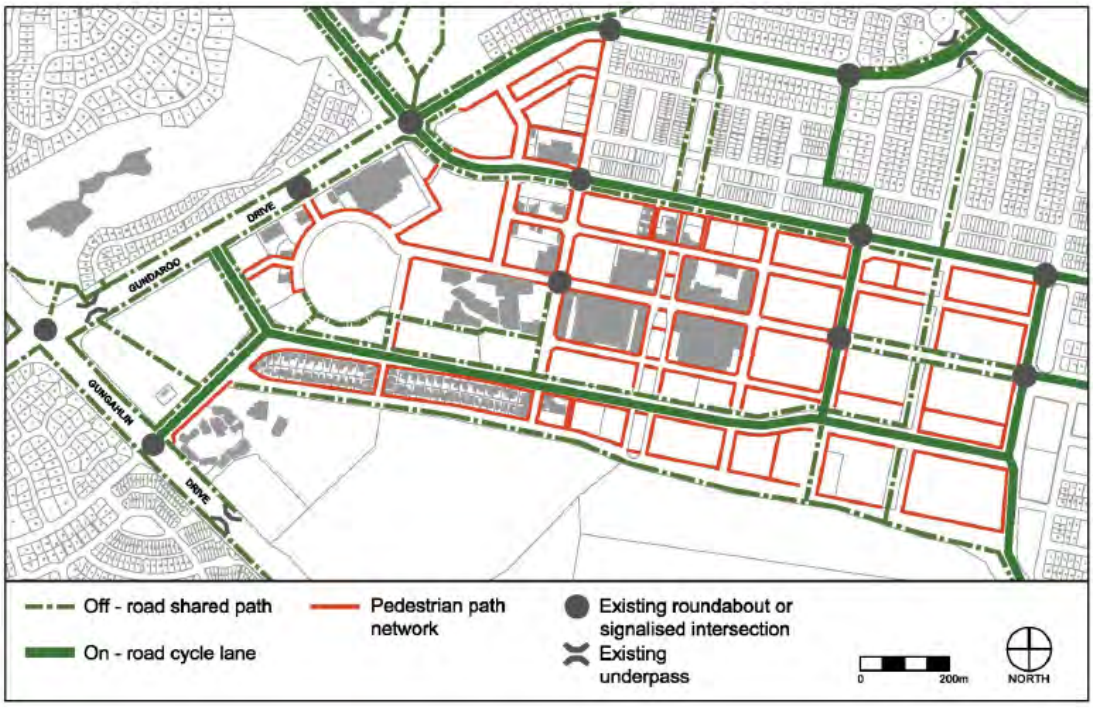


Figure 13, below is taken from the Precinct Code and shows the proposed Trunk Walking & Cycling Network within the Gungahlin Town Centre. This layout provides an 'Off Road Shared Path between the proposed Community Facility/Mixed Use zoned land and the Mulangarri Grassland Reserve.

Figure 13 – Trunk Walking & Cycling Network.



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6.5 Water Supplies for Fire Fighting Operations.

The 'Rules' under 3.5 – Bushfire Protection states that a "hydrants are to be provided along the perimeter road to the satisfaction of the ACT Fire & Rescue ACT".

A hydrant supply shall be installed to comply with the agreed standards for water supply and require type F5 standard 45 l/s single standard hydrants at 60 metre intervals.

6.6 Management of Pocket Parks.

The 'Rules' under 3.5 – Bushfire Protection states that "Open Space adjacent to the bushfire interface area within the town centre is maintained in accordance with the *Strategic Bushfire Management Plan*".

The pocket parks/Community Open Space within the Gungahlin Town Centre precinct shall be maintained to the prescriptions of an Inner Asset Protection Zone as defined by the ACT Strategic Bushfire Management Plan - 2014.

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SECTION 7

CONCLUSION.

The development proposal reviewed in this updated risk assessment is for that part of the Gungahlin Town Centre precinct known as Gungahlin Town Centre East, which adjoins the grassland vegetation within the Mulangarri Grasslands Reserve and within Block 221 [Hills, Ridges and Buffer Zone land].

The Gungahlin Town Centre Design Concept proposes a blend of Community Facilities/Mixed Use Zone located adjacent to the northern boundary of the grassland vegetation within these Reserves. This vegetation is deemed to be bushfire prone vegetation and therefore the future development precinct is bushfire prone.

This report examines Variation 300 of the Territory Plan and the bushfire risk to the proposed development from future fire occurrences in the grassland vegetation and compares the recommendations of the Precinct Code with the bushfire protection measures recommended in the *Strategic Bushfire Risk Management Plan for the ACT 2014.*

The comparison of the requirements has found that the recommendations provided in the Precinct Code comply with the requirements of the *Strategic Bushfire Risk Management Plan for the ACT 2014.*

The recommendations provided in this updated report also address the matters raised by the ACT Emergency Services Agency [ACTESA] in correspondence dated 1st September 2015.

Graham Swain
Managing Director
Australian Bushfire Protection Planners Pty Limited.

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REFERENCES:

- Strategic Bushfire Management Plan for the ACT – January 2014;
- The Canberra Spatial Plan – ACT Planning & Land Authority – March 2004;
- Variation 300 of the Territory Plan;
- Precinct Code – Gungahlin Town Centre;
- *Australian Standard for Risk Management* AS/NZS ISO 31000:2009;
- Emergency Risk Management – Applications Guide. (EMA) 2000);
- Overall Fuel Hazard Guide – Fourth Edition – DSE. July 2010;
- Planning for Bushfire Risk Mitigation - 2009;
- A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.*

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Appendix G

Coffey Stage 2 Contamination Investigation of the Gungahlin Town Centre

coffey environments
SPECIALISTS IN ENVIRONMENTAL, SOCIAL AND SAFETY PERFORMANCE

22 May 2012

Land Development Agency
Transact House
470 Northbourne Ave
Dickson ACT 2602

Attention: Grant Rootes

Dear Grant,

RE: Gungahlin Town Centre East Estate - Stockpile Beneficial Reuse Assessment and Waste Classification

1 INTRODUCTION

Coffey Environments Australia Pty Ltd (Coffey) was commissioned by the Land Development Agency (LDA) to conduct a Beneficial Reuse Assessment (BRA) for stockpiles of soil and building and demolition waste of unknown origin located on the southern verge of Anthony Rolfe Avenue in Gungahlin Town Centre East Estate, ACT (the Site). Figure 1 shows the Site location and Figure 2 shows the stockpile layout plan.

The assessment has been conducted in accordance with:

- Coffey proposal (ref: ENAUTHOD04276-P02) and subsequent discussions with Mr. Grant Rootes of the LDA.
- The sampling plan proposed in the letter by Coffey dated 2 April 2012 titled “Gungahlin Town Centre East - Stockpile Beneficial Reuse Assessment and/or Waste Classification” which was endorsed by the ACT Environment Protection Unit (EPU) in an email dated 10 April 2012.

This BRA has been prepared for endorsement by the ACT Environment Protection Unit (EPU). The report has been prepared with reference to the ACT EPA (2009), Contaminated Sites Environment Protection Policy including ACT Government (2011) Information Sheet 4 Information– Requirements for the Reuse and Disposal of Contaminated Soil and the ACT Environmental Standards: Assessment and Classification of Liquid and Non Liquid Wastes (June 2001).

2 BACKGROUND

The Phase 2 Environmental Site Assessment (ESA) for the Gungahlin Town Centre East Estate recently completed by Coffey Environments (ref: ENAUBRAD01160AA) (Coffey, March 2012) noted that stockpiles of unknown origin had been dumped at the edge of Kate Crace Street and Anthony Rolfe Avenue. The report recommended that 'the stockpiles be further assessed by LDA and an appropriate management strategy developed and implemented, such as waste classification, disposal offsite and/or potential beneficial reuse'.

Based on historical imagery the stockpiles have been formed incrementally from around January 2010 to present day. Various truck loads of fill material appear to have been dumped over this time resulting a stockpile comprised of multiple "mounds". At the time of fieldwork undertaken for the ESA (16 to 18 January 2012) field observations indicated the extent of the stockpile area was approximately 150m long, extending between Cartamessa Avenue (on the other side of Anthony Rolfe Avenue) and Kate Crace Street. The width of the stockpile area was between four and seven metres, with a height of between 0.5m and 2m high.

The stockpiles were surveyed on behalf of the LDA by a registered surveyor from Land Data Surveys (Land Data). The surveyed and computed volume of the combined stockpiles was 910m^3. Based on the footnote below Coffey has assumed a conservative volume of 1000m^3 given potential uncertainly resulting from the irregularity of the stockpiles.

The stockpiles were largely grassed-over, which restricted visual assessment at the time of the ESA. Road base material (gravels) was observed in the eastern and central parts of the stockpile mounds and where the stockpiles were visible in the western portion. Piles of broken concrete and bitumen were present in the eastern portion. Yellow-brown sandy clays were observed in the western edge of the stockpile mounds – although often road base gravels were also observed where there were breaks in the grass cover. Building rubble was present in some of the eastern mounds.

3 OBJECTIVES

The proposed approach is to maximise the volume of soil and gravel materials that could be beneficially reused at a commercial/industrial site. During removal of the stockpiles it is anticipated that the contractor will utilise an excavator bucket and attachment and/or sieving to sift through the stockpile and separate out as far as practicable soil and gravel materials suitable for a commercial/industrial land use, and mixed waste/building or demolition waste/concrete/recyclables for disposal at Mugga Lane Resource Management Facility (Mugga Lane) or alternatively at a recycling facility.

The objectives of the stockpile assessment are to therefore:

- Assess a preliminary indicative estimation of the volume of the stockpiles that may be suitable for beneficial reuse under a commercial/industrial land use; the volume that could be disposed of at a recycling facility; and the volume that may need to be disposed of at Mugga Lane
- Assess the suitability of the stockpiles for beneficial reuse at a commercial/industrial site
- Assess a waste classification for any material not suitable for recycling or beneficial reuse.

4 SCOPE OF WORKS AND FIELD METHODOLOGY

Coffey undertook the following scope of works and field methodology:

- Sixteen (15) test pits were excavated across the stockpile with a tracked seven tonne excavator to the natural ground surface where access or services allowed. The depth of test pits ranged from approximately 0.5m to 2m depending on the thickness of the stockpile
- The test pits were located based on field observations with the objective of characterising the contents of the stockpile to meet the project objectives
- The types of materials in the stockpile was qualitatively assessed in the field based on visual and olfactory indications of contamination (e.g. soils, soils mixed with building and demolition rubble, concrete or other rubbish)
- Nineteen (19) primary soil samples (SS1 to SS19) and two duplicate samples (QC1 and QC2) were collected. Soil samples were collected directly from an intact chunk of soil collected from the centre of the excavator bucket by hand using a new, clean pair of disposable Nitrile gloves. Samples were transferred directly to a laboratory supplied jar and placed in cooled chiller box. Samples were stored, handled and transported in a cooled condition under chain of custody (COC) documentation. Soil sample locations are shown on Figure 2.
- Soil sample descriptions are provided in Attachment A. In general, the soil sample description was generally indicative of the material encountered for the full depth of the test pit as the stockpile material was relatively homogenous with respect to field descriptions of lithology
- All soil samples were field screened for volatile organic compounds with a photoionisation detector (PID). The calibration record for the PID is presented in Attachment B
- All samples (21) were analysed for metals (8), total petroleum hydrocarbons (TPH) (C6-C36), benzene, toluene, ethylbenzene, and xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAHs) (this gives a rate of 1/50m^3 based on a total stockpile volume of 1000m^3)
- Five (5) selected samples and one (1) Quality Assurance/Quality Control (QA/QC) sample was analysed for semi-volatile organic compounds (SVOCs) which includes PAHs, organchlorine pesticides (OCPs), organophosphate pesticides (OPPs), and polychlorinated biphenols (PCBs) (i.e. analysed at rate of 1/200m^3)
- All samples were forwarded to SGS, Alexandria NSW for analyses. SGS is NATA accredited for the analyses performed. The laboratory analytical report, sample receipt notifications and COC documentation are presented in Attachment C
- The stockpile was assessed for potential asbestos containing materials based on the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, Western Australia Department of Health (WA DoH 2009) as follows:
    - A ten litre soil sample was collected at seven locations
    - Four of the locations were areas where building and demolition waste was detected (to assess for potential asbestos containing materials) and three were areas where there was believed to be only natural soils (to support the assessment of the absence of asbestos containing materials)
    - Each sample was spread out for assessment on a contrasting colour fabric and raked over to assess for asbestos containing materials

- Sampling, spreading and raking was undertaken by Julia Jasonsmith who has completed the WorkSafe Asbestos Awareness and Identification training course.

- One field trip blank and one trip spike was analysed
- For BRA, laboratory results were assessed against health based investigation levels for Commercial/Industrial land uses (HIL F) published in the National Environment Protection (Assessment of Site Contamination) Measure 1999, Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater, National Environment Protection Council
- For waste classification, laboratory results were assessed against the procedure and criteria described in ACT Environmental Standards: Assessment and Classification of Liquid and Non Liquid Wastes (June 2001)
- Asbestos results were assessed against WA DoH 2009
- All field work was undertaken in accordance with Coffey Standard Operating Procedures
- The assessment and laboratory analyses were conducted in general accordance with the relevant National Environment Protection (Assessment of Site Contamination) Measures (NEPMs) published by the National Environment Protection Council 1999 (NEPC, 1999).

The scope of works was documented in a sample plan prepared by Coffey dated 30 March 2012, RE: Gungahlin Town Centre East Estate - Stockpile Beneficial Reuse Assessment and/or Waste Classification. The sample plan was reviewed and endorsed by the ACT EPU in an email dated 10 April 2012. The ACT EPU stated:

> *"The Environment Protection Unit has reviewed the document titled "Gungahlin Town Centre East - Stockpile Beneficial Reuse Assessment and/or Waste Classification" dated 2 April 2012 by Coffey Environments Pty Ltd and supports the proposed sampling plan for the material identified."*

5 SITE ASSESSMENT CRITERIA

5.1 Beneficial Reuse Assessment

To assess the suitability of the stockpiled material for beneficial re-use under a commercial/industrial land use, the soil analytical results have been assessed against relevant guidelines from Schedule B(1): Guidelines on Investigation Levels for Soil and Groundwater to the NEPM (NEPC, 1999).

Coffey adopted the land-use scenario and Health Investigation Levels (HILs) from Column F of the above guideline for commercial/Industrial: includes premises such as shops and offices as well as factories and industrial sites. The assessment criteria are presented in Table 5.1.

As NEPC (1999) does not include guidance for TPHs and BTEX, the sensitive land use thresholds for petroleum based organic contaminants published in NSW EPA (1994) were used without multiplication to supplement the published HIL F criteria.

The Western Australia (WA) Department of Health (DOH) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, May 2009 have been adopted by the Act Environment Protection Authority for use in the ACT. As potential asbestos containing

materials were not identified through field screening, laboratory analysis of soils for asbestos or field measurement of potential asbestos containing materials was not undertaken.

Table 5-1: Soil Assessment Criteria adapted from Table 5-A in: NEPC (1999), unless otherwise indicated.

Contaminant	Human Health Investigation Level – F† (mg/kg)
TPH C_6-C_9	65*
TPH C_{10}-C_{36}	1,000*
>C_{16}-C_{35} Aromatics	450
C_{16}-C_{35} Aliphatics	28000
>C_{35} Aliphatics	280000
Benzene	1*
Toluene	130*
Ethylbenzene	50*
Total Xylene	25*
Benzo(a)pyrene	5
PAH	100
Arsenic	500
Cadmium	100
Chromium (III)	60%
Chroumium (VI)	-
Copper	5000
Lead	1500
Mercury	75
Nickel	3000
Zinc	35000
Aldrin + Dieldrin	50
Chlordane	250
DDT + DDD + DDE	1000
Heptachlor	50
PCB (Total)	50
Phenol	42500

†*Criteria sourced from NEPC (1999) guidelines, unless otherwise stated.*
**Criteria sourced from NSW EPA (1994) guidelines.*

5.2 Waste Classification

The waste classification of material from the stockpile was conducted in general accordance with the procedures for classifying waste as detailed in the ACT's Environmental Standards: Assessment & Classification of Liquid & Non-liquid Wastes (June 2000).

6 SITE HISTORY AND SURROUNDING LAND USE

The Site history of the block of land on which the stockpile occurs was undertaken for Coffey (March 2012). This can be summarised as follows:

- The Site has been vacant and not used since the 1960s
- The Site was undeveloped and appeared to have been used for grazing purposes prior to the 1960s
- Gungahlin Town Centre (to the west of the Site) and associated roads and infrastructure (including roads located within the Site) appeared to have been developed from the late 1990s/early 2000s with development continuing today
- The stockpile of illegally dumped waste appeared at the corner of Kate Crace Street and Anthony Rolfe Avenue in a Google Earth image taken in January 2011
- Review of Near Map historical aerial photographs indicate the stockpile has been incrementally developed since late 2009/early 2010 until present day.

Land uses surrounding the Site include:

- To the west of Kate Crace Street is the existing Gungahlin Town Centre developed to date
- To the east of the Site is the existing residential suburb of Franklin
- To the north are residential houses which are part of the Gungahlin Town Centre
- To the south is the Mulanggari Grasslands Nature Reserve.

7 FIELD OBSERVATIONS AND SAMPLING

A visual assessment of the stockpile and soil sampling was conducted on 27 April 2012 by an Environmental Scientist from Coffey. A number of different fill materials occurred within different stockpile areas as shown on Figure 3 and described below:

- Material consisting of natural fill soils (silty and sandy clays with red, yellow, black, white, and clear, subangular to subrounded sands) occurred in the western end of the stockpile. A small amount of gravel material (consistent with road base gravel) was observed scattered across the surface of this material. This portion of the stockpile had an approximate volume of 470m^3 and is shown as Area 10 on Figure 3. This portion of the stockpile area is referred to as Stockpile A, which is also shown on Figure 3.
- Natural fill soil material (silty and sandy clays with red, yellow, black, white, and clear, subangular to subrounded sands **mixed with** building and demolition waste occurred in the centre of the stockpile. This portion of the stockpile had an approximate volume of 235m^3 and is shown as Areas 2 (20m^3), 5 (10m^3), 6 (15m^3), 8 (100m^3), 9 (90m^3) on Figure 3. This portion of the stockpile area is referred to as Stockpile B, which is also shown on Figure 3.
- Material on the eastern end of the stockpile had an approximate volume of 205m^3 and consisted of:
    - Approximately 50m^3 of concrete (shown as Area 4 on Figure 3)
    - Approximately 155m^3 of concrete mixed with bricks (shown as Areas 1, 3 and 7 on Figure 3)
    - Approximately 3m^3 of miscellaneous rubbish including empty metal drums, mattresses, and wooden pallets (located in the eastern portion of the stockpile)
    - Approximately 0.2m^3 of bitumen and sand (located in the eastern portion of the stockpile) (this portion of the stockpile has been assessed as part of Stockpile A).

No staining or odour was detected during field work with the exception of the small mound (<0.2m^3) of bitumen and sand at the eastern end of the stockpile. Sands within this stockpile were stained black.

Potential asbestos containing materials were not observed during Site works or the screening for asbestos as described in Section 4.

Coffey collected a total of 19 primary samples and two quality control duplicate samples from the stockpile. Soil headspace screening was undertaken using a photo-ionisation detector (PID). PID measurements for the 19 soil samples screened were between 0.0 and 0.4ppm indicating that significant ionisable and volatile compounds were not present within the samples collected.

The 21 soil samples collected were forwarded to SGS, a NATA accredited laboratory, for the analyses specified above under chain of custody conditions and analysed for a selection of the contaminants of potential concern as described in Section 4.

8 RESULTS AND DISCUSSION

8.1 Commercial/Industrial Land Use

Laboratory analytical results for the 19 primary and 2 duplicate soil samples analysed are summarised in Table LR1 and were assessed against the Site assessment criteria discussed in Section 5. Laboratory analytical reports are also attached in Attachment C.

Concentrations of arsenic, cadmium, copper, lead, nickel and zinc were above the laboratory limit of reporting (LOR) but below the HIL F assessment criteria. Concentrations of mercury were below the LOR and the adopted assessment criteria.

Total petroleum hydrocarbon concentrations were below the LOR and the HIL F assessment criterion of 1000mg/kg for all samples with the exception Sample SS18 (bitumen and sands) (TPH C_{10} – C_{36} of 657mg/kg above LOR but below HIL F) and Sample SS11 (organic, brown silty clay) (TPH C_{10} – C_{36} of 1880mg/kg above HIL F).

The TPH detected in Sample SS18 is considered likely to be attributed to the bitumen. This material is considered suitable for commercial/industrial land use based on the relatively small volume of the material (less than 0.2m^3) and because the concentration of TPHs was below the HIL F criterion.

No apparent source of TPH was observed in Sample SS11. However, as this sample was collected from material described as organic, brown silty clay, it was considered likely that the TPH was attributable to natural organic materials. Therefore, a silica gel clean up was run on this sample. Concentrations of TPH were not detected in the sample after silica gel-clean up. Therefore, Coffey consider that the TPH detected was attributable to natural organic materials and not impact from petroleum hydrocarbons.

The concentrations of PCBs, OCPs, OPPs, PAHs, were below laboratory LOR and below the adopted soil assessment criteria.

Potential asbestos containing materials were not observed during Site works or the screening for asbestos based on WA DOH (2009) described in Section 4.

8.2 Waste Classification

According to the Waste Classification procedure:

- The material is not a special waste
- The material is not a liquid waste
- The building and demolition waste (including concrete, brick and other building and demolition waste) component of the stockpile material is ‘pre-classified’ as Inert Waste
- The soil and gravel component of the stockpile material is not a ‘pre-classified waste’
- The miscellaneous rubbish component of the stockpile is consistent with household domestic waste and thus is ‘pre-classified’ as Solid Waste
- The material does not possess hazardous characteristics
- Soil analytical results for all soil samples were below the maximum values for leachable concentration and total concentrations when used together were below the criteria for Inert Waste. Therefore, the soil and gravel component of the stockpile classifies as Inert Waste
- The material consisted predominantly of soil, gravel and building and demolition waste and thus is deemed to be non-putrescible.

Additionally, we note that concrete and bricks could be recycled at an appropriate facility.

We note soils mixed with other types of waste (such as building and demolition waste) may require disposal at Mugga Lane as mixed demolition waste (unless the soil and building and demolition waste can be separated) or may be suitable for reuse at a recycling facility.

9 QUALITY ASSURANCE AND QUALITY CONTROL

Relative percent differences (RPDs) between primary soil samples and their duplicate samples are presented in Table LR2. The RPD results were less than 50% for all analytes. This was within the target range.

Trip spike analytical results are presented in Table LR3. The concentrations of BTEX recovered from the trip spike were between 107 and 110%. This is within the target range of recovery for trip spikes.

Field work was conducted in accordance with Coffey SOPs by a Coffey environmental scientist.

Based on the above, the field and laboratory data quality was assessed and is considered acceptable for the purpose of this assessment.

10 CONCLUSIONS

10.1 Stockpile A

Stockpile A consists of 470m^3 of soil material from the stockpile and the 0.2m^3 of bitumen and sand. Based on the above assessment, Coffey considers that Stockpile A is suitable for beneficial reuse within a commercial/industrial land use.

10.2 Stockpile B

Stockpile B consists of 235m3 of mixed soil and building and demolition waste. It is proposed to separate the building rubble from the soils as far as practicable. Based on the above assessment,

Coffey considers that soil component of Stockpile B is suitable for beneficial reuse within a commercial/industrial land use.

10.3 Residual Building Rubble mixed with Soil (from Stockpile B)

We note that it may not be practicable to separate all the building rubble from the soils and it is likely that there some building rubble mixed with soil will remain. This material may be suitable for use at a recycling facility. Alternatively, this material may require disposal at Mugga Lane as mixed demolition waste (Inert Waste).

10.4 Building Rubble, Concrete and Bricks

The 205m^3 of concrete and other recyclables (bricks and metal) and the building rubble proposed to be separated from Stockpile B is 'pre classified' as Inert Waste or could potentially be recycled at an appropriate facility.

10.5 Miscellaneous Rubbish

The miscellaneous rubbish component of the stockpile (approximately 3m^3) is consistent with household domestic waste and thus is 'pre-classified' as Solid Waste.

11 PROPOSED BENEFICIAL REUSE OPTIONS

11.1 Option 1

Coffey understands that LDA propose to potentially beneficially reuse Stockpile A and the soil and gravel component of Stockpile B within a portion of the Gungahlin Town Centre East Estate (Block 1, Section 232 or Block 1, Section 230) subject to resolving various matters associated with changes to ground level and/or ground disturbance.

We understand that an "In Principal" agreement for this potential reuse option would be subject to providing to the ACT EPU final details of the locations where the material would be placed and a letter from the LDA stating that they agree to receive the materials within the nominated locations.

Therefore, LDA seek an "In Principal" beneficial reuse approval for Block 1, Section 232 and Block 1, Section 230.

11.2 Option 2

Alternatively, LDA may have opportunity to beneficially reuse Stockpile A and the soil and gravel component of Stockpile B within a future road construction project in the vicinity of the Site. However, we note that details of the specific site/project are not yet available.

We understand that an "In Principal" agreement for this potential reuse option would be subject to identification of an appropriate site to receive the material and obtaining a letter of consent from the receiving site.

Therefore, LDA seek an "In Principal" beneficial reuse approval for use within a road project consistent with a commercial/industrial land use.

11.3 Option 3

Alternatively, if either Option 1 or Option 2 is not practicable, LDA would seek to beneficially reuse the material within the Borrow Pit of the West Belconnen Resource Management Centre.

Therefore, LDA seek a beneficial reuse approval for Borrow Pit of the West Belconnen Resource Management Centre.

12 WASTE DISPOSAL

As described in Section 10.3 we note that it may not be practicable to separate all the building rubble from the soils and it is likely that there some building rubble mixed with soil will remain from Stockpile B. This material may be suitable for use at a recycling facility. Alternatively, this material may require disposal at Mugga Lane as mixed soil and demolition waste (Inert Waste).

Therefore, LDA seek waste disposal approval for Mugga Lane for up to 235m^3 of mixed soil and demolition waste (Inert Waste).

13 CLOSURE

We note that a respective beneficial reuse approval or waste disposal approval is required from the ACT EPU prior to removal of any material from Site.

The stockpiles should not be used for more sensitive land uses without further assessment of the suitability of the material for that purpose and/or treatment/remediation if necessary.

This report must be read in conjunction with the attached Important Information about Your Coffey Report.

If you have any queries, please do not hesitate to contact Xanthe Holford on 0432 499 929 or 02 8083 1600.

Written/Submitted by:	Reviewed/Approved by:
	
Julia Jasonsmith Environmental Scientist	Xanthe Holford Principal Environmental Consultant

Attachments

Important Information about your Coffey Report

Figure 1 Site Location Plan

Figure 2 Site Layout and Sample Locations

Figure 3 Stockpile Areas and Volumes

Table LR1 Laboratory Analytical Results

Table LR2 Relative Percent Difference Calculations for Duplicate Samples

Table LR3 Trip Blank and Trip Spike Results

Attachment A Soil Sample Descriptions

Attachment B PID Calibration Record

Attachment C Chain of Custody Forms and Laboratory Analytical Reports

Important Information about Your Coffey Environmental Report

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Important information about your **Coffey** Environmental Report

Uncertainties as to what lies below the ground on potentially contaminated sites can lead to remediation costs blow outs, reduction in the value of the land and to delays in the redevelopment of land. These uncertainties are an inherent part of dealing with land contamination. The following notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report has been written for a specific purpose

Your report has been developed on the basis of a specific purpose as understood by Coffey and applies only to the site or area investigated. For example, the purpose of your report may be:

- To assess the environmental effects of an on-going operation.
- To provide due diligence on behalf of a property vendor.
- To provide due diligence on behalf of a property purchaser.
- To provide information related to redevelopment of the site due to a proposed change in use, for example, industrial use to a residential use.
- To assess the existing baseline environmental, and sometimes geological and hydrological conditions or constraints of a site prior to an activity which may alter the sites environmental, geological or hydrological condition.

For each purpose, a specific approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible, quantify risks that both recognised and unrecognised contamination pose to the proposed activity. Such risks may be both financial (for example, clean up costs or limitations to the site use) and physical (for example, potential health risks to users of the site or the general public).

Scope of Investigations

The work was conducted, and the report has been prepared, in response to specific instructions from the client to whom this report is addressed, within practical time and budgetary constraints, and in reliance on certain data and information made available to Coffey. The analyses, evaluations, opinions and conclusions presented in this report are based on those instructions, requirements, data or information, and they could change if such instructions etc. are in fact inaccurate or incomplete.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man and may change with time. For example, groundwater levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of the subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project and/or on the property.

Interpretation of factual data

Environmental site assessments identify actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from indirect field measurements and sometimes other reports on the site are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of Coffey through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other problems encountered on site.

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Important information about your **Coffey** Environmental Report

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered with redevelopment or on-going use of the site. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. In particular, a due diligence report for a property vendor may not be suitable for satisfying the needs of a purchaser. Your report should not be applied for any purpose other than that originally specified at the time the report was issued.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other professionals who are affected by the report. Have Coffey explain the report implications to professionals affected by them and then review plans and specifications produced to see how they have incorporated the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel), field testing and laboratory evaluation of field samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Contact Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to land development and land use. It is common that not all approaches will be necessarily dealt with in your environmental site assessment report due to concepts proposed at that time. As a project progresses through planning and design toward construction and/or maintenance, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

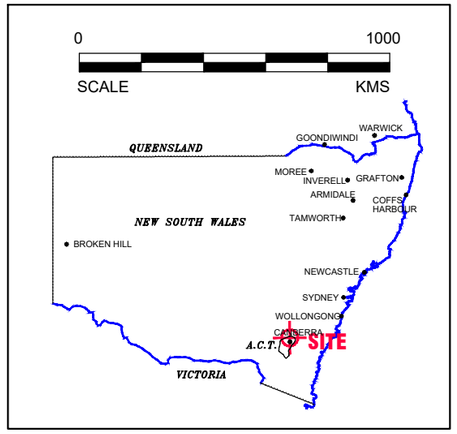
Responsibility

Environmental reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

72510 / 07-06

Figures

Gungahlin Town Centre East Estate - Stockpile Beneficial Reuse Assessment and Waste Classification



GENERAL AREA MAP

Aerial image source: Google Earth Pro 2011
Aerial image ©: GeoEye 2011

revision	description	drawn	approved	date

0 250 500 750 1,000 1,250
SCALE 1:25000 (A3) METRES

drawn	CGT
approved	
date	15.05.2012
scale	AS SHOWN
original size	

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client: LAND DEVELOPMENT AGENCY

project: GUNGAHLIN TOWN CENTRE EAST ESTATE - STOCKPILE WASTE CLASSIFICATION

title: SITE LOCATION PLAN

job no: ENAUBRAD01182AA-D02

figure no: FIGURE 1

PLOT DATE: 22/05/2012 DWG FILE: F:\ENV\GEELONG JOB FILES\ENV\XXXX-GEOTXXXX ELECTRONIC JOB FILES\WIP\ENAUBRAD01182AA - STOCKPILE GUNGAHLIN\ENAUBRAD01182AA-D02.DWG

Aerial image source: Nearmap.com, Hypertiles, 29/12/2011

N

LEGEND

STOCKPILE LOCATION

SS# × SAMPLE LOCATION

revision	description	drawn	approved	date

0 10 20 30 40 50
SCALE 1:1000 (A3) METRES

drawn	CGT
approved	
date	15.05.2012
scale	AS SHOWN
original size	

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client: LAND DEVELOPMENT AGENCY

project: GUNGAHLIN TOWN CENTRE EAST ESTATE - STOCKPILE WASTE CLASSIFICATION

title: SITE LAYOUT AND SAMPLE LOCATIONS

job no: ENAUBRAD01182AA-D02

figure no: FIGURE 2

PLOT DATE: 22/05/2012 DWG FILE: F:\ENV\VGEELONG JOB FILES\ENV\XXXX-GEOTXXXX ELECTRONIC JOB FILES\WIP\ENAUBRAD01182AA - STOCKPILE GUNGAHLIN\ENAUBRAD01182AA - D02.DWG

Aerial image source: Nearmap.com, Hypertiles, 29/12/2011

N

LEGEND

STOCKPILE LOCATION

APPROXIMATE STOCKPILE VOLUMES:

1. 40m³
2. 20m³ (PART OF STOCKPILE B)
3. 85m³
4. 50m³
5. 10m³ (PART OF STOCKPILE B)
6. 15m³ (PART OF STOCKPILE B)
7. 30m³
8. 100m³ (PART OF STOCKPILE B)
9. 90m³ (PART OF STOCKPILE B)
10. 470m³ (STOCKPILE A)

revision	description	drawn	approved	date

0 10 20 30 40 50
SCALE 1:1000 (A3) METRES

drawn	CGT
approved	
date	15.05.2012
scale	AS SHOWN
original size	

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client: LAND DEVELOPMENT AGENCY

project: GUNGAHLIN TOWN CENTRE EAST ESTATE - STOCKPILE WASTE CLASSIFICATION

title: STOCKPILE AREAS AND VOLUMES

job no: ENAUBRAD01182AA-D02

figure no: FIGURE 3

PLOT DATE: 22/05/2012 DWG FILE: F:\ENV\GEELONG JOB FILES\ENVXXXXX-GEOTXXXX ELECTRONIC JOB FILES\WIP\ENAUBRAD01182AA - STOCKPILE GUNGAHLIN\ENAUBRAD01182AA-D02.DWG

Tables

Gungahlin Town Centre East Estate - Stockpile Beneficial Reuse Assessment and Waste Classification

Field_ID	SS1	SS2	SS3	SS3	SS4	SS5	SS6	QC1	QC1	SS7	SS8	SS8	SS9	SS10
Sampled_Date-Time	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012
Lab_Report_Number	SE107753-1	SE107753-1	SE107753-1	SE107753B-1	SE107753-1	SE107753-1	SE107753-1	SE107753-1	SE107753B-1	SE107753-1	SE107753-1	SE107753B-1	SE107753-1	SE107753-1
Analyses				TCLP - mg/L					TCLP - mg/L			TCLP - mg/L		

Chem_Group	ChemName	Units	EQL	ACT EPA (2000) CT1	ACT EPA (2000) SCC1	ACT EPA (2000) TCLP1	NEPM 1999 EIL	NEPM 1999 HIL F													
				mg/kg	mg/kg	mg/L	mg/kg	mg/kg													
Asbestos	Asbestos	No detect	0.01						-	-	-	-	-	-	-	-	-	-	-	-	-
	Total BTEX	mg/kg	0						0	0	0	-	0	0	0	0	-	0	0	-	0	0
BTEX	Benzene	mg/kg	0.1		18	0.05			<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1		1080	3			<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Toluene	mg/kg	0.1		518	1.44			<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2						<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2
	Xylene (o)	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Xylene Total	mg/kg	0.3		1800	5			<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	<0.3	-	<0.3	<0.3	-	<0.3	<0.3
Inorganics	pH (Lab)	pH_Units	0						-	-	4.7	-	-	-	-	-	8.6	-	-	6.6	-	-
	pH (after HCL)	pH_Units	0						-	-	1.7	-	-	-	-	-	1.7	-	-	1.7	-	-
Metals	Arsenic	mg/kg	3	10	500	0.5	20	500	5	5	5	-	3	5	4	6	-	5	3	-	3	6
	Cadmium	mg/kg	0.3	2	100	0.1	3	100	0.3	0.3	0.3	-	<0.3	0.3	<0.3	0.4	-	0.3	<0.3	-	<0.3	0.3
	Chromium	mg/kg	0.3	10					46	47	50	<0.005	16	22	43	68	<5	54	18	<5	20	51
	Copper	mg/kg	0.5				100	5000	16	14	4.3	-	11	12	6.7	11	-	11	9	-	8.9	6.8
	Lead	mg/kg	1	10	1500	1	600	1500	17	17	24	<0.02	17	15	23	23	<20	17	11	<20	18	27
	Mercury	mg/kg	0.05	0.4	50	0.02	1	75	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05
	Nickel	mg/kg	0.5	4	1050	0.2	60	3000	7.4	7.6	4.8	<0.01	7.9	21	6.5	7.3	<10	7.9	8	<10	5.1	4.9
	Zinc	mg/kg	0.5				200	35000	21	16	9.7	-	35	46	12	12	-	13	47	-	28	8.7
OCP	2,4-DDT	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	4,4-DDE	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	a-BHC	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	Aldrin	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	Aldrin + Dieldrin	mg/kg						50	-	-	-	-	<0.3	-	-	-	-	-	-	-	-	-
	b-BHC	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	gamma-Chlordane	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	cis-Chlordane	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	d-BHC	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	DDD	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	DDT	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	DDT+DDE+DDD	mg/kg						1000	-	-	-	-	<0.3[#1]	-	-	-	-	-	-	-	-	-
	Dieldrin	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Endosulfan I	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Endosulfan II	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Endosulfan sulphate	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	Endrin	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Endrin aldehyde	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	Endrin ketone	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	g-BHC (Lindane)	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	Heptachlor	mg/kg	0.1					50	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	Heptachlor epoxide	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	Hexachlorobenzene	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	Methoxychlor	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	o,p-DDD	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	o,p'-DDE	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
	trans-Nonachlor	mg/kg	0.1						-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-
OPP	Azinophos methyl	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Bromophos-ethyl	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Chlorpyrifos	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Diazinon	mg/kg	0.5						-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-
	Dichlorvos	mg/kg	0.5						-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-
	Dimethoate	mg/kg	0.5						-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-
	Ethion	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Fenitrothion	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Malathion	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Methidathion	mg/kg	0.5						-	-	-	-	<0.5	-	-	-	-	-	-	-	-	-
	Parathion	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Acenaphthylene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Anthracene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Benzo(a)anthracene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Benzo(a)pyrene	mg/kg	0.1	0.08	1	0.004		5	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Benzo(b)fluoranthene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Benzo(g,h,i)perylene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Benzo(k)fluoranthene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Chrysene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Dibenz(a,h)anthracene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Fluoranthene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Fluorene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Naphthalene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Phenanthrene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Pyrene	mg/kg	0.1						<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1
	Total PAHs	mg/kg	0.8	200	200			100	<0.8	<0.8	<0.8	-	<0.8	<0.8	<0.8	<0.8	-	<0.8	<0.8	-	<0.8	<0.8
Polychlorinated Biphenyls	Arochlor 1221	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Aroclor 1016	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Aroclor 1232	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Aroclor 1242	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-

Field_ID	SS1	SS2	SS3	SS3	SS4	SS5	SS6	QC1	QC1	SS7	SS8	SS8	SS9	SS10
Sampled_Date-Time	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012
Lab_Report_Number	SE107753-1	SE107753-1	SE107753-1	SE107753B-1	SE107753-1	SE107753-1	SE107753-1	SE107753-1	SE107753B-1	SE107753-1	SE107753-1	SE107753B-1	SE107753-1	SE107753-1
Analyses				TCLP - mg/L					TCLP - mg/L			TCLP - mg/L		

Chem_Group	ChemName	Units	EQL	ACT EPA (2000) CT1	ACT EPA (2000) SCC1	ACT EPA (2000) TCLP1	NEPM 1999 EIL	NEPM 1999 HIL F														
	Aroclor 1248	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Aroclor 1254	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Aroclor 1260	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Aroclor 1262	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	Aroclor 1268	mg/kg	0.2						-	-	-	-	<0.2	-	-	-	-	-	-	-	-	-
	PCBs (Sum of total)	mg/kg	1	2	2			50	-	-	-	-	<1	-	-	-	-	-	-	-	-	-
TPH	TPH C6 - C9	mg/kg	20	650	650				<20	<20	<20	-	<20	<20	<20	<20	-	<20	<20	-	<20	<20
	TPH C10 - C14	mg/kg	20						<20	<20	<20	-	<20	<20	<20	<20	-	<20	<20	-	<20	<20
	TPH C15 - C28	mg/kg	50						<50	<50	<50	-	<50	<50	<50	<50	-	<50	<50	-	<50	<50
	TPH C29 - C36	mg/kg	50						<50	<50	<50	-	<50	<50	<50	<50	-	<50	<50	-	<50	<50
	TPH C10 - C36 (Sum of total)	mg/kg		5000	5000				<120	<120	<120	-	<120	<120	<120	<120	-	<120	<120	-	<120	<120

Field_ID	SS11	SS11	SS12	SS12	SS13	SS14	SS15	SS16	QC2	QC2	SS17	SS17	SS18
Sampled_Date-Time	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012
Lab_Report_Number	SE107753-1	SE107753A	SE107753-1	SE107753B-1	SE107753-1	SE107753-1	SE107753-1	SE107753-1	SE107753-1	SE107753B-1	SE107753-1	SE107753B-1	SE107753-1
Analyses		Silica Gel Cleanup		TCLP - mg/L						TCLP (µg/L)		TCLP - mg/L	

Chem_Group	ChemName	Units	EQL	ACT EPA (2000) CT1	ACT EPA (2000) SCC1	ACT EPA (2000) TCLP1	NEPM 1999 EIL	NEPM 1999 HIL F												
				mg/kg	mg/kg	mg/L	mg/kg	mg/kg												
Asbestos	Asbestos	No detect	0.01						-	-	-	-	-	-	-	-	-	-	-	-
	Total BTEX	mg/kg	0						0	-	0	-	0	0	0	0	0	-	0	-
BTEX	Benzene	mg/kg	0.1		18	0.05			<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Ethylbenzene	mg/kg	0.1		1080	3			<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Toluene	mg/kg	0.1		518	1.44			<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Xylene (m & p)	mg/kg	0.2						<0.2	-	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	-
	Xylene (o)	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Xylene Total	mg/kg	0.3		1800	5			<0.3	-	<0.3	-	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	-
Inorganics	pH (Lab)	pH_Units	0						-	-	-	7	-	-	-	-	-	8.9	-	7
	pH (after HCL)	pH_Units	0						-	-	-	1.7	-	-	-	-	-	1.7	-	1.7
Metals	Arsenic	mg/kg	3	10	500	0.5	20	500	5	-	6	-	5	<3	5	<3	<3	-	6	-
	Cadmium	mg/kg	0.3	2	100	0.1	3	100	0.4	-	0.3	-	0.3	<0.3	<0.3	0.9	0.7	-	0.4	-
	Chromium	mg/kg	0.3	10					20	-	21	<0.005	55	16	44	12	17	<0.005	74	<0.005
	Copper	mg/kg	0.5				100	5000	16	-	15	-	7.5	7.2	12	7.4	8.5	-	9.5	-
	Lead	mg/kg	1	10	1500	1	600	1500	16	-	22	<0.02	24	14	16	46	51	0.13	27	<0.02
	Mercury	mg/kg	0.05	0.4	50	0.02	1	75	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	-
	Nickel	mg/kg	0.5	4	1050	0.2	60	3000	13	-	14	<0.01	4.7	5.7	8.9	5.7	6.3	<0.01	4.8	<0.01
	Zinc	mg/kg	0.5				200	35000	76	-	46	-	7.3	28	14	130	110	-	12	-
OCP	2,4-DDT	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	4,4-DDE	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	a-BHC	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	Aldrin	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	Aldrin + Dieldrin	mg/kg						50	<0.3	-	-	-	-	-	-	<0.3	<0.3	-	-	-
	b-BHC	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	gamma-Chlordane	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	cis-Chlordane	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	d-BHC	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	DDD	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	DDT	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	DDT+DDE+DDD	mg/kg						1000	<0.3[#1]	-	-	-	-	-	-	<0.3[#1]	<0.3[#1]	-	-	-
	Dieldrin	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Endosulfan I	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Endosulfan II	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Endosulfan sulphate	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	Endrin	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Endrin aldehyde	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	Endrin ketone	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	g-BHC (Lindane)	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	Heptachlor	mg/kg	0.1					50	<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	Heptachlor epoxide	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	Hexachlorobenzene	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	Methoxychlor	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	o,p-DDD	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	o,p'-DDE	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
	trans-Nonachlor	mg/kg	0.1						<0.1	-	-	-	-	-	-	<0.1	<0.1	-	-	-
OPP	Azinophos methyl	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Bromophos-ethyl	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Chlorpyrifos	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Diazinon	mg/kg	0.5						<0.5	-	-	-	-	-	-	<0.5	<0.5	-	-	-
	Dichlorvos	mg/kg	0.5						<0.5	-	-	-	-	-	-	<0.5	<0.5	-	-	-
	Dimethoate	mg/kg	0.5						<0.5	-	-	-	-	-	-	<0.5	<0.5	-	-	-
	Ethion	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Fenitrothion	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Malathion	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Methidathion	mg/kg	0.5						<0.5	-	-	-	-	-	-	<0.5	<0.5	-	-	-
	Parathion	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
PAH	Acenaphthene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Acenaphthylene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Anthracene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Benzo(a)anthracene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Benzo(a)pyrene	mg/kg	0.1	0.08	1	0.004		5	<0.1	-	<0.1	-	<0.1	0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Benzo(b)fluoranthene	mg/kg	0.1						0.4	-	<0.1	-	<0.1	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	<0.1	<0.1	<0.1	-	<0.1	-
	Benzo(k)fluoranthene	mg/kg	0.1						0.2	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Chrysene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Dibenz(a,h)anthracene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Fluoranthene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Fluorene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Naphthalene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Phenanthrene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.1	-
	Pyrene	mg/kg	0.1						<0.1	-	<0.1	-	<0.1	0.2	<0.1	<0.1	<0.1	-	<0.1	-
	Total PAHs	mg/kg	0.8	200	200			100	<0.8	-	<0.8	-	<0.8	<0.8	<0.8	<0.8	<0.8	-	<0.8	-
Polychlorinated Biphenyls	Arochlor 1221	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Aroclor 1016	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Aroclor 1232	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-
	Aroclor 1242	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-

Field_ID	SS11	SS11	SS12	SS12	SS13	SS14	SS15	SS16	QC2	QC2	SS17	SS17	SS18
Sampled_Date-Time	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012	27/04/2012
Lab_Report_Number	SE107753-1	SE107753A	SE107753-1	SE107753B-1	SE107753-1	SE107753-1	SE107753-1	SE107753-1	SE107753-1	SE107753B-1	SE107753-1	SE107753B-1	SE107753-1
Analyses		Silica Gel Cleanup		TCLP - mg/L						TCLP (µg/L)		TCLP - mg/L	

Chem_Group	ChemName	Units	EQL	ACT EPA (2000) CT1	ACT EPA (2000) SCC1	ACT EPA (2000) TCLP1	NEPM 1999 EIL	NEPM 1999 HIL F											
	Aroclor 1248	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-	<0.2
	Aroclor 1254	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-	<0.2
	Aroclor 1260	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-	<0.2
	Aroclor 1262	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-	<0.2
	Aroclor 1268	mg/kg	0.2						<0.2	-	-	-	-	-	-	<0.2	<0.2	-	-	-	<0.2
	PCBs (Sum of total)	mg/kg	1	2	2			50	<1	-	-	-	-	-	-	<1	<1	-	-	-	<1
TPH	TPH C6 - C9	mg/kg	20	650	650				<200	-	<20	-	<20	<20	<20	<20	<20	-	<20	-	<20
	TPH C10 - C14	mg/kg	20						280	<20	<20	-	<20	<20	<20	<20	<20	-	<20	-	34
	TPH C15 - C28	mg/kg	50						690	<50	<50	-	<50	<50	<50	<50	<50	-	<50	-	560
	TPH C29 - C36	mg/kg	50						910	<50	<50	-	<50	<50	<50	<50	<50	-	<50	-	63
	TPH C10 - C36 (Sum of total)	mg/kg		5000	5000				1880[#2]	-	<120	-	<120	<120	<120	<120	<120	-	<120	-	657[#2]

Field_ID	SS18	SS19
Sampled_Date-Time	27/04/2012	27/04/2012
Lab_Report_Number	SE107753B-1	SE107753-1
Analyses	TCLP - mg/L	

Chem_Group	ChemName	Units	EQL	ACT EPA (2000) CT1	ACT EPA (2000) SCC1	ACT EPA (2000) TCLP1	NEPM 1999 EIL	NEPM 1999 HIL F		
				mg/kg	mg/kg	mg/L	mg/kg	mg/kg		
Asbestos	Asbestos	No detect	0.01						-	-
	Total BTEX	mg/kg	0						-	0
BTEX	Benzene	mg/kg	0.1		18	0.05			-	<0.1
	Ethylbenzene	mg/kg	0.1		1080	3			-	<0.1
	Toluene	mg/kg	0.1		518	1.44			-	<0.1
	Xylene (m & p)	mg/kg	0.2						-	<0.2
	Xylene (o)	mg/kg	0.1						-	<0.1
	Xylene Total	mg/kg	0.3		1800	5			-	<0.3
Inorganics	pH (Lab)	pH_Units	0						9	-
	pH (after HCL)	pH_Units	0						1.7	-
Metals	Arsenic	mg/kg	3	10	500	0.5	20	500	-	<3
	Cadmium	mg/kg	0.3	2	100	0.1	3	100	-	<0.3
	Chromium	mg/kg	0.3	10					<0.005	11
	Copper	mg/kg	0.5				100	5000	-	6
	Lead	mg/kg	1	10	1500	1	600	1500	<0.02	9
	Mercury	mg/kg	0.05	0.4	50	0.02	1	75	-	<0.05
	Nickel	mg/kg	0.5	4	1050	0.2	60	3000	<0.01	4.1
	Zinc	mg/kg	0.5				200	35000	-	20
OCP	2,4-DDT	mg/kg	0.1						-	<0.1
	4,4-DDE	mg/kg	0.1						-	<0.1
	a-BHC	mg/kg	0.1						-	<0.1
	Aldrin	mg/kg	0.1						-	<0.1
	Aldrin + Dieldrin	mg/kg						50	-	<0.3
	b-BHC	mg/kg	0.1						-	<0.1
	gamma-Chlordane	mg/kg	0.1						-	<0.1
	cis-Chlordane	mg/kg	0.1						-	<0.1
	d-BHC	mg/kg	0.1						-	<0.1
	DDD	mg/kg	0.1						-	<0.1
	DDT	mg/kg	0.1						-	<0.1
	DDT+DDE+DDD	mg/kg						1000	-	<0.3[#1]
	Dieldrin	mg/kg	0.2						-	<0.2
	Endosulfan I	mg/kg	0.2						-	<0.2
	Endosulfan II	mg/kg	0.2						-	<0.2
	Endosulfan sulphate	mg/kg	0.1						-	<0.1
	Endrin	mg/kg	0.2						-	<0.2
	Endrin aldehyde	mg/kg	0.1						-	<0.1
	Endrin ketone	mg/kg	0.1						-	<0.1
	g-BHC (Lindane)	mg/kg	0.1						-	<0.1
	Heptachlor	mg/kg	0.1					50	-	<0.1
	Heptachlor epoxide	mg/kg	0.1						-	<0.1
	Hexachlorobenzene	mg/kg	0.1						-	<0.1
	Methoxychlor	mg/kg	0.1						-	<0.1
	o,p-DDD	mg/kg	0.1						-	<0.1
	o,p'-DDE	mg/kg	0.1						-	<0.1
	trans-Nonachlor	mg/kg	0.1						-	<0.1
OPP	Azinophos methyl	mg/kg	0.2						-	<0.2
	Bromophos-ethyl	mg/kg	0.2						-	<0.2
	Chlorpyrifos	mg/kg	0.2						-	<0.2
	Diazinon	mg/kg	0.5						-	<0.5
	Dichlorvos	mg/kg	0.5						-	<0.5
	Dimethoate	mg/kg	0.5						-	<0.5
	Ethion	mg/kg	0.2						-	<0.2
	Fenitrothion	mg/kg	0.2						-	<0.2
	Malathion	mg/kg	0.2						-	<0.2
	Methidathion	mg/kg	0.5						-	<0.5
	Parathion	mg/kg	0.2						-	<0.2
PAH	Acenaphthene	mg/kg	0.1						-	<0.1
	Acenaphthylene	mg/kg	0.1						-	<0.1
	Anthracene	mg/kg	0.1						-	<0.1
	Benzo(a)anthracene	mg/kg	0.1						-	<0.1
	Benzo(a)pyrene	mg/kg	0.1	0.08	1	0.004		5	-	<0.1
	Benzo(b)fluoranthene	mg/kg	0.1						-	<0.1
	Benzo(g,h,i)perylene	mg/kg	0.1						-	<0.1
	Benzo(k)fluoranthene	mg/kg	0.1						-	<0.1
	Chrysene	mg/kg	0.1						-	<0.1
	Dibenz(a,h)anthracene	mg/kg	0.1						-	<0.1
	Fluoranthene	mg/kg	0.1						-	<0.1
	Fluorene	mg/kg	0.1						-	<0.1
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1						-	<0.1
	Naphthalene	mg/kg	0.1						-	<0.1
	Phenanthrene	mg/kg	0.1						-	<0.1
	Pyrene	mg/kg	0.1						-	<0.1
	Total PAHs	mg/kg	0.8	200	200			100	-	<0.8
Polychlorinated Biphenyls	Arochlor 1221	mg/kg	0.2						-	<0.2
	Aroclor 1016	mg/kg	0.2						-	<0.2
	Aroclor 1232	mg/kg	0.2						-	<0.2
	Aroclor 1242	mg/kg	0.2						-	<0.2

Field_ID	SS18	SS19
Sampled_Date-Time	27/04/2012	27/04/2012
Lab_Report_Number	SE107753B-1	SE107753-1
Analyses	TCLP - mg/L	

Chem_Group	ChemName	Units	EQL	ACT EPA (2000) CT1	ACT EPA (2000) SCC1	ACT EPA (2000) TCLP1	NEPM 1999 EIL	NEPM 1999 HIL F		
	Aroclor 1248	mg/kg	0.2						-	<0.2
	Aroclor 1254	mg/kg	0.2						-	<0.2
	Aroclor 1260	mg/kg	0.2						-	<0.2
	Aroclor 1262	mg/kg	0.2						-	<0.2
	Aroclor 1268	mg/kg	0.2						-	<0.2
	PCBs (Sum of total)	mg/kg	1	2	2			50	-	<1
TPH	TPH C6 - C9	mg/kg	20	650	650				-	<20
	TPH C10 - C14	mg/kg	20						-	<20
	TPH C15 - C28	mg/kg	50						-	<50
	TPH C29 - C36	mg/kg	50						-	<50
	TPH C10 - C36 (Sum of total)	mg/kg		5000	5000				-	<120

Field Duplicates (SOIL)
Filter: SDG in('SE107753-1')

SDG				SE107753-1	SE107753-1		SE107753-1	SE107753-1	
Field_ID				SS7	QC1	**RPD**	SS16	QC2	**RPD**
Sampled_Date-Time				27/04/2012	27/04/2012		27/04/2012	27/04/2012	
Chem_Group	**ChemName**	**Units**	**EQL**						
Metals	Arsenic	mg/kg	3	5.0	6.0	18	<3.0	<3.0	0
	Cadmium	mg/kg	0.3	0.3	0.4	29	0.9	0.7	25
	Chromium	mg/kg	0.3	54.0	68.0	23	12.0	17.0	34
	Copper	mg/kg	0.5	11.0	11.0	0	7.4	8.5	14
	Lead	mg/kg	1	17.0	23.0	30	46.0	51.0	10
	Mercury	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Nickel	mg/kg	0.5	7.9	7.3	8	5.7	6.3	10
	Zinc	mg/kg	0.5	13.0	12.0	8	130.0	110.0	17
OCP	2,4-DDT	mg/kg	0.1				<0.1	<0.1	0
	4,4-DDE	mg/kg	0.1				<0.1	<0.1	0
	a-BHC	mg/kg	0.1				<0.1	<0.1	0
	Aldrin	mg/kg	0.1				<0.1	<0.1	0
	b-BHC	mg/kg	0.1				<0.1	<0.1	0
	gamma-Chlordane	mg/kg	0.1				<0.1	<0.1	0
	cis-Chlordane	mg/kg	0.1				<0.1	<0.1	0
	d-BHC	mg/kg	0.1				<0.1	<0.1	0
	DDD	mg/kg	0.1				<0.1	<0.1	0
	DDT	mg/kg	0.1				<0.1	<0.1	0
	Dieldrin	mg/kg	0.2				<0.2	<0.2	0
	Endosulfan I	mg/kg	0.2				<0.2	<0.2	0
	Endosulfan II	mg/kg	0.2				<0.2	<0.2	0
	Endosulfan sulphate	mg/kg	0.1				<0.1	<0.1	0
	Endrin	mg/kg	0.2				<0.2	<0.2	0
	Endrin aldehyde	mg/kg	0.1				<0.1	<0.1	0
	Endrin ketone	mg/kg	0.1				<0.1	<0.1	0
	g-BHC (Lindane)	mg/kg	0.1				<0.1	<0.1	0
	Heptachlor	mg/kg	0.1				<0.1	<0.1	0
	Heptachlor epoxide	mg/kg	0.1				<0.1	<0.1	0
	Hexachlorobenzene	mg/kg	0.1				<0.1	<0.1	0
	Methoxychlor	mg/kg	0.1				<0.1	<0.1	0
	o,p-DDD	mg/kg	0.1				<0.1	<0.1	0
	o,p'-DDE	mg/kg	0.1				<0.1	<0.1	0
	trans-Nonachlor	mg/kg	0.1				<0.1	<0.1	0
OPP	Azinophos methyl	mg/kg	0.2				<0.2	<0.2	0
	Bromophos-ethyl	mg/kg	0.2				<0.2	<0.2	0
	Chlorpyrifos	mg/kg	0.2				<0.2	<0.2	0
	Diazinon	mg/kg	0.5				<0.5	<0.5	0
	Dichlorvos	mg/kg	0.5				<0.5	<0.5	0
	Dimethoate	mg/kg	0.5				<0.5	<0.5	0
	Ethion	mg/kg	0.2				<0.2	<0.2	0
	Fenitrothion	mg/kg	0.2				<0.2	<0.2	0
	Malathion	mg/kg	0.2				<0.2	<0.2	0
	Methidathion	mg/kg	0.5				<0.5	<0.5	0
	Parathion	mg/kg	0.2				<0.2	<0.2	0
PAH	Acenaphthene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Acenaphthylene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Benzo(b)fluoranthene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Chrysene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Dibenz(a,h)anthracene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Fluoranthene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Fluorene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Naphthalene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Phenanthrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Pyrene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Total PAHs	mg/kg	0.8	<0.8	<0.8	0	<0.8	<0.8	0
Polychlorinated Biphenyls	Arochlor 1221	mg/kg	0.2				<0.2	<0.2	0
	Aroclor 1016	mg/kg	0.2				<0.2	<0.2	0
	Aroclor 1232	mg/kg	0.2				<0.2	<0.2	0
	Aroclor 1242	mg/kg	0.2				<0.2	<0.2	0
	Aroclor 1248	mg/kg	0.2				<0.2	<0.2	0
	Aroclor 1254	mg/kg	0.2				<0.2	<0.2	0
	Aroclor 1260	mg/kg	0.2				<0.2	<0.2	0
	Aroclor 1262	mg/kg	0.2				<0.2	<0.2	0
	Aroclor 1268	mg/kg	0.2				<0.2	<0.2	0
	PCBs (Sum of total)	mg/kg	1				<1.0	<1.0	0
TPH	TPH C6 - C9	mg/kg	20	<20.0	<20.0	0	<20.0	<20.0	0
	TPH C10 - C14	mg/kg	20	<20.0	<20.0	0	<20.0	<20.0	0
	TPH C15 - C28	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0
	TPH C29 - C36	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0

*RPDs have only been considered where a concentration is greater than 5 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (5-10 x EQL); 50 (10-30 x EQL); 50 (> 30 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary la

Field Blanks (SOIL)
Filter: SDG in('SE107753-1')

			SDG	SE107753-1	SE107753-1
			Field_ID	Trip Blank	Trip Spike
			Sampled_Date-Time	24/04/2012	24/04/2012
			Sample_Type	Trip_B	Trip_S
Chem_Group	**ChemName**	**Units**	**EQL**		
	Total BTEX	mg/kg	0	-	-
BTEX	Benzene	mg/kg	0.1	-	108%
	Ethylbenzene	mg/kg	0.1	-	109%
	Toluene	mg/kg	0.1	-	108%
	Xylene (m & p)	mg/kg	0.2	-	110%
	Xylene (o)	mg/kg	0.1	-	107%
	Xylene Total	mg/kg	0.3	-	
Metals	Arsenic	mg/kg	3	-	-
	Cadmium	mg/kg	0.3	-	-
	Chromium	mg/kg	0.3	-	-
	Copper	mg/kg	0.5	-	-
	Lead	mg/kg	1	-	-
	Mercury	mg/kg	0.05	-	-
	Nickel	mg/kg	0.5	-	-
	Zinc	mg/kg	0.5	-	-
OCP	2,4-DDT	mg/kg	0.1	-	-
	4,4-DDE	mg/kg	0.1	-	-
	a-BHC	mg/kg	0.1	-	-
	Aldrin	mg/kg	0.1	-	-
	b-BHC	mg/kg	0.1	-	-
	gamma-Chlordane	mg/kg	0.1	-	-
	cis-Chlordane	mg/kg	0.1	-	-
	d-BHC	mg/kg	0.1	-	-
	DDD	mg/kg	0.1	-	-
	DDT	mg/kg	0.1	-	-
	Dieldrin	mg/kg	0.2	-	-
	Endosulfan I	mg/kg	0.2	-	-
	Endosulfan II	mg/kg	0.2	-	-
	Endosulfan sulphate	mg/kg	0.1	-	-
	Endrin	mg/kg	0.2	-	-
	Endrin aldehyde	mg/kg	0.1	-	-
	Endrin ketone	mg/kg	0.1	-	-
	g-BHC (Lindane)	mg/kg	0.1	-	-
	Heptachlor	mg/kg	0.1	-	-
	Heptachlor epoxide	mg/kg	0.1	-	-
	Hexachlorobenzene	mg/kg	0.1	-	-
	Methoxychlor	mg/kg	0.1	-	-
	o,p-DDD	mg/kg	0.1	-	-
	o,p'-DDE	mg/kg	0.1	-	-
	trans-Nonachlor	mg/kg	0.1	-	-
OPP	Azinophos methyl	mg/kg	0.2	-	-
	Bromophos-ethyl	mg/kg	0.2	-	-
	Chlorpyrifos	mg/kg	0.2	-	-
	Diazinon	mg/kg	0.5	-	-
	Dichlorvos	mg/kg	0.5	-	-
	Dimethoate	mg/kg	0.5	-	-
	Ethion	mg/kg	0.2	-	-
	Fenitrothion	mg/kg	0.2	-	-
	Malathion	mg/kg	0.2	-	-
	Methidathion	mg/kg	0.5	-	-
	Parathion	mg/kg	0.2	-	-
PAH	1-Methylnaphthalene	mg/kg	0.1	-	-
	2-methylnaphthalene	mg/kg	0.1	-	-
	Acenaphthene	mg/kg	0.1	-	-
	Acenaphthylene	mg/kg	0.1	-	-
	Anthracene	mg/kg	0.1	-	-
	Benzo(a)anthracene	mg/kg	0.1	-	-
	Benzo(a)pyrene	mg/kg	0.1	-	-
	Benzo(b)&(k)fluoranthene	mg/kg	0.2	-	-
	Benzo(b)fluoranthene	mg/kg	0.1	-	-
	Benzo(g,h,i)perylene	mg/kg	0.1	-	-
	Benzo(k)fluoranthene	mg/kg	0.1	-	-
	Chrysene	mg/kg	0.1	-	-
	Dibenz(a,h)anthracene	mg/kg	0.1	-	-
	Fluoranthene	mg/kg	0.1	-	-
	Fluorene	mg/kg	0.1	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	-	-
	Naphthalene	mg/kg	0.1	-	-
	Phenanthrene	mg/kg	0.1	-	-
	Pyrene	mg/kg	0.1	-	-
	Total PAHs	mg/kg	0.8	-	-
Polychlorinated Biphenyls	Arochlor 1221	mg/kg	0.2	-	-
	Aroclor 1016	mg/kg	0.2	-	-
	Aroclor 1232	mg/kg	0.2	-	-
	Aroclor 1242	mg/kg	0.2	-	-
	Aroclor 1248	mg/kg	0.2	-	-
	Aroclor 1254	mg/kg	0.2	-	-
	Aroclor 1260	mg/kg	0.2	-	-
	Aroclor 1262	mg/kg	0.2	-	-
	Aroclor 1268	mg/kg	0.2	-	-
	PCBs (Sum of total)	mg/kg	1	-	-
TPH	TPH C6 - C9	mg/kg	20	<20	-
	TPH C10 - C14	mg/kg	20	<20	-
	TPH C15 - C28	mg/kg	50	<50	-
	TPH C29 - C36	mg/kg	50	<50	-

Attachment A

Soil Sample Descriptions

Gungahlin Town Centre East Estate - Stockpile Beneficial Reuse Assessment and Waste Classification

Sample Number	PID (ppm)	Description	Depth (m)
SS1	0.2	Silty CLAY: Orange to brown clay. Some fine to coarse grained sand, sub-angular to sub-rounded, coloured grey, red, yellow and white.	0.1-0.3
SS2	0.2	Silty CLAY: Orange to brown clay. Some fine to coarse grained sand, sub-angular to sub-rounded, coloured grey, red, yellow and white. Some medium gravels, red to grey, sub-angular.	0.4-0.6
SS3	0.3	Silty CLAY: Brown clay, some fine to coarse grained sand, sub-angular to sub-rounded, coloured grey, red, yellow and white.	0.9-1.1
SS4	0.4	Silty CLAY: Brown, some medium to coarse sub-angular sands, brown, grey, yellow and white.	0.1-0.3
SS5	0.2	Silty CLAY: Yellow to brown, trace of fine to medium grained, coarse sands, grey, yellow and red.	0.4-0.6
SS6	0.2	Silty CLAY: Yellow to brown, trace of fine to medium grained, coarse sands, grey, yellow and red.	0.9-1.1
SS7	0.0	Silty CLAY: Yellow to brown, trace of fine to medium grained, coarse sands, grey, yellow and red.	1.1-1.3
SS8	0.0	Sandy CLAY: Brown to grey, sands mostly fine grained, yellow, grey, black and white, sub-angular.	0.1-0.3
SS9	0.0	Silty CLAY: Brown, trace sub-angular to angular, red to brown, grey, white and yellow sands, fine to coarse grained.	0.1-0.3
SS10	0.1	Silty CLAY: Red to grey.	1.5-1.7
SS11	0.4	Silty CLAY: Brown.	0.3-0.5
SS12	0.2	Silty CLAY: Grey to brown, trace of fine grained, grey, white, red and yellow sands.	0.1-0.3
SS13	0.1	Silty Sandy CLAY: Grey to brown, trace of fine grained, grey, white, red and yellow sands.	1.3-1.5
SS14	0.2	Silty Sandy CLAY: Grey to brown, trace of fine grained, grey, white, red and yellow sands.	0.3-0.5
SS15	0.2	Gravelly CLAY: Orange to brown, gravels are angular, grey and yellow, fine to coarse.	0.5-0.7
SS16	0.1	Silty Sandy CLAY: Grey to brown, trace of fine grained, grey, white, red and yellow sands.	0.3-0.5
SS17	0.0	Gravelly CLAY: Orange to brown, gravels are angular, grey and yellow, fine.	0.9-1.1
SS18	0.2	Clayey SAND: Black sand, angular, fine to medium grained, clays are brown.	0.1-0.3
SS19	0.2	Clayey SAND: Sands are uniform, find grained, grey, white, yellow and clear.	0.3-0.5

Attachment B

PID Calibration Record

Gungahlin Town Centre East Estate - Stockpile Beneficial Reuse Assessment and Waste Classification

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FIELD EQUIPMENT CALIBRATION DETAILS

Job/Site Details:	
CE Project Name: **Stockpile Assessment Gungahlin**	CE Project Number: **ENAUBRAD01182AA**
Fieldwork Date(s): **27 April 2012**	Work Completed By: **Julia Jasonsmith**
Type of Work (eg. ESA, GME, etc): **ESA**	

Photoionisation Detector (PID):			
Equipment Description: **MiniRae 2000** **PGM07600**		Equipment Plant Number:	**110-007981**
Calibration Frequency Required by Manufacturer: **6 Monthly**			
Date Last Serviced &/or Calibrated by a Qualified Technician: **11 April 2012**			
By Who (Personnel & Company Name): **Milenko, Thermo Fisher Scientific**			
Challenge/Calibration Standard: **100 ppm Isobutylene**			
Field Challenge Details:			
1) Date/Time: 27.04.12 / 0300		6) Date/Time:	
2) Date/Time:		7) Date/Time:	
3) Date/Time:		8) Date/Time:	
4) Date/Time:		9) Date/Time:	
5) Date/Time:		10) Date/Time:	

Interface Probe (IP):	
Equipment Description:	Equipment Plant Number:
Calibration Frequency Required by Manufacturer:	
Date Last Serviced &/or Calibrated by a Qualified Technician:	
By Who (Personnel & Company Name):	
Field Functionality Test Details:	
1) Date/Time:	6) Date/Time:
2) Date/Time:	7) Date/Time:
3) Date/Time:	8) Date/Time:
4) Date/Time:	9) Date/Time:
5) Date/Time:	10) Date/Time:

Water Quality Meter:	
Equipment Description:	Equipment Plant Number:
Calibration Frequency Required by Manufacturer:	
Date Last Serviced &/or Calibrated by a Qualified Technician:	
By Who (Personnel & Company Name):	
Calibration Standards:	
Field Challenge Details:	
1) Date/Time:	6) Date/Time:
2) Date/Time:	7) Date/Time:
3) Date/Time:	8) Date/Time:
4) Date/Time:	9) Date/Time:
5) Date/Time:	10) Date/Time:

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Project No.	ENO11882TH
Date:	16/04/12
Page	1 of 1

DAILY FIELD SUMMARY

Project Name: Gungahlin Town Centre East Stockpile

Field Personnel (Initials): JJS

Project Manager (Initials): XH

Time	Description of Tasks Undertaken: (Include details onsite, all personnel, standby, phone calls)
1020 -	Arrive on site & fill out SSP's Meet O'Donnell Griffin.
1030	Start marking of services
	- Services including electricity, gas, telstra go directly through centre of stockpile stop
	- Print out DBYD cover sheets.
	- Pit hole @ each end of stpile to identify depth of services.
11.10	Service locating complete.
1115	offsite for bathroom stop
1130	Meet Jemmena on site.
1205	Jemmena service locating complete.
	- Call Icon re: docket for sign off.

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Project No.	EB01182AA
Date:	27/04/12
Page	1 of 1

DAILY FIELD SUMMARY

Project Name: Gungahlin Town Centre Stockpile Sampling

Field Personnel (Initials): JVS

Project Manager (Initials): AH

Time	Description of Tasks Undertaken: (Include details onsite, all personnel, standby, phone calls)
0750	Arrive on site to meet UOW for site entry. Meet Steve @ 820am.
0845	IHT arrive with excavator.
0900	Cover site Safety plan
0900	start work Potholing
0930	Call Jemena to ask where service locator is (should have been on site @ 915. Service locator now unable to attend site. Jemena (courtney) verbally confirms that as long as depth to services are identified work may proceed.
0945	Services exposed @ 750mm on western end of stockpile. Photograph obtained
10 10	Stockpile sampling begins.
1400	
1320	Asbestos sorting started
1400	Asbestos sampling complete.
	14 m^3 Sorted Concrete little NO.
	300 m^3 Unsorted Concrete, Rock, Bricks.
	1200 m^3 ~~Unsorted~~ ~~Unsorted~~
	600 m^3 unsorted mixed soil
	1200 m^3 sorted soils.
	3 m^3 misc. Rubbish including drums, mattresses, pallets etc.
1415	Call Kaythe. Finish @ site & head to office.

Attachment C
Chain of Custody Forms and Laboratory Analytical Reports

Gungahlin Town Centre East Estate - Stockpile Beneficial Reuse Assessment and Waste Classification

SAMPLE RECEIPT ADVICE

SE107753

CLIENT DETAILS

Contact	Julia Jasonsmith
Client	Coffey Environments Pty Ltd
Address	17 Torrens St BRADDON ACT 2612
Telephone	02 6162 2622
Facsimile	02 6262 0494
Email	julia_jasonsmith@coffey.com
Project	**ENAUBRAD01182AA - Gungahlin**
Order Number	**94373-374**
Samples	23

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 1/5/2012
Report Due	Mon 7/5/2012
SGS Reference	**SE107753**

SUBMISSION DETAILS

This is to confirm that 23 samples were received on Tuesday 1/5/2012. Results are expected to be ready by Monday 7/5/2012. Please quote SGS reference SE107753 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	23 Soils	Type of documentation received	COC
Date documentation received	1/5/2012	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.6°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	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

Project Name : Gungahlin Town Centre East Stockpile.

Trip Spike will be anlysed for BTEX.

ANALYTICAL REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Xanthe Holford	Manager	Huong Crawford
Client	Coffey Environments Pty Ltd	Laboratory	SGS Alexandria Environmental
Address	17 Torrens St BRADDON ACT 2612	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	02 6248 7154	Telephone	+61 2 8594 0400
Facsimile	02 6248 7157	Facsimile	+61 2 8594 0499
Email	xanthe_holford@coffey.com	Email	au.environmental.sydney@sgs.com
Project	**ENAUBRAD01182AA - Gungahlin**	SGS Reference	SE107753 R0
Order Number	**94373-374**	Report Number	0000027419
Samples	23	Date Reported	07 May 2012
		Date Received	01 May 2012

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

Project Name : Gungahlin Town Centre East Stockpile.
VOC/VPH: The Limit of Reporting (LOR) has been raised due to interferences from the sample matrix.
PAH - The Limit of Reporting (LOR) has been raised due to interferences from the sample matrix.

SIGNATORIES

Andy Sutton
Organics Chemist

Huong Crawford
Laboratory Manager

Ly Kim Ha
Organics Supervisor

Parameter	Units	LOR	Sample Number: SE107753.001 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS1	SE107753.002 Soil 27 Apr 2012 SS2	SE107753.003 Soil 27 Apr 2012 SS3	SE107753.004 Soil 27 Apr 2012 SS4	SE107753.005 Soil 27 Apr 2012 SS5
VOC's in Soil Method: AN433/AN434							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1	-	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	-	-
m/p-xylene	mg/kg	0.2	-	-	-	-	-
o-xylene	mg/kg	0.1	-	-	-	-	-
Surrogates							
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-
Totals							
Total Xylenes*	mg/kg	0.3	-	-	-	-	-
Total BTEX*	mg/kg	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434							
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Surrogates							
Trifluorotoluene (Surrogate)	%	-	**68**	**64**	**65**	**65**	**73**
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403							
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	50	<50	<50	<50	<50	<50
TRH C29-C36	mg/kg	50	<50	<50	<50	<50	<50
Surrogates							
TRH (Surrogate)	%	-	-	-	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420							
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<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	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (Vic EPA)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE107753.001 Soil 27 Apr 2012 SS1	SE107753.002 Soil 27 Apr 2012 SS2	SE107753.003 Soil 27 Apr 2012 SS3	SE107753.004 Soil 27 Apr 2012 SS4	SE107753.005 Soil 27 Apr 2012 SS5
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420 (continued)								
Surrogates								
d5-nitrobenzene (Surrogate)	%	-		**98**	**110**	**110**	**110**	**118**
2-fluorobiphenyl (Surrogate)	%	-		**104**	**116**	**116**	**114**	**124**
d14-p-terphenyl (Surrogate)	%	-		**96**	**104**	**102**	**100**	**106**
OC Pesticides in Soil Method: AN400/AN420								
Hexachlorobenzene (HCB)	mg/kg	0.1		-	-	-	<0.1	-
Alpha BHC	mg/kg	0.1		-	-	-	<0.1	-
Lindane	mg/kg	0.1		-	-	-	<0.1	-
Heptachlor	mg/kg	0.1		-	-	-	<0.1	-
Aldrin	mg/kg	0.1		-	-	-	<0.1	-
Beta BHC	mg/kg	0.1		-	-	-	<0.1	-
Delta BHC	mg/kg	0.1		-	-	-	<0.1	-
Heptachlor epoxide	mg/kg	0.1		-	-	-	<0.1	-
o,p'-DDE	mg/kg	0.1		-	-	-	<0.1	-
Alpha Endosulfan	mg/kg	0.2		-	-	-	<0.2	-
Gamma Chlordane	mg/kg	0.1		-	-	-	<0.1	-
Alpha Chlordane	mg/kg	0.1		-	-	-	<0.1	-
trans-Nonachlor	mg/kg	0.1		-	-	-	<0.1	-
p,p'-DDE	mg/kg	0.1		-	-	-	<0.1	-
Dieldrin	mg/kg	0.2		-	-	-	<0.2	-
Endrin	mg/kg	0.2		-	-	-	<0.2	-
o,p'-DDD	mg/kg	0.1		-	-	-	<0.1	-
o,p'-DDT	mg/kg	0.1		-	-	-	<0.1	-
Beta Endosulfan	mg/kg	0.2		-	-	-	<0.2	-
p,p'-DDD	mg/kg	0.1		-	-	-	<0.1	-
p,p'-DDT	mg/kg	0.1		-	-	-	<0.1	-
Endosulfan sulphate	mg/kg	0.1		-	-	-	<0.1	-
Endrin Aldehyde	mg/kg	0.1		-	-	-	<0.1	-
Methoxychlor	mg/kg	0.1		-	-	-	<0.1	-
Endrin Ketone	mg/kg	0.1		-	-	-	<0.1	-
Surrogates								
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-		-	-	-	**101**	-
OP Pesticides in Soil Method: AN400/AN420								
Dichlorvos	mg/kg	0.5		-	-	-	<0.5	-
Dimethoate	mg/kg	0.5		-	-	-	<0.5	-
Diazinon (Dimpylate)	mg/kg	0.5		-	-	-	<0.5	-
Fenitrothion	mg/kg	0.2		-	-	-	<0.2	-
Malathion	mg/kg	0.2		-	-	-	<0.2	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2		-	-	-	<0.2	-
Parathion-ethyl (Parathion)	mg/kg	0.2		-	-	-	<0.2	-
Bromophos Ethyl	mg/kg	0.2		-	-	-	<0.2	-
Methidathion	mg/kg	0.5		-	-	-	<0.5	-
Ethion	mg/kg	0.2		-	-	-	<0.2	-
Azinphos-methyl (Guthion)	mg/kg	0.2		-	-	-	<0.2	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE107753.001 Soil 27 Apr 2012 SS1	SE107753.002 Soil 27 Apr 2012 SS2	SE107753.003 Soil 27 Apr 2012 SS3	SE107753.004 Soil 27 Apr 2012 SS4	SE107753.005 Soil 27 Apr 2012 SS5
OP Pesticides in Soil Method: AN400/AN420 (continued)								
Surrogates								
2-fluorobiphenyl (Surrogate)	%	-		-	-	-	**114**	-
d14-p-terphenyl (Surrogate)	%	-		-	-	-	**100**	-
PCBs in Soil Method: AN400/AN420								
Arochlor 1016	mg/kg	0.2		-	-	-	<0.2	-
Arochlor 1221	mg/kg	0.2		-	-	-	<0.2	-
Arochlor 1232	mg/kg	0.2		-	-	-	<0.2	-
Arochlor 1242	mg/kg	0.2		-	-	-	<0.2	-
Arochlor 1248	mg/kg	0.2		-	-	-	<0.2	-
Arochlor 1254	mg/kg	0.2		-	-	-	<0.2	-
Arochlor 1260	mg/kg	0.2		-	-	-	<0.2	-
Arochlor 1262	mg/kg	0.2		-	-	-	<0.2	-
Arochlor 1268	mg/kg	0.2		-	-	-	<0.2	-
Total PCBs (Arochlors)	mg/kg	1		-	-	-	<1	-
Surrogates								
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-		-	-	-	**101**	-
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320								
Arsenic, As	mg/kg	3		**5**	**5**	**5**	**3**	**5**
Cadmium, Cd	mg/kg	0.3		**0.3**	**0.3**	**0.3**	<0.3	**0.3**
Chromium, Cr	mg/kg	0.3		**46**	**47**	**50**	**16**	**22**
Copper, Cu	mg/kg	0.5		**16**	**14**	**4.3**	**11**	**12**
Lead, Pb	mg/kg	1		**17**	**17**	**24**	**17**	**15**
Nickel, Ni	mg/kg	0.5		**7.4**	**7.6**	**4.8**	**7.9**	**21**
Zinc, Zn	mg/kg	0.5		**21**	**16**	**9.7**	**35**	**46**
Mercury in Soil Method: AN312								
Mercury	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002								
% Moisture	%	0.5		**13**	**16**	**14**	**17**	**11**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE107753.006 Soil 27 Apr 2012 SS6	SE107753.007 Soil 27 Apr 2012 SS7	SE107753.008 Soil 27 Apr 2012 SS8	SE107753.009 Soil 27 Apr 2012 SS9	SE107753.010 Soil 27 Apr 2012 SS10
VOC's in Soil Method: AN433/AN434								
Monocyclic Aromatic Hydrocarbons								
Benzene	mg/kg	0.1		-	-	-	-	-
Toluene	mg/kg	0.1		-	-	-	-	-
Ethylbenzene	mg/kg	0.1		-	-	-	-	-
m/p-xylene	mg/kg	0.2		-	-	-	-	-
o-xylene	mg/kg	0.1		-	-	-	-	-
Surrogates								
Dibromofluoromethane (Surrogate)	%	-		-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-		-	-	-	-	-
d8-toluene (Surrogate)	%	-		-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-		-	-	-	-	-

Parameter	Units	LOR	Sample Number: SE107753.006 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS6	SE107753.007 Soil 27 Apr 2012 SS7	SE107753.008 Soil 27 Apr 2012 SS8	SE107753.009 Soil 27 Apr 2012 SS9	SE107753.010 Soil 27 Apr 2012 SS10
VOC's in Soil Method: AN433/AN434 (continued)							
Totals							
Total Xylenes*	mg/kg	0.3	-	-	-	-	-
Total BTEX*	mg/kg	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434							
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Surrogates							
Trifluorotoluene (Surrogate)	%	-	**70**	**62**	**74**	**65**	**74**
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403							
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	50	<50	<50	<50	<50	<50
TRH C29-C36	mg/kg	50	<50	<50	<50	<50	<50
Surrogates							
TRH (Surrogate)	%	-	-	-	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420							
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<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	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (Vic EPA)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Surrogates							
d5-nitrobenzene (Surrogate)	%	-	**102**	**112**	**104**	**114**	**116**
2-fluorobiphenyl (Surrogate)	%	-	**110**	**114**	**110**	**116**	**118**
d14-p-terphenyl (Surrogate)	%	-	**98**	**98**	**98**	**104**	**102**

Parameter	Units	LOR	Sample Number: SE107753.006 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS6	SE107753.007 Soil 27 Apr 2012 SS7	SE107753.008 Soil 27 Apr 2012 SS8	SE107753.009 Soil 27 Apr 2012 SS9	SE107753.010 Soil 27 Apr 2012 SS10
OC Pesticides in Soil Method: AN400/AN420							
Hexachlorobenzene (HCB)	mg/kg	0.1	-	-	-	-	-
Alpha BHC	mg/kg	0.1	-	-	-	-	-
Lindane	mg/kg	0.1	-	-	-	-	-
Heptachlor	mg/kg	0.1	-	-	-	-	-
Aldrin	mg/kg	0.1	-	-	-	-	-
Beta BHC	mg/kg	0.1	-	-	-	-	-
Delta BHC	mg/kg	0.1	-	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	-	-	-	-	-
o,p'-DDE	mg/kg	0.1	-	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	-	-	-	-	-
Gamma Chlordane	mg/kg	0.1	-	-	-	-	-
Alpha Chlordane	mg/kg	0.1	-	-	-	-	-
trans-Nonachlor	mg/kg	0.1	-	-	-	-	-
p,p'-DDE	mg/kg	0.1	-	-	-	-	-
Dieldrin	mg/kg	0.2	-	-	-	-	-
Endrin	mg/kg	0.2	-	-	-	-	-
o,p'-DDD	mg/kg	0.1	-	-	-	-	-
o,p'-DDT	mg/kg	0.1	-	-	-	-	-
Beta Endosulfan	mg/kg	0.2	-	-	-	-	-
p,p'-DDD	mg/kg	0.1	-	-	-	-	-
p,p'-DDT	mg/kg	0.1	-	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	-	-	-	-	-
Endrin Aldehyde	mg/kg	0.1	-	-	-	-	-
Methoxychlor	mg/kg	0.1	-	-	-	-	-
Endrin Ketone	mg/kg	0.1	-	-	-	-	-
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-	-
OP Pesticides in Soil Method: AN400/AN420							
Dichlorvos	mg/kg	0.5	-	-	-	-	-
Dimethoate	mg/kg	0.5	-	-	-	-	-
Diazinon (Dimpylate)	mg/kg	0.5	-	-	-	-	-
Fenitrothion	mg/kg	0.2	-	-	-	-	-
Malathion	mg/kg	0.2	-	-	-	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	-	-	-	-	-
Parathion-ethyl (Parathion)	mg/kg	0.2	-	-	-	-	-
Bromophos Ethyl	mg/kg	0.2	-	-	-	-	-
Methidathion	mg/kg	0.5	-	-	-	-	-
Ethion	mg/kg	0.2	-	-	-	-	-
Azinphos-methyl (Guthion)	mg/kg	0.2	-	-	-	-	-
Surrogates							
2-fluorobiphenyl (Surrogate)	%	-	-	-	-	-	-
d14-p-terphenyl (Surrogate)	%	-	-	-	-	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE107753.006 Soil 27 Apr 2012 SS6	SE107753.007 Soil 27 Apr 2012 SS7	SE107753.008 Soil 27 Apr 2012 SS8	SE107753.009 Soil 27 Apr 2012 SS9	SE107753.010 Soil 27 Apr 2012 SS10
PCBs in Soil Method: AN400/AN420							
Arochlor 1016	mg/kg	0.2	-	-	-	-	-
Arochlor 1221	mg/kg	0.2	-	-	-	-	-
Arochlor 1232	mg/kg	0.2	-	-	-	-	-
Arochlor 1242	mg/kg	0.2	-	-	-	-	-
Arochlor 1248	mg/kg	0.2	-	-	-	-	-
Arochlor 1254	mg/kg	0.2	-	-	-	-	-
Arochlor 1260	mg/kg	0.2	-	-	-	-	-
Arochlor 1262	mg/kg	0.2	-	-	-	-	-
Arochlor 1268	mg/kg	0.2	-	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	-	-	-	-	-
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	-	-	-	-	-
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320							
Arsenic, As	mg/kg	3	**4**	**5**	**3**	**3**	**6**
Cadmium, Cd	mg/kg	0.3	<0.3	**0.3**	<0.3	<0.3	**0.3**
Chromium, Cr	mg/kg	0.3	**43**	**54**	**18**	**20**	**51**
Copper, Cu	mg/kg	0.5	**6.7**	**11**	**9.0**	**8.9**	**6.8**
Lead, Pb	mg/kg	1	**23**	**17**	**11**	**18**	**27**
Nickel, Ni	mg/kg	0.5	**6.5**	**7.9**	**8.0**	**5.1**	**4.9**
Zinc, Zn	mg/kg	0.5	**12**	**13**	**47**	**28**	**8.7**
Mercury in Soil Method: AN312							
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002							
% Moisture	%	0.5	**11**	**16**	**7.9**	**12**	**14**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE107753.011 Soil 27 Apr 2012 SS11	SE107753.012 Soil 27 Apr 2012 SS12	SE107753.013 Soil 27 Apr 2012 SS13	SE107753.014 Soil 27 Apr 2012 SS14	SE107753.015 Soil 27 Apr 2012 SS15
VOC's in Soil Method: AN433/AN434							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1	-	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	-	-
m/p-xylene	mg/kg	0.2	-	-	-	-	-
o-xylene	mg/kg	0.1	-	-	-	-	-
Surrogates							
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-
Totals							
Total Xylenes*	mg/kg	0.3	-	-	-	-	-
Total BTEX*	mg/kg	-	-	-	-	-	-

Parameter	Units	LOR	Sample Number: SE107753.011 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS11	SE107753.012 Soil 27 Apr 2012 SS12	SE107753.013 Soil 27 Apr 2012 SS13	SE107753.014 Soil 27 Apr 2012 SS14	SE107753.015 Soil 27 Apr 2012 SS15
Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434							
TRH C6-C9	mg/kg	20	<200↑	<20	<20	<20	<20
Surrogates							
Trifluorotoluene (Surrogate)	%	-	**93**	**76**	**72**	**71**	**70**
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403							
TRH C10-C14	mg/kg	20	**280**	<20	<20	<20	<20
TRH C15-C28	mg/kg	50	**690**	<50	<50	<50	<50
TRH C29-C36	mg/kg	50	**910**	<50	<50	<50	<50
Surrogates							
TRH (Surrogate)	%	-	-	-	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420							
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.2**	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg	0.1	**0.4**	<0.1	<0.1	**0.1**	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	**0.2**	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.1**	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<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	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (Vic EPA)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Surrogates							
d5-nitrobenzene (Surrogate)	%	-	**116**	**116**	**116**	**116**	**126**
2-fluorobiphenyl (Surrogate)	%	-	**98**	**120**	**116**	**118**	**122**
d14-p-terphenyl (Surrogate)	%	-	**98**	**102**	**106**	**114**	**118**
OC Pesticides in Soil Method: AN400/AN420							
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-	-	-
Alpha BHC	mg/kg	0.1	<0.1	-	-	-	-
Lindane	mg/kg	0.1	<0.1	-	-	-	-
Heptachlor	mg/kg	0.1	<0.1	-	-	-	-
Aldrin	mg/kg	0.1	<0.1	-	-	-	-
Beta BHC	mg/kg	0.1	<0.1	-	-	-	-
Delta BHC	mg/kg	0.1	<0.1	-	-	-	-
Heptachlor epoxide	mg/kg	0.1	<0.1	-	-	-	-
o,p'-DDE	mg/kg	0.1	<0.1	-	-	-	-
Alpha Endosulfan	mg/kg	0.2	<0.2	-	-	-	-
Gamma Chlordane	mg/kg	0.1	<0.1	-	-	-	-
Alpha Chlordane	mg/kg	0.1	<0.1	-	-	-	-
trans-Nonachlor	mg/kg	0.1	<0.1	-	-	-	-
p,p'-DDE	mg/kg	0.1	<0.1	-	-	-	-
Dieldrin	mg/kg	0.2	<0.2	-	-	-	-
Endrin	mg/kg	0.2	<0.2	-	-	-	-

Parameter	Units	LOR	Sample Number: SE107753.011 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS11	SE107753.012 Soil 27 Apr 2012 SS12	SE107753.013 Soil 27 Apr 2012 SS13	SE107753.014 Soil 27 Apr 2012 SS14	SE107753.015 Soil 27 Apr 2012 SS15
OC Pesticides in Soil Method: AN400/AN420 (continued)							
o,p'-DDD	mg/kg	0.1	<0.1	-	-	-	-
o,p'-DDT	mg/kg	0.1	<0.1	-	-	-	-
Beta Endosulfan	mg/kg	0.2	<0.2	-	-	-	-
p,p'-DDD	mg/kg	0.1	<0.1	-	-	-	-
p,p'-DDT	mg/kg	0.1	<0.1	-	-	-	-
Endosulfan sulphate	mg/kg	0.1	<0.1	-	-	-	-
Endrin Aldehyde	mg/kg	0.1	<0.1	-	-	-	-
Methoxychlor	mg/kg	0.1	<0.1	-	-	-	-
Endrin Ketone	mg/kg	0.1	<0.1	-	-	-	-
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**110**	-	-	-	-
OP Pesticides in Soil Method: AN400/AN420							
Dichlorvos	mg/kg	0.5	<0.5	-	-	-	-
Dimethoate	mg/kg	0.5	<0.5	-	-	-	-
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	-	-	-	-
Fenitrothion	mg/kg	0.2	<0.2	-	-	-	-
Malathion	mg/kg	0.2	<0.2	-	-	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	-	-	-	-
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	-	-	-	-
Bromophos Ethyl	mg/kg	0.2	<0.2	-	-	-	-
Methidathion	mg/kg	0.5	<0.5	-	-	-	-
Ethion	mg/kg	0.2	<0.2	-	-	-	-
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	-	-	-	-
Surrogates							
2-fluorobiphenyl (Surrogate)	%	-	**98**	-	-	-	-
d14-p-terphenyl (Surrogate)	%	-	**98**	-	-	-	-

Parameter	Units	LOR	Sample Number: SE107753.011 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS11	SE107753.012 Soil 27 Apr 2012 SS12	SE107753.013 Soil 27 Apr 2012 SS13	SE107753.014 Soil 27 Apr 2012 SS14	SE107753.015 Soil 27 Apr 2012 SS15
PCBs in Soil Method: AN400/AN420							
Arochlor 1016	mg/kg	0.2	<0.2	-	-	-	-
Arochlor 1221	mg/kg	0.2	<0.2	-	-	-	-
Arochlor 1232	mg/kg	0.2	<0.2	-	-	-	-
Arochlor 1242	mg/kg	0.2	<0.2	-	-	-	-
Arochlor 1248	mg/kg	0.2	<0.2	-	-	-	-
Arochlor 1254	mg/kg	0.2	<0.2	-	-	-	-
Arochlor 1260	mg/kg	0.2	<0.2	-	-	-	-
Arochlor 1262	mg/kg	0.2	<0.2	-	-	-	-
Arochlor 1268	mg/kg	0.2	<0.2	-	-	-	-
Total PCBs (Arochlors)	mg/kg	1	<1	-	-	-	-
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**110**	-	-	-	-
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320							
Arsenic, As	mg/kg	3	**5**	**6**	**5**	<3	**5**
Cadmium, Cd	mg/kg	0.3	**0.4**	**0.3**	**0.3**	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	**20**	**21**	**55**	**16**	**44**
Copper, Cu	mg/kg	0.5	**16**	**15**	**7.5**	**7.2**	**12**
Lead, Pb	mg/kg	1	**16**	**22**	**24**	**14**	**16**
Nickel, Ni	mg/kg	0.5	**13**	**14**	**4.7**	**5.7**	**8.9**
Zinc, Zn	mg/kg	0.5	**76**	**46**	**7.3**	**28**	**14**
Mercury in Soil Method: AN312							
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002							
% Moisture	%	0.5	**26**	**14**	**13**	**17**	**11**

Parameter	Units	LOR	Sample Number: SE107753.016 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS16	SE107753.017 Soil 27 Apr 2012 SS17	SE107753.018 Soil 27 Apr 2012 SS18	SE107753.019 Soil 27 Apr 2012 SS19	SE107753.020 Soil 27 Apr 2012 QC1
VOC's in Soil Method: AN433/AN434							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1	-	-	-	-	-
Toluene	mg/kg	0.1	-	-	-	-	-
Ethylbenzene	mg/kg	0.1	-	-	-	-	-
m/p-xylene	mg/kg	0.2	-	-	-	-	-
o-xylene	mg/kg	0.1	-	-	-	-	-
Surrogates							
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-
Totals							
Total Xylenes*	mg/kg	0.3	-	-	-	-	-
Total BTEX*	mg/kg	-	-	-	-	-	-

Parameter	Units	LOR	Sample Number: SE107753.016 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS16	SE107753.017 Soil 27 Apr 2012 SS17	SE107753.018 Soil 27 Apr 2012 SS18	SE107753.019 Soil 27 Apr 2012 SS19	SE107753.020 Soil 27 Apr 2012 QC1
Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434							
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Surrogates							
Trifluorotoluene (Surrogate)	%	-	**73**	**73**	**70**	**70**	**75**
Dibromofluoromethane (Surrogate)	%	-	-	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403							
TRH C10-C14	mg/kg	20	<20	<20	**34**	<20	<20
TRH C15-C28	mg/kg	50	<50	<50	**560**	<50	<50
TRH C29-C36	mg/kg	50	<50	<50	**63**	<50	<50
Surrogates							
TRH (Surrogate)	%	-	-	-	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420							
Naphthalene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Benzo(b)fluoranthene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<1.0↑	<0.1	<0.1
Total PAH (Vic EPA)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Surrogates							
d5-nitrobenzene (Surrogate)	%	-	**118**	**114**	**120**	**120**	**112**
2-fluorobiphenyl (Surrogate)	%	-	**114**	**106**	**120**	**112**	**106**
d14-p-terphenyl (Surrogate)	%	-	**120**	**102**	**100**	**108**	**100**
OC Pesticides in Soil Method: AN400/AN420							
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Alpha BHC	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Lindane	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Heptachlor	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Aldrin	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Beta BHC	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Delta BHC	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Heptachlor epoxide	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
o,p'-DDE	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Alpha Endosulfan	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Gamma Chlordane	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Alpha Chlordane	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
trans-Nonachlor	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
p,p'-DDE	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Dieldrin	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Endrin	mg/kg	0.2	<0.2	-	<0.2	<0.2	-

Parameter	Units	LOR	Sample Number: SE107753.016 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS16	SE107753.017 Soil 27 Apr 2012 SS17	SE107753.018 Soil 27 Apr 2012 SS18	SE107753.019 Soil 27 Apr 2012 SS19	SE107753.020 Soil 27 Apr 2012 QC1
OC Pesticides in Soil Method: AN400/AN420 (continued)							
o,p'-DDD	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
o,p'-DDT	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Beta Endosulfan	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
p,p'-DDD	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
p,p'-DDT	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Endosulfan sulphate	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Endrin Aldehyde	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Methoxychlor	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Endrin Ketone	mg/kg	0.1	<0.1	-	<0.1	<0.1	-
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**107**	-	**111**	**99**	-
OP Pesticides in Soil Method: AN400/AN420							
Dichlorvos	mg/kg	0.5	<0.5	-	<0.5	<0.5	-
Dimethoate	mg/kg	0.5	<0.5	-	<0.5	<0.5	-
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	-	<0.5	<0.5	-
Fenitrothion	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Malathion	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Bromophos Ethyl	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Methidathion	mg/kg	0.5	<0.5	-	<0.5	<0.5	-
Ethion	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Surrogates							
2-fluorobiphenyl (Surrogate)	%	-	**114**	-	**120**	**112**	-
d14-p-terphenyl (Surrogate)	%	-	**120**	-	**100**	**108**	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE107753.016 Soil 27 Apr 2012 SS16	SE107753.017 Soil 27 Apr 2012 SS17	SE107753.018 Soil 27 Apr 2012 SS18	SE107753.019 Soil 27 Apr 2012 SS19	SE107753.020 Soil 27 Apr 2012 QC1
PCBs in Soil Method: AN400/AN420							
Arochlor 1016	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Arochlor 1221	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Arochlor 1232	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Arochlor 1242	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Arochlor 1248	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Arochlor 1254	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Arochlor 1260	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Arochlor 1262	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Arochlor 1268	mg/kg	0.2	<0.2	-	<0.2	<0.2	-
Total PCBs (Arochlors)	mg/kg	1	<1	-	<1	<1	-
Surrogates							
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**107**	-	**111**	**99**	-
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320							
Arsenic, As	mg/kg	3	<3	**6**	<3	<3	**6**
Cadmium, Cd	mg/kg	0.3	**0.9**	**0.4**	**0.8**	<0.3	**0.4**
Chromium, Cr	mg/kg	0.3	**12**	**74**	**130**	**11**	**68**
Copper, Cu	mg/kg	0.5	**7.4**	**9.5**	**8.8**	**6.0**	**11**
Lead, Pb	mg/kg	1	**46**	**27**	**41**	**9**	**23**
Nickel, Ni	mg/kg	0.5	**5.7**	**4.8**	**5.1**	**4.1**	**7.3**
Zinc, Zn	mg/kg	0.5	**130**	**12**	**96**	**20**	**12**
Mercury in Soil Method: AN312							
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Moisture Content Method: AN002							
% Moisture	%	0.5	**3.7**	**11**	**2.9**	**5.7**	**15**

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name SE107753.021 Soil 27 Apr 2012 QC2	SE107753.022 Soil 24 Apr 2012 Trip Blank	SE107753.023 Soil 24 Apr 2012 Trip Spike
VOC's in Soil Method: AN433/AN434					
Monocyclic Aromatic Hydrocarbons					
Benzene	mg/kg	0.1	-	-	[108%]
Toluene	mg/kg	0.1	-	-	[108%]
Ethylbenzene	mg/kg	0.1	-	-	[109%]
m/p-xylene	mg/kg	0.2	-	-	[110%]
o-xylene	mg/kg	0.1	-	-	[107%]
Surrogates					
Dibromofluoromethane (Surrogate)	%	-	-	-	**96**
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	**96**
d8-toluene (Surrogate)	%	-	-	-	**93**
Bromofluorobenzene (Surrogate)	%	-	-	-	**61**
Totals					
Total Xylenes*	mg/kg	0.3	-	-	-
Total BTEX*	mg/kg	-	-	-	-

Parameter	Units	LOR	Sample Number: SE107753.021 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: QC2	SE107753.022 Soil 24 Apr 2012 Trip Blank	SE107753.023 Soil 24 Apr 2012 Trip Spike
Volatile Petroleum Hydrocarbons in Soil Method: AN433/AN434					
TRH C6-C9	mg/kg	20	<20	<20	-
Surrogates					
Trifluorotoluene (Surrogate)	%	-	**71**	**75**	-
Dibromofluoromethane (Surrogate)	%	-	-	-	-
d4-1,2-dichloroethane (Surrogate)	%	-	-	-	-
d8-toluene (Surrogate)	%	-	-	-	-
Bromofluorobenzene (Surrogate)	%	-	-	-	-
TRH (Total Recoverable Hydrocarbons) in Soil Method: AN403					
TRH C10-C14	mg/kg	20	<20	<20	-
TRH C15-C28	mg/kg	50	<50	<50	-
TRH C29-C36	mg/kg	50	<50	<50	-
Surrogates					
TRH (Surrogate)	%	-	-	-	-
PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: AN420					
Naphthalene	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(b)fluoranthene	mg/kg	0.1	<0.1	-	-
Benzo(k)fluoranthene	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 (Vic EPA)	mg/kg	0.8	<0.8	-	-
Surrogates					
d5-nitrobenzene (Surrogate)	%	-	**88**	-	-
2-fluorobiphenyl (Surrogate)	%	-	**84**	-	-
d14-p-terphenyl (Surrogate)	%	-	**82**	-	-
OC Pesticides in Soil Method: AN400/AN420					
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	-	-
Alpha BHC	mg/kg	0.1	<0.1	-	-
Lindane	mg/kg	0.1	<0.1	-	-
Heptachlor	mg/kg	0.1	<0.1	-	-
Aldrin	mg/kg	0.1	<0.1	-	-
Beta BHC	mg/kg	0.1	<0.1	-	-
Delta BHC	mg/kg	0.1	<0.1	-	-
Heptachlor epoxide	mg/kg	0.1	<0.1	-	-
o,p'-DDE	mg/kg	0.1	<0.1	-	-
Alpha Endosulfan	mg/kg	0.2	<0.2	-	-
Gamma Chlordane	mg/kg	0.1	<0.1	-	-
Alpha Chlordane	mg/kg	0.1	<0.1	-	-
trans-Nonachlor	mg/kg	0.1	<0.1	-	-
p,p'-DDE	mg/kg	0.1	<0.1	-	-
Dieldrin	mg/kg	0.2	<0.2	-	-
Endrin	mg/kg	0.2	<0.2	-	-

Parameter	Units	LOR	Sample Number: SE107753.021 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: QC2	SE107753.022 Soil 24 Apr 2012 Trip Blank	SE107753.023 Soil 24 Apr 2012 Trip Spike
OC Pesticides in Soil Method: AN400/AN420 (continued)					
o,p'-DDD	mg/kg	0.1	<0.1	-	-
o,p'-DDT	mg/kg	0.1	<0.1	-	-
Beta Endosulfan	mg/kg	0.2	<0.2	-	-
p,p'-DDD	mg/kg	0.1	<0.1	-	-
p,p'-DDT	mg/kg	0.1	<0.1	-	-
Endosulfan sulphate	mg/kg	0.1	<0.1	-	-
Endrin Aldehyde	mg/kg	0.1	<0.1	-	-
Methoxychlor	mg/kg	0.1	<0.1	-	-
Endrin Ketone	mg/kg	0.1	<0.1	-	-
Surrogates					
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**82**	-	-
OP Pesticides in Soil Method: AN400/AN420					
Dichlorvos	mg/kg	0.5	<0.5	-	-
Dimethoate	mg/kg	0.5	<0.5	-	-
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	-	-
Fenitrothion	mg/kg	0.2	<0.2	-	-
Malathion	mg/kg	0.2	<0.2	-	-
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	-	-
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	-	-
Bromophos Ethyl	mg/kg	0.2	<0.2	-	-
Methidathion	mg/kg	0.5	<0.5	-	-
Ethion	mg/kg	0.2	<0.2	-	-
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	-	-
Surrogates					
2-fluorobiphenyl (Surrogate)	%	-	**84**	-	-
d14-p-terphenyl (Surrogate)	%	-	**82**	-	-

Parameter	Units	LOR	Sample Number: SE107753.021 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: QC2	SE107753.022 Soil 24 Apr 2012 Trip Blank	SE107753.023 Soil 24 Apr 2012 Trip Spike
PCBs in Soil Method: AN400/AN420					
Arochlor 1016	mg/kg	0.2	<0.2	-	-
Arochlor 1221	mg/kg	0.2	<0.2	-	-
Arochlor 1232	mg/kg	0.2	<0.2	-	-
Arochlor 1242	mg/kg	0.2	<0.2	-	-
Arochlor 1248	mg/kg	0.2	<0.2	-	-
Arochlor 1254	mg/kg	0.2	<0.2	-	-
Arochlor 1260	mg/kg	0.2	<0.2	-	-
Arochlor 1262	mg/kg	0.2	<0.2	-	-
Arochlor 1268	mg/kg	0.2	<0.2	-	-
Total PCBs (Arochlors)	mg/kg	1	<1	-	-
Surrogates					
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**82**	-	-
Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320					
Arsenic, As	mg/kg	3	<3	-	-
Cadmium, Cd	mg/kg	0.3	**0.7**	-	-
Chromium, Cr	mg/kg	0.3	**17**	-	-
Copper, Cu	mg/kg	0.5	**8.5**	-	-
Lead, Pb	mg/kg	1	**51**	-	-
Nickel, Ni	mg/kg	0.5	**6.3**	-	-
Zinc, Zn	mg/kg	0.5	**110**	-	-
Mercury in Soil Method: AN312					
Mercury	mg/kg	0.05	<0.05	-	-
Moisture Content Method: AN002					
% Moisture	%	0.5	**3.3**	**19**	-

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	LB019542	mg/kg	0.05	<0.05	0%	105%	119%
	LB019543	mg/kg	0.05	<0.05	0%	115%	105%

OC Pesticides in Soil **Method: ME-(AU)-[ENV]AN400/AN420**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Hexachlorobenzene (HCB)	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Alpha BHC	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Lindane	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Heptachlor	LB019368	mg/kg	0.1	<0.1	0%	90%
	LB019369	mg/kg	0.1	<0.1		140%
Aldrin	LB019368	mg/kg	0.1	<0.1	0%	95%
	LB019369	mg/kg	0.1	<0.1		140%
Beta BHC	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Delta BHC	LB019368	mg/kg	0.1	<0.1	0%	80%
	LB019369	mg/kg	0.1	<0.1		110%
Heptachlor epoxide	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
o,p'-DDE	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Alpha Endosulfan	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Gamma Chlordane	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Alpha Chlordane	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
trans-Nonachlor	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
p,p'-DDE	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Dieldrin	LB019368	mg/kg	0.2	<0.2	0%	90%
	LB019369	mg/kg	0.2	<0.2		130%
Endrin	LB019368	mg/kg	0.2	<0.2	0%	95%
	LB019369	mg/kg	0.2	<0.2		135%
o,p'-DDD	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
o,p'-DDT	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Beta Endosulfan	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
p,p'-DDD	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
p,p'-DDT	LB019368	mg/kg	0.1	<0.1	0%	80%
	LB019369	mg/kg	0.1	<0.1		120%
Endosulfan sulphate	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Endrin Aldehyde	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Methoxychlor	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA
Endrin Ketone	LB019368	mg/kg	0.1	<0.1	0%	NA
	LB019369	mg/kg	0.1	<0.1		NA

Surrogates

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.

OC Pesticides in Soil Method: ME-(AU)-[ENV]AN400/AN420 (continued)

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB019368	%	-	97%	1%	92%
	LB019369	%	-	103%		126%

OP Pesticides in Soil Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Dichlorvos	LB019368	mg/kg	0.5	<0.5	0%	94%
	LB019369	mg/kg	0.5	<0.5		89%
Dimethoate	LB019368	mg/kg	0.5	<0.5	0%	NA
	LB019369	mg/kg	0.5	<0.5		NA
Diazinon (Dimpylate)	LB019368	mg/kg	0.5	<0.5	0%	96%
	LB019369	mg/kg	0.5	<0.5		98%
Fenitrothion	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Malathion	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Chlorpyrifos (Chlorpyrifos Ethyl)	LB019368	mg/kg	0.2	<0.2	0%	111%
	LB019369	mg/kg	0.2	<0.2		113%
Parathion-ethyl (Parathion)	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Bromophos Ethyl	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Methidathion	LB019368	mg/kg	0.5	<0.5	0%	NA
	LB019369	mg/kg	0.5	<0.5		NA
Ethion	LB019368	mg/kg	0.2	<0.2	0%	110%
	LB019369	mg/kg	0.2	<0.2		101%
Azinphos-methyl (Guthion)	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
2-fluorobiphenyl (Surrogate)	LB019368	%	-	116%	7%	92%
	LB019369	%	-	104%		90%
d14-p-terphenyl (Surrogate)	LB019368	%	-	110%	20%	86%
	LB019369	%	-	102%		82%

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB019368	mg/kg	0.1	<0.1	0%	100%	98%
	LB019369	mg/kg	0.1	<0.1		94%	
Acenaphthylene	LB019368	mg/kg	0.1	<0.1	0%	122%	115%
	LB019369	mg/kg	0.1	<0.1		118%	
Acenaphthene	LB019368	mg/kg	0.1	<0.1	0%	97%	102%
	LB019369	mg/kg	0.1	<0.1		119%	
Fluorene	LB019368	mg/kg	0.1	<0.1	0%	NA	NA
	LB019369	mg/kg	0.1	<0.1		NA	
Phenanthrene	LB019368	mg/kg	0.1	<0.1	0%	113%	109%
	LB019369	mg/kg	0.1	<0.1		118%	
Anthracene	LB019368	mg/kg	0.1	<0.1	0%	104%	119%
	LB019369	mg/kg	0.1	<0.1		119%	
Fluoranthene	LB019368	mg/kg	0.1	<0.1	0%	119%	122%
	LB019369	mg/kg	0.1	<0.1		122%	
Pyrene	LB019368	mg/kg	0.1	<0.1	0%	115%	115%
	LB019369	mg/kg	0.1	<0.1		125%	
Benzo(a)anthracene	LB019368	mg/kg	0.1	<0.1	0%	NA	NA
	LB019369	mg/kg	0.1	<0.1		NA	

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.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil Method: ME-(AU)-[ENV]AN420 (continued)

				MB	DUP %RPD	LCS %Recovery	MS %Recovery
Chrysene	LB019368	mg/kg	0.1	<0.1	0%	NA	NA
	LB019369	mg/kg	0.1	<0.1		NA	
Benzo(b)fluoranthene	LB019368	mg/kg	0.1	<0.1	0%	NA	NA
	LB019369	mg/kg	0.1	<0.1		NA	
Benzo(k)fluoranthene	LB019368	mg/kg	0.1	<0.1	0%	NA	NA
	LB019369	mg/kg	0.1	<0.1		NA	
Benzo(a)pyrene	LB019368	mg/kg	0.1	<0.1	0%	114%	99%
	LB019369	mg/kg	0.1	<0.1		117%	
Indeno(1,2,3-cd)pyrene	LB019368	mg/kg	0.1	<0.1	0%	NA	NA
	LB019369	mg/kg	0.1	<0.1		NA	
Dibenzo(a&h)anthracene	LB019368	mg/kg	0.1	<0.1	0%	NA	NA
	LB019369	mg/kg	0.1	<0.1		NA	
Benzo(ghi)perylene	LB019368	mg/kg	0.1	<0.1	0%	NA	NA
	LB019369	mg/kg	0.1	<0.1		NA	
Total PAH (Vic EPA)	LB019368	mg/kg	0.8	<0.8	0%	NA	NA
	LB019369	mg/kg	0.8	<0.8		NA	

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
d5-nitrobenzene (Surrogate)	LB019368	%	-	118%	0 - 6%	108%	108%
	LB019369	%	-	112%		106%	
2-fluorobiphenyl (Surrogate)	LB019368	%	-	116%	4 - 7%	110%	108%
	LB019369	%	-	104%		100%	
d14-p-terphenyl (Surrogate)	LB019368	%	-	110%	2 - 20%	84%	90%
	LB019369	%	-	102%		90%	

PCBs in Soil Method: ME-(AU)-[ENV]AN400/AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Arochlor 1016	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Arochlor 1221	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Arochlor 1232	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Arochlor 1242	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Arochlor 1248	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Arochlor 1254	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Arochlor 1260	LB019368	mg/kg	0.2	<0.2	0%	140%
	LB019369	mg/kg	0.2	<0.2		78%
Arochlor 1262	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Arochlor 1268	LB019368	mg/kg	0.2	<0.2	0%	NA
	LB019369	mg/kg	0.2	<0.2		NA
Total PCBs (Arochlors)	LB019368	mg/kg	1	<1	0%	NA
	LB019369	mg/kg	1	<1		NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB019368	%	-	97%	1%	99%
	LB019369	%	-	103%		109%

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	LB019537	mg/kg	3	<3	14 - 31%	96%	92%
	LB019538	mg/kg	3	<3		96%	86%
Cadmium, Cd	LB019537	mg/kg	0.3	<0.3	0 - 34%	95%	88%
	LB019538	mg/kg	0.3	<0.3		95%	76%
Chromium, Cr	LB019537	mg/kg	0.3	<0.3	20 - 30%	96%	91%
	LB019538	mg/kg	0.3	<0.3		97%	143%
Copper, Cu	LB019537	mg/kg	0.5	<0.5	13 - 14%	95%	84%
	LB019538	mg/kg	0.5	<0.5		96%	87%
Lead, Pb	LB019537	mg/kg	1	<1	4 - 35%	96%	93%
	LB019538	mg/kg	1	<1	10 - 43%	96%	74%
Nickel, Ni	LB019537	mg/kg	0.5	<0.5	7 - 16%	98%	87%
	LB019538	mg/kg	0.5	<0.5		98%	80%
Zinc, Zn	LB019537	mg/kg	0.5	<0.5	35 - 43%	99%	162%
	LB019538	mg/kg	0.5	<0.5		99%	196%

TRH (Total Recoverable Hydrocarbons) in Soil **Method: ME-(AU)-[ENV]AN403**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C10-C14	LB019368	mg/kg	20	<20	0%	108%	113%
	LB019369	mg/kg	20	<20		110%	
TRH C15-C28	LB019368	mg/kg	50	<50	0%	103%	113%
	LB019369	mg/kg	50	<50		105%	
TRH C29-C36	LB019368	mg/kg	50	<50	0%	105%	115%
	LB019369	mg/kg	50	<50		100%	

VOC's in Soil **Method: ME-(AU)-[ENV]AN433/AN434**

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery	MS %Recovery
Benzene	LB019234	mg/kg	0.1	<0.1	106%	97%
	LB019235	mg/kg	0.1	<0.1	102%	
Toluene	LB019234	mg/kg	0.1	<0.1	103%	92%
	LB019235	mg/kg	0.1	<0.1	98%	
Ethylbenzene	LB019234	mg/kg	0.1	<0.1	101%	90%
	LB019235	mg/kg	0.1	<0.1	94%	
m/p-xylene	LB019234	mg/kg	0.2	<0.2	100%	92%
	LB019235	mg/kg	0.2	<0.2	99%	
o-xylene	LB019234	mg/kg	0.1	<0.1	88%	81%
	LB019235	mg/kg	0.1	<0.1	97%	

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB019234	%	-	99%	97%	97%
	LB019235	%	-	96%	98%	
d4-1,2-dichloroethane (Surrogate)	LB019234	%	-	102%	101%	100%
	LB019235	%	-	101%	103%	
d8-toluene (Surrogate)	LB019234	%	-	100%	100%	100%
	LB019235	%	-	100%	101%	
Bromofluorobenzene (Surrogate)	LB019234	%	-	69%	67%	75%
	LB019235	%	-	97%	102%	

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.

Volatile Petroleum Hydrocarbons in Soil **Method: ME-(AU)-[ENV]AN433/AN434**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C9	LB019234	mg/kg	20	<20	0%	119%	139%
	LB019235	mg/kg	20	<20	0%	126%	

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Trifluorotoluene (Surrogate)	LB019234	%	-	76%	3 - 8%	79%	73%
	LB019235	%	-	79%	0 - 7%	83%	

METHOD SUMMARY

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.
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
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with diffential polarity of the elluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
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).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433/AN434	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	This analysis is not covered by the scope of accreditation.
^	Performed by outside laboratory.
LOR	Limit of Reporting
↑↓	Raised or Lowered Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
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.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf

STATEMENT OF QA/QC PERFORMANCE

SE107753 R0

CLIENT DETAILS

Contact	Xanthe Holford
Client	Coffey Environments Pty Ltd
Address	17 Torrens St BRADDON ACT 2612
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Email	xanthe_holford@coffey.com
Project	**ENAUBRAD01182AA - Gungahlin**
Order Number	**94373-374**
Samples	23

LABORATORY DETAILS

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SGS Reference	SE107753 R0
Report Number	0000027420
Date Reported	07 May 2012

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 with the exception of the following:

Duplicate	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	2 items
	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	1 item
Matrix Spike	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	1 item
	Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest	2 items

SAMPLE SUMMARY

Sample counts by matrix	23 Soils	Type of documentation received	COC
Date documentation received	1/5/2012	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.6°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE107753 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
SS1	SE107753.001	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS2	SE107753.002	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS3	SE107753.003	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS4	SE107753.004	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS5	SE107753.005	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS6	SE107753.006	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS7	SE107753.007	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS8	SE107753.008	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS9	SE107753.009	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS10	SE107753.010	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS11	SE107753.011	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS12	SE107753.012	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS13	SE107753.013	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS14	SE107753.014	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS15	SE107753.015	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS16	SE107753.016	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS17	SE107753.017	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS18	SE107753.018	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
SS19	SE107753.019	LB019542	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
QC1	SE107753.020	LB019543	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012
QC2	SE107753.021	LB019543	27 Apr 2012	01 May 2012	25 May 2012	07 May 2012	25 May 2012	07 May 2012

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE107753.001	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS2	SE107753.002	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS3	SE107753.003	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS4	SE107753.004	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS5	SE107753.005	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS6	SE107753.006	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS7	SE107753.007	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS8	SE107753.008	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS9	SE107753.009	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS10	SE107753.010	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS11	SE107753.011	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS12	SE107753.012	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS13	SE107753.013	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS14	SE107753.014	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS15	SE107753.015	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS16	SE107753.016	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS17	SE107753.017	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS18	SE107753.018	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
SS19	SE107753.019	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
QC1	SE107753.020	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
QC2	SE107753.021	LB019350	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	08 May 2012	07 May 2012
Trip Blank	SE107753.022	LB019350	24 Apr 2012	01 May 2012	08 May 2012	03 May 2012	08 May 2012	07 May 2012

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE107753.001	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS2	SE107753.002	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS3	SE107753.003	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS4	SE107753.004	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS5	SE107753.005	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS6	SE107753.006	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS7	SE107753.007	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS8	SE107753.008	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS9	SE107753.009	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS10	SE107753.010	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS11	SE107753.011	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS12	SE107753.012	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012

HOLDING TIME SUMMARY

SE107753 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.

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS13	SE107753.013	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS14	SE107753.014	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS15	SE107753.015	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS16	SE107753.016	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS17	SE107753.017	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS18	SE107753.018	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS19	SE107753.019	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC1	SE107753.020	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC2	SE107753.021	LB019369	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
Trip Blank	SE107753.022	LB019369	24 Apr 2012	01 May 2012	08 May 2012	03 May 2012	12 Jun 2012	07 May 2012

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE107753.001	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS2	SE107753.002	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS3	SE107753.003	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS4	SE107753.004	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS5	SE107753.005	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS6	SE107753.006	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS7	SE107753.007	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS8	SE107753.008	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS9	SE107753.009	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS10	SE107753.010	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS11	SE107753.011	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS12	SE107753.012	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS13	SE107753.013	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS14	SE107753.014	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS15	SE107753.015	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS16	SE107753.016	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS17	SE107753.017	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS18	SE107753.018	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS19	SE107753.019	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC1	SE107753.020	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC2	SE107753.021	LB019369	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
Trip Blank	SE107753.022	LB019369	24 Apr 2012	01 May 2012	08 May 2012	03 May 2012	12 Jun 2012	07 May 2012

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
SS1	SE107753.001	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS2	SE107753.002	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS3	SE107753.003	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS4	SE107753.004	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS5	SE107753.005	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS6	SE107753.006	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS7	SE107753.007	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS8	SE107753.008	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS9	SE107753.009	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS10	SE107753.010	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS11	SE107753.011	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS12	SE107753.012	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS13	SE107753.013	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS14	SE107753.014	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS15	SE107753.015	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS16	SE107753.016	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS17	SE107753.017	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS18	SE107753.018	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS19	SE107753.019	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC1	SE107753.020	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC2	SE107753.021	LB019369	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
Trip Blank	SE107753.022	LB019369	24 Apr 2012	01 May 2012	08 May 2012	03 May 2012	12 Jun 2012	07 May 2012

HOLDING TIME SUMMARY

SE107753 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.

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE107753.001	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS2	SE107753.002	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS3	SE107753.003	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS4	SE107753.004	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS5	SE107753.005	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS6	SE107753.006	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS7	SE107753.007	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS8	SE107753.008	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS9	SE107753.009	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS10	SE107753.010	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS11	SE107753.011	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS12	SE107753.012	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS13	SE107753.013	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS14	SE107753.014	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS15	SE107753.015	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS16	SE107753.016	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS17	SE107753.017	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS18	SE107753.018	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS19	SE107753.019	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC1	SE107753.020	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC2	SE107753.021	LB019369	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
Trip Blank	SE107753.022	LB019369	24 Apr 2012	01 May 2012	08 May 2012	03 May 2012	12 Jun 2012	07 May 2012

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
SS1	SE107753.001	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS2	SE107753.002	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS3	SE107753.003	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS4	SE107753.004	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS5	SE107753.005	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS6	SE107753.006	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS7	SE107753.007	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS8	SE107753.008	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS9	SE107753.009	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS10	SE107753.010	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS11	SE107753.011	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS12	SE107753.012	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS13	SE107753.013	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS14	SE107753.014	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS15	SE107753.015	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS16	SE107753.016	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS17	SE107753.017	LB019537	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS18	SE107753.018	LB019538	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
SS19	SE107753.019	LB019538	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
QC1	SE107753.020	LB019538	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012
QC2	SE107753.021	LB019538	27 Apr 2012	01 May 2012	24 Oct 2012	07 May 2012	24 Oct 2012	07 May 2012

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE107753.001	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS2	SE107753.002	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS3	SE107753.003	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS4	SE107753.004	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS5	SE107753.005	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS6	SE107753.006	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS7	SE107753.007	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS8	SE107753.008	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS9	SE107753.009	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS10	SE107753.010	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS11	SE107753.011	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS12	SE107753.012	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012

HOLDING TIME SUMMARY

SE107753 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.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS13	SE107753.013	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS14	SE107753.014	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS15	SE107753.015	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS16	SE107753.016	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS17	SE107753.017	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS18	SE107753.018	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
SS19	SE107753.019	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC1	SE107753.020	LB019368	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
QC2	SE107753.021	LB019369	27 Apr 2012	01 May 2012	11 May 2012	03 May 2012	12 Jun 2012	07 May 2012
Trip Blank	SE107753.022	LB019369	24 Apr 2012	01 May 2012	08 May 2012	03 May 2012	12 Jun 2012	07 May 2012

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE107753.001	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS2	SE107753.002	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS3	SE107753.003	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS4	SE107753.004	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS5	SE107753.005	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS6	SE107753.006	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS7	SE107753.007	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS8	SE107753.008	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS9	SE107753.009	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS10	SE107753.010	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS11	SE107753.011	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS12	SE107753.012	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS13	SE107753.013	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS14	SE107753.014	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS15	SE107753.015	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS16	SE107753.016	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS17	SE107753.017	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS18	SE107753.018	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS19	SE107753.019	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
QC1	SE107753.020	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
QC2	SE107753.021	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
Trip Blank	SE107753.022	LB019235	24 Apr 2012	01 May 2012	08 May 2012	02 May 2012	11 Jun 2012	07 May 2012
Trip Spike	SE107753.023	LB019235	24 Apr 2012	01 May 2012	08 May 2012	02 May 2012	11 Jun 2012	07 May 2012

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE107753.001	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS2	SE107753.002	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS3	SE107753.003	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS4	SE107753.004	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS5	SE107753.005	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS6	SE107753.006	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS7	SE107753.007	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS8	SE107753.008	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS9	SE107753.009	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS10	SE107753.010	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS11	SE107753.011	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS12	SE107753.012	LB019234	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	04 May 2012
SS13	SE107753.013	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS14	SE107753.014	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS15	SE107753.015	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS16	SE107753.016	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS17	SE107753.017	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS18	SE107753.018	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
SS19	SE107753.019	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
QC1	SE107753.020	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
QC2	SE107753.021	LB019235	27 Apr 2012	01 May 2012	11 May 2012	02 May 2012	11 Jun 2012	07 May 2012
Trip Blank	SE107753.022	LB019235	24 Apr 2012	01 May 2012	08 May 2012	02 May 2012	11 Jun 2012	07 May 2012

HOLDING TIME SUMMARY

SE107753 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.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Trip Spike	SE107753.023	LB019235	24 Apr 2012	01 May 2012	08 May 2012	02 May 2012	11 Jun 2012	07 May 2012

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.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	SS4	SE107753.004	%	60 - 130%	101
	SS11	SE107753.011	%	60 - 130%	110
	SS16	SE107753.016	%	60 - 130%	107
	SS18	SE107753.018	%	60 - 130%	111
	SS19	SE107753.019	%	60 - 130%	99
	QC2	SE107753.021	%	60 - 130%	82

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	SS4	SE107753.004	%	60 - 130%	114
	SS11	SE107753.011	%	60 - 130%	98
	SS16	SE107753.016	%	60 - 130%	114
	SS18	SE107753.018	%	60 - 130%	120
	SS19	SE107753.019	%	60 - 130%	112
	QC2	SE107753.021	%	60 - 130%	84
d14-p-terphenyl (Surrogate)	SS4	SE107753.004	%	60 - 130%	100
	SS11	SE107753.011	%	60 - 130%	98
	SS16	SE107753.016	%	60 - 130%	120
	SS18	SE107753.018	%	60 - 130%	100
	SS19	SE107753.019	%	60 - 130%	108
	QC2	SE107753.021	%	60 - 130%	82

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	SS1	SE107753.001	%	60 - 130%	104
	SS2	SE107753.002	%	60 - 130%	116
	SS3	SE107753.003	%	60 - 130%	116
	SS4	SE107753.004	%	60 - 130%	114
	SS5	SE107753.005	%	60 - 130%	124
	SS6	SE107753.006	%	60 - 130%	110
	SS7	SE107753.007	%	60 - 130%	114
	SS8	SE107753.008	%	60 - 130%	110
	SS9	SE107753.009	%	60 - 130%	116
	SS10	SE107753.010	%	60 - 130%	118
	SS11	SE107753.011	%	60 - 130%	98
	SS12	SE107753.012	%	60 - 130%	120
	SS13	SE107753.013	%	60 - 130%	116
	SS14	SE107753.014	%	60 - 130%	118
	SS15	SE107753.015	%	60 - 130%	122
	SS16	SE107753.016	%	60 - 130%	114
	SS17	SE107753.017	%	60 - 130%	106
	SS18	SE107753.018	%	60 - 130%	120
	SS19	SE107753.019	%	60 - 130%	112
	QC1	SE107753.020	%	60 - 130%	106
	QC2	SE107753.021	%	60 - 130%	84
d14-p-terphenyl (Surrogate)	SS1	SE107753.001	%	60 - 130%	96
	SS2	SE107753.002	%	60 - 130%	104
	SS3	SE107753.003	%	60 - 130%	102
	SS4	SE107753.004	%	60 - 130%	100
	SS5	SE107753.005	%	60 - 130%	106
	SS6	SE107753.006	%	60 - 130%	98
	SS7	SE107753.007	%	60 - 130%	98
	SS8	SE107753.008	%	60 - 130%	98
	SS9	SE107753.009	%	60 - 130%	104
	SS10	SE107753.010	%	60 - 130%	102
	SS11	SE107753.011	%	60 - 130%	98
	SS12	SE107753.012	%	60 - 130%	102
	SS13	SE107753.013	%	60 - 130%	106
	SS14	SE107753.014	%	60 - 130%	114
	SS15	SE107753.015	%	60 - 130%	118
	SS16	SE107753.016	%	60 - 130%	120
	SS17	SE107753.017	%	60 - 130%	102

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 (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d14-p-terphenyl (Surrogate)	SS18	SE107753.018	%	60 - 130%	100
	SS19	SE107753.019	%	60 - 130%	108
	QC1	SE107753.020	%	60 - 130%	100
	QC2	SE107753.021	%	60 - 130%	82
d5-nitrobenzene (Surrogate)	SS1	SE107753.001	%	60 - 130%	98
	SS2	SE107753.002	%	60 - 130%	110
	SS3	SE107753.003	%	60 - 130%	110
	SS4	SE107753.004	%	60 - 130%	110
	SS5	SE107753.005	%	60 - 130%	118
	SS6	SE107753.006	%	60 - 130%	102
	SS7	SE107753.007	%	60 - 130%	112
	SS8	SE107753.008	%	60 - 130%	104
	SS9	SE107753.009	%	60 - 130%	114
	SS10	SE107753.010	%	60 - 130%	116
	SS11	SE107753.011	%	60 - 130%	116
	SS12	SE107753.012	%	60 - 130%	116
	SS13	SE107753.013	%	60 - 130%	116
	SS14	SE107753.014	%	60 - 130%	116
	SS15	SE107753.015	%	60 - 130%	126
	SS16	SE107753.016	%	60 - 130%	118
	SS17	SE107753.017	%	60 - 130%	114
	SS18	SE107753.018	%	60 - 130%	120
	SS19	SE107753.019	%	60 - 130%	120
	QC1	SE107753.020	%	60 - 130%	112
	QC2	SE107753.021	%	60 - 130%	88

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	SS4	SE107753.004	%	60 - 130%	101
	SS11	SE107753.011	%	60 - 130%	110
	SS16	SE107753.016	%	60 - 130%	107
	SS18	SE107753.018	%	60 - 130%	111
	SS19	SE107753.019	%	60 - 130%	99
	QC2	SE107753.021	%	60 - 130%	82

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	Trip Spike	SE107753.023	%	60 - 130%	61
d4-1,2-dichloroethane (Surrogate)	Trip Spike	SE107753.023	%	60 - 130%	96
d8-toluene (Surrogate)	Trip Spike	SE107753.023	%	60 - 130%	93
Dibromofluoromethane (Surrogate)	Trip Spike	SE107753.023	%	60 - 130%	96

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Trifluorotoluene (Surrogate)	SS1	SE107753.001	%	60 - 130%	68
	SS2	SE107753.002	%	60 - 130%	64
	SS3	SE107753.003	%	60 - 130%	65
	SS4	SE107753.004	%	60 - 130%	65
	SS5	SE107753.005	%	60 - 130%	73
	SS6	SE107753.006	%	60 - 130%	70
	SS7	SE107753.007	%	60 - 130%	62
	SS8	SE107753.008	%	60 - 130%	74
	SS9	SE107753.009	%	60 - 130%	65
	SS10	SE107753.010	%	60 - 130%	74
	SS11	SE107753.011	%	60 - 130%	93
	SS12	SE107753.012	%	60 - 130%	76
	SS13	SE107753.013	%	60 - 130%	72
	SS14	SE107753.014	%	60 - 130%	71
	SS15	SE107753.015	%	60 - 130%	70
	SS16	SE107753.016	%	60 - 130%	73
	SS17	SE107753.017	%	60 - 130%	73
	SS18	SE107753.018	%	60 - 130%	70

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.

Volatile Petroleum Hydrocarbons in Soil (continued) — **Method: ME-(AU)-[ENV]AN433/AN434**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Trifluorotoluene (Surrogate)	SS19	SE107753.019	%	60 - 130%	70
	QC1	SE107753.020	%	60 - 130%	75
	QC2	SE107753.021	%	60 - 130%	71
	Trip Blank	SE107753.022	%	60 - 130%	75

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
LB019542.001	Mercury	mg/kg	0.05	<0.05
LB019543.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB019368.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	97
LB019369.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	103

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result
LB019368.001	Dichlorvos	mg/kg	0.5	<0.5
	Dimethoate	mg/kg	0.5	<0.5
	Diazinon (Dimpylate)	mg/kg	0.5	<0.5
	Fenitrothion	mg/kg	0.2	<0.2
	Malathion	mg/kg	0.2	<0.2
	Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
	Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
	Bromophos Ethyl	mg/kg	0.2	<0.2
	Methidathion	mg/kg	0.5	<0.5

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.

OP Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB019368.001		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	116
		d14-p-terphenyl (Surrogate)	%	-	110
LB019369.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	104
		d14-p-terphenyl (Surrogate)	%	-	102

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB019368.001		Naphthalene	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
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	118
		2-fluorobiphenyl (Surrogate)	%	-	116
		d14-p-terphenyl (Surrogate)	%	-	110
LB019369.001		Naphthalene	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
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	112
		2-fluorobiphenyl (Surrogate)	%	-	104
		d14-p-terphenyl (Surrogate)	%	-	102

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result
LB019368.001	Arochlor 1016	mg/kg	0.2	<0.2
	Arochlor 1221	mg/kg	0.2	<0.2
	Arochlor 1232	mg/kg	0.2	<0.2
	Arochlor 1242	mg/kg	0.2	<0.2
	Arochlor 1248	mg/kg	0.2	<0.2

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.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB019368.001		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	97
LB019369.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	103

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB019537.001	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
LB019538.001	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

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB019368.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	50	<50
	TRH C29-C36	mg/kg	50	<50
LB019369.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	50	<50
	TRH C29-C36	mg/kg	50	<50

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB019235.001	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1
	Hydrocarbons	Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	96
		d4-1,2-dichloroethane (Surrogate)	%	-	101
		d8-toluene (Surrogate)	%	-	100
		Bromofluorobenzene (Surrogate)	%	-	97

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB019234.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Trifluorotoluene (Surrogate)	%	-	76
LB019235.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Trifluorotoluene (Surrogate)	%	-	79

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 %
SE107753.010	LB019542.014	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE107753.019	LB019542.024	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE107753.021	LB019543.006	Mercury	mg/kg	0.05	<0.05	<0.05	200	0

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE107753.004	LB019368.007		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
			Endrin	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	100	100	30	1

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE107753.016	LB019368.019		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	%	-	114.0	106.0	30	7
			d14-p-terphenyl (Surrogate)	%	-	120.0	98.0	30	20

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE107753.001	LB019368.004	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(b)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0

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.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE107753.001	LB019368.004		Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Total PAH (Vic EPA)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	%	-	98.0	104.0	30	6
			2-fluorobiphenyl (Surrogate)	%	-	104.0	108.0	30	4
			d14-p-terphenyl (Surrogate)	%	-	96.0	98.0	30	2
SE107753.016	LB019368.021		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Total PAH (Vic EPA)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	%	-	118.0	118.0	30	0
			2-fluorobiphenyl (Surrogate)	%	-	114.0	106.0	30	7
			d14-p-terphenyl (Surrogate)	%	-	120.0	98.0	30	20

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE107753.004	LB019368.007		Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	100	100	30	1

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 %
SE107753.008	LB019537.014	Arsenic, As	mg/kg	3	3	<3	127	14
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	18	13	32	30
		Copper, Cu	mg/kg	0.5	9.0	7.9	36	14
		Lead, Pb	mg/kg	1	11	11	39	4
		Nickel, Ni	mg/kg	0.5	8.0	6.8	37	16
		Zinc, Zn	mg/kg	0.5	47	31	31	43 ②
SE107753.017	LB019537.024	Arsenic, As	mg/kg	3	6	4	88	31
		Cadmium, Cd	mg/kg	0.3	0.4	<0.3	113	34
		Chromium, Cr	mg/kg	0.3	74	60	30	20
		Copper, Cu	mg/kg	0.5	9.5	8.4	36	13
		Lead, Pb	mg/kg	1	27	19	34	35 ②
		Nickel, Ni	mg/kg	0.5	4.8	4.5	41	7
		Zinc, Zn	mg/kg	0.5	12	8.7	35	35
SE107820.006	LB019538.014	Lead, Pb	mg/kg	1	9	10	40	10
SE107820.012	LB019538.021	Lead, Pb	mg/kg	1	25	16	35	43 ②

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.

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE107753.001	LB019368.004	TRH C10-C14	mg/kg	20	<20	<20	200	0
		TRH C15-C28	mg/kg	50	<50	<50	200	0
		TRH C29-C36	mg/kg	50	<50	<50	200	0
SE107753.016	LB019368.021	TRH C10-C14	mg/kg	20	<20	<20	200	0
		TRH C15-C28	mg/kg	50	<50	<50	200	0
		TRH C29-C36	mg/kg	50	<50	<50	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE107753.002	LB019234.014		TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Trifluorotoluene (Surrogate)	%	-	64	66	30	3
SE107753.012	LB019234.025		TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Trifluorotoluene (Surrogate)	%	-	76	70	30	8
SE107753.013	LB019235.004		TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Trifluorotoluene (Surrogate)	%	-	72	72	30	0
SE107753.022	LB019235.014		TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Trifluorotoluene (Surrogate)	%	-	75	70	30	7

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 %
LB019542.002	Mercury	mg/kg	0.05	0.21	0.2	70 - 130	105
LB019543.002	Mercury	mg/kg	0.05	0.23	0.2	70 - 130	115

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB019368.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	90
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	95
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	80
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	90
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	95
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	80
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	92	100	60 - 140	92
LB019369.002		Heptachlor	mg/kg	0.1	0.3	0.2	60 - 140	140
		Aldrin	mg/kg	0.1	0.3	0.2	60 - 140	140
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	110
		Dieldrin	mg/kg	0.2	0.3	0.2	60 - 140	130
		Endrin	mg/kg	0.2	0.3	0.2	60 - 140	135
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	120
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	130	100	60 - 140	126

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB019368.002		Dichlorvos	mg/kg	0.5	1.3	1.33	60 - 140	94
		Diazinon (Dimpylate)	mg/kg	0.5	1.3	1.33	60 - 140	96
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.5	1.33	60 - 140	111
		Ethion	mg/kg	0.2	1.5	1.33	60 - 140	110
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	92.0	100	60 - 120	92
		d14-p-terphenyl (Surrogate)	%	-	86.0	100	60 - 140	86
LB019369.002		Dichlorvos	mg/kg	0.5	1.2	1.33	60 - 140	89
		Diazinon (Dimpylate)	mg/kg	0.5	1.3	1.33	60 - 140	98
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	1.5	1.33	60 - 140	113
		Ethion	mg/kg	0.2	1.3	1.33	60 - 140	101
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	90.0	100	60 - 120	90
		d14-p-terphenyl (Surrogate)	%	-	82.0	100	60 - 140	82

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB019368.002		Naphthalene	mg/kg	0.1	4.0	4	60 - 140	100
		Acenaphthylene	mg/kg	0.1	4.9	4	60 - 140	122
		Acenaphthene	mg/kg	0.1	3.9	4	60 - 140	97
		Phenanthrene	mg/kg	0.1	4.5	4	60 - 140	113
		Anthracene	mg/kg	0.1	4.2	4	60 - 140	104
		Fluoranthene	mg/kg	0.1	4.8	4	60 - 140	119
		Pyrene	mg/kg	0.1	4.6	4	60 - 140	115
		Benzo(a)pyrene	mg/kg	0.1	4.6	4	60 - 140	114
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	108.0	100	60 - 140	108
		2-fluorobiphenyl (Surrogate)	%	-	110.0	100	60 - 140	110
		d14-p-terphenyl (Surrogate)	%	-	84.0	100	60 - 140	84
LB019369.002		Naphthalene	mg/kg	0.1	3.8	4	60 - 140	94
		Acenaphthylene	mg/kg	0.1	4.7	4	60 - 140	118
		Acenaphthene	mg/kg	0.1	4.8	4	60 - 140	119
		Phenanthrene	mg/kg	0.1	4.7	4	60 - 140	118
		Anthracene	mg/kg	0.1	4.8	4	60 - 140	119
		Fluoranthene	mg/kg	0.1	4.9	4	60 - 140	122
		Pyrene	mg/kg	0.1	5.0	4	60 - 140	125
		Benzo(a)pyrene	mg/kg	0.1	4.7	4	60 - 140	117
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	106.0	100	60 - 140	106
		2-fluorobiphenyl (Surrogate)	%	-	100.0	100	60 - 140	100
		d14-p-terphenyl (Surrogate)	%	-	90.0	100	60 - 140	90

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR

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.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB019368.002		Arochlor 1260	mg/kg	0.2	0.6	0.4	60 - 140	140
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	99	100	60 - 140	99
LB019369.002		Arochlor 1260	mg/kg	0.2	0.3	0.4	60 - 140	78
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	110	100	60 - 140	109

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 %
LB019537.002	Arsenic, As	mg/kg	3	48	50	80 - 120	96
	Cadmium, Cd	mg/kg	0.3	47	50	80 - 120	95
	Chromium, Cr	mg/kg	0.3	48	50	80 - 120	96
	Copper, Cu	mg/kg	0.5	47	50	80 - 120	95
	Lead, Pb	mg/kg	1	48	50	80 - 120	96
	Nickel, Ni	mg/kg	0.5	49	50	80 - 120	98
	Zinc, Zn	mg/kg	0.5	50	50	80 - 120	99
LB019538.002	Arsenic, As	mg/kg	3	48	50	80 - 120	96
	Cadmium, Cd	mg/kg	0.3	48	50	80 - 120	95
	Chromium, Cr	mg/kg	0.3	48	50	80 - 120	97
	Copper, Cu	mg/kg	0.5	48	50	80 - 120	96
	Lead, Pb	mg/kg	1	48	50	80 - 120	96
	Nickel, Ni	mg/kg	0.5	49	50	80 - 120	98
	Zinc, Zn	mg/kg	0.5	50	50	80 - 120	99

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB019368.002	TRH C10-C14	mg/kg	20	43	40	60 - 140	108
	TRH C15-C28	mg/kg	50	<50	40	60 - 140	103
	TRH C29-C36	mg/kg	50	<50	40	60 - 140	105
LB019369.002	TRH C10-C14	mg/kg	20	44	40	60 - 140	110
	TRH C15-C28	mg/kg	50	<50	40	60 - 140	105
	TRH C29-C36	mg/kg	50	<50	40	60 - 140	100

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB019235.002	Monocyclic	Benzene	mg/kg	0.1	3.1	3	60 - 140	102
	Aromatic	Toluene	mg/kg	0.1	2.9	3	60 - 140	98
		Ethylbenzene	mg/kg	0.1	2.8	3	60 - 140	94
		m/p-xylene	mg/kg	0.2	5.9	5.9	60 - 140	99
		o-xylene	mg/kg	0.1	2.8	2.9	60 - 140	97
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	98.0	100	60 - 140	98
		d4-1,2-dichloroethane (Surrogate)	%	-	103.0	100	60 - 140	103
		d8-toluene (Surrogate)	%	-	101.0	100	60 - 140	101
		Bromofluorobenzene (Surrogate)	%	-	102.0	100	60 - 140	102

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB019234.002	TRH C6-C9	mg/kg	20	29	24.4	60 - 140	119
LB019235.002	TRH C6-C9	mg/kg	20	31	24.4	60 - 140	126

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%
SE107753.001	LB019542.004	Mercury	mg/kg	0.05	0.26	<0.05	0.2	119
SE107753.020	LB019543.004	Mercury	mg/kg	0.05	0.25	<0.05	0.2	105

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE107753.003	LB019368.007		Naphthalene	mg/kg	0.1	3.9	<0.1	4	98
			Acenaphthylene	mg/kg	0.1	4.6	<0.1	4	115
			Acenaphthene	mg/kg	0.1	4.1	<0.1	4	102
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	4.4	<0.1	4	109
			Anthracene	mg/kg	0.1	4.8	<0.1	4	119
			Fluoranthene	mg/kg	0.1	4.9	<0.1	4	122
			Pyrene	mg/kg	0.1	4.6	<0.1	4	115
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	3.9	<0.1	4	99
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(a&h)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Total PAH (Vic EPA)	mg/kg	0.8	35	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	%	-	108.0	110.0	100	108
			2-fluorobiphenyl (Surrogate)	%	-	108.0	116.0	100	108
			d14-p-terphenyl (Surrogate)	%	-	90.0	102.0	100	90

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%
SE107752.013	LB019537.004	Arsenic, As	mg/kg	3	55	9	50	92
		Cadmium, Cd	mg/kg	0.3	44	<0.3	50	88
		Chromium, Cr	mg/kg	0.3	57	11	50	91
		Copper, Cu	mg/kg	0.5	78	36	50	84
		Lead, Pb	mg/kg	1	100	58	50	93
		Nickel, Ni	mg/kg	0.5	56	13	50	87
		Zinc, Zn	mg/kg	0.5	320	240	50	162 ⑤
SE107753.018	LB019538.004	Arsenic, As	mg/kg	3	44	<3	50	86
		Cadmium, Cd	mg/kg	0.3	39	0.8	50	76
		Chromium, Cr	mg/kg	0.3	200	130	50	143 ⑨
		Copper, Cu	mg/kg	0.5	52	8.8	50	87
		Lead, Pb	mg/kg	1	78	41	50	74
		Nickel, Ni	mg/kg	0.5	45	5.1	50	80
		Zinc, Zn	mg/kg	0.5	190	96	50	196 ⑨

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE107753.002	LB019368.006	TRH C10-C14	mg/kg	20	45	<20	40	113
		TRH C15-C28	mg/kg	50	<50	<50	40	113
		TRH C29-C36	mg/kg	50	<50	<50	40	115

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433/AN434

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE107752.001	LB019234.005		TRH C6-C9	mg/kg	20	34	<20	24.4	139
		Surrogates	Trifluorotoluene (Surrogate)	%	-	73	76	-	73

MATRIX SPIKE DUPLICATES

SE107753 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.

SAMPLE RECEIPT ADVICE

SE107753

CLIENT DETAILS

Client	Coffey Environments Pty Ltd	Project	ENAUBRAD01182AA - Gungahlin

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury in Soil	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in	PCBs in Soil	Total Recoverable Metals in Soil by ICPOES from	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	SS1	1	-	-	20	-	7	4	-	6
002	SS2	1	-	-	20	-	7	4	-	6
003	SS3	1	-	-	20	-	7	4	-	6
004	SS4	1	26	13	20	11	7	4	-	6
005	SS5	1	-	-	20	-	7	4	-	6
006	SS6	1	-	-	20	-	7	4	-	6
007	SS7	1	-	-	20	-	7	4	-	6
008	SS8	1	-	-	20	-	7	4	-	6
009	SS9	1	-	-	20	-	7	4	-	6
010	SS10	1	-	-	20	-	7	4	-	6
011	SS11	1	26	13	20	11	7	4	-	6
012	SS12	1	-	-	20	-	7	4	-	6
013	SS13	1	-	-	20	-	7	4	-	6
014	SS14	1	-	-	20	-	7	4	-	6
015	SS15	1	-	-	20	-	7	4	-	6
016	SS16	1	26	13	20	11	7	4	-	6
017	SS17	1	-	-	20	-	7	4	-	6
018	SS18	1	26	13	20	11	7	4	-	6
019	SS19	1	26	13	20	11	7	4	-	6
020	QC1	1	-	-	20	-	7	4	-	6
021	QC2	1	26	13	20	11	7	4	-	6
022	Trip Blank	-	-	-	-	-	-	4	-	6
023	Trip Spike	-	-	-	-	-	-	-	11	-

CONTINUED OVERLEAF

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.

SAMPLE RECEIPT ADVICE

SE107753

CLIENT DETAILS

Client	Coffey Environments Pty Ltd	Project	ENAUBRAD01182AA - Gungahlin

SUMMARY OF ANALYSIS

No.	Sample ID	Moisture Content
001	SS1	1
002	SS2	1
003	SS3	1
004	SS4	1
005	SS5	1
006	SS6	1
007	SS7	1
008	SS8	1
009	SS9	1
010	SS10	1
011	SS11	1
012	SS12	1
013	SS13	1
014	SS14	1
015	SS15	1
016	SS16	1
017	SS17	1
018	SS18	1
019	SS19	1
020	QC1	1
021	QC2	1
022	Trip Blank	1

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.

ANALYTICAL REPORT

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Xanthe Holford	Manager	Huong Crawford
Client	Coffey Environments Pty Ltd	Laboratory	SGS Alexandria Environmental
Address	17 Torrens St BRADDON ACT 2612	Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	02 6248 7154	Telephone	+61 2 8594 0400
Facsimile	02 6248 7157	Facsimile	+61 2 8594 0499
Email	xanthe_holford@coffey.com	Email	au.environmental.sydney@sgs.com
Project	**ENAUBRAD01182AA - Gungahlin**	SGS Reference	SE107753A R0
Order Number	**94373-374**	Report Number	0000029249
Samples	1	Date Reported	21 May 2012
		Date Received	15 May 2012

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Andy Sutton
Organics Chemist

Parameter	Units	LOR	Sample Number SE107753A.011 Sample Matrix Soil Sample Date 27 Apr 2012 Sample Name SS11
TPH Silica Gel (Total Petroleum Hydrocarbons - Silica Gel) in Soil	**Method: AN403**		
TPH C10-C14 Silica Gel	mg/kg	20	<20
TPH C15-C28 Silica Gel	mg/kg	50	<50
TPH C29-C36 Silica Gel	mg/kg	50	<50

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.

TPH Silica Gel (Total Petroleum Hydrocarbons - Silica Gel) in Soil **Method: ME-(AU)-[ENV]AN403**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
TPH C10-C14 Silica Gel	LB020218	mg/kg	20	<20	110%
TPH C15-C28 Silica Gel	LB020218	mg/kg	50	<50	105%
TPH C29-C36 Silica Gel	LB020218	mg/kg	50	<50	103%

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with diffential polarity of the elluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependant on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	This analysis is not covered by the scope of accreditation.
^	Performed by outside laboratory.
LOR	Limit of Reporting
↑↓	Raised or Lowered Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
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.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf

SAMPLE RECEIPT ADVICE

SE107753A

CLIENT DETAILS

Contact	Julia Jasonsmith
Client	Coffey Environments Pty Ltd
Address	17 Torrens Street Braddon ACT 2612
Telephone	02 6162 2622
Facsimile	02 6262 0494
Email	julia_jasonsmith@coffey.com
Project	**ENAUBRAD01182AA - Gungahlin**
Order Number	**94373-374**
Samples	1

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 15/5/2012
Report Due	Mon 21/5/2012
SGS Reference	**SE107753A**

SUBMISSION DETAILS

This is to confirm that 1 sample was received on Tuesday 15/5/2012. Results are expected to be ready by Monday 21/5/2012. Please quote SGS reference SE107753A 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	15/5/2012	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.6°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	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

Project Name : Gungahlin Town Centre East Stockpile.

SAMPLE RECEIPT ADVICE

SE107753A

CLIENT DETAILS

Client	Coffey Environments Pty Ltd	Project	ENAUBRAD01182AA - Gungahlin

SUMMARY OF ANALYSIS

No.	Sample ID	TPH Silica Gel (Total Petroleum Hydrocarbons -
011	SS11	3

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.

AU.SampleReceipt.Sydney (Sydney)

SGS REF : 107753-A

TA : STD
DUE : 21.5.12

From: Pichai, Prasanna (Sydney)
Sent: Tuesday, 15 May 2012 10:48 AM
To: AU.SampleReceipt.Sydney (Sydney)
Subject: FW: Report Job SE107753, your reference ENAUBRAD01182AA - Gungahlin

Hi team,

Please see email from client below.

Could we please create an "A" job for silica gel clean up on sample SS11?

Kindly let me know once this done.

Thanks,

Kind Regards,
Prasanna Pichai
Environmental Services
Client Services Officer
SGS Australia Pty Ltd
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Phone: +61 (0)2 8594 0465
Fax: + 61 (0)2 8594 0499
E-mail: Prasanna.Pichai @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: AU.Environmental.Sydney (Sydney)
Sent: Tuesday, 15 May 2012 10:43 AM
To: Pichai, Prasanna (Sydney)
Subject: FW: Report Job SE107753, your reference ENAUBRAD01182AA - Gungahlin

Thanks

Regards,

Huong

-----Original Message-----
From: Julia Jasonsmith [mailto:Julia_Jasonsmith@coffey.com]
Sent: Monday, 14 May 2012 1:29 PM
To: AU.Environmental.Sydney (Sydney); Xanthe Holford

Subject: RE: Report Job SE107753, your reference ENAUBRAD01182AA - Gungahlin

Hey Prasannaa,

The sample SS11 from the above job (your reference SE107753) had TPH C19 - C36 concentrations of 1880 mg/kg.
Would we be able to run a silica gel cleanup for this sample please?

Let me know. Jules

DR. JULIA JASONSMITH
Environmental Scientist
Coffey Environments
17 Torrens Street Braddon ACT 2612 Australia T +61 2 6216 0206 F +61 2 6162 0494 M +61 417 250 707 coffey.com

-----Original Message-----
From: AU.Environmental.Sydney@SGS.com [mailto:AU.Environmental.Sydney@SGS.com]
Sent: Monday, 7 May 2012 6:59 PM
To: Cheryl Halim; Johnson Bei; Julia Jasonsmith; Xanthe Holford
Subject: Report Job SE107753, your reference ENAUBRAD01182AA - Gungahlin

Dear Sir/Madam,
Attached is the report for our Job SE107753, your reference ENAUBRAD01182AA - Gungahlin

Regards,
Prasanna Pichai
Client Services

STATEMENT OF QA/QC PERFORMANCE

SE107753A R0

CLIENT DETAILS

Contact	Xanthe Holford
Client	Coffey Environments Pty Ltd
Address	17 Torrens St BRADDON ACT 2612
Telephone	02 6248 7154
Facsimile	02 6248 7157
Email	xanthe_holford@coffey.com
Project	**ENAUBRAD01182AA - Gungahlin**
Order Number	**94373-374**
Samples	1

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
SGS Reference	SE107753A R0
Report Number	0000029250
Date Reported	21 May 2012

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 with the exception of the following:

Extraction Date	TPH Silica Gel (Total Petroleum Hydrocarbons - Silica Gel) in Soil	1 item

SAMPLE SUMMARY

Sample counts by matrix	1 Soil	Type of documentation received	Email
Date documentation received	15/5/2012	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.6°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE107753A 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.

TPH Silica Gel (Total Petroleum Hydrocarbons - Silica Gel) in Soil — **Method: ME-(AU)-[ENV]AN403**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS11	SE107753A.011	LB020218	27 Apr 2012	15 May 2012	11 May 2012	15 May 2012†	24 Jun 2012	21 May 2012

SURROGATES

SE107753A R0

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.

No surrogates were required for this job.

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.

TPH Silica Gel (Total Petroleum Hydrocarbons - Silica Gel) in Soil — **Method: ME-(AU)-[ENV]AN403**

Sample Number	Parameter	Units	LOR	Result
LB020218.001	TPH C10-C14 Silica Gel	mg/kg	20	<20
	TPH C15-C28 Silica Gel	mg/kg	50	<50
	TPH C29-C36 Silica Gel	mg/kg	50	<50

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.

No duplicates were required for this job.

LABORATORY CONTROL SAMPLES

SE107753A R0

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.

TPH Silica Gel (Total Petroleum Hydrocarbons - Silica Gel) in Soil — Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB020218.002	TPH C10-C14 Silica Gel	mg/kg	20	44	40	70 - 130	110
	TPH C15-C28 Silica Gel	mg/kg	50	<50	40	70 - 130	105
	TPH C29-C36 Silica Gel	mg/kg	50	<50	40	70 - 130	103

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.

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

SE107753A 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.

STATEMENT OF QA/QC PERFORMANCE

SE107753B R0

CLIENT DETAILS

Contact	Xanthe Holford
Client	Coffey Environments Pty Ltd
Address	17 Torrens St BRADDON ACT 2612
Telephone	02 6248 7154
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Email	xanthe_holford@coffey.com
Project	**ENAUBRAD01182AA - Gungahlin - Additional**
Order Number	**94373-374**
Samples	21

LABORATORY DETAILS

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SGS Reference	SE107753B R0
Report Number	0000028876
Date Reported	17 May 2012

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 with the exception of the following:

Extraction Date	VOC's in Soil	21 items

SAMPLE SUMMARY

Sample counts by matrix	21 Soils	Type of documentation received	Email
Date documentation received	16/5/12@14:42pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.6°C
Sample container provider	SGS	Turnaround time requested	Next Day
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

SE107753B 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.

Metals in Soil (TCLP) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS3	SE107753B.003	LB020247	27 Apr 2012	01 May 2012	24 Oct 2012	17 May 2012	24 Oct 2012	17 May 2012
SS8	SE107753B.008	LB020247	27 Apr 2012	01 May 2012	24 Oct 2012	17 May 2012	24 Oct 2012	17 May 2012
SS12	SE107753B.012	LB020247	27 Apr 2012	01 May 2012	24 Oct 2012	17 May 2012	24 Oct 2012	17 May 2012
SS17	SE107753B.017	LB020247	27 Apr 2012	01 May 2012	24 Oct 2012	17 May 2012	24 Oct 2012	17 May 2012
SS18	SE107753B.018	LB020247	27 Apr 2012	01 May 2012	24 Oct 2012	17 May 2012	24 Oct 2012	17 May 2012
QC1	SE107753B.020	LB020247	27 Apr 2012	01 May 2012	24 Oct 2012	17 May 2012	24 Oct 2012	17 May 2012
QC2	SE107753B.021	LB020247	27 Apr 2012	01 May 2012	24 Oct 2012	17 May 2012	24 Oct 2012	17 May 2012

TCLP (Toxicity Characteristic Leaching Procedure) for Metals

Method: ME-(AU)-[ENV]AN006

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS3	SE107753B.003	LB020202	27 Apr 2012	01 May 2012	26 Jul 2012	16 May 2012	26 Jul 2012	17 May 2012
SS8	SE107753B.008	LB020202	27 Apr 2012	01 May 2012	26 Jul 2012	16 May 2012	26 Jul 2012	17 May 2012
SS12	SE107753B.012	LB020202	27 Apr 2012	01 May 2012	26 Jul 2012	16 May 2012	26 Jul 2012	17 May 2012
SS17	SE107753B.017	LB020202	27 Apr 2012	01 May 2012	26 Jul 2012	16 May 2012	26 Jul 2012	17 May 2012
SS18	SE107753B.018	LB020202	27 Apr 2012	01 May 2012	26 Jul 2012	16 May 2012	26 Jul 2012	17 May 2012
QC1	SE107753B.020	LB020202	27 Apr 2012	01 May 2012	26 Jul 2012	16 May 2012	26 Jul 2012	17 May 2012
QC2	SE107753B.021	LB020202	27 Apr 2012	01 May 2012	26 Jul 2012	16 May 2012	26 Jul 2012	17 May 2012

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SS1	SE107753B.001	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS2	SE107753B.002	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS3	SE107753B.003	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS4	SE107753B.004	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS5	SE107753B.005	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS6	SE107753B.006	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS7	SE107753B.007	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS8	SE107753B.008	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS9	SE107753B.009	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS10	SE107753B.010	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS11	SE107753B.011	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS12	SE107753B.012	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS13	SE107753B.013	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS14	SE107753B.014	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS15	SE107753B.015	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS16	SE107753B.016	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS17	SE107753B.017	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS18	SE107753B.018	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
SS19	SE107753B.019	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
QC1	SE107753B.020	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012
QC2	SE107753B.021	LB020279	27 Apr 2012	01 May 2012	11 May 2012	17 May 2012†	26 Jun 2012	17 May 2012

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.

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	SS1	SE107753B.001	%	60 - 130%	106
	SS2	SE107753B.002	%	60 - 130%	103
	SS3	SE107753B.003	%	60 - 130%	98
	SS4	SE107753B.004	%	60 - 130%	100
	SS5	SE107753B.005	%	60 - 130%	94
	SS6	SE107753B.006	%	60 - 130%	93
	SS7	SE107753B.007	%	60 - 130%	92
	SS8	SE107753B.008	%	60 - 130%	92
	SS9	SE107753B.009	%	60 - 130%	93
	SS10	SE107753B.010	%	60 - 130%	92
	SS11	SE107753B.011	%	60 - 130%	86
	SS12	SE107753B.012	%	60 - 130%	80
	SS13	SE107753B.013	%	60 - 130%	81
	SS14	SE107753B.014	%	60 - 130%	77
	SS15	SE107753B.015	%	60 - 130%	76
	SS16	SE107753B.016	%	60 - 130%	79
	SS17	SE107753B.017	%	60 - 130%	76
	SS18	SE107753B.018	%	60 - 130%	83
	SS19	SE107753B.019	%	60 - 130%	81
	QC1	SE107753B.020	%	60 - 130%	78
	QC2	SE107753B.021	%	60 - 130%	79
d4-1,2-dichloroethane (Surrogate)	SS1	SE107753B.001	%	60 - 130%	99
	SS2	SE107753B.002	%	60 - 130%	99
	SS3	SE107753B.003	%	60 - 130%	99
	SS4	SE107753B.004	%	60 - 130%	99
	SS5	SE107753B.005	%	60 - 130%	100
	SS6	SE107753B.006	%	60 - 130%	101
	SS7	SE107753B.007	%	60 - 130%	98
	SS8	SE107753B.008	%	60 - 130%	99
	SS9	SE107753B.009	%	60 - 130%	100
	SS10	SE107753B.010	%	60 - 130%	99
	SS11	SE107753B.011	%	60 - 130%	99
	SS12	SE107753B.012	%	60 - 130%	100
	SS13	SE107753B.013	%	60 - 130%	101
	SS14	SE107753B.014	%	60 - 130%	100
	SS15	SE107753B.015	%	60 - 130%	100
	SS16	SE107753B.016	%	60 - 130%	100
	SS17	SE107753B.017	%	60 - 130%	100
	SS18	SE107753B.018	%	60 - 130%	99
	SS19	SE107753B.019	%	60 - 130%	100
	QC1	SE107753B.020	%	60 - 130%	100
	QC2	SE107753B.021	%	60 - 130%	99
d8-toluene (Surrogate)	SS1	SE107753B.001	%	60 - 130%	98
	SS2	SE107753B.002	%	60 - 130%	98
	SS3	SE107753B.003	%	60 - 130%	98
	SS4	SE107753B.004	%	60 - 130%	98
	SS5	SE107753B.005	%	60 - 130%	98
	SS6	SE107753B.006	%	60 - 130%	99
	SS7	SE107753B.007	%	60 - 130%	97
	SS8	SE107753B.008	%	60 - 130%	98
	SS9	SE107753B.009	%	60 - 130%	99
	SS10	SE107753B.010	%	60 - 130%	99
	SS11	SE107753B.011	%	60 - 130%	103
	SS12	SE107753B.012	%	60 - 130%	102
	SS13	SE107753B.013	%	60 - 130%	103
	SS14	SE107753B.014	%	60 - 130%	100
	SS15	SE107753B.015	%	60 - 130%	100
	SS16	SE107753B.016	%	60 - 130%	100
	SS17	SE107753B.017	%	60 - 130%	101
	SS18	SE107753B.018	%	60 - 130%	99
	SS19	SE107753B.019	%	60 - 130%	100

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.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	QC1	SE107753B.020	%	60 - 130%	100
	QC2	SE107753B.021	%	60 - 130%	100
Dibromofluoromethane (Surrogate)	SS1	SE107753B.001	%	60 - 130%	95
	SS2	SE107753B.002	%	60 - 130%	94
	SS3	SE107753B.003	%	60 - 130%	95
	SS4	SE107753B.004	%	60 - 130%	95
	SS5	SE107753B.005	%	60 - 130%	96
	SS6	SE107753B.006	%	60 - 130%	95
	SS7	SE107753B.007	%	60 - 130%	94
	SS8	SE107753B.008	%	60 - 130%	95
	SS9	SE107753B.009	%	60 - 130%	94
	SS10	SE107753B.010	%	60 - 130%	94
	SS11	SE107753B.011	%	60 - 130%	92
	SS12	SE107753B.012	%	60 - 130%	94
	SS13	SE107753B.013	%	60 - 130%	94
	SS14	SE107753B.014	%	60 - 130%	91
	SS15	SE107753B.015	%	60 - 130%	91
	SS16	SE107753B.016	%	60 - 130%	90
	SS17	SE107753B.017	%	60 - 130%	91
	SS18	SE107753B.018	%	60 - 130%	90
	SS19	SE107753B.019	%	60 - 130%	91
	QC1	SE107753B.020	%	60 - 130%	92
	QC2	SE107753B.021	%	60 - 130%	89

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.

VOC's in Soil — **Method: ME-(AU)-[ENV]AN433/AN434**

Sample Number		Parameter	Units	LOR	Result
LB020279.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	95
		d4-1,2-dichloroethane (Surrogate)	%	-	100
		d8-toluene (Surrogate)	%	-	98
		Bromofluorobenzene (Surrogate)	%	-	87
	Totals	Total BTEX*	mg/kg	-	0

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.

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE107753B.010	LB020279.015	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	%	-	94.0	93.0	50	1
			d4-1,2-dichloroethane (Surrogate)	%	-	99.0	100.0	50	1
			d8-toluene (Surrogate)	%	-	99.0	99.0	50	0
			Bromofluorobenzene (Surrogate)	%	-	92.0	95.0	50	3
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX*	mg/kg	-	0	0	200	NA
SE107753B.021	LB020279.031	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	%	-	89.0	89.0	50	0
			d4-1,2-dichloroethane (Surrogate)	%	-	99.0	98.0	50	1
			d8-toluene (Surrogate)	%	-	100.0	101.0	50	1
			Bromofluorobenzene (Surrogate)	%	-	79.0	78.0	50	1
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX*	mg/kg	-	0	0	200	NA

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.

Metals in Soil (TCLP) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB020247.002	Chromium, Cr	mg/L	0.005	1.9	2	80 - 120	97
	Lead, Pb	mg/L	0.02	2.0	2	80 - 120	98
	Nickel, Ni	mg/L	0.01	2.0	2	80 - 120	100

VOC's in Soil

Method: ME-(AU)-[ENV]AN433/AN434

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB020279.002	Monocyclic	Benzene	mg/kg	0.1	2.9	3	60 - 140	98
	Aromatic	Toluene	mg/kg	0.1	3.0	3	60 - 140	99
		Ethylbenzene	mg/kg	0.1	3.0	3	60 - 140	99
		m/p-xylene	mg/kg	0.2	6.4	5.9	60 - 140	108
		o-xylene	mg/kg	0.1	3.3	2.9	60 - 140	114
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	94.0	100	60 - 140	94
		d4-1,2-dichloroethane (Surrogate)	%	-	100.0	100	60 - 140	100
		d8-toluene (Surrogate)	%	-	98.0	100	60 - 140	98
		Bromofluorobenzene (Surrogate)	%	-	100.0	100	60 - 140	100

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.

VOC's in Soil — **Method: ME-(AU)-[ENV]AN433/AN434**

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE107753B.00	LB020279.004	Monocyclic	Benzene	mg/kg	0.1	2.8	<0.1	3	92
1		Aromatic	Toluene	mg/kg	0.1	2.8	<0.1	3	94
			Ethylbenzene	mg/kg	0.1	2.8	<0.1	3	94
			m/p-xylene	mg/kg	0.2	6.0	<0.2	5.9	102
			o-xylene	mg/kg	0.1	3.1	<0.1	2.9	107
		Surrogates	Dibromofluoromethane (Surrogate)	%	-	95.0	95.0	100	95
			d4-1,2-dichloroethane (Surrogate)	%	-	100.0	99.0	100	100
			d8-toluene (Surrogate)	%	-	98.0	98.0	100	98
			Bromofluorobenzene (Surrogate)	%	-	102.0	106.0	100	102
		Totals	Total Xylenes*	mg/kg	0.3	9.1	<0.3	-	-
			Total BTEX*	mg/kg	-	18	0	-	-

MATRIX SPIKE DUPLICATES

SE107753B 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.

ANALYTICAL REPORT

WORLD RECOGNISED ACCREDITATION

CLIENT DETAILS

Contact	Xanthe Holford
Client	Coffey Environments Pty Ltd
Address	17 Torrens St BRADDON ACT 2612
Telephone	02 6248 7154
Facsimile	02 6248 7157
Email	xanthe_holford@coffey.com
Project	**ENAUBRAD01182AA - Gungahlin - Additional**
Order Number	**94373-374**
Samples	21

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
SGS Reference	SE107753B R0
Report Number	0000028875
Date Reported	17 May 2012
Date Received	01 May 2012

COMMENTS

The document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

Project Name : Gungahlin Town Centre East Stockpile.

SIGNATORIES

Huong Crawford
Laboratory Manager

Ly Kim Ha
Organics Supervisor

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE107753B.001 Soil 27 Apr 2012 SS1	SE107753B.002 Soil 27 Apr 2012 SS2	SE107753B.003 Soil 27 Apr 2012 SS3	SE107753B.004 Soil 27 Apr 2012 SS4	SE107753B.005 Soil 27 Apr 2012 SS5
VOC's in Soil Method: AN433/AN434								
Monocyclic Aromatic Hydrocarbons								
Benzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Surrogates								
Dibromofluoromethane (Surrogate)	%	-		**95**	**94**	**95**	**95**	**96**
d4-1,2-dichloroethane (Surrogate)	%	-		**99**	**99**	**99**	**99**	**100**
d8-toluene (Surrogate)	%	-		**98**	**98**	**98**	**98**	**98**
Bromofluorobenzene (Surrogate)	%	-		**106**	**103**	**98**	**100**	**94**
Totals								
Total Xylenes*	mg/kg	0.3		<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	-		**0**	**0**	**0**	**0**	**0**
TCLP (Toxicity Characteristic Leaching Procedure) for Metals Method: AN006								
pH 1:20	pH Units	-		-	-	**4.7**	-	-
pH 1:20 plus HCL	pH Units	-		-	-	**1.7**	-	-
Extraction Solution Used	No unit	-		-	-	**1**	-	-
Mass of Sample Used*	g	-		-	-	**13**	-	-
Volume of ExtractionSolution Used*	mL	-		-	-	**250**	-	-
pH TCLP after 18 hours	pH Units	-		-	-	**5.0**	-	-
Metals in Soil (TCLP) by ICPOES Method: AN320/AN321								
Chromium, Cr	mg/L	0.005		-	-	<0.005	-	-
Lead, Pb	mg/L	0.02		-	-	<0.02	-	-
Nickel, Ni	mg/L	0.01		-	-	<0.01	-	-

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE107753B.006 Soil 27 Apr 2012 SS6	SE107753B.007 Soil 27 Apr 2012 SS7	SE107753B.008 Soil 27 Apr 2012 SS8	SE107753B.009 Soil 27 Apr 2012 SS9	SE107753B.010 Soil 27 Apr 2012 SS10
VOC's in Soil Method: AN433/AN434								
Monocyclic Aromatic Hydrocarbons								
Benzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2		<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1
Surrogates								
Dibromofluoromethane (Surrogate)	%	-		**95**	**94**	**95**	**94**	**94**
d4-1,2-dichloroethane (Surrogate)	%	-		**101**	**98**	**99**	**100**	**99**
d8-toluene (Surrogate)	%	-		**99**	**97**	**98**	**99**	**99**
Bromofluorobenzene (Surrogate)	%	-		**93**	**92**	**92**	**93**	**92**
Totals								
Total Xylenes*	mg/kg	0.3		<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	-		**0**	**0**	**0**	**0**	**0**

Parameter	Units	LOR	Sample Number: SE107753B.006 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS6	SE107753B.007 Soil 27 Apr 2012 SS7	SE107753B.008 Soil 27 Apr 2012 SS8	SE107753B.009 Soil 27 Apr 2012 SS9	SE107753B.010 Soil 27 Apr 2012 SS10
TCLP (Toxicity Characteristic Leaching Procedure) for Metals Method: AN006							
pH 1:20	pH Units	-	-	-	**6.6**	-	-
pH 1:20 plus HCL	pH Units	-	-	-	**1.7**	-	-
Extraction Solution Used	No unit	-	-	-	**1**	-	-
Mass of Sample Used*	g	-	-	-	**13**	-	-
Volume of ExtractionSolution Used*	mL	-	-	-	**250**	-	-
pH TCLP after 18 hours	pH Units	-	-	-	**5.1**	-	-
Metals in Soil (TCLP) by ICPOES Method: AN320/AN321							
Chromium, Cr	mg/L	0.005	-	-	<0.005	-	-
Lead, Pb	mg/L	0.02	-	-	<0.02	-	-
Nickel, Ni	mg/L	0.01	-	-	<0.01	-	-

Parameter	Units	LOR	Sample Number: SE107753B.011 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS11	SE107753B.012 Soil 27 Apr 2012 SS12	SE107753B.013 Soil 27 Apr 2012 SS13	SE107753B.014 Soil 27 Apr 2012 SS14	SE107753B.015 Soil 27 Apr 2012 SS15
VOC's in Soil Method: AN433/AN434							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogates							
Dibromofluoromethane (Surrogate)	%	-	**92**	**94**	**94**	**91**	**91**
d4-1,2-dichloroethane (Surrogate)	%	-	**99**	**100**	**101**	**100**	**100**
d8-toluene (Surrogate)	%	-	**103**	**102**	**103**	**100**	**100**
Bromofluorobenzene (Surrogate)	%	-	**86**	**80**	**81**	**77**	**76**
Totals							
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	-	**0**	**0**	**0**	**0**	**0**
TCLP (Toxicity Characteristic Leaching Procedure) for Metals Method: AN006							
pH 1:20	pH Units	-	-	**7.0**	-	-	-
pH 1:20 plus HCL	pH Units	-	-	**1.7**	-	-	-
Extraction Solution Used	No unit	-	-	**1**	-	-	-
Mass of Sample Used*	g	-	-	**13**	-	-	-
Volume of ExtractionSolution Used*	mL	-	-	**250**	-	-	-
pH TCLP after 18 hours	pH Units	-	-	**5.0**	-	-	-
Metals in Soil (TCLP) by ICPOES Method: AN320/AN321							
Chromium, Cr	mg/L	0.005	-	<0.005	-	-	-
Lead, Pb	mg/L	0.02	-	<0.02	-	-	-
Nickel, Ni	mg/L	0.01	-	<0.01	-	-	-

Parameter	Units	LOR	Sample Number: SE107753B.016 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: SS16	SE107753B.017 Soil 27 Apr 2012 SS17	SE107753B.018 Soil 27 Apr 2012 SS18	SE107753B.019 Soil 27 Apr 2012 SS19	SE107753B.020 Soil 27 Apr 2012 QC1
VOC's in Soil Method: AN433/AN434							
Monocyclic Aromatic Hydrocarbons							
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogates							
Dibromofluoromethane (Surrogate)	%	-	**90**	**91**	**90**	**91**	**92**
d4-1,2-dichloroethane (Surrogate)	%	-	**100**	**100**	**99**	**100**	**100**
d8-toluene (Surrogate)	%	-	**100**	**101**	**99**	**100**	**100**
Bromofluorobenzene (Surrogate)	%	-	**79**	**76**	**83**	**81**	**78**
Totals							
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX*	mg/kg	-	**0**	**0**	**0**	**0**	**0**
TCLP (Toxicity Characteristic Leaching Procedure) for Metals Method: AN006							
pH 1:20	pH Units	-	-	**7.0**	**9.0**	-	**8.6**
pH 1:20 plus HCL	pH Units	-	-	**1.7**	**1.7**	-	**1.7**
Extraction Solution Used	No unit	-	-	**1**	**1**	-	**1**
Mass of Sample Used*	g	-	-	**13**	**13**	-	**13**
Volume of ExtractionSolution Used*	mL	-	-	**250**	**250**	-	**250**
pH TCLP after 18 hours	pH Units	-	-	**5.0**	**6.4**	-	**5.0**
Metals in Soil (TCLP) by ICPOES Method: AN320/AN321							
Chromium, Cr	mg/L	0.005	-	<0.005	<0.005	-	<0.005
Lead, Pb	mg/L	0.02	-	<0.02	<0.02	-	<0.02
Nickel, Ni	mg/L	0.01	-	<0.01	<0.01	-	<0.01

Parameter	Units	LOR	Sample Number: SE107753B.021 Sample Matrix: Soil Sample Date: 27 Apr 2012 Sample Name: QC2
VOC's in Soil Method: AN433/AN434			
Monocyclic Aromatic Hydrocarbons			
Benzene	mg/kg	0.1	<0.1
Toluene	mg/kg	0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2
o-xylene	mg/kg	0.1	<0.1
Surrogates			
Dibromofluoromethane (Surrogate)	%	-	**89**
d4-1,2-dichloroethane (Surrogate)	%	-	**99**
d8-toluene (Surrogate)	%	-	**100**
Bromofluorobenzene (Surrogate)	%	-	**79**

Parameter	Units	LOR	Sample Number SE107753B.021 Sample Matrix Soil Sample Date 27 Apr 2012 Sample Name QC2
VOC's in Soil Method: AN433/AN434 (continued)			
Totals			
Total Xylenes*	mg/kg	0.3	<0.3
Total BTEX*	mg/kg	-	**0**
TCLP (Toxicity Characteristic Leaching Procedure) for Metals Method: AN006			
pH 1:20	pH Units	-	**8.9**
pH 1:20 plus HCL	pH Units	-	**1.7**
Extraction Solution Used	No unit	-	**1**
Mass of Sample Used*	g	-	**13**
Volume of ExtractionSolution Used*	mL	-	**250**
pH TCLP after 18 hours	pH Units	-	**5.2**
Metals in Soil (TCLP) by ICPOES Method: AN320/AN321			
Chromium, Cr	mg/L	0.005	<0.005
Lead, Pb	mg/L	0.02	**0.13**
Nickel, Ni	mg/L	0.01	<0.01

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.

Metals in Soil (TCLP) by ICPOES Method: ME-(AU)-[ENV]AN320/AN321

Parameter	QC Reference	Units	LOR	LCS %Recovery
Chromium, Cr	LB020247	mg/L	0.005	97%
Lead, Pb	LB020247	mg/L	0.02	98%
Nickel, Ni	LB020247	mg/L	0.01	100%

VOC's in Soil Method: ME-(AU)-[ENV]AN433/AN434

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB020279	mg/kg	0.1	<0.1	0%	98%	92%
Toluene	LB020279	mg/kg	0.1	<0.1	0%	99%	94%
Ethylbenzene	LB020279	mg/kg	0.1	<0.1	0%	99%	94%
m/p-xylene	LB020279	mg/kg	0.2	<0.2	0%	108%	102%
o-xylene	LB020279	mg/kg	0.1	<0.1	0%	114%	107%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB020279	%	-	95%	0 - 1%	94%	95%
d4-1,2-dichloroethane (Surrogate)	LB020279	%	-	100%	1%	100%	100%
d8-toluene (Surrogate)	LB020279	%	-	98%	0 - 1%	98%	98%
Bromofluorobenzene (Surrogate)	LB020279	%	-	87%	1 - 3%	100%	102%

Totals

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Xylenes*	LB020279	mg/kg	0.3	<0.3	0%	NA	NA
Total BTEX*	LB020279	mg/kg	-	0	NA	NA	NA

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.
AN433/AN434	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
*	This analysis is not covered by the scope of accreditation.
^	Performed by outside laboratory.
LOR	Limit of Reporting
↑↓	Raised or Lowered Limit of Reporting
QFH	QC result is above the upper tolerance
QFL	QC result is below the lower tolerance
-	The sample was not analysed for this analyte
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.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf

AU.SampleReceipt.Sydney (Sydney)

From: Xanthe Holford [Xanthe_Holford@coffey.com]
Sent: Wednesday, 16 May 2012 12:42 PM
To: AU.SampleReceipt.Sydney (Sydney)
Cc: Julia Jasonsmith
Subject: RE: SGS Sample Receipt Advice (Ref: ENAUBRAD01182AA - Gungahlin, Lab Ref: SE107753)

Importance: High

SGS Ref: SE107753B
Date Due: 17/5/12
TAT: 1 Day

Hi

As discussed on the phone

This email supersedes the email below.

Can you please schedule the following samples for TCLP Cr, Pb and Ni:
20 21 17 18 3 8 12
QC1, QC2, SS17, SS18, SS3, SS8, SS12

And, would you mind scheduling all samples SS1 to SS19 and QC1 and QC2 for BTEX?

As discussed 24 hours TAT for BTEX (50% surcharge)

And as fast a TAT as you can manage on the metals TCLP (to be advised)

Regards

XANTHE HOLFORD
Principal
Coffey Environments
Level 1, 3 Rider Boulevard Rhodes NSW 2138 Australia T +61 2 8083 1600 F +61 2 8765 0762 coffey.com

We are moving
From early July 2012 we will be located at:

Coffey
Level 19, Tower B - Citadel Tower
799 Pacific Highway
Chatswood NSW 2067

-----Original Message-----
From: Xanthe Holford
Sent: Wednesday, May 16, 2012 11:24 AM
To: 'AU.Samplereceipt.Sydney@SGS.com'
Subject: RE: SGS Sample Receipt Advice (Ref: ENAUBRAD01182AA - Gungahlin, Lab Ref: SE107753)

Hi Angela

Would you mind scheduling all samples SS1 to SS19 and QC1 and QC2 for BTEX?

regards

XANTHE HOLFORD
Principal
Coffey Environments
Level 1, 3 Rider Boulevard Rhodes NSW 2138 Australia T +61 2 8083 1600 F +61 2 8765 0762 coffey.com

We are moving
From early July 2012 we will be located at:

Coffey
Level 19, Tower B - Citadel Tower
799 Pacific Highway
Chatswood NSW 2067

-----Original Message-----
From: AU.Samplereceipt.Sydney@SGS.com [mailto:AU.Samplereceipt.Sydney@SGS.com]
Sent: Wednesday, May 02, 2012 9:44 PM
To: Xanthe Holford
Subject: SGS Sample Receipt Advice (Ref: ENAUBRAD01182AA - Gungahlin, Lab Ref: SE107753)

Dear Xanthe Holford,

Please be advised we have received samples for analysis as detailed in the attached documentation.

Best regards,
Angela Mamalicos
Sample Admin Manager
SGS Australia Pty Ltd
Phone: +61 (0)2 8594 0400
Fax: +61 (0)2 8594 0499

SAMPLE RECEIPT ADVICE

SE107753B

CLIENT DETAILS

Contact	Julia Jasonsmith
Client	Coffey Environments Pty Ltd
Address	17 Torrens St BRADDON ACT 2612
Telephone	02 6162 2622
Facsimile	02 6262 0494
Email	julia_jasonsmith@coffey.com
Project	**ENAUBRAD01182AA - Gungahlin - Additional**
Order Number	**94373-374**
Samples	21

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 1/5/2012
Report Due	Thu 17/5/2012
SGS Reference	**SE107753B**

SUBMISSION DETAILS

This is to confirm that 21 samples were received on Tuesday 1/5/2012. Results are expected to be ready by Thursday 17/5/2012. Please quote SGS reference SE107753B when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	21 Soils	Type of documentation received	Email
Date documentation received	16/5/12@14:42pm	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.6°C
Sample container provider	SGS	Turnaround time requested	Next Day
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	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

Project Name : Gungahlin Town Centre East Stockpile.

SAMPLE RECEIPT ADVICE

SE107753B

CLIENT DETAILS

Client	Coffey Environments Pty Ltd	Project	ENAUBRAD01182AA - Gungahlin - Additiona

SUMMARY OF ANALYSIS

No.	Sample ID	Metals in Soil (TCLP) by ICPOES	TCLP (Toxicity Characteristic Leaching	VOC's in Soil
001	SS1	-	-	11
002	SS2	-	-	11
003	SS3	3	6	11
004	SS4	-	-	11
005	SS5	-	-	11
006	SS6	-	-	11
007	SS7	-	-	11
008	SS8	3	6	11
009	SS9	-	-	11
010	SS10	-	-	11
011	SS11	-	-	11
012	SS12	3	6	11
013	SS13	-	-	11
014	SS14	-	-	11
015	SS15	-	-	11
016	SS16	-	-	11
017	SS17	3	6	11
018	SS18	3	6	11
019	SS19	-	-	11
020	QC1	3	6	11
021	QC2	3	6	11

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.

Appendix H

Section 211 Environmental Impact Statement Exemption

RECEIVED
21/11/2013

Simon Corbell MLA

ATTORNEY GENERAL
MINISTER FOR POLICE AND EMERGENCY SERVICES
MINISTER FOR THE ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

MEMBER FOR MOLONGLO

Mr Chris Reynolds
Executive Director
Land Development Agency
Economic Development Directorate
Level 6 Transact House
470 Northbourne Avenue
DICKSON ACT 2602

Dear Mr Reynolds

Exemption from the requirement to complete an Environmental Impact Statement under Section 211 of the planning and Development Act 2007 - Development in the remaining Greenfield areas of Gungahlin

I have reviewed the information provided in your request under Section 211 of the *Planning and Development Act 2007* (the Act) for an exemption from the requirement to complete an Environmental Impact Statement (EIS).

Having considered the information submitted in support of your request, I consider that the expected environmental impact of the proposal has been sufficiently addressed.

As Minister responsible for the Act, I advise that the proposed development of the remaining Greenfield areas of Gungahlin, including Gungahlin Town Centre (east), Jacka (north), Moncrieff, Taylor, Kenny (part) and Throsby (part), as indicated in the attached map, will not require further environmental assessment in relation to the identified schedule 4 triggers. You are now able to lodge impact track development applications for actions described in your application with the Environment and Sustainable Development Directorate. Please ensure that you include a copy of this letter with any relevant development application.

Yours sincerely

Simon Corbell MLA
Minister for the Environment and Sustainable Development

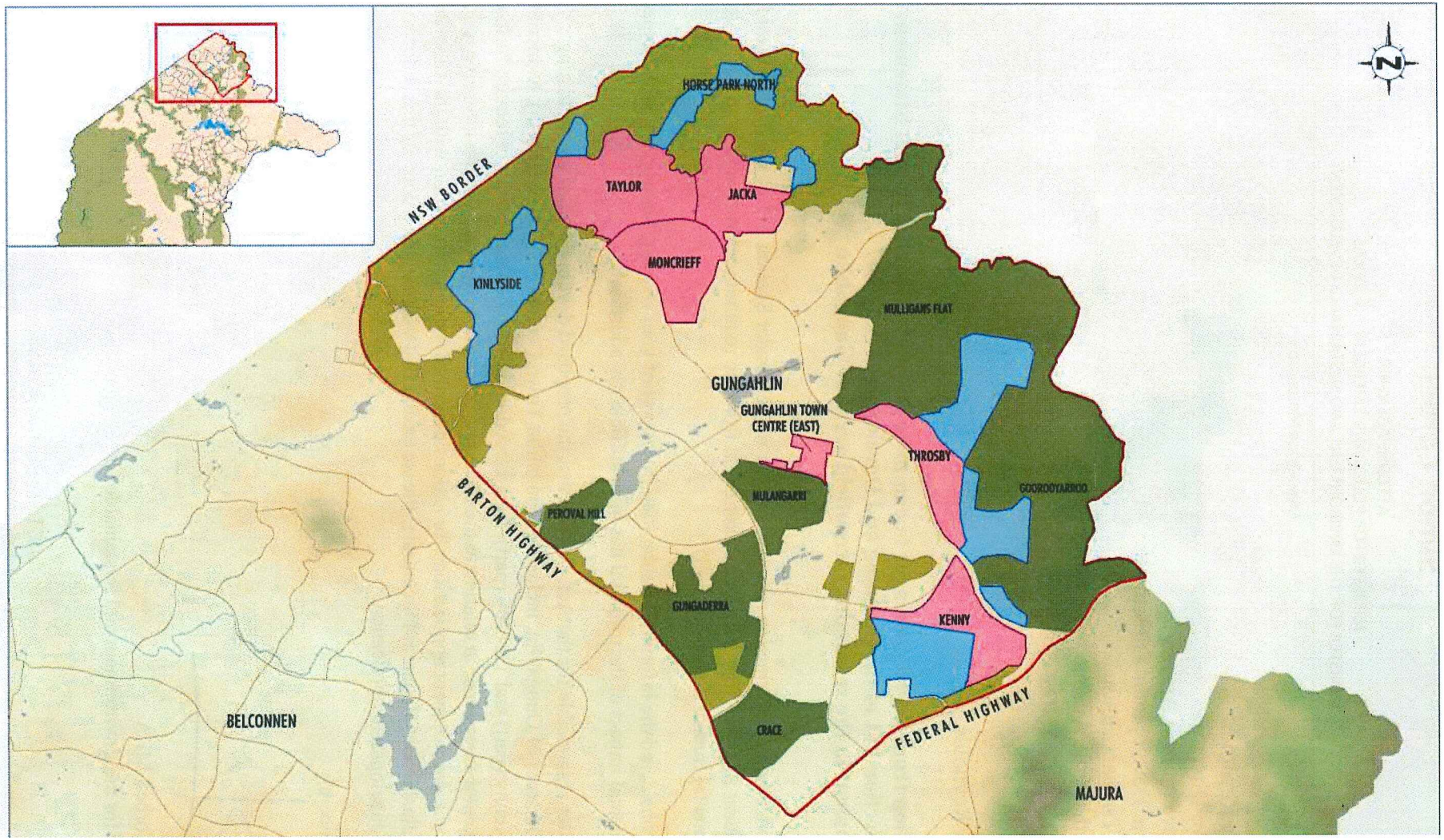
20.11.13

ACT LEGISLATIVE ASSEMBLY

London Circuit, Canberra ACT 2601 GPO Box 1020, Canberra ACT 2601

Phone (02) 6205 0000 Fax (02) 6205 0535 Email corbell@act.gov.au

Attachment 1. Map of areas covered by the s211 Request



Appendix I

ACT Heritage Council Advice

ACT Heritage Council

HERITAGE ADVICE

Under Part 10 of the *Heritage Act 2004*

Heritage Reference:	Gungahlin-General
Contact Officer:	Meaghan Russell
Received by Council:	14 July 2016
Due date:	27 July 2016

TO: Deed Management
Planning Delivery Division
deedman@act.gov.au

Block:	Section:	Division / District:	Heritage Places:

Status of Place: Recorded Aboriginal Places: Possible Scarred Tree and PAD

Description of Works: Draft Estate Development Plan

Council Advice provided by: Secretary / ACT Heritage Manager

Background:

On 14 July 2016, the ACT Heritage Council (the Council) received a revised draft Estate Development Plan (EDP) for the Gungahlin Town Centre East area, for review and comment.

The draft EDP describes the planning constraints and opportunities of the 38 hectare site, and presents a design for future subdivision and urban development. The EDP identifies that the heritage values of the locality have been subject to prior investigation, in consultation with Representative Aboriginal Organisations (RAOs), which consisted of the following:

- Biosis (2012) undertook a cultural heritage assessment of the Gungahlin Town Centre East area, which identified no heritage constraints to proposed development, although the presence of a section of the Old Wells Station Track was noted;
- GML (2015) undertook a cultural heritage assessment of Block 1, Section 230 and Block 1, Section 234, Gungahlin, which concluded that this area was a 'potential archaeological deposit' (PAD), in which Aboriginal places and objects may occur. This assessment was reviewed and supported by Biosis (2015); and
- CHMA (2016) undertook archaeological excavation of the Manning Clarke extension alignment within Block 1, Section 230 and Block 1, Section 234, Gungahlin, which did not identify any Aboriginal places or objects and concluded that the investigated area was of low archaeological potential.

In this context, the draft EDP identifies that:

- A shared path will be established along the alignment of Old Wells Station Track within the subject area, and the track will also be recorded for historical purposes;

- The potential scarred tree within Gungahlin is to be retained in open space;

- Assessment of the archaeological potential of Block 1, Section 230, Gungahlin is ongoing, with archaeological excavation precede the use of the locality as a light rail construction compound; and

- Additional heritage investigations of Block 1, Section 230, Gungahlin are not anticipated at this time, but would be required if PAD areas within the block are not subject to investigation and management as part of the light rail project. Further advice will be sought from the Council following the light rail archaeological investigation to confirm any additional heritage investigation or management requirements in relation to this area.

Advice:

The Council endorses the draft Gungahlin Town Centre East subject to the following conditions:

- The draft EDP contains sensitive information on Aboriginal places and objects which should not be made publically available. Text and mapping within the EDP should be redacted for public exhibition, so that Aboriginal site locations are not identified;

- Ground disturbance works, including geotechnical investigations, should not be undertaken within Block 1, Section 230, Gungahlin prior to completion of the archaeological investigation of the PAD area; unless authorised by the Council under Section 76 of the *Heritage Act 2004*;

- Should Aboriginal places or objects be identified within the Gungahlin Town Centre East development area, a 'Statement of Heritage Effect' (SHE) should be prepared in accordance with Section 61G of the *Heritage Act 2004*, and approved by the Council under Section 61H of the *Heritage Act 2004* prior to the commencement of works; and

- The project's Construction Environmental Management Plan (CEMP) must identify heritage requirements for the project and be submitted to the Council for endorsement prior to the commencement of works. Heritage requirements should include management controls for the protection of the possible Aboriginal scarred tree in Gungahlin during works, and an 'Unanticipated Discovery Protocol' to identify management requirements for any heritage places or objects encountered during construction works.

Fiona Moore
A/g Secretary (as delegate for),
ACT Heritage Council

27 July 2016

ACT Heritage Council

HERITAGE ADVICE

Under Part 10 of the *Heritage Act 2004*

Heritage Reference: Gungahlin-General
Contact Officer: Meaghan Russell
Received by Council: 9 November 2016

TO: John Piechowski
Indesco
John.Piechowski@indesco.com.au

Location:	Gungahlin Town Centre East
Status of Place:	Recorded Aboriginal Places: Possible Aboriginal Cultural Trees and PAD
Description of Works:	Draft Estate Development Plan, Circulation #2
Council Advice provided by:	Secretary / ACT Heritage Manager

Background:

On 9 November 2016, the ACT Heritage Council (the Council) received a revised draft Estate Development Plan (EDP) for the Gungahlin Town Centre East area (Circulation #2), prepared on behalf of the Chief Minister, Treasury and Economic Development Directorate (CMTEDD).

The draft EDP (Circulation #1) was provided to the Council on 14 July 2016, and identified that:

- A section of the Old Wells Station Track occurs within the subject area, along which a shared path will be established, following recording of the existing track for historical purposes;
- Gungahlin contains a potential Aboriginal cultural tree, which is to be retained in open space;
- Block 1, Section 230, Gungahlin contains a 'potential archaeological deposit' (PAD), to be subject to archaeological investigation as part of the light rail project. Following this investigation, further advice will be sought from the Council on whether any further heritage assessment or management will be required as part of the Gungahlin Town Centre East project.

Prior Council advice on the draft EDP was issued on 27 July 2016, which endorsed the EDP subject to the following conditions:

- Text and mapping within the EDP should be redacted for public exhibition, so that Aboriginal site locations are not identified;
- Ground disturbance works, including geotechnical investigations, should not be undertaken within Block 1, Section 230, Gungahlin prior to completion of the archaeological investigation of the PAD area; unless authorised by the Council under Section 76 of the *Heritage Act 2004*;
- Should Aboriginal places or objects be identified within the Gungahlin Town Centre East development area, a 'Statement of Heritage Effect' (SHE) should be prepared in

accordance with Section 61G of the *Heritage Act 2004*, and approved by the Council under Section 61H of the *Heritage Act 2004* prior to the commencement of works; and

- The project's Construction Environmental Management Plan (CEMP) must identify heritage requirements for the project and be submitted to the Council for endorsement prior to the commencement of works.

Advice:

On 4 November 2016, the Council notified CMTEDD that a potential Aboriginal place had been recorded within , Gungahlin; and that this tree was proposed for removal as part of the Gungahlin Town Centre East project. As set out in this advice:

- A heritage assessment of the tree must be undertaken to determine whether it is an Aboriginal place, by Representative Aboriginal Organisations (RAOs), an arborist and an archaeologist; and

- No development or other activity that could damage the tree should be undertaken until such time as the heritage assessment is complete, and the cultural or natural status of the tree is determined.

The revised EDP should be amended to reflect the above advice, or be amended to reflect the outcomes of the above.

The Council also requires the following amendments to the revised draft EDP prior to finalisation:

- The reference to in Section 1.9 should be removed, as this publically identifies an individual tree as a potential Aboriginal place; and in accordance with prior Council advice, individual Aboriginal site locations are not to be identified;

- Appendix E ('Heritage advice - ACT Heritage Council') should be amended to include Council advice issued on 27 July 2016 and this advice, and to remove an email from ACT Heritage on the Section 56 application process; as the latter does not constitute Council advice;

- If documents in Appendix E are to be made publically available, references to specific Aboriginal site locations within are to be redacted; and

- 'Aboriginal' should be capitalised throughout.

Fiona Moore
A/g Secretary (as delegate for),
ACT Heritage Council
18 November 2016

Appendix J

Traffix Group Gungahlin Town Centre East Estate Traffic Study

TraffixGroup

Traffic Engineers and Transport Planners

Traffic Engineering Assessment

Estate Development Plan
at
Gungahlin Town Centre East Estate

Prepared For

Indesco Pty Ltd

Traffix Group Pty Ltd ABN 32 100 481 570
Address: Suite 8, 431 Burke Road, Glen Iris Victoria 3146
Telephone: 03 9822 2888 Website: www.traffixgroup.com.au
Email: admin@traffixgroup.com.au

Traffic Engineering Assessment

Estate Development Plan
for
Gungahlin Town Centre East Estate

Document Control

Issue No.	Type	Date	Prepared By	Approved By
A	Draft	8/07/16	C Blair	W de Waard
B	Final	12/07/16	C Blair	W de Waard

Our Reference: G21164R-01B

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1 Introduction

Traffix Group has been engaged by Indesco to undertake a traffic study for the Estate Development Plan (EDP) for Gungahlin Town Centre ('GTC') East Estate. The proposed development consists of 220,021m^2 of office space, 31,425m^2 for retail space, 48,610m^2 for other land uses and 1,070 residential units.

This report has been primarily based on a previous report entitled 'Gungahlin Town Centre East – EDP Traffic Report' by Indesco that was completed in June, 2015.

This report provides a detailed traffic engineering assessment of the generation and distribution of traffic and investigations into key intersections and their performance.

This traffic study has been based on the following information and guidelines:

- Proposed development prepared by Indesco,
- Traffic generation as per the Zenith model (2031) as developed for Capital Metro by Arup,
- RMS Technical Direction 2013/14 (May 2013),
- Road hierarchy classification based on the ACT Planning and Land Authority (ACTPLA) *Estate Development Code* (October 2013), and
- ACT Planning and Land Authority (ACTPLA) *Estate Development Code* (October 2014).

The purpose of this report is to provide an appreciation of the future development of GTC East and the resulting traffic impacts.

1.1 Site Location

Gungahlin Town Centre (GTC) East is located approximately 13km to the north of Canberra CBD and is within the suburb of Gungahlin. It is surrounded by the suburbs of Ngunnawal, Palmerston, Franklin, Harrison, Throsby, Forde and Amaroo.

The site comprises Sections 11, 28 29, 229, 230, 231, 233, 235 and 246 Gungahlin. It is the eastern portion of the Gungahlin Town Centre. Kate Crace Street forms the western boundary, Anthony Rolfe Avenue the northern boundary, Manning Clark Crescent and Hamer Street the eastern boundary and the Mulanggari Grasslands Nature Reserve the southern boundary.

Also included in the site is a small area of land bounded by The Valley Avenue, Gozzard Street and the Mullangarri Nature Reserve to the west of Kate Crace Street and the area bounded by Hinder Street, Hibberson Street, Kate Crace Street and Anthony Rolfe Avenue. To the west of Kate Crace Street is the existing Town Centre and east of the site are the existing suburbs of Franklin and Gungahlin. The estate is shown in Figure 1 below.

GTC East has a total land area of approximately 38 hectares. The land to the north of GTC East contains existing residential development, existing and future Commercial and Mixed Use. The land to the east consists of recently completed residential land within the Gungahlin and Franklin suburbs. The land to the west of the site contains existing and future commercial development with the land to the west of the 'western' leg of the site containing existing residential development.

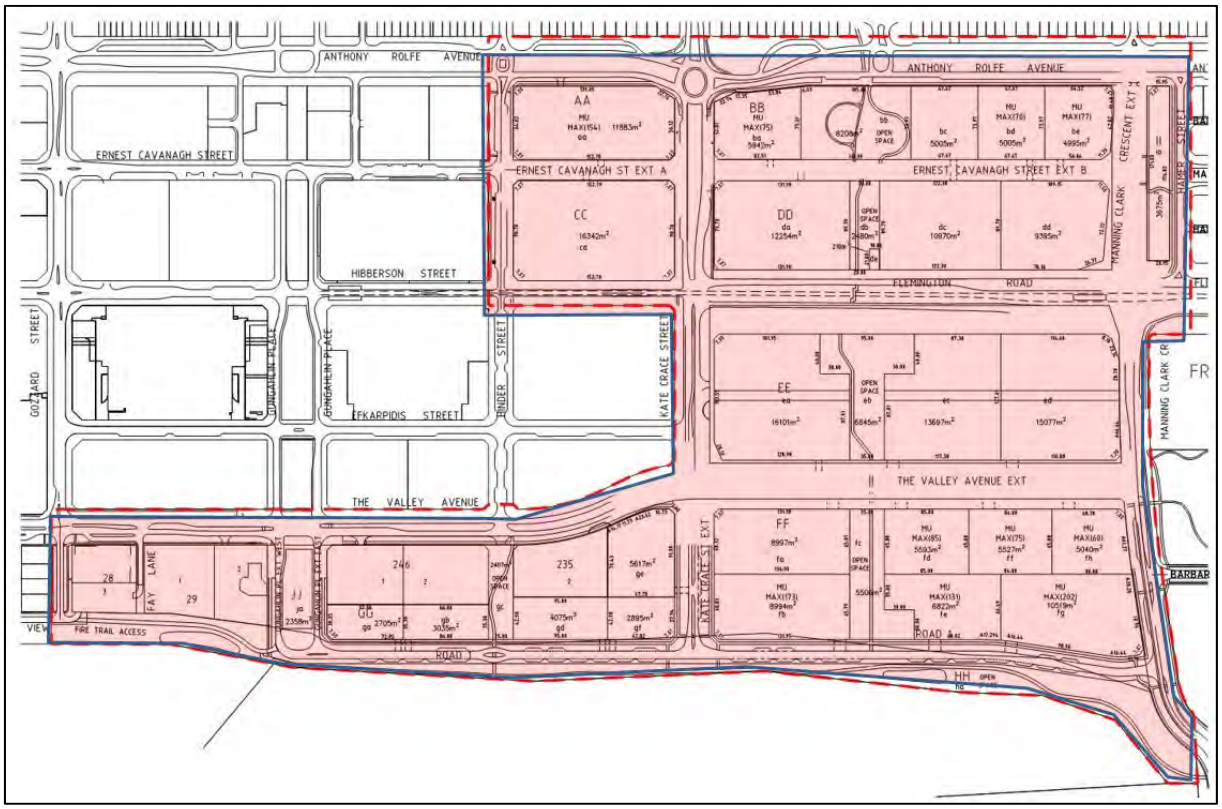


Figure 1: Site Location

2 Existing Conditions

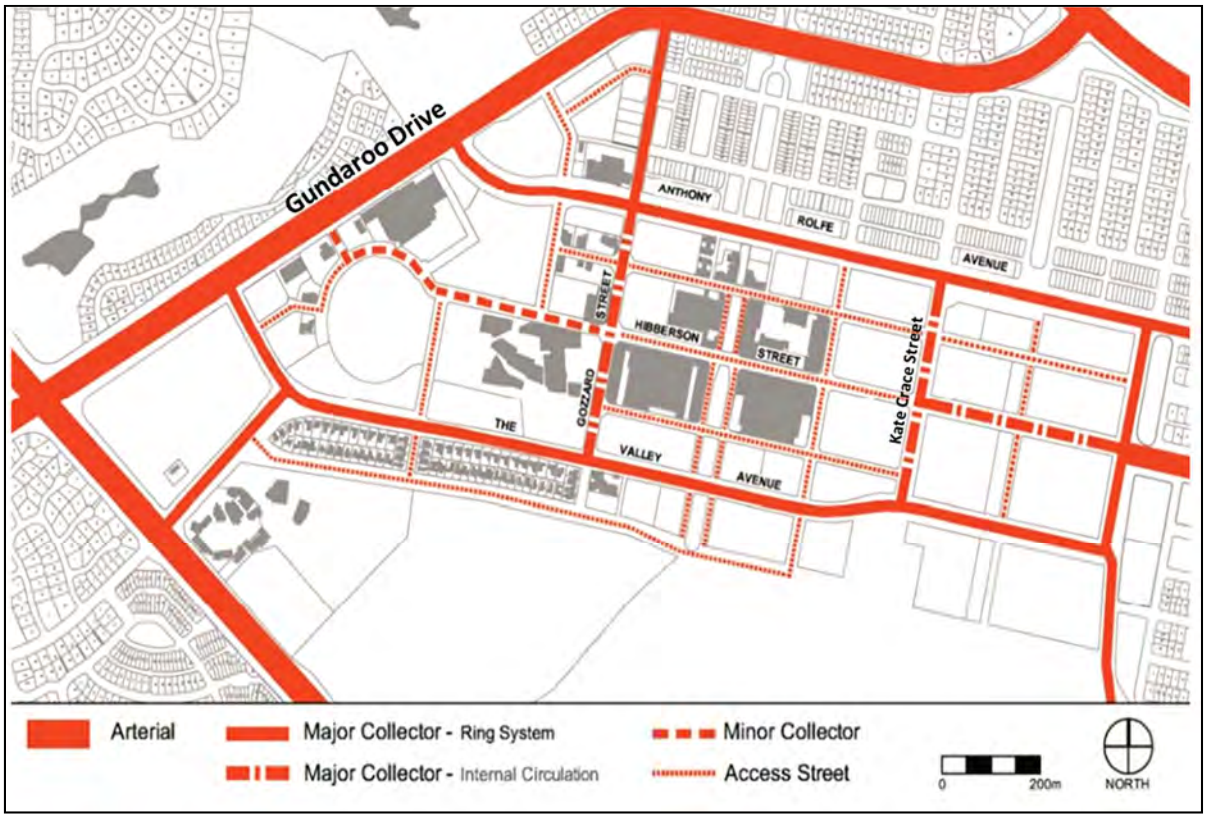
2.1 Road Hierarchy

The street hierarchy for the GTC has been established within the Gungahlin Precinct Code, as shown below in Figure 2. The road system is based on a 'ring' arrangement to divert through traffic around the Town Centre.

The function of each road classification is broadly defined in the Estate Development Code.

Access Streets have been defined as streets where the speed and traffic volumes are low and also where pedestrian and cycle movements are facilitated. Access Streets A and B are distinguished on the basis of traffic volumes. Within the Gungahlin Town Centre (GTC), traffic volumes are higher than in residential areas and all access streets will be Access Street B.

Collector Roads have higher traffic volumes and a greater emphasis on distributing through traffic from access streets to the arterial road network. Major and minor collector roads are distinguished on the basis of traffic volumes. Within the GTC East all collector roads have been designed as Major Collectors (refer to Figure 2).



Source: Gungahlin Precinct Code

Figure 2: Gungahlin Precinct Code - Road Hierarchy Map

For new estates, the road hierarchy is established from calculated traffic volumes within the Estate Development Code, as summarised in Table 1 and Table 2 below. For existing roads, the road hierarchy is primarily based on the function that they perform rather than on the existing traffic volumes. Furthermore, road classification is not a direction indicator of road capacity. The capacity of roads is determined using Austroads Guidelines, as described later in the report.

Table 1: Street Hierarchy for New Estates in Residential Zones and CZ5

Street Type and Function	Type	Design Speed (km/h)	Traffic Volume (vpd)
Access Streets	Access Street A	60	0 – 300
	Access Street B	60	301 – 1000
Collector Roads	Minor Collector	60	1001 – 3000
	Major Collector	70	3001 – 6000

Table 2: Street Hierarchy for New Estates in Commercial zones (excluding CZ5)

Street Type and Function	Type	Design Speed (km/h)	Traffic Volume (vpd)
Access Streets	Access Street	60	0 – 1000
Collector Road	Minor Collector	60	1001 – 3000
	Major Collector	70	3001 – 6000

2.2 Surrounding Road Network

Automatic tube count data was provided by TAMS which consisted of traffic volumes, average and 85 percentile speeds and speed limits, refer to Table 3.

Table 3: Characteristics of Surrounding Road Network

Street	Characteristics
The Valley Avenue	The Valley Avenue is a two-way two lane major collector road. The posted speed limit is 60 km/h. The observed 85% speeds were 62.6 km/h westbound and 66.2 km/h eastbound. Traffic surveys undertaken in 2013 showed weekday average traffic volumes of 4,026 vpd and 3,600 vpd for the westbound and eastbound directions. On street parking is not allowed for this street.
Hibberson Street	Hibberson Street is a two-way two lane access street. The posted speed limit for this road is 40 km/h. The observed 85% speeds were 35.6 km/h for both westbound and eastbound. Traffic surveys undertaken in 2011 showed weekday average traffic volumes of 4,401 westbound and 3,399 eastbound. On street parking spaces are available on this street.
Anthony Rolfe Avenue	Anthony Rolfe Avenue is a two-way two lane divided major collector road. The posted speed limit for this road is 60 km/h. Traffic surveys undertaken in 2013 demonstrated weekday average traffic volumes of 2,237 vpd westbound and 3,010 vpd eastbound. Parking bays are provided for in the service roads feeding into this street.
Kate Crace Street	Kate Crace Street is a two-way two lane major collector road. The posted speed limit for this road is 50 km/h. The observed 85% speeds were 50.2 km/h westbound and 55.6 km/h eastbound. Traffic surveys undertaken in 2013 demonstrated weekday average traffic volumes of 2,862 and 2,312. On street parking is allowed for this street.
Hinder Street	Hinder Street is a two-way two lane access street. The posted speed limit for this street is 40 km/h. The observed 85% speeds were 34.8 km/h for the northbound and 31.6 km/h for the southbound direction. Traffic surveys undertaken in 2011 showed weekday average traffic volumes of 2,153 and 1,530. There are on-street parking spaces available on this street.
Gungahlin Place	Gungahlin Place is composed of two one-way single lane access streets. The posted speed limit for this street is 40 km/h. The observed 85% speeds were 50.6 km/h for the northbound and 31.6 km/h for the southbound direction. Traffic surveys undertaken in 2011 showed weekday average traffic volumes of 1,883 and 1,261. There are on-street parking spaces available on this street.
Efkarpidis Street	Efkarpidis Street is a two lane two way local access street. The posted speed limit for this street is 40 km/h. The observed 85% speeds were 49.8 km/h for the westbound direction and 49.2 km/h for the eastbound direction. Traffic surveys undertaken in 2011 showed weekday average traffic

Street	Characteristics
	volumes of 1,527 westbound and 854 eastbound. There are on-street parking spaces available on this street.
Flemington Road	Flemington Road is an arterial road with posted speed limit of 70 km/h. There are on-street parking spaces available on the service roads feeding into Flemington Road.
Manning Clark Crescent (section between Flemington Road and Mulangarri Grasslands)	Manning Clark Crescent is a major collector road with posted speed limit of 60 km/h. On street parking in indented bays is available on this road.

2.3 Road Capacity

In several cases, the traffic volumes observed on the surrounding road network exceed the maximum volumes provided within the Estate Development Code for each road classification. While the function of the existing roads is established by the road hierarchy, the capacity of each road has been calculated separately based on Austroads Guide to Traffic Engineering Practice: Roadway Capacity and Table 15 Link Properties from Environment and Sustainable Development Directorate's (ESDD) Strategic Model Calibration Report 2014, refer to Table 4. The capacity and existing traffic volumes have been tabulated in Table 5.

This demonstrates that the existing road network within the Gungahlin Town Centre is operating below capacity.

Table 4: Calculated Road Capacities

Road	Speed (km/h)	Hourly Capacity per Lane (vph)	Daily Capacity per Lane (vpd)
The Valley Avenue	60	700	7,000
Kate Crace Road	50	600	6,000
Efkarpidis Street	40	500	5,000
Hinder Street	40	500	5,000

Table 5: Utilisation of Existing Capacity

Road	Two Way Daily Capacity (vpd)	Existing Volume (vpd)	Utilisation of Capacity (%)
The Valley Avenue	14,000	7,626	54%
Kate Crace Road	12,000	5,174	43%
Efkarpidis Street	10,000	2,381	24%
Hinder Street	10,000	3,683	37%

2.4 Public Transport

The site is well serviced by ACTION buses with the following routes traversing the study area enumerated in Table 6 and shown in Figure 3.

Table 6: Gungahlin ACTION Bus Routes

Route	Route Description
200	Red Rapid 200 travels between Gungahlin and Fyshwick via the City | Russell | Barton and Kingston. Buses depart every 10 minutes between 7am and 8:30am and every 15 minutes between 8:30am and 7pm weekdays
259 / 255	Gungahlin to Kingston Railway Station
252 / 251	Kingston Railway Station to Belconnen
59	Amaro to Gungahlin Marketplace
57	City | Northbourne Avenue | Flemington Road | Franklin | Gungahlin Marketplace
56	Gungahlin Marketplace | Palmerston | Mitchell | City
55	Gungahlin Marketplace | Forde | Bonner
54	Gungahlin | Crace | Belconnen
52	Belconnen | Federation Square | Ngunnawal | Gungahlin Marketplace

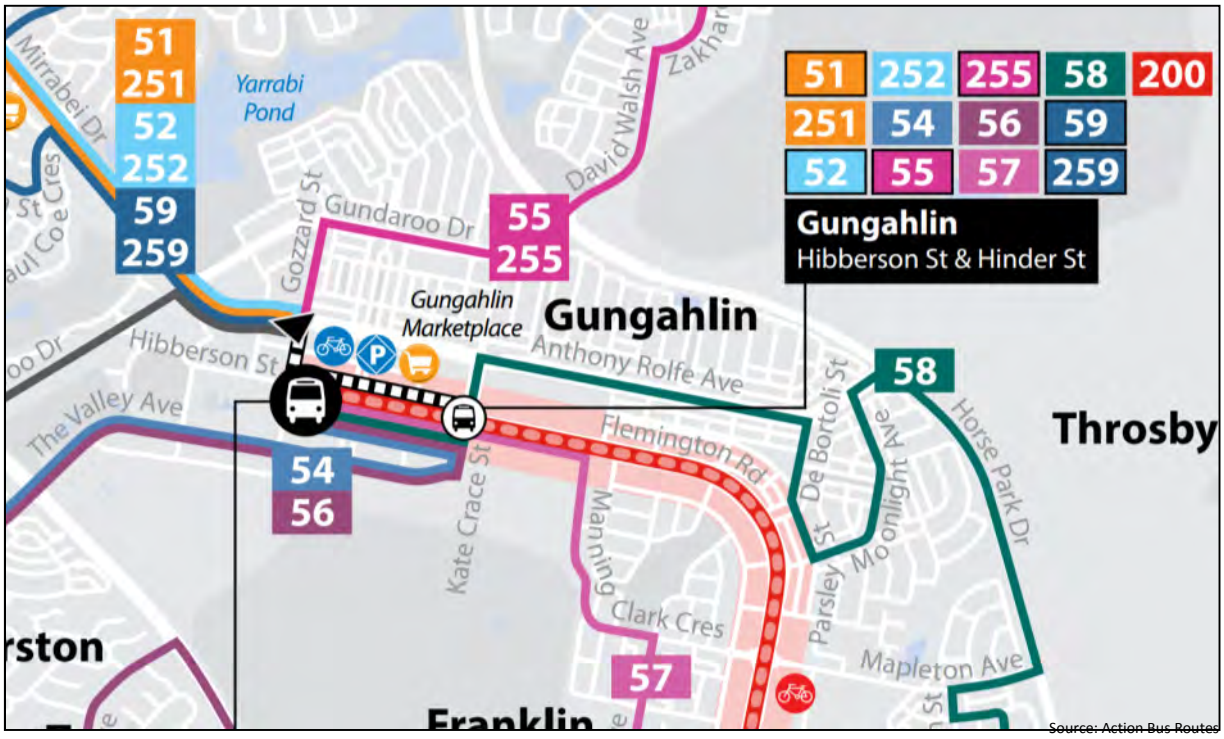


Figure 3: Gungahlin ACTION Bus Routes

2.5 Accident Records

Crash history reports were obtained from Roads ACT for a five year period (2009 – 2014) for Kate Crace Street, The Valley Avenue, Anthony Rolfe Avenue, Hibberson Street, Efkarpidis Street, Manning Clark Crescent and Hinder Street with the summarised results in Table 7 and Figure 4.

Table 7: Gungahlin Crash Statistics

Road	Detail
Gungahlin Place	• 74 crashes involving 147 vehicles • Two crashes needed medical attention
Flemington Road	• 45 crashes involving 83 vehicles. • 7 crashes needed medical attention
The Valley Avenue	• 7 crashes involving 13 vehicles
Anthony Rolfe Avenue	• 94 crashes involving 183 vehicles • 10 crashes needed medical attention
Kate Crace Street	• 50 crashes involving 93 vehicles • 5 crashes needed medical attention
Hibberson Street	• 102 crashes involving 202 vehicles • 12 crashes needed medical attention
Efkarpidis Street	• 59 crashes involving 20 vehicles. • 9 crashes needed medical attention
Manning Clark Crescent	• 8 crashes involving 14 vehicles • One crash needed medical attention and one crash victim was admitted to hospital
Hinder Street	• 144 crashes involving 294 vehicles • 18 crashes needed medical attention

An analysis of the crash data is provided below:

- The most common crash category was crash type 101 (cross traffic or through and through crashes with vehicles from adjacent direction in an intersection) rear end type which accounted for 54% of all crashes.
- 65 crashes resulted in injuries requiring medical treatment (no fatalities).
- More than 70% of the crashes occurred during fine weather conditions.

It is noted that there are high accident rates at intersections on Hibberson Street and Hinder Street within GTC East. Whilst these existing conditions are outside the scope of the Gungahlin Town Centre East EDP, it is also noted that the introduction of light rail and associated closure of Hibberson Street

from Kate Crace Street to Gungahlin Place should significantly alleviate this issue. For further discussion on the proposed road network, refer to Section 3.

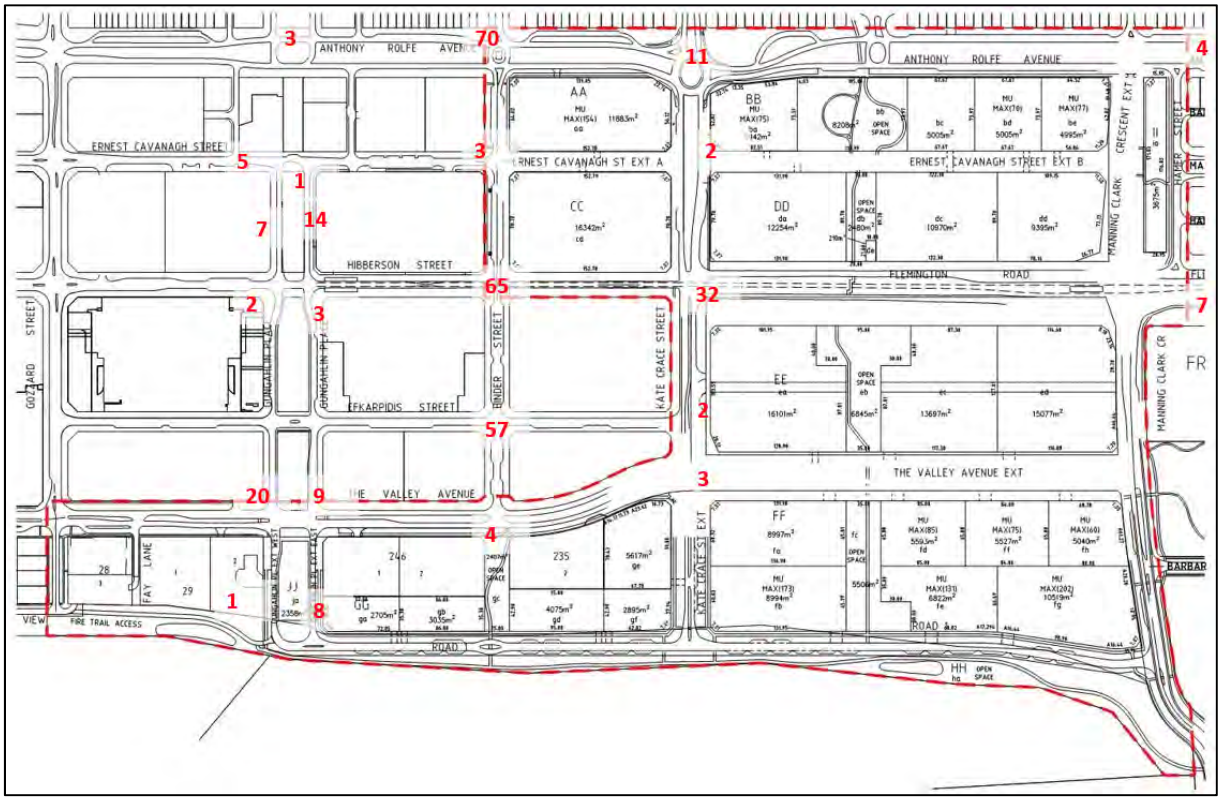


Figure 4: GTC East 5 Year Crash Location and Frequency

3 Proposed Development

3.1 Development

Gungahlin Town Centre East is zoned for CF Community Facilities, CZ1 and CZ2 Business Zones and CZ5 Mixed Use zone. The development is made up of 213,077m^2 for office space, 22,110m^2 for retail space, residential space (1,282 dwellings) and 39,136m^2 for other land uses. Table 8 shows a breakdown of the developments that are proposed in the GTC East EDP in more detail.

Table 8: Gungahlin Town Centre East Development

Block	Area (m^2)	Development Type			
		Office (m^2)	Retail (m^2)	Other (m^2)	Dwellings
aa	11,883	9,820	500		122
ba	5,942	4500	500		70
bc	5,005	6,600	3,300	3,300	
bd	5,005	2,000	2,200		70
be	4,996	2,000	2,200		77
ca	16,342	15,200	7,600	7,600	

Block	Area (m^2)	Development Type			
		Office (m^2)	Retail (m^2)	Other (m^2)	Dwellings
da	12,254	32,650	600		
dc	10,970	28,900	510		
dd	9,395	30,720	560		
ea	16,101	22,540	500		
ec	13,697	17,360	420	5,920	
ed	15,077	17,360	420	5,920	
fa	8,997	6,600	3,300	3,300	
fb	8,994	3,300		2,970	173
fd	5,593	2,100			85
fe	6,822	2,552			131
ff	5,527	2,070			75
fg	10,519	3,944			202
fh	5,040	1,890			60
ga	2,705	1,350	1,350	2,700	
gb	3,035	1,565	1,565	3,000	
gd	4,075	2,000	2,000	4,000	
ge	5,617	2,000	2,500	6,700	
gf	2,895	1,000	1,400	3,200	
bb	8,208				
db	2,481				
eb	6,845				
fc	5,506				
gc	2,407				
ha	24,889				
ia	3,675				
ja	2,358				
Total	**252,822**	**220,021**	**31,425**	**48,610**	**1,065**

3.2 Land Use

The proposed zoning of GTC East has been illustrated in Figure 5 and in EDP Drawing UD-LUP-13 'Land Use Plan'. Areas south of the Valley Avenue will be zoned Mixed Use while areas fronting the Flemington Road section between Manning Clark Crescent and Kate Crace Street will be Business Zones. Areas adjoing the Ernest Cavanagh Street section from Hinder Street to Manning Clark Crescent will either be Core, Business, Mixed Use and Community Facility Zones. GTC East will also

provide a north to south pedestrian linkage via an open space spine from Anthony Rolfe Avenue to Road 1. This will be located on the eastern side of GTC East.

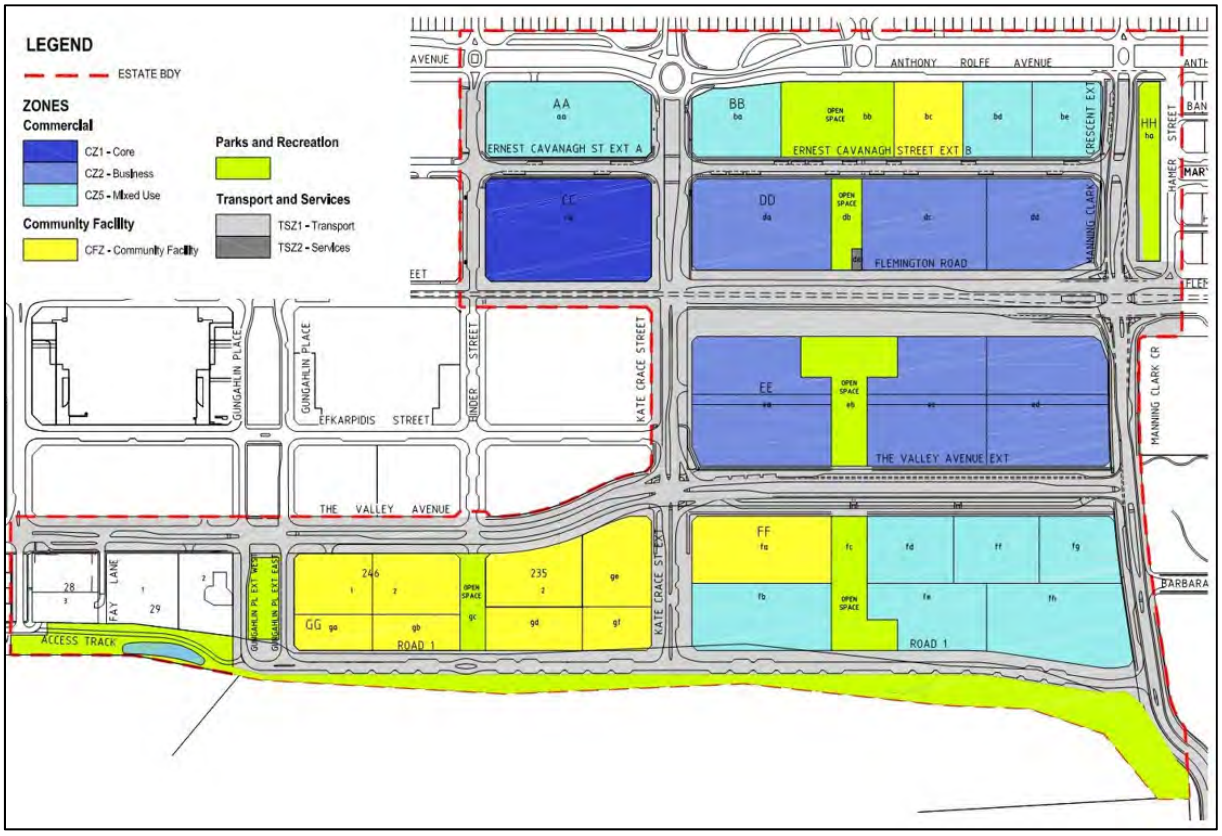


Figure 5: Proposed Development

3.3 Road Network

The GTC East EDP proposes a new southern road, "Road 1" and the extension of Kate Crace Street, Gungahlin Place and Ernest Cavanagh Street. The proposed road network is shown in Figure 6.

The Valley Avenue and Manning Clark Crescent are also proposed to be extended; however, this will form part of a separate Development Application being undertake as a Capital Works Project.

The Capital Metro Authority (CMA) propose to close Hibberson Street to vehicles between Gungahlin Place and Kate Crace Street with the introduction of light rail. CMA also propose to signalise the Hibberson Street intersections with Hinder Street and Kate Crace Street.

Figure 6: Proposed Road Network

3.4 Access

An analysis of future traffic flows and transport arrangements in GTC East (no direct vehicle access to Flemington Road and Anthony Rolfe Avenue) resulted in the following access recommendations:

- Blocks ga, gb, gd, gf, fb, fe and fg will have full access on Road 1;
- Block ge will have full access on Kate Crace Street extension;
- Blocks ea, ec and ed will have left in left out access on The Valley Avenue;
- Blocks fa, fd and ff will have a service road feeding into The Valley Avenue. Block ea will also have a left in left out access off Kate Crace Street; and
- Blocks aa, ca, ba, bc, bd, be, da, dc and dd will have full access on Ernest Cavanagh Street Extension.

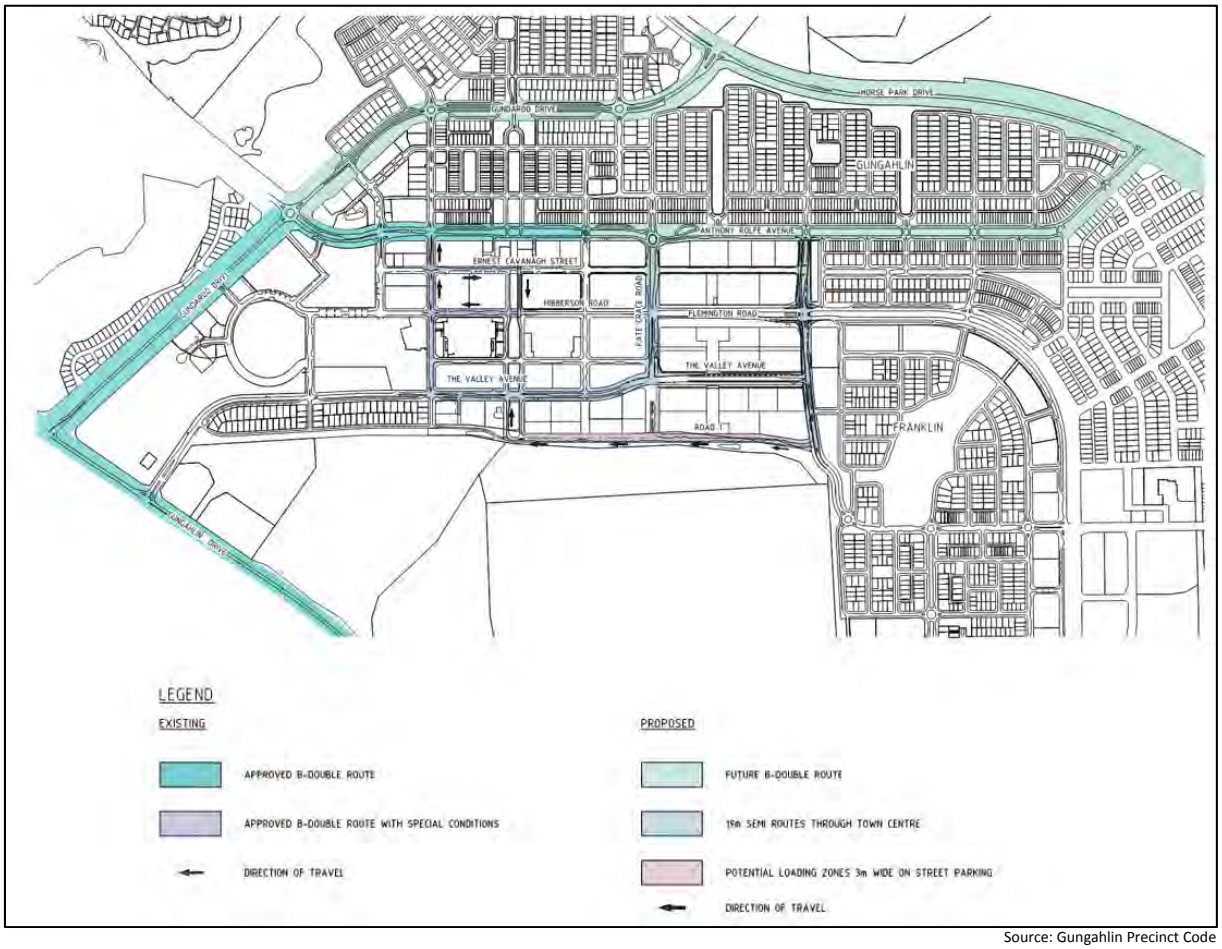
3.5 Heavy Vehicle Access

The heavy vehicle routes have been illustrated in Figure 7 and in EDP Drawing ENG-HVP-040 'Heavy Vehicle Route Plan'. The map outlines the routes (including direction of travel) for approved b-double route with special conditions, future B-double route and 19m semi routes through the Town Centre.

Loading and unloading of heavy vehicles would be fully accommodated within each development. The following roads are the proposed heavy vehicle routes:

- Gungahlin Place northbound
- Gozzard Street
- Anthony Rolfe Avenue
- Ernest Cavanagh Street
- Hibberson Street
- Kate Crace Road
- The Valley Avenue
- Road 1

Due to the commercial land uses, parking bays in Road 1 and The Valley Avenue will be 3m wide, which will allow loading zones for smaller delivery vehicles.



Source: Gungahlin Precinct Code

Figure 7: Gungahlin Precinct Code – Heavy Vehicle Routes

3.6 Parking

Future developments of proposed blocks are expected to provide for their parking requirements within their site and will adhere to the following parking rates stated in the ACTPLA Parking and Vehicular Access Guide as follows.

Table 9: Street Hierarchy for Estates in Residential Zones and CZ5

Development Type	Parking Provision Rates
Residential	CZ2 zones in town centres do not have minimum parking requirements CZ5 zones use the following parking rates: • 1 space per single bedroom unit • A minimum average provision of 1.5 spaces per two bedroom dwelling, provided that each two bedroom dwelling is allocated a minimum of one (1) parking space and each two (2) bedroom dwelling is allocated no more than two (2) parking spaces; • or • Two (2) parking spaces per two bedroom dwelling; • and • Two (2) parking spaces for each dwelling with three or more bedrooms; • plus • One (1) visitor space per four (4) dwellings or part thereof where a compound comprises four (4) or more dwellings
Office	CZ2 and CZ5 zones - 2.5 spaces/100m^2 GFA
Retail / Other	CZ2 zone - 4 spaces/100m^2 GFA CZ5 zones – 5 spaces/100m^2 GFA

The design of GTC East Estate allowed for a number of on-street indented parking bays to provide short term parking opportunites for visitors to the various developments:

- 20 parking spaces on both sides of Ernest Cavanagh Street extension section between Hinder Street and Kate Crace Street;
- 18 parking spaces north side and 20 parking spaces south side of Ernest Cavanagh Street extension between Kate Crace Street and Manning Clark Street extension;
- Approximately 45 parking spaces north side of The Valley Avenue;
- 8 parking spaces north side and 22 parking spaces south side of Road 1 section from Gungahlin Place extension and Kate Crace Street extension; and
- 8 parking spaces north side and 28 parking spaces south side of Road 1 section from Kate Crace Street extension to Manning Clark Crescent.

3.7 Walking and Cycling

The design of GTC East estate aims to augment the existing walking and cycling infrastructure as seen in Figure 8 (EDP-ENG-PT-100 'Shared Path Network') and Figure 9 (EDP-ENG-PT-095 'Public Transport Network & Off Road Movement Systems Plan')numerated below:

- Provision of new on-road cycle lanes on the north side of The Valley Avenue from Gungahlin Place to Manning Clark Crescent
- Provision of new off road shared paths:
  - On the south side of Road 1 from Gozzard Avenue to Manning Clark Crescent;
  - On the west side of Kate Crace Street extension; and
  - On the north to south green strip from Road 1 to Anthony Rolfe Avenue

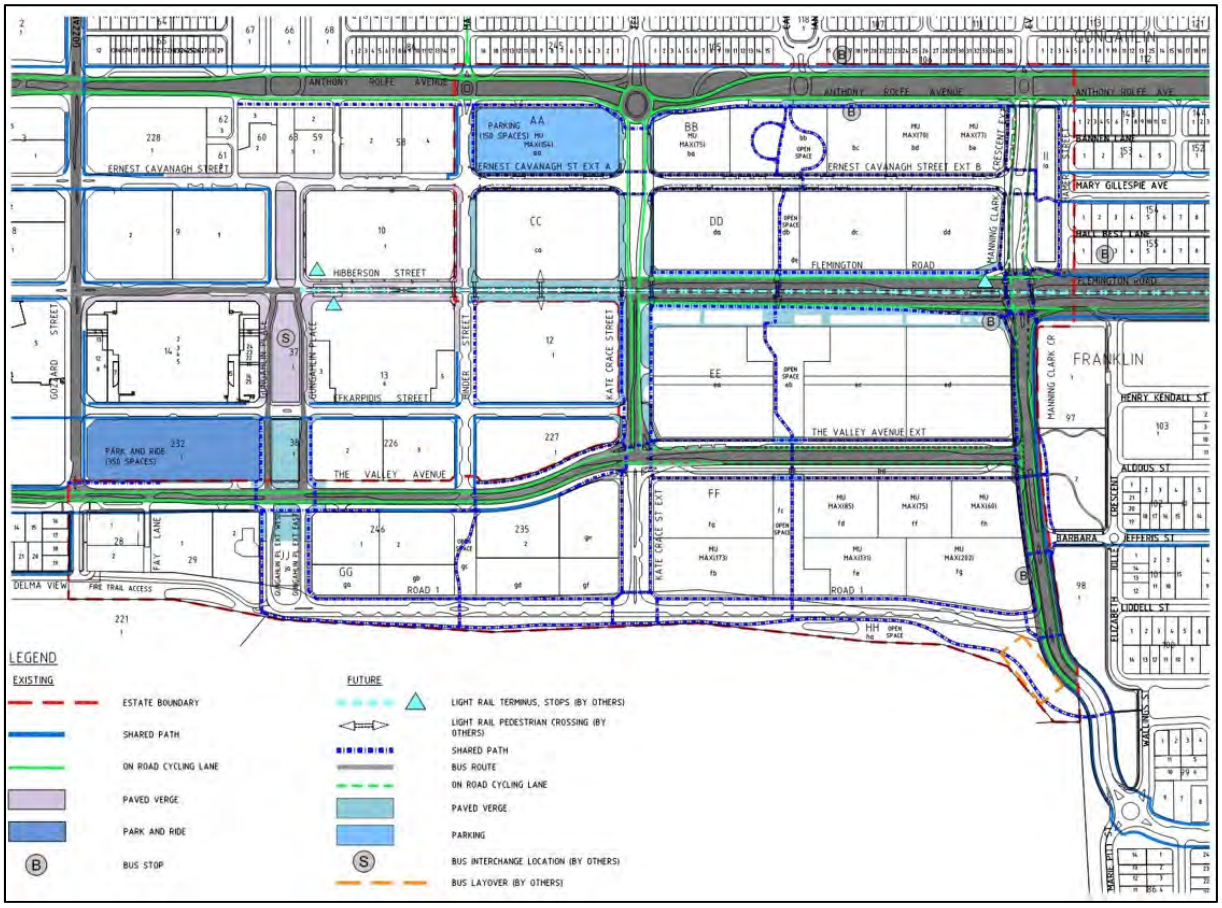


Figure 8: Proposed Shared Path Network

3.8 Public Transport

The design of GTC East takes into account the operation of the light rail along Flemington Road and Hibberson Street up to Gungahlin Pace. As can be seen in Figure 9 and EDP Drawing ENG-PT-095 'Public Transport Network & Off Road Movement Systems Plan', new bus routes are proposed along Gungahlin Place, The Valley Avenue and Manning Clark Crescent Extension.

There is an existing park and ride facility on Block 1 Section 232 Gungahlin. A temporary park and ride facility has also been constructed on Block aa Section AA. This EDP proposed a permanent public parking provision on Block aa Section AA in accordance with the Gungahlin Precinct Code.

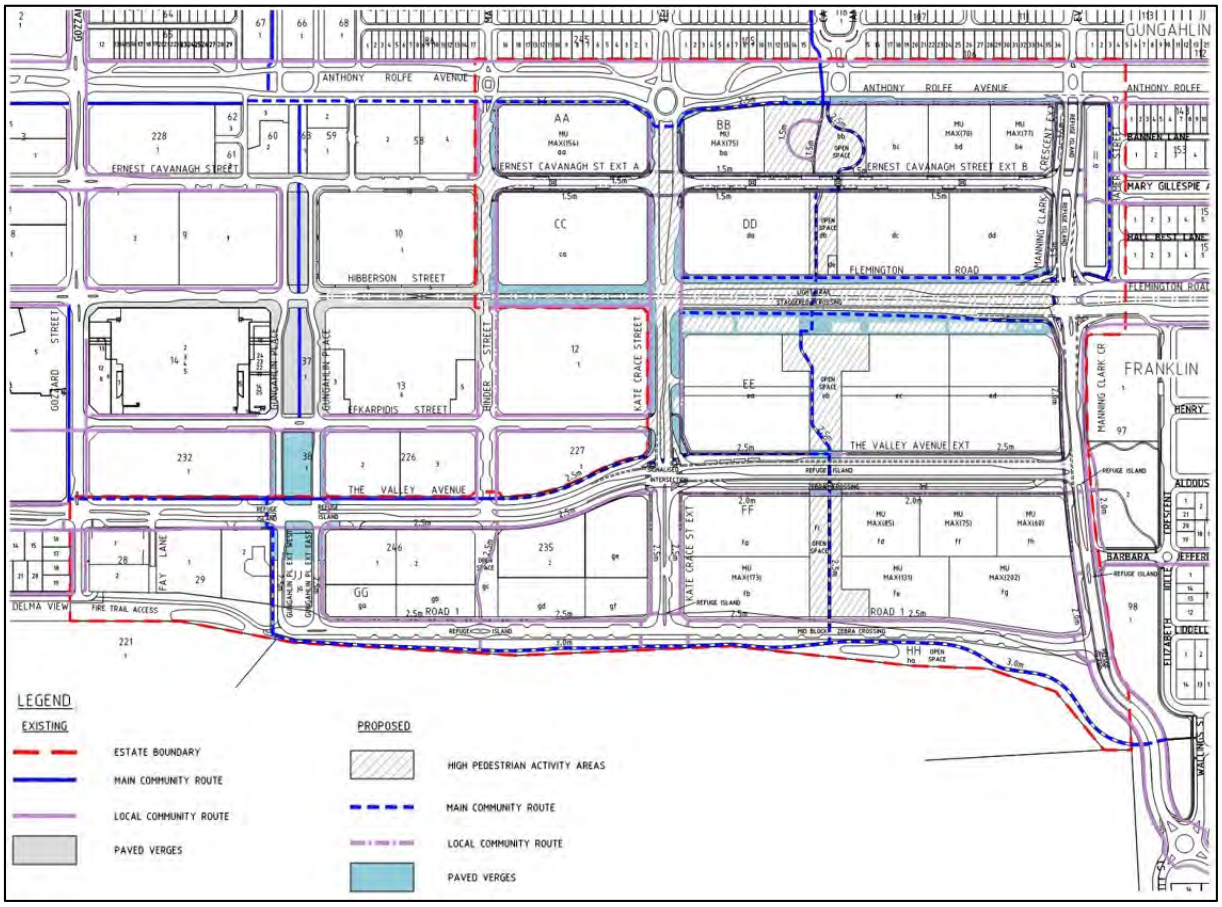


Figure 9: Proposed Public Transport and Off Road Movement Plan

4 Traffic Generation and Distribution

Indesco have provided Traffix Group with outputs for a Zenith Model (2031) around the Gungahlin Town Centre that includes the GTC East development that was obtained from Capital Metro Authority in consultation with Arup and Veitch Lister Consulting. This model includes the light rail operating between Gungahlin and Civic. The output extract for the Zenith Model are shown below in Figure 10.

Source: Capital Metro

Figure 10: 2031 AM Two Hour Peak Zenith Model Output

A zonal land use model was developed by Arup to model employment and residential densities based on the Territory Plan with input from the LDA in relation to land release forecasts. Arup and the LDA confirmed that development of GTC East was included in these assumptions.

This study used a factor of 0.65 to convert the two hour peak into the one hour peak from the Zenith Model Output. Figure 11 below shows the summary for the peak hour vehicle trips as generated by the Zenith Mode.

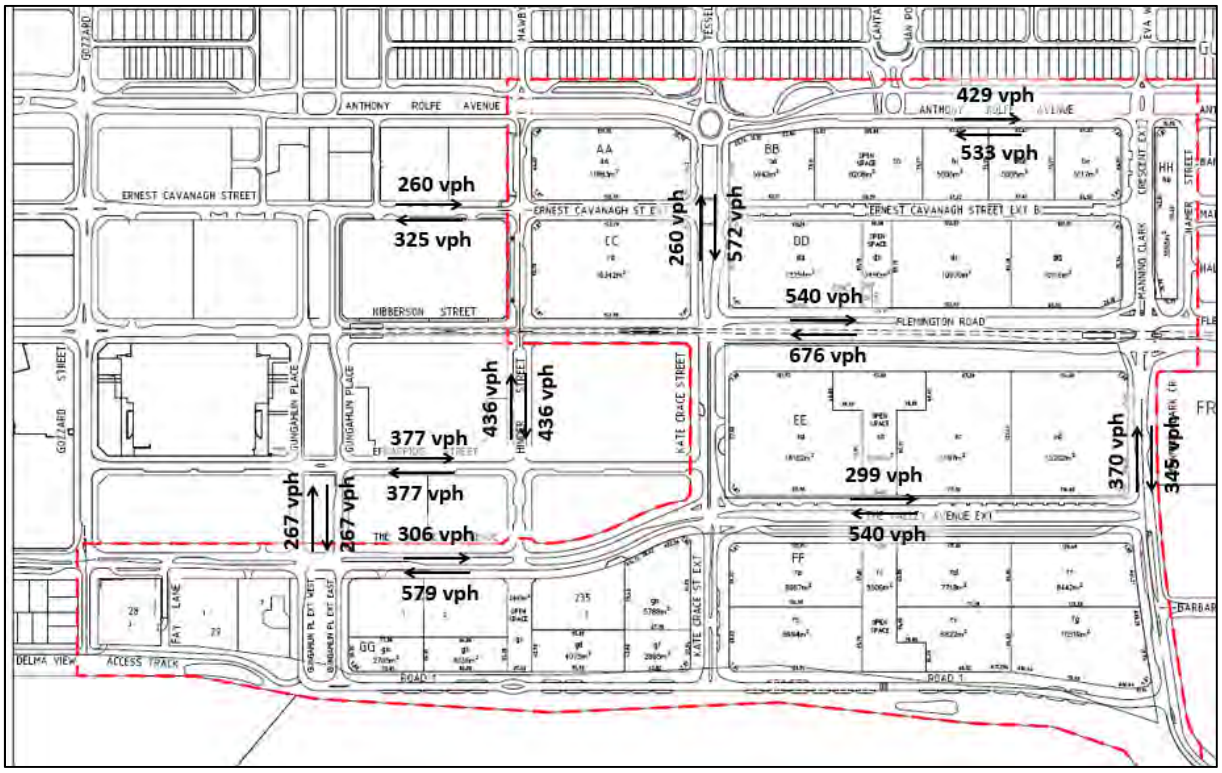


Figure 11: 2031 AM Peak Zenith Output

The daily traffic volume was conservatively estimated by adding the directional peak hour volumes together and multiplying by ten. A comparison is shown below in Table 10.

Table 10: Daily Traffic Volume Comparison

Road	Measured Volumes (2011-2013)	Zenith Model (2031) (vpd)	Variance (%)
The Valley Avenue	7,626	8,850	16%
Anthony Rolfe Avenue	5,247	9,620	83%
Flemington Road	7,800	12,160	56%
Kate Crace Street	5,174	8,320	61%
Hinder Street	3,683	8,720	137%
The Valley Avenue Extension	N/A	8,390	N/A
Ernest Cavanagh Street Extension	N/A	N/A	N/A
Road 1	N/A	N/A	N/A

As shown in the table above, traffic volumes are shown to have grown significantly from the measured volumes to the Zenith model (2031). The volumes shown in the Zenith model generally appropriate given the magnitude of development proposed in the area.

It should be noted that the Zenith (2031) outputs did not include Road 1 and Ernest Cavanagh Extension in the outputs. On this basis, approximately 20% of the traffic that is utilising The Valley

Avenue Extension will be redistributed to Road 1 and the volume of traffic utilising the existing section of Ernest Cavanagh Street will be assumed to be similar to the extension.

Table 11: Adopted Daily Traffic Volumes

Road	Measured Volumes (2011-2013)	Adopted Numbers (2031) (vpd)	Variance (%)
The Valley Avenue	7,626	8,850	16%
Anthony Rolfe Avenue	5,247	9,620	83%
Flemington Road	7,800	12,160	56%
Kate Crace Street	5,174	8,320	61%
Hinder Street	3,683	8,720	137%
The Valley Avenue Extension	N/A	6,712	N/A
Ernest Cavanagh Street Extension	N/A	5,850	N/A
Road 1	N/A	1,678	N/A

4.1 Road Capacity

The capacity of each road has been calculated separately based on Austroads Guide to Traffic Management Part 3, refer to Table 12.

Table 12: Calculated Road Capacities for Proposed and Existing Roads

Proposed Road Section	Speed	Road Type	Hourly Capacity per lane (vph)	Daily Capacity per lane (vpd)
The Valley Avenue	60	Urban Distributor	700	7,000
Flemington Road	70	Urban Arterial	800	8,000
Kate Crace Road	50	Urban Distributor	600	6,000
Ernest Cavanagh Street	50	Local Street	600	6,000
The Valley Avenue Extension	60	Urban Distributor	700	7,000
Ernest Cavanagh Street Extension A & B	50	Local Street	600	6,000
Road 1	50	Local Street	600	6,000

The proposed and existing roads within the GTC East area will operate above the nominal road classification as described earlier in the report. However, the roads will operate well within their environmental capacity and at acceptable levels for a Town Centre.

5 Impacts

5.1 Proposed Road Hierarchy

An assessment of the daily traffic volumes derived from the Zenith model showed that all roads will operate within their rated capacity in 2031. The proposed road heirachy has been established to be consistent with the road functions as set out in the Gungahlin Precint Code. The proposed road hierarchy is provided in Figure 12 and in EDP Drawing ENG-RHP-035 'Road Hierachy Overall Plan'.

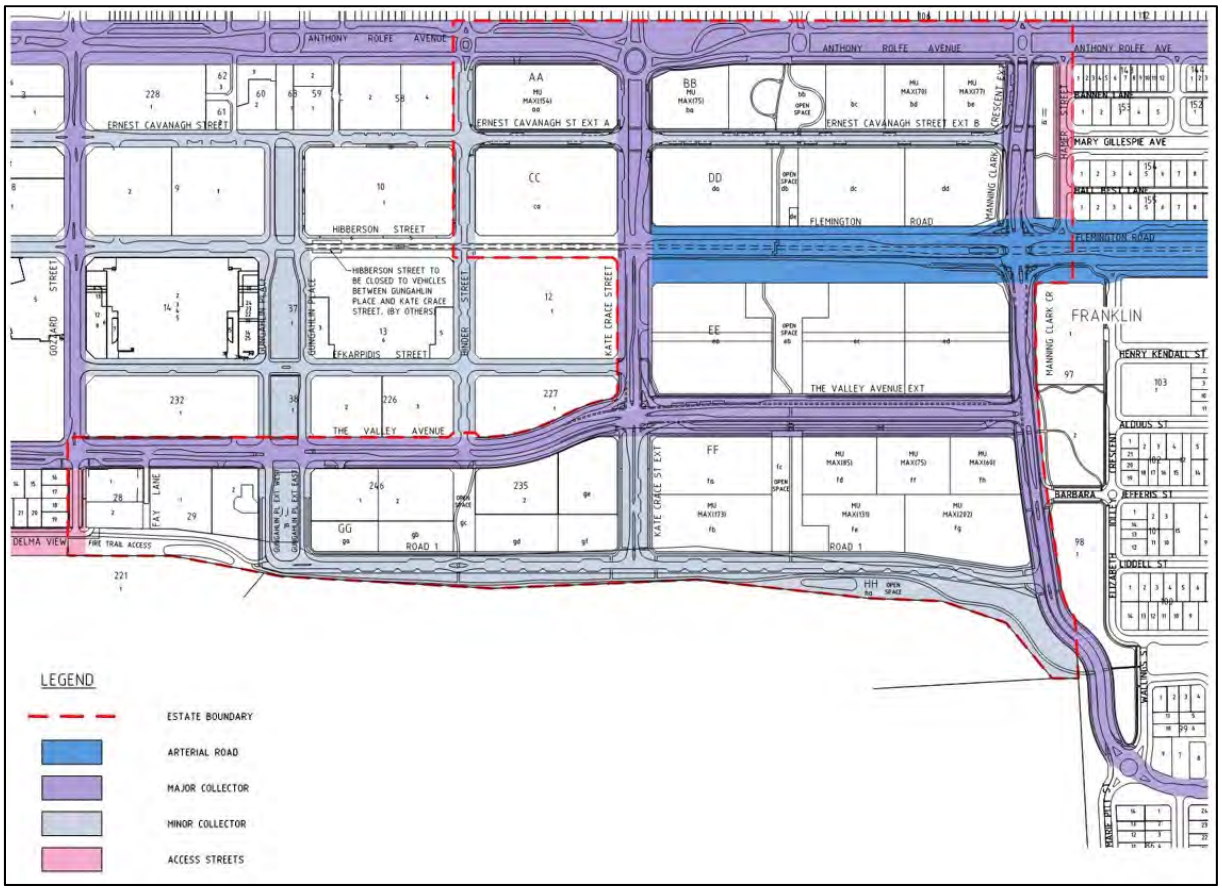


Figure 12: Proposed Road Hierarchy Plan

5.2 Intersection Vehicle and Pedestrian Performance

5.2.1 Intersection Analysis

This study assessed only the new intersections proposed within the GTC East EDP:

- Kate Crace Street/The Valley Avenue: signalised intersection.
- Gungahlin Place/The Valley Avenue: signalised intersection.
- Manning Clark Crescent/Road 1: priority controlled intersection.

The performance of the intersections were assessed using SIDRA. SIDRA is a traffic engineering micro-analytical traffic evaluation tool used for intersection design and analysis. It stands for Signalised and unsignalised Intersection Design and Research Aid and is used for the analysis of

intersection capacity, level of service and performance. This package provides several useful indicators to determine the level of intersection performance. These are known as Level of Service (LOS), Average Delay (seconds) and Maximum Queue Length (metres). The LOS criteria for intersections are shown in Table 13.

Table 13: Level of Service Criteria for Intersections

Level of Service	Average Delay (seconds per vehicle)	Traffic Signals and Roundabout	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and 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	Greater than 71	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing; requires other control mode

Intersection configurations for The Valley Avenue/Gungahlin Place signalised intersection, Road 1/Manning Clark Crescent priority control and The Valley Avenue/Kate Crace Street signalised intersection are shown in Figure 13 with results in Table 14.

Figure 13: Proposed Intersection Configuration

Analysis of the three (3) intersections shows acceptable Levels of Service.

Table 14: Post Development Intersection Performance

Intersection	Peak Hour	DOS	Delay (s)	LOS
The Valley Avenue / Gungahlin Place Extension	AM Peak	0.798	35.0	C
	AM Peak -50% increase	0.908	55.3	D
The Valley Avenue / Kate Crace Street	AM Peak	0.558	20.8	B
	AM Peak -50% increase	0.643	19.6	B
Manning Clark Crescent / Road 1	AM Peak	0.179	1.5	A
	AM Peak -50% increase	0.264	1.3	A

An assessment of traffic impacts and intersection performance for The Valley Avenue Extension, Ernest Cavanagh Street Extension and Manning Clark Crescent Extension has been undertaken or reviewed by Cardno within the Gungahlin Town Centre East Roads PSP Report, February 2014. This report concludes that the associated intersection configurations have been reviewed and approved by Roads ACT.

An assessment of traffic impacts and intersection performance along the proposed light rail route has been undertaken by Parsons Brinckerhoff (Capital Metro Traffic and Transport Impact Assessment, June 2015). This report notes that overall, negligible impacts will occur across the road network as a result of the project. It is expected that delays will increase at the Hibberson Street intersections with Hinder Street and Kate Crace Street due to the signal priority arrangements.

However the LOS is still modelled at B and C, respectively. Positive impacts are noted for cyclists and pedestrians. Furthermore, the proposed closure of Hibberson Street between Gungahlin Place and Kate Crace Street was modelled to result in reduced traffic volumes along the remaining sections of Hibberson Street.

5.3 Other Intersections

5.3.1 The Valley Avenue / Gozzard Street

The Zenith model (2031) shows that in the vicinity of Gozzard Street, The Valley Avenue will carry a combined 1,255 vehicles during the AM peak. The model also estimates that 455 vehicles will turn into The Valley Avenue during the same peak. A first principles analysis shows that that would be approximately one vehicle every 7.9 seconds. On this basis, it is highly likely that this intersection would need to be signalised in the future as the vehicle volumes from the west are particularly high during the peak and delays would be significant.

5.3.2 Hibberson Street / Hinder Street

The crash analysis that was conducted previously in the report showed that 65 crashes have occurred at this location in the five years. This issue is likely to be resolved due to the removal of vehicle movements into Hibberson Street as a result of the nearby light rail works.

5.3.3 Anthony Rolfe Avenue / Hinder Street

The crash analysis that was conducted previously in the report showed that 70 crashes have occurred at the intersection of Anthony Rolfe Avenue and Hinder Street. As this location is likely to be affected by the light rail works, this issue will require further investigation following the completion of the works and the normalisation of the traffic patterns.

5.3.4 Efkarpidis Street / Hinder Street

Works by Capital Works and CMA propose that the Efkarpidis Street / Kate Crace Street intersection will become left in / left out. This will affect the traffic patterns at Efkarpidis Street / Hinder Street, and it is recommended that a future study be conducted at this location to determine the effect of the nearby intersection works.

5.3.5 Anthony Rolfe Avenue / Manning Clark Crescent

The geometry of the intersection between Anthony Rolfe Avenue and Manning Clarke Crescent is sub-optimal for a high capacity intersection. A separate study is recommended to assess the intersection layout at this location and the implications of the additional traffic volumes as well as the recently approved development application for the Manning Clark Crescent extension.

6 Conclusions

The key findings of the traffic and parking impact assessment are summarised as follows:

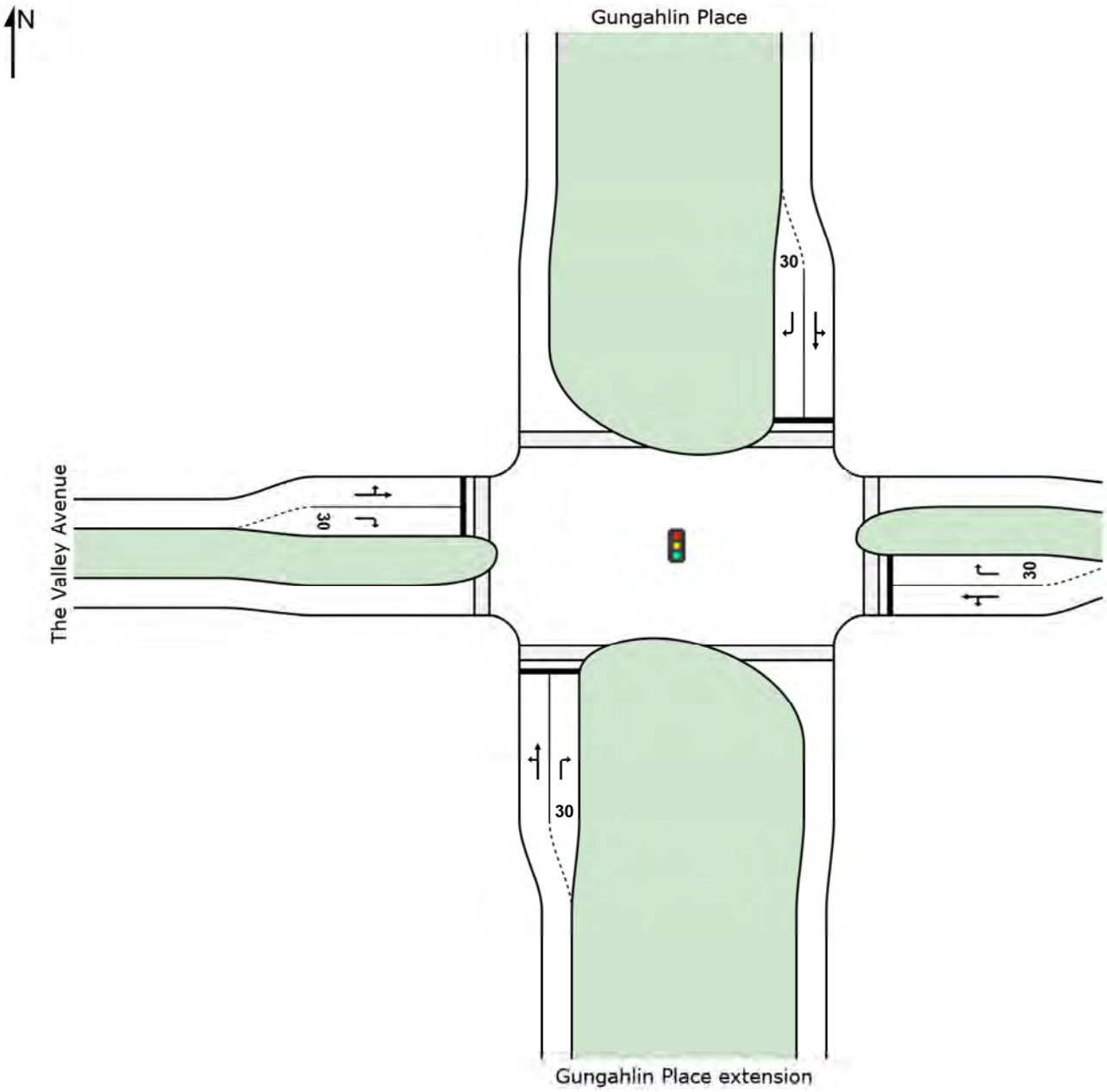
- The three intersections analysed showed acceptable Levels of Service during the peak periods with the addition of the traffic generated by the development.
- The proposed developments in the estate are expected to provide for their parking needs within their individual sites.
- The design of GTC East estate is based on the road hierarchy identified in the Gungahlin Precinct Code.
- The proposed transport network has allowed for the operation of the light rail with its terminus at Hibberson Street and has also identified supporting bus routes.
- Additional pedestrian and cycle infrastructure has been identified to allow for the GTC East developments.

Appendix A:
Post-Development SIDRA Results

SITE LAYOUT

Site: 1 [The Valley Avenue / Gungahlin Place extension]

The Valley Ave / Gungahlin Pl
AM Peak
3021
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 1 [The Valley Avenue / Gungahlin Place extension]

The Valley Ave / Gungahlin Pl
AM Peak
3021
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gungahlin Place extension											
1	L2	61	0.0	0.430	45.5	LOS D	2.5	17.4	0.99	0.75	32.0
2	T1	1	0.0	0.430	42.2	LOS C	2.5	17.4	0.99	0.75	28.7
3	R2	56	0.0	0.386	45.3	LOS D	2.2	15.6	0.99	0.74	32.0
Approach		118	0.0	0.430	45.4	LOS D	2.5	17.4	0.99	0.75	32.0
East: The Valley Avenue											
4	L2	17	0.0	0.798	35.2	LOS C	15.8	115.5	0.92	0.89	37.5
5	T1	405	5.0	0.798	29.6	LOS C	15.8	115.5	0.92	0.89	40.3
6	R2	162	0.0	0.259	27.1	LOS B	4.7	32.8	0.78	0.76	35.6
Approach		584	3.5	0.798	29.1	LOS C	15.8	115.5	0.88	0.85	38.8
North: Gungahlin Place											
7	L2	109	0.0	0.726	44.1	LOS D	6.6	46.0	1.00	0.90	30.2
8	T1	51	0.0	0.726	40.7	LOS C	6.6	46.0	1.00	0.90	29.4
9	R2	109	0.0	0.503	41.4	LOS C	4.2	29.6	0.98	0.78	30.6
Approach		269	0.0	0.726	42.3	LOS C	6.6	46.0	0.99	0.85	30.2
West: The Valley Avenue											
10	L2	116	0.0	0.772	39.6	LOS C	13.9	100.2	0.99	0.92	32.8
11	T1	236	5.0	0.772	34.1	LOS C	13.9	100.2	0.99	0.92	37.7
12	R2	12	0.0	0.025	30.7	LOS C	0.3	2.4	0.79	0.67	37.2
Approach		364	3.2	0.772	35.7	LOS C	13.9	100.2	0.98	0.91	36.0
All Vehicles		1334	2.4	0.798	35.0	LOS C	15.8	115.5	0.94	0.86	35.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	53	21.1	LOS C	0.1	0.1	0.73	0.73
P12	South Stage 2	53	18.9	LOS B	0.1	0.1	0.69	0.69
P21	East Stage 1	53	34.3	LOS D	0.1	0.1	0.93	0.93
P22	East Stage 2	53	32.5	LOS D	0.1	0.1	0.90	0.90
P31	North Stage 1	53	26.5	LOS C	0.1	0.1	0.81	0.81
P32	North Stage 2	53	24.1	LOS C	0.1	0.1	0.78	0.78
P41	West Stage 1	53	34.3	LOS D	0.1	0.1	0.93	0.93
P42	West Stage 2	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		421	28.2	LOS C			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

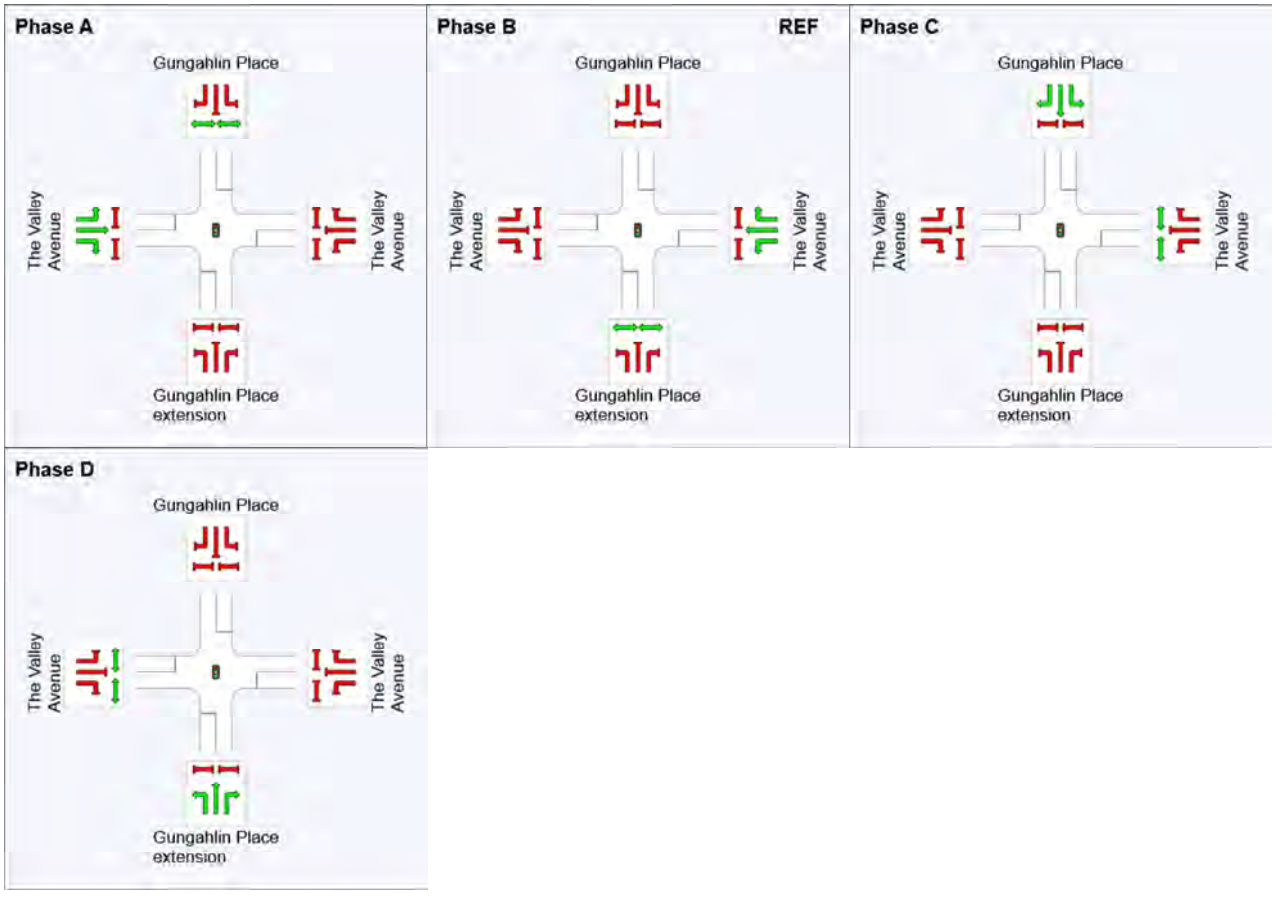
Site: 1 [The Valley Avenue / Gungahlin Place extension]

The Valley Ave / Gungahlin Pl
AM Peak
3021
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Opposed Turns
Movement Class: All Movement Classes
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Reference Phase	No	Yes	No	No
Phase Change Time (sec)	56	0	31	45
Green Time (sec)	19	26	9	6
Yellow Time (sec)	3	3	3	3
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	24	31	14	11
Phase Split	30%	39%	18%	14%



MOVEMENT SUMMARY

Site: 1 [The Valley Avenue / Gungahlin Place extension - 50% increase]

The Valley Ave / Gungahlin Pl
AM Peak
3021
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gungahlin Place extension											
1	L2	61	0.0	0.096	33.1	LOS C	2.4	17.1	0.71	0.71	35.9
2	T1	1	0.0	0.096	29.8	LOS C	2.4	17.1	0.71	0.71	31.7
3	R2	56	0.0	0.386	64.2	LOS E	3.3	22.8	0.99	0.75	27.5
Approach		118	0.0	0.386	47.8	LOS D	3.3	22.8	0.84	0.73	31.3
East: The Valley Avenue											
4	L2	17	0.0	0.908	55.7	LOS D	38.8	283.1	0.92	1.00	31.0
5	T1	608	5.0	0.908	50.1	LOS D	38.8	283.1	0.92	1.00	32.9
6	R2	162	0.0	0.202	29.2	LOS C	6.0	41.7	0.67	0.75	34.9
Approach		787	3.9	0.908	45.9	LOS D	38.8	283.1	0.87	0.95	33.2
North: Gungahlin Place											
7	L2	109	0.0	0.855	68.4	LOS E	10.2	71.6	1.00	1.02	25.1
8	T1	51	0.0	0.855	65.0	LOS E	10.2	71.6	1.00	1.02	24.6
9	R2	109	0.0	0.755	67.4	LOS E	6.8	47.5	1.00	0.89	25.1
Approach		269	0.0	0.855	67.4	LOS E	10.2	71.6	1.00	0.96	25.0
West: The Valley Avenue											
10	L2	116	0.0	0.890	70.5	LOS E	30.0	217.1	1.00	1.09	25.8
11	T1	354	5.0	0.890	64.9	LOS E	30.0	217.1	1.00	1.09	28.7
12	R2	12	0.0	0.023	39.9	LOS C	0.5	3.4	0.76	0.67	34.0
Approach		482	3.7	0.890	65.7	LOS E	30.0	217.1	0.99	1.08	28.0
All Vehicles		1655	2.9	0.908	55.3	LOS D	38.8	283.1	0.93	0.97	29.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	53	23.5	LOS C	0.1	0.1	0.63	0.63
P12	South Stage 2	53	21.6	LOS C	0.1	0.1	0.60	0.60
P21	East Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P22	East Stage 2	53	53.3	LOS E	0.2	0.2	0.94	0.94
P31	North Stage 1	53	36.1	LOS D	0.1	0.1	0.78	0.78
P32	North Stage 2	53	33.8	LOS D	0.1	0.1	0.75	0.75
P41	West Stage 1	53	54.3	LOS E	0.2	0.2	0.95	0.95
P42	West Stage 2	53	53.3	LOS E	0.2	0.2	0.94	0.94
All Pedestrians		421	41.3	LOS E			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

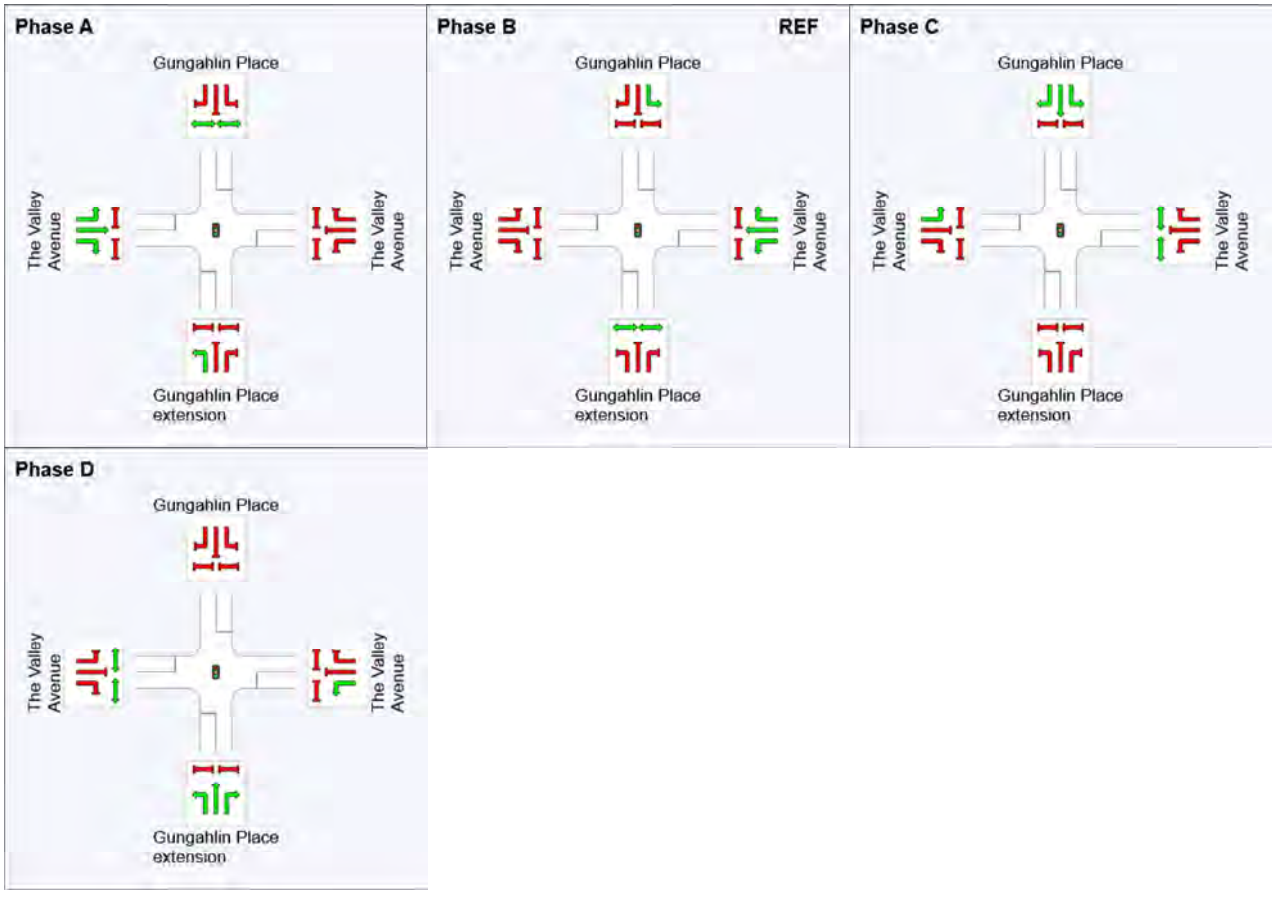
Site: 1 [The Valley Avenue / Gungahlin Place extension - 50% increase]

The Valley Ave / Gungahlin Pl
AM Peak
3021
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Opposed Turns
Movement Class: All Movement Classes
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

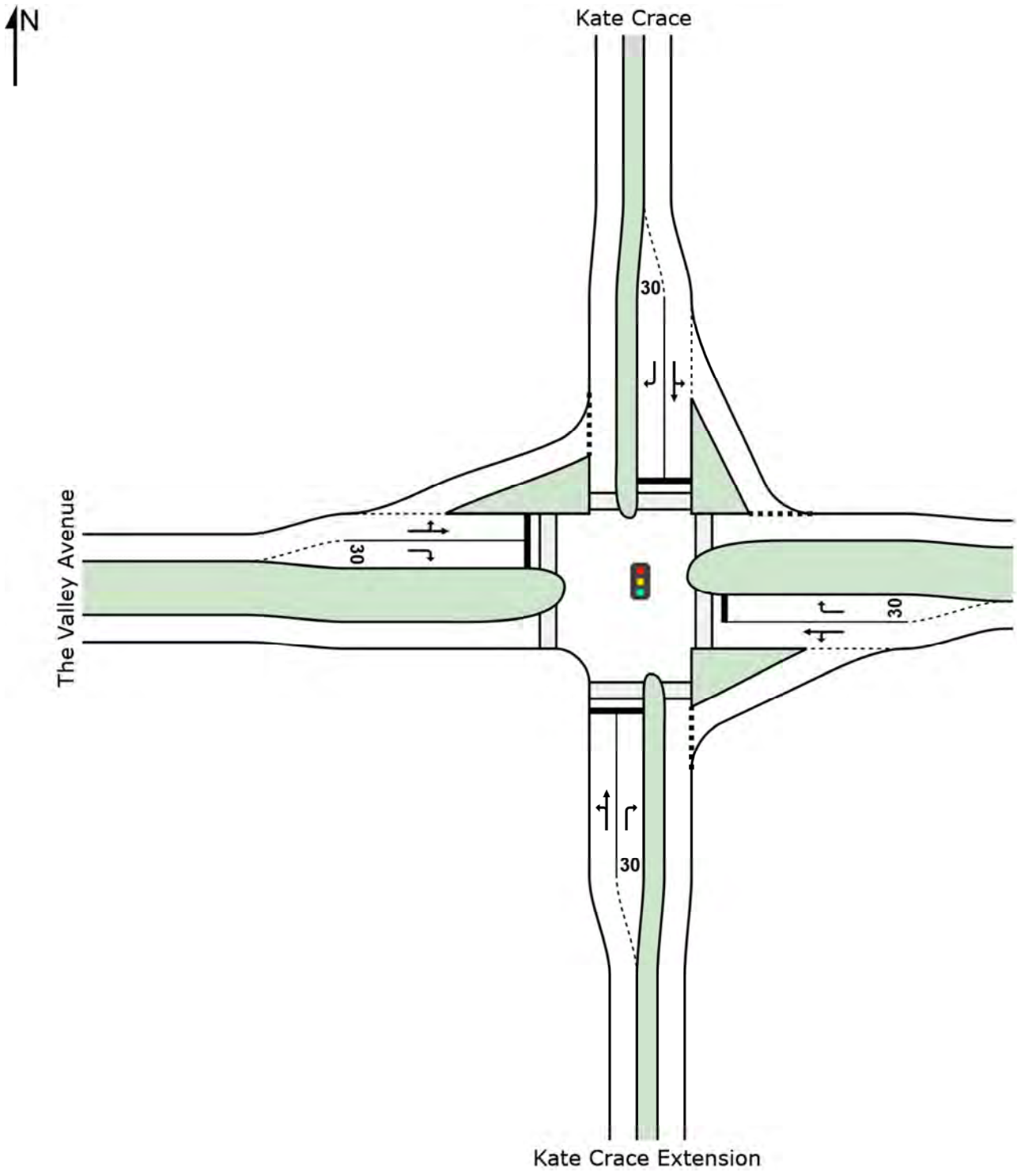
Phase	A	B	C	D
Reference Phase	No	Yes	No	No
Phase Change Time (sec)	83	0	55	69
Green Time (sec)	32	50	9	9
Yellow Time (sec)	3	3	3	3
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	37	55	14	14
Phase Split	31%	46%	12%	12%



SITE LAYOUT

Site: 1 [2031-Kate Crace Street / The Valley Avenue -FINAL]

Kate Crace Street / The Valley Avenue
AM Peak
2031
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 1 [2031-Kate Crace Street / The Valley Avenue -FINAL]

Kate Crace Street / The Valley Avenue
AM Peak
2031
Signals - Fixed Time Isolated Cycle Time = 75 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kate Crace Extension											
1	L2	29	1.0	0.162	40.0	LOS C	1.1	7.9	0.94	0.71	35.8
2	T1	3	1.0	0.162	34.5	LOS C	1.1	7.9	0.94	0.71	36.4
3	R2	84	1.0	0.427	41.4	LOS C	3.1	21.6	0.98	0.76	35.0
Approach		116	1.0	0.427	40.9	LOS C	3.1	21.6	0.97	0.75	35.2
East: The Valley Avenue											
4	L2	43	5.0	0.196	5.7	LOS A	0.4	3.0	0.07	0.09	58.0
5	T1	297	5.0	0.196	0.1	LOS A	0.4	3.0	0.07	0.09	59.0
6	R2	200	5.0	0.558	35.8	LOS C	6.8	49.9	0.95	0.81	36.9
Approach		540	5.0	0.558	13.7	LOS A	6.8	49.9	0.40	0.35	48.3
North: Kate Crace											
7	L2	106	5.0	0.153	13.4	LOS A	1.8	12.9	0.61	0.68	48.8
8	T1	7	5.0	0.153	7.7	LOS A	1.8	12.9	0.61	0.68	49.5
9	R2	106	5.0	0.554	42.3	LOS C	3.9	28.8	0.99	0.79	34.6
Approach		219	5.0	0.554	27.2	LOS B	3.9	28.8	0.80	0.73	40.8
West: The Valley Avenue											
10	L2	144	5.0	0.535	23.3	LOS B	7.3	53.0	0.89	0.79	44.4
11	T1	144	5.0	0.535	17.6	LOS B	7.3	53.0	0.89	0.79	45.0
12	R2	18	5.0	0.056	32.2	LOS C	0.5	4.0	0.84	0.69	38.3
Approach		306	5.0	0.535	21.2	LOS B	7.3	53.0	0.89	0.78	44.2
All Vehicles		1181	4.6	0.558	20.8	LOS B	7.3	53.0	0.65	0.57	44.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	53	21.7	LOS C	0.1	0.1	0.76	0.76
P12	South Stage 2	53	20.2	LOS C	0.1	0.1	0.73	0.73
P21	East Stage 1	53	31.8	LOS D	0.1	0.1	0.92	0.92
P22	East Stage 2	53	30.0	LOS C	0.1	0.1	0.90	0.90
P31	North Stage 1	53	21.7	LOS C	0.1	0.1	0.76	0.76
P32	North Stage 2	53	20.2	LOS C	0.1	0.1	0.73	0.73
P41	West Stage 1	53	31.8	LOS D	0.1	0.1	0.92	0.92
P42	West Stage 2	53	30.0	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		421	25.9	LOS C			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

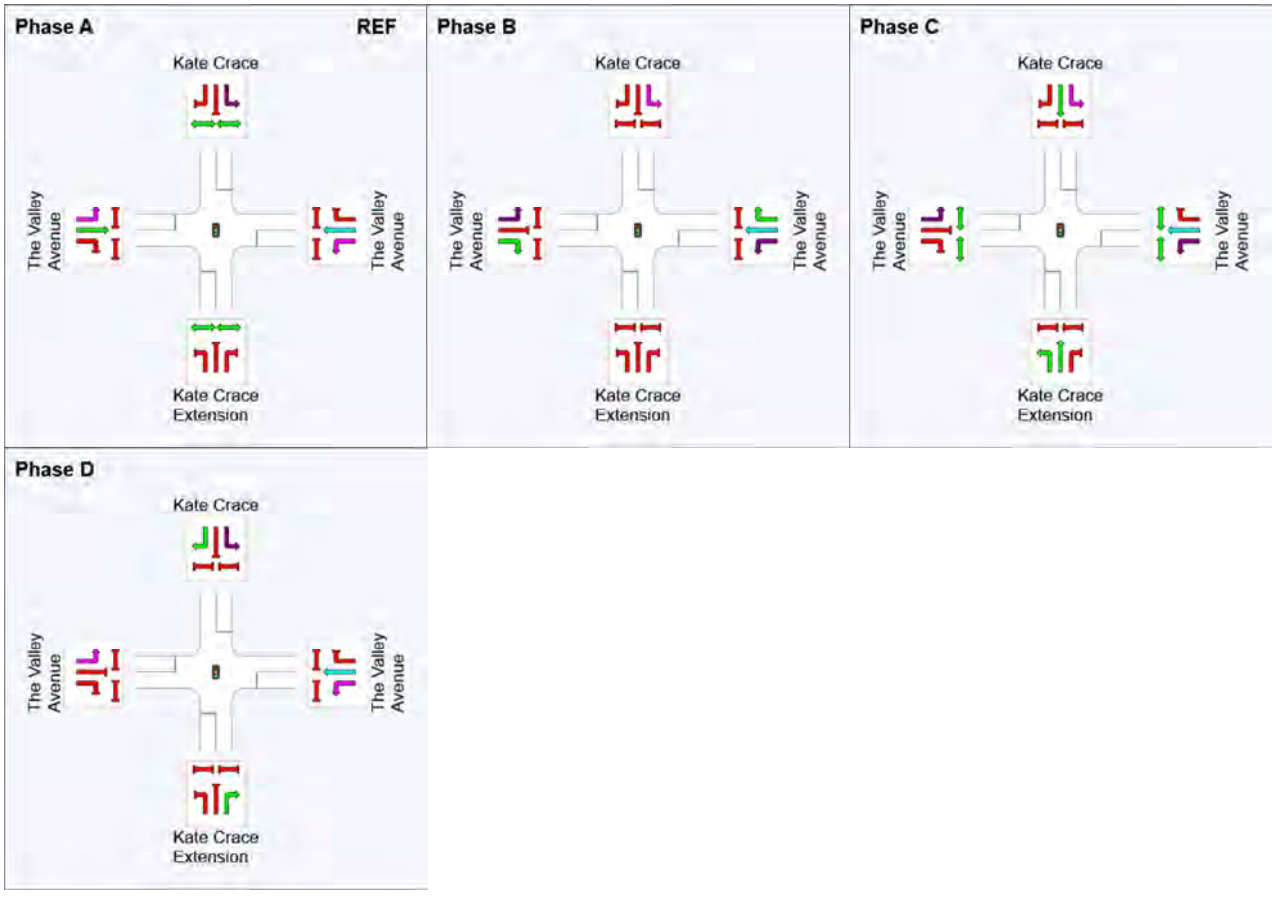
Site: 1 [2031-Kate Crace Street / The Valley Avenue -FINAL]

Kate Crace Street / The Valley Avenue
AM Peak
2031
Signals - Fixed Time Isolated Cycle Time = 75 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Opposed Turns
Movement Class: All Movement Classes
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Reference Phase	Yes	No	No	No
Phase Change Time (sec)	0	26	47	61
Green Time (sec)	20	15	8	8
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	26	21	14	14
Phase Split	35%	28%	19%	19%



MOVEMENT SUMMARY

Site: 1 [2031-Kate Crace Street / The Valley Avenue -FINAL - 50%]

Kate Crace Street / The Valley Avenue
AM Peak
2031
Signals - Fixed Time Isolated Cycle Time = 75 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kate Crace Extension											
1	L2	29	1.0	0.185	41.3	LOS C	1.1	8.1	0.96	0.71	35.3
2	T1	3	1.0	0.185	35.8	LOS C	1.1	8.1	0.96	0.71	35.9
3	R2	84	1.0	0.488	42.8	LOS D	3.1	22.1	0.99	0.77	34.5
Approach		116	1.0	0.488	42.3	LOS C	3.1	22.1	0.98	0.75	34.8
East: The Valley Avenue											
4	L2	43	5.0	0.279	5.7	LOS A	0.7	4.8	0.06	0.06	58.2
5	T1	446	5.0	0.279	0.0	LOS A	0.7	4.8	0.06	0.06	59.3
6	R2	200	5.0	0.643	38.6	LOS C	7.2	52.7	0.98	0.83	35.9
Approach		689	5.0	0.643	11.6	LOS A	7.2	52.7	0.33	0.29	49.8
North: Kate Crace											
7	L2	106	5.0	0.161	13.5	LOS A	1.7	12.5	0.63	0.69	48.8
8	T1	7	5.0	0.161	7.8	LOS A	1.7	12.5	0.63	0.69	49.5
9	R2	106	5.0	0.633	44.2	LOS D	4.1	29.8	1.00	0.82	34.0
Approach		219	5.0	0.633	28.2	LOS B	4.1	29.8	0.81	0.75	40.4
West: The Valley Avenue											
10	L2	144	5.0	0.582	25.0	LOS B	9.9	71.9	0.88	0.80	43.7
11	T1	216	5.0	0.582	19.4	LOS B	9.9	71.9	0.88	0.80	44.3
12	R2	18	5.0	0.063	34.2	LOS C	0.6	4.1	0.86	0.69	37.5
Approach		378	5.0	0.582	22.2	LOS B	9.9	71.9	0.87	0.79	43.7
All Vehicles		1402	4.7	0.643	19.6	LOS B	9.9	71.9	0.60	0.53	44.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P11	South Stage 1	53	18.8	LOS B	0.1	0.1	0.71	0.71
P12	South Stage 2	53	17.4	LOS B	0.1	0.1	0.68	0.68
P21	East Stage 1	53	31.8	LOS D	0.1	0.1	0.92	0.92
P22	East Stage 2	53	30.9	LOS D	0.1	0.1	0.91	0.91
P31	North Stage 1	53	18.8	LOS B	0.1	0.1	0.71	0.71
P32	North Stage 2	53	17.4	LOS B	0.1	0.1	0.68	0.68
P41	West Stage 1	53	31.8	LOS D	0.1	0.1	0.92	0.92
P42	West Stage 2	53	30.9	LOS D	0.1	0.1	0.91	0.91
All Pedestrians		421	24.7	LOS C			0.81	0.81

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

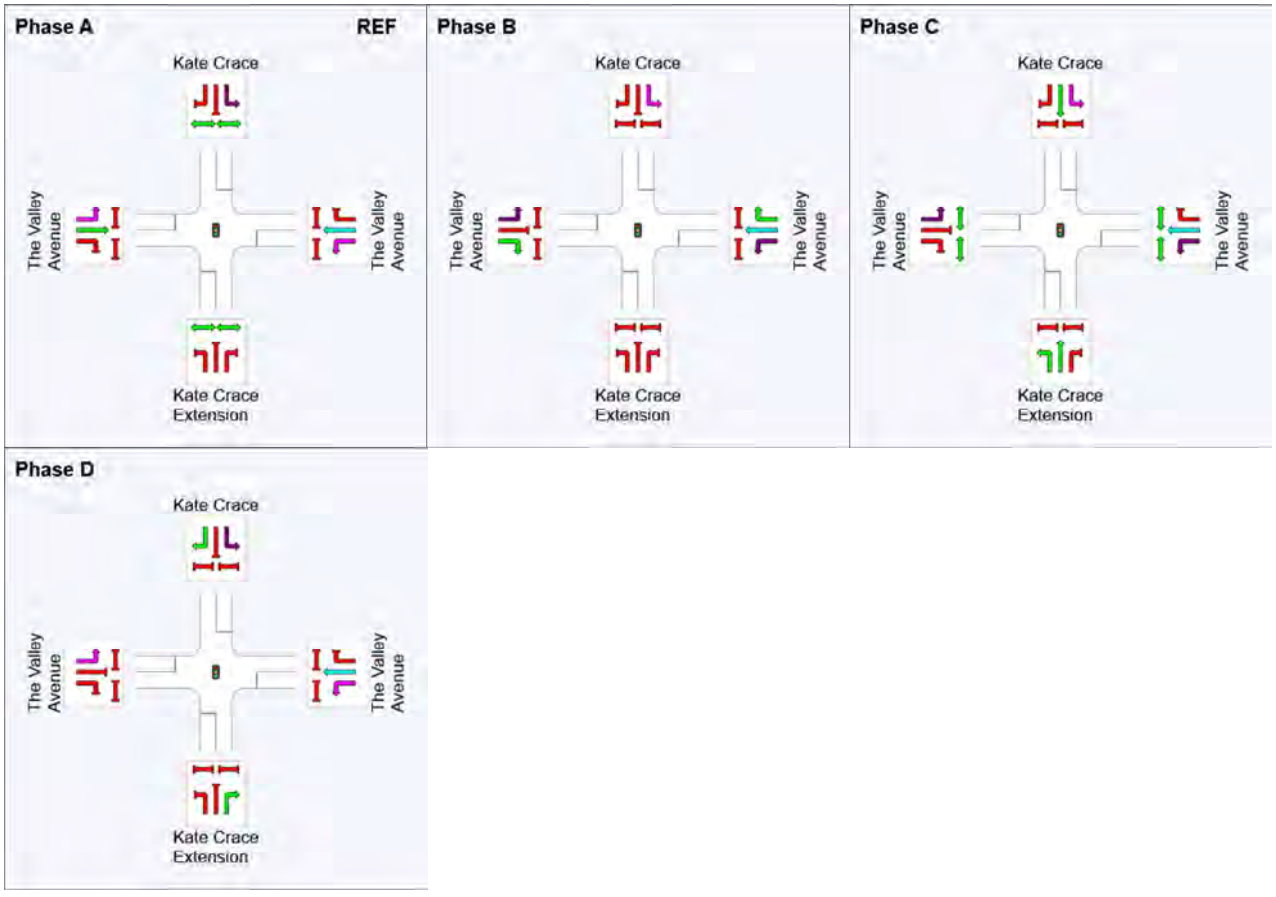
Site: 1 [2031-Kate Crace Street / The Valley Avenue -FINAL - 50%]

Kate Crace Street / The Valley Avenue
AM Peak
2031
Signals - Fixed Time Isolated Cycle Time = 75 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Opposed Turns
Movement Class: All Movement Classes
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

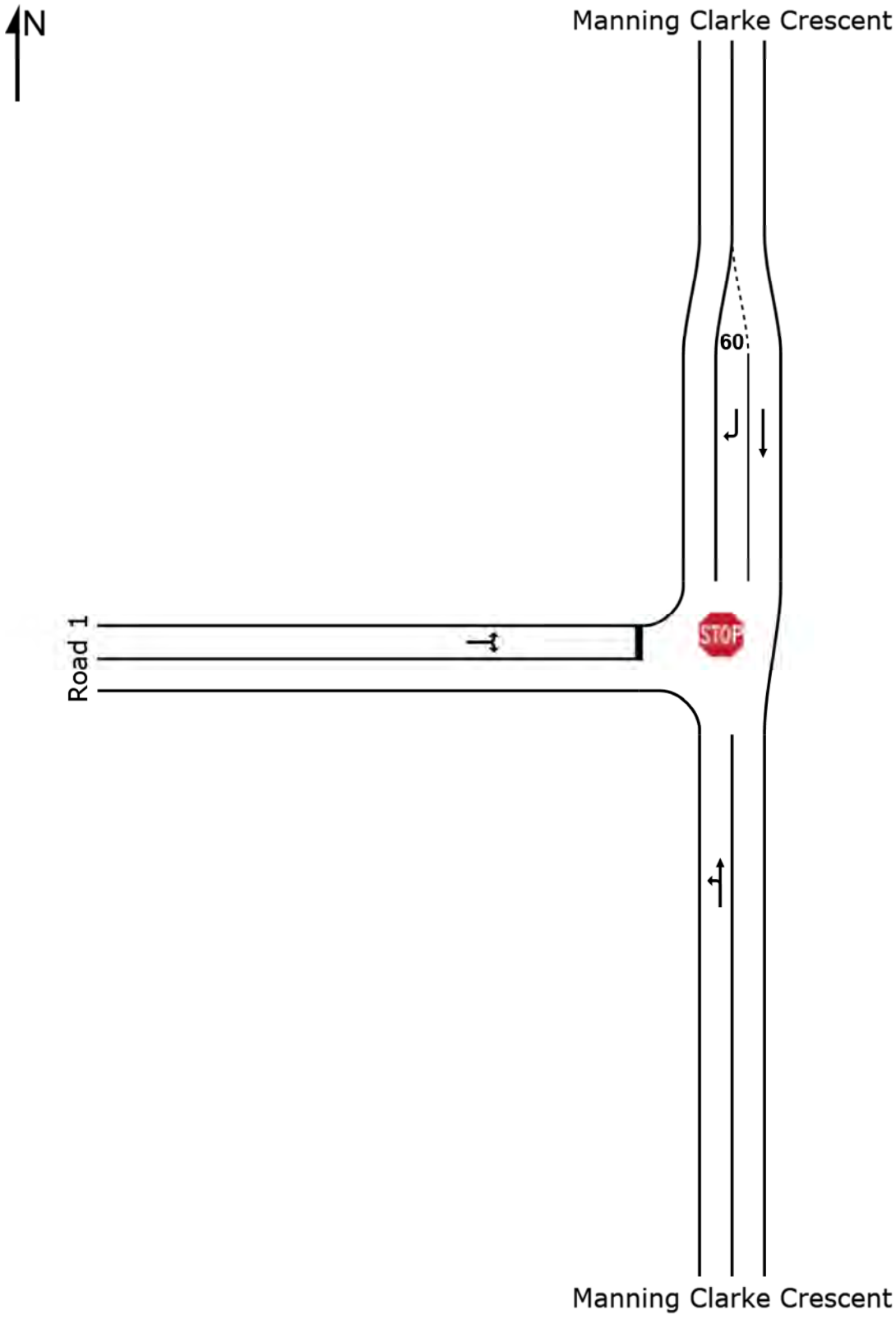
Phase	A	B	C	D
Reference Phase	Yes	No	No	No
Phase Change Time (sec)	0	30	49	62
Green Time (sec)	24	13	7	7
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	30	19	13	13
Phase Split	40%	25%	17%	17%



SITE LAYOUT

Site: 1 [Road 1 / Manning Clarke Cr -AM]

Post Development
2021
Stop (Two-Way)



MOVEMENT SUMMARY

Site: 1 [Road 1 / Manning Clarke Cr -AM]

Post Development
2021
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manning Clarke Crescent											
1	L2	18	0.0	0.179	5.6	LOS A	0.0	0.0	0.00	0.03	58.1
2	T1	331	0.0	0.179	0.0	LOS A	0.0	0.0	0.00	0.03	59.7
Approach		348	0.0	0.179	0.3	NA	0.0	0.0	0.00	0.03	59.6
North: Manning Clarke Crescent											
8	T1	301	5.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	60	5.0	0.048	6.8	LOS A	0.2	1.5	0.42	0.62	51.8
Approach		361	5.0	0.159	1.1	NA	0.2	1.5	0.07	0.10	58.4
West: Road 1											
10	L2	56	5.0	0.075	9.8	LOS A	0.3	2.1	0.44	0.89	50.6
12	R2	7	5.0	0.075	15.4	LOS B	0.3	2.1	0.44	0.89	50.1
Approach		63	5.0	0.075	10.4	LOS A	0.3	2.1	0.44	0.89	50.6
All Vehicles		773	2.7	0.179	1.5	NA	0.3	2.1	0.07	0.14	58.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Road 1 / Manning Clarke Cr -AM - 50%]

Post Development
2021
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Manning Clarke Crescent											
1	L2	18	0.0	0.264	5.6	LOS A	0.0	0.0	0.00	0.02	58.1
2	T1	496	0.0	0.264	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		514	0.0	0.264	0.2	NA	0.0	0.0	0.00	0.02	59.7
North: Manning Clarke Crescent											
8	T1	452	5.0	0.239	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	60	5.0	0.059	7.6	LOS A	0.2	1.8	0.51	0.69	51.3
Approach		512	5.0	0.239	0.9	NA	0.2	1.8	0.06	0.08	58.8
West: Road 1											
10	L2	56	5.0	0.104	11.0	LOS A	0.4	2.7	0.56	0.94	49.4
12	R2	7	5.0	0.104	24.0	LOS B	0.4	2.7	0.56	0.94	48.9
Approach		63	5.0	0.104	12.5	LOS A	0.4	2.7	0.56	0.94	49.3
All Vehicles		1088	2.6	0.264	1.3	NA	0.4	2.7	0.06	0.10	58.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.