Moncrieff B4 S23
Site Investigation Report

Prepared for:

The 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 23 Moncrieff. The subject site, currently a vacant block, spans approximately 4,154m^2 and is zoned as CFZ Community Facility Zone 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 23 Moncrieff as a standalone use.

This report evaluates the suitability of the subject site for a proposed mixed use development, consisting of a 6 storey building with a residential yield ranging between 98 and 122 dwellings, together with a commercial ground floor area of approximately 2,500m^2.

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 and commercial 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 near an area identified by the ESA to be a Strategic Bushfire Management Area. 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.

- **Noise Assessment:** It is recommended that a full noise assessment be undertaken to current standards to inform the design and layout of the proposed development. This assessment would provide an insight into potential noise impacts from Mirrabei Drive and to a lesser extent, Horse Park Drive. The findings would guide the appropriate build type, the strategic placement of habitable areas, and the determination of suitable setbacks.

- **Electrical Service:** In conjunction with Evoenergy, determine the timing of the proposed development with respect to Evoenergy's electrical feeder extension works. This is to be undertaken once actual development demands are calculated. 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. Allow 14.2m x 6.2m of space on site for a potential on site substation, which is to be confirmed with Evoenergy at the PNA stage.

- **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 developments for holistic compatibility. The proposal is to be made in accordance with Territory Plan requirements and EPSDD's Development Application process.

- **Geotechnical Investigation:** The site is recommended for 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 existing 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 south in Block 5 Section 23, that is currently conveyed through the site. Verify whether the size and grade of the existing DN375 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. The arborist is to also produce a Tree Management Plan, which is to be endorsed by 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 or access driveway, replacement trees at a ratio and location agreed to with TCCS and EPSDD Climate Change and Energy will need to be considered.

- **Site Access Point:** Assess the most appropriate access point to the site given the constraints and limitations of O'Keefe Avenue and the Gungahlin District Policy not allowing access off Mirrabei Drive. 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 that is suitably sized, work closely with Icon Water to establish a connection to their existing DN150 main either in O'Keefe Avenue or Hoffmann Street. This is to be established once the development and its potable water demand, including firefighting water demand, is known. Determine best locations for additional hydrants on existing mains to meet the Fire Risk Type of the development, with at least one additional hydrant being needed on the main in O'Keefe Avenue. 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 or Telstra 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 23 Moncrieff, 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 4,154m^2. The block is flanked by Mirrabei Drive to the west, O'Keefe Avenue to the north, and Hoffmann Street to the east. A development currently under construction is situated to the south of the site. Hill Thalis Architecture + Urban Projects (Hill Thalis) have undertaken a preliminary yield analysis on the subject site, proposing a 6 storey development comprising 98 residential dwellings, or 122 aged care dwellings (5 storey), above a 2,500m^2 commercial area on the ground floor.

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

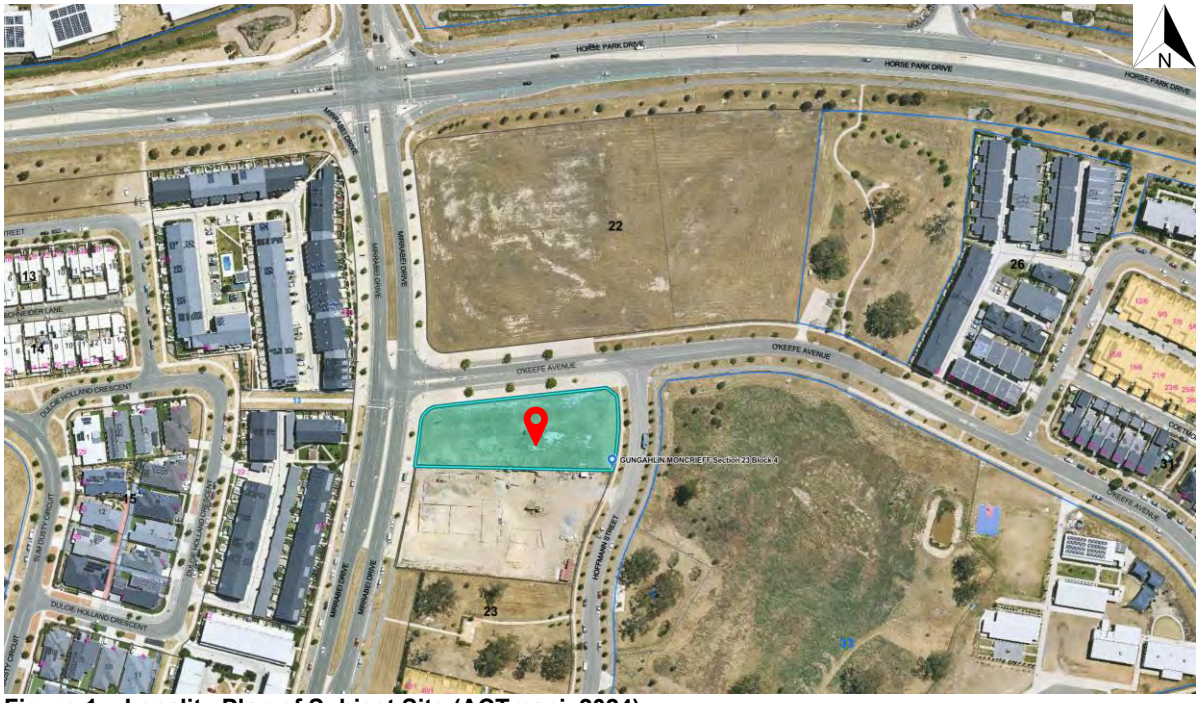


Figure 1 – Locality Plan of Subject Site (ACTmapi, 2024)

The purpose of this Site Investigation Report is to assess the suitability of the subject site for the intended mixed use residential and commercial 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, interim Territory Plan 2023, and the Planning Act 2023. The subject site is zoned as a Community Facility Zone in the ACT Territory Plan Map (2023). Hence, based on the ACT Legislation Register website, the following zone policy outcomes are applicable to the subject site:

1. Facilitate social sustainability and inclusion through providing accessible sites for key government and non-government facilities and services for individuals, families and communities.
2. Provide accessible sites for civic life and allow community organisations to meet the needs of the Territory's various forms of community.
3. Protect social and community uses from competition from other uses.
4. Enable the efficient use of land through facilitating the co-location and multi-use of community facilities, generally near public transport routes and convenience services appropriate to the use.
5. Encourage adaptable and affordable housing for persons in need of residential support or care.
6. Safeguard the amenity of surrounding residential areas against unacceptable adverse impacts including from traffic, parking, noise or loss of privacy.
7. Promote active living and active travel.
8. Provide safe pedestrian and cycling access to community facilities to promote active living.

Reference is made to the Territory Plan 2023, specifically, the Part E Zone Policies, E4 – Community Facility Zone 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 20234 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 2024.

Land Use / Development Type
ancillary use
business agency
community activity centre
community housing
community theatre
complementary use
consolidation
cultural facility
demolition
early childhood education and care
educational establishment
emergency services facility
health facility
hospital
indoor recreation facility
minor road
minor use
office
outdoor recreation facility
parkland
place of worship
public agency
religious associated use
residential care accommodation
retirement village
sign
social enterprise
subdivision
supportive housing
temporary use
varying a lease
veterinary clinic

Figure 2 – Permissible Land Uses and Development Types in Community Facility Zone (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. Assessment Requirement item 17 in the District Policy states that 'on Blocks 4 and 5 Section 23 no access is permitted to Mirrabei Drive and acoustic requirements are to be assessed on an individual basis'. This assessment requirement is a mandatory development control that must be met for a future development on the site.

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 23 Moncrieff 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 Moncrieff Block 4 Section 23 shows that the site is zoned as CF: Community Facilities. An excerpt of the Territory Plan map is shown in Figure 3, where the subject site for the Site Investigation Report is approximately located with red place marker.

Figure 3 – Territory Plan Land Use Map (ACTmapi, 2024)

3 Proposed Development

The subject site is located in Block 4 Section 23 Moncrieff, surrounded by predominantly medium density residential developments. The Suburban Land Agency (SLA) engaged Hill Thalis to prepare a massing and yield analysis for the site to determine the most appropriate development for the area. The outcome of this study resulted in two similar yield options for the site, both involving a 6 storey development. These options included a ground floor commercial area with a gross floor area of approximately 2,500m^2. Above this commercial floor, both options proposed an additional 5 storeys of shop-top housing, with one option yielding 98 residential dwellings, each averaging 75m^2, and the other option yielding 122 aged care dwellings, each averaging 60m^2.

Refer to Figure 4 below for an excerpt from the Draft Concept Plan by Hill Thalis, which illustrates the built form over the site and Figure 5, which shows the massing work in perspective view.

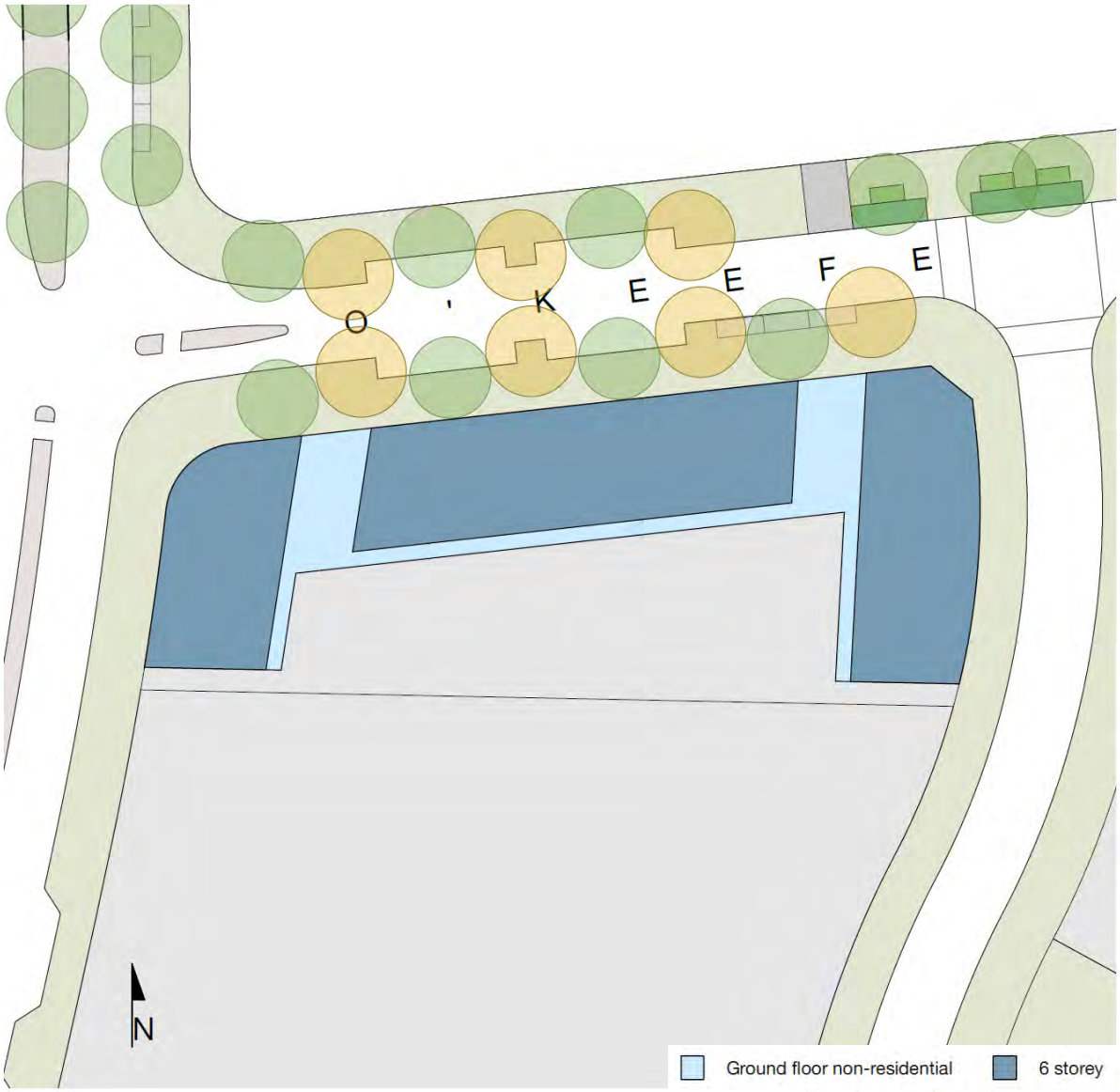


Figure 4 – Block 4 Section 235 Moncrieff Concept Plan (Hill Thalis, 2024)

Figure 5 – Concept Plan Perspective View (Hill Thalis, 2024)

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 scenarios. This report does not consider the broader development within Moncrieff and the infrastructure capacity to service a broader development context.

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 the suburb of Moncrieff and is bordered by Mirrabei Drive to the west, O'Keefe Avenue to the north, and Hoffmann Street to the east. Further to the north of the site, the land in Section 22 is currently undeveloped, and similarly, most of Section 33 Moncrieff to the east of the site is undeveloped. The subject site is in close proximity to Horse Park Drive, approximately 160m to the north of the site, which is a major arterial road that connects to the broader Gungahlin district. A development currently under construction is located to the south of the site on Block 5 Section 23, with access to Block 5 Section 23 off Hoffmann Street in the block's north east corner. Block 4 Section 23 Moncrieff is an unoccupied block with an area of approximately 4,154m^2.

During a site inspection, it was observed that the topography of the site is evenly graded from the south west corner to the north east corner of the site boundary with an average approximate grade of 3.0%. The differing grades within the subject site when compared to the surrounding development and roads, suggest significant regrading activities may have occurred on the site as part of the estate works.

The site is unoccupied, unfenced (with the exception of the southern boundary), and grassed. The grassed area over the site receives regular maintenance through mowing activities, 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 6 to Figure 9 provide a general overview of the site from different visual aspects, including a future development sign. The photos provide an indication of the site's current condition, topographical features, and some of the existing trees surrounding the site.

Figure 6 – General Site Photo of the Subject Site Looking North West

Figure 7 – General Site Photo of the Subject Site Looking South West

Figure 8 – General Site Photo of the Subject Site Looking East

Figure 9 – Development Sign on the Site

6 Literature Review

JPS Engineering have undertaken a comprehensive literature review of the documents comprising the approved Moncrieff West Estate Development Plan (EDP). The EDP was evaluated and approved by EPSDD under the Territory Plan 2007 in March 2014. Relevant reports applicable to the subject site that have been made available by EPSDD include the EDP report by Brown Consulting from March 2014, the traffic report by Brown Consulting from February 2014, the Bushfire Risk Assessment by ABPP from January 2014, and the Cultural Heritage Assessment from April 2010. 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 significant 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 located in Appendix F, Superb Parrot report in Appendix G, heritage report in Appendix I, and traffic report included in Appendix J.

6.1 Estate Development Plan Report

In March 2014, Brown Consulting completed an Estate Development Plan (EDP) Report for Moncrieff West Estate with supporting drawings. Brown Consulting undertook the Estate Development Plan (EDP) for Moncrieff West, which provided for 415 blocks, including 7 multi unit sites and two commercial sites. The estate contained blocks for one or two storey housing and 2 to 4 storey multi unit sites. Affordable housing was provided for up to 20.3% of the estate. The EDP included the extension of Mirrabei Drive, passing through the middle of Moncrieff and providing for a future Inter-town Public Transport (IPT) route to the Moncrieff Group Centre, designed and constructed with the estate. The extension of Horse Park Drive adjacent to Moncrieff West was designed at a similar time to the estate and was under construction during the EDP process, as Capital Works.

6.1.1 Environmental Assessment

Brown Consulting, in their EDP report, advised that a site audit of Block 588 was undertaken by JBS Environmental in 2006. The investigation assessed the contamination status of the site as low, deeming it suitable for residential land use. The Environmental Protection Authority (EPA) reviewed and endorsed the Site Audit in 2006. Clearance from ACTPLA and the EPA was provided through the Concept Plan for Block 588. Since the development received approval from both the Federal and ACT governments as part of the Gungahlin Strategic Assessment, this report was omitted from the EDP Report.

6.1.2 Hydrology and Catchment

The following summarises the major stormwater catchments for Moncrieff, as advised by Brown Consulting in their EDP:

- Western Catchment: This catchment drains a small area of Taylor and part of Horse Park Drive, flowing into an existing creek along the southern boundary of Moncrieff.
- Southern Central Catchment: The south eastern catchment of Moncrieff West flows south into the existing creek and floodway adjacent to the existing Mirrabei Drive. The Mirrabei Drive extension will become the main drainage path for this catchment.
- Northern Catchment: The northern catchment drains north through proposed culverts under Horse Park Drive into Taylor. This catchment drained under Horse Park Drive into a large regional pond constructed on the northern side of Horse Park Drive, east of this project, as Capital Works by others. This regional pond provided water quality and quantity treatment for this catchment of Moncrieff, eliminating the need for local measures on this estate.

A stormwater master plan was prepared for Moncrieff West, illustrating the schematic stormwater pipe layout for the development, catchment areas, 5 and 100 year ARI flows, velocity depth safety criteria, and 100 year ARI flood extents. See below Figure 10 for an excerpt of the EDP stormwater master plan, showing the northern catchment area delineated by dashed blue lines and arrows showing the direction of flow.

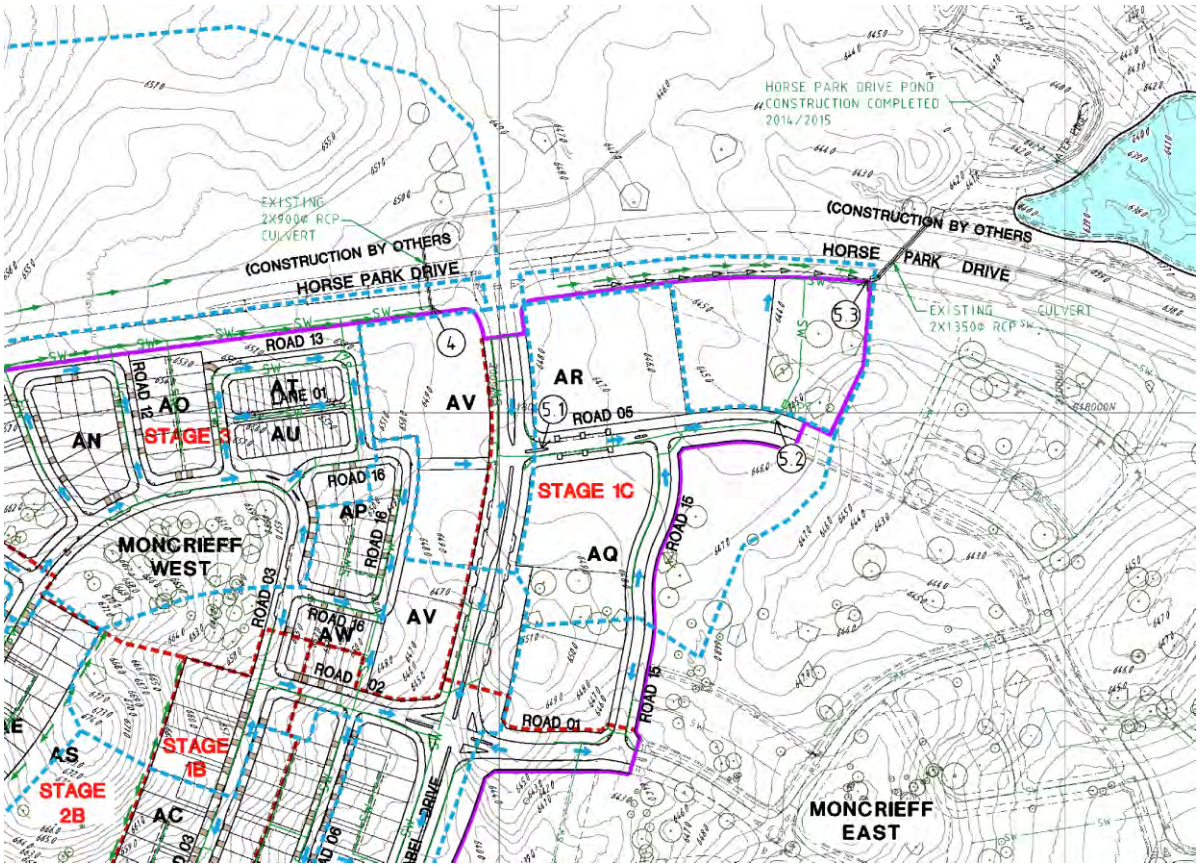


Figure 10 – EDP Stormwater Master Plan (Brown Consulting, 2014)

6.1.3 Tree Assessment

A detailed tree survey and assessment of Moncrieff was undertaken by DSB in 2008. Trees within the Mirrabei Drive corridor were reassessed as part of the North Gungahlin Roads and Ponds Review of Tree Assessment by JEA in October 2009. In 2010, the Land Development Agency (LDA) commissioned Scenic Landscape Architecture to provide a tree assessment report for additional trees and tree groups within Moncrieff. The Tree Management Plans for Moncrieff West identified the status of the trees on site and nominated those to be retained and those recommended for removal. As part of the EDP. exceptional value trees have been retained in open space and the majority of the high value trees also retained in areas of open space, road reserves and within large blocks.

See below Figure 11 for and excerpt of the landscape master plan, which shows proposed street trees and existing trees to be retained in the general location of the subject site.

Figure 11 – EDP Landscape Master Plan (Brown Consulting, 2014)

6.1.4 Noise Assessments

Brown Consulting undertook a noise assessment to inform the EDP submission, referencing ACTPLA's Noise Management Guidelines (Draft), March 1996. The guidelines stipulate that for new developments, the maximum road traffic noise levels should be 63 dB(A)L10 (18 hour) at a point one metre in front of the nearest affected residential dwelling façade, and 58 dB(A)L10 (18 hour) within a recreational courtyard of private open space not facing the road source.

A noise assessment report for Horse Park Drive was prepared by UNSW at ADFA in December 2011. Noise abatement measures may be required for multi unit developments fronting Horse Park Drive, depending on the development type, proximity to Horse Park Drive, and height. This should be assessed by the developer of each multi-unit site.

Another noise assessment report for Mirrabei Drive was prepared by UNSW at ADFA in October 2013 to inform the Moncrieff West EDP. All blocks on the western side of Mirrabei Drive are close enough to the road to require noise abatement measures on building facades fronting Mirrabei Drive. Multi unit developments fronting Mirrabei Drive may also require noise abatement measures, depending on the development type, proximity to Mirrabei Drive, and height. This should be assessed by the developer of each multi-unit site.

If the predicted external traffic noise levels do not comply with the criterion, additional treatments are available to control noise intrusion into the building. Treatments may include upgraded glazing and external doors opening onto habitable rooms (living, dining, and bedrooms). These treatments may need to be supplemented with mechanical ventilation and air conditioning to allow windows to remain closed during high traffic noise periods.

See below Figure 12 for an excerpt of the Planning Controls Plan included in the EDP drawings that show the subject site affected by noise.

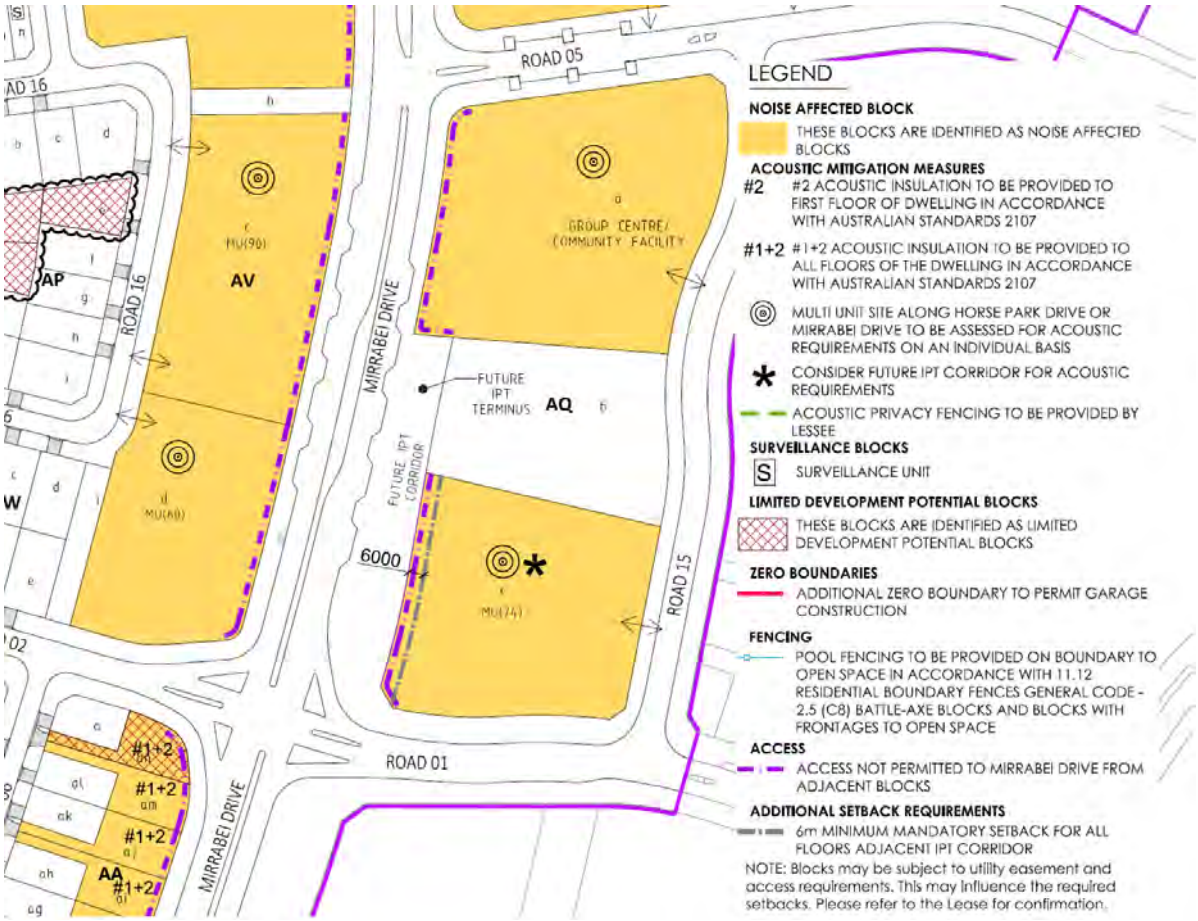


Figure 12 – EDP Planning Controls Plan (Brown Consulting, 2014)

6.2 Geotechnical Information

A geotechnical investigation was run concurrently with the EDP submission and was used for the detailed design phase of the estate. 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 2014 EDP drawings.

Refer to Appendix E for the full Estate Development report for Moncrieff West.

Figure 13 – Cut and Fill EDP Plan (Brown Consulting, 2014)

6.3 Bushfire

Australian Bushfire Protection Planners (ABPP) were commissioned by the Land Development Agency (LDA) to prepare a revised Bushfire Risk Assessment for Moncrieff. The revised report, issued on 13 March 2012, determined the level of bushfire risk and the necessary protection measures, in accordance with the AS/NZS ISO 31000:2009 standards.

The assessment examined potential fire paths from external sources to the west, northwest, north, and northeast, as well as from unmanaged grassy woodland vegetation to the south of the residential precinct. The land to the north and northwest of Moncrieff rises gently to the northwest, creating a slight downslope fire path from the northwest and west with a spread rate of 0.85 km/h. However, the open landscape allows rapid fire spread. Wind effects on the lea side of One Tree Hill cause turbulence, negating the downslope fire path benefits. The upslope fire path from Ginninderra Creek, under north easterly winds, affects the north eastern edge of the development precinct.

Identified fire scenarios relevant to the subject site in the ABPP report, include fires in the open grassy woodland vegetation within the future suburb of Jacka, northeast of Moncrieff, burning under north easterly winds toward Moncrieff's north eastern edge. This risk is temporary as construction in Jacka will mitigate it. This fire path is represented in Figure 14 below, extract from the ABPP report.

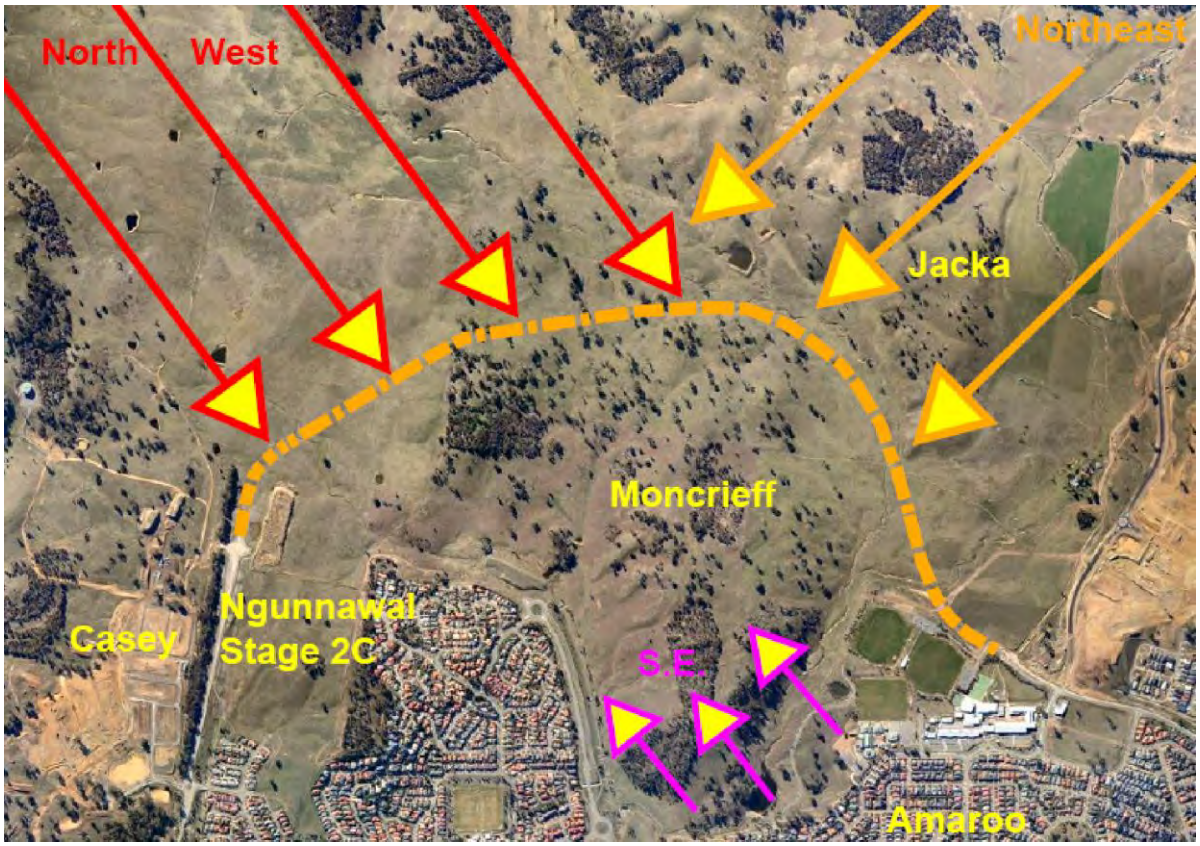


Figure 14 – Moncrieff Fire Paths (ABPP, 2012)

Following discussions with ESA and ACT Fire & Rescue, recommendations were made for statutory bushfire protection zones around the new suburb. Additional protection measures were decided for the western, north western, northern, and north eastern aspects of Moncrieff, allowing the removal of the 'Ember Zone' requirement and bushfire construction standards for future dwellings within the wider residential precinct, including Taylor and Jacka.

A 40 metre wide Inner Asset Protection Zone over the Horse Park Drive corridor was recommended and a further 300m Outer Asset Protection Zone to the north was proposed. Open Space areas with the subject site were proposed to be managed as Inner Asset Protection Zones. See below Figure 15, which is an excerpt from an EDP drawing that indicates this Protection Zones, with respect to the site.

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

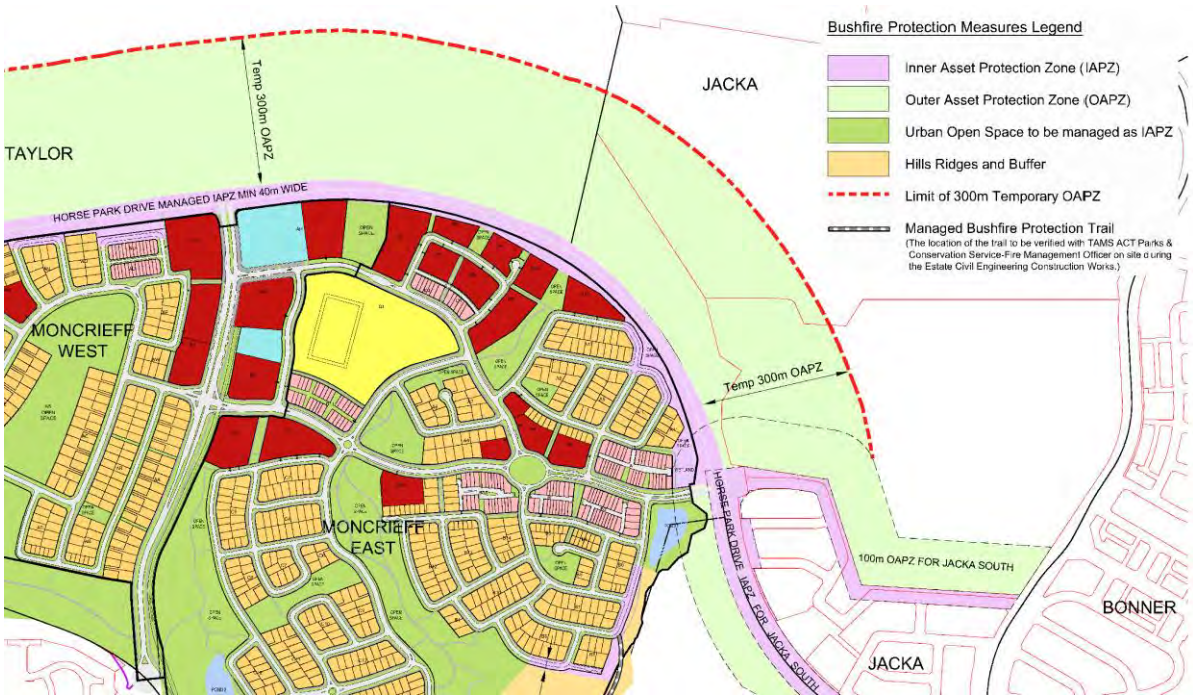


Figure 15 – Bushfire Protection Plan in Relation to the Subject Site (Brown Consulting, 2014)

6.4 Environmental

The Canberra Ornithologists Group (COG) prepared a report on the distribution, abundance, and breeding status of the Superb Parrot (Polytelis swainsonii) during the 2009 to 2010 breeding season in the Gungahlin region of ACT. This report was submitted as part of the Moncrieff EDP and was completed on 7 April 2010.

The Superb Parrot is a listed threatened species under the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999 and is considered vulnerable under the ACT's Nature Conservation Act 1980. The species is regarded as a non-breeding summer migrant, primarily found in the north western area of the ACT, particularly around Mt. Rogers in the suburb of Fraser.

The survey aimed to document the distribution and breeding status of Superb Parrots within and around the proposed suburbs of Kenny, Throsby, Jacka, Moncrieff, and Kinlyside during the 2009 to 2010 breeding season, and to assess the condition of the tree-hollow estate within the development areas.

The entire area of the proposed suburb of Moncrieff was searched on foot for four hours starting at 6:30am on 26 November and again on 14 December 2010. Despite a total of eight hours spent in the area, no signs of Superb Parrots were observed, validating the observations from the previous year.

Refer to Appendix G for the full Canberra Ornithologists Group Superb Parrot Investigation report in the Gungahlin region.

6.5 Heritage

Navin Officer Heritage Consultants (NOHC) completed a Cultural Heritage Assessment within Moncrieff in April 2010 to facilitate ongoing actions associated with implementing the Moncrieff Precinct Code. This study expanded on the 2009 NOHC report on the Water Quality Control Pond and extensions to Horse Park Drive and Mirrabei Drive, North Gungahlin, ACT.

Key findings and actions presented in the report included:

- Seven previously recorded sites were re-found: M/A1, M/A2, M/A3, M/A5, HP15, C3/14, and CAS5.

- Additional Potential Archaeological Deposits (PADs) were identified at M/A1, M/A2, M/A3, and M/A5.
- The boundary of site HP15 was modified.
- Six previously unidentified Aboriginal sites were recorded: M/A6, M/A7, M/A8, MAIF1, MAIF2, and MAIF3.
- Moncrieff PAD was further defined and divided into two areas: MA/3 and PAD, and MA/2 and PAD.
- Eight historic sites were previously recorded in the Moncrieff study area.
- Six historic sites were not re-found: M/H1, M/H2, M/H4, M/H6, M/H7, and M/H8.
- Two historic sites were re-found and combined: M/H3 and M/H9, now referred to as M/H3-H9.
- No new historic sites were identified in the current investigation.
- Thirteen Aboriginal sites, including four PADs, and two historic sites are presently identifiable in Moncrieff.
- All previously recorded Aboriginal sites are listed on the ACT Heritage Register; sites from the current study are not yet listed.

Refer to Figure 16 below for an extract of the abovementioned locations of previously recorded Aboriginal sites and PADs within the NOHC Moncrieff study area.

Figure 16 – Locations of Recorded Aboriginal Sites and PADs within Moncrieff (Navin Officer, 2010)

Recommendations provided by NOHC were as follows:

- No further action is required for sites M/A4, M/IF3, M/IF5, SA1/3, HP13, HP14, HP33, HPIF10, and CH1.
- A Conservation Management Plan (CMP) should be prepared for the salvage of all Aboriginal artefact occurrences before construction.
- Archaeological subsurface testing should be conducted in areas with moderate archaeological potential: M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD, to establish the presence and nature of any subsurface deposits. This should be included in the CMP.
- Further discussions should take place regarding the area of cultural significance in the study area to reach an amicable outcome for all relevant parties.
- It is inadvisable to leave parts of the fence line M/H3 and M/H9 in situ. If located within open space, these items should be preserved as a heritage feature. The Canberra Museum and Gallery should be approached for possible curation of these items. This should also be included in the CMP.

Refer to Appendix I for the full Navin Officer Heritage Consultants Cultural Heritage Assessment report.

6.6 Traffic

In February 2014, Brown Consulting completed a traffic report to support the Moncrieff West development as part of the EDP application. The September 2011 EMME model was requested by Brown Consulting from Territory and Municipal Services (TAMS) to confirm the previously adopted traffic estimates. The LDA advised that full development figures for Moncrieff, Jacka, and Taylor should be adopted in estimating the traffic volume on the Mirrabei Drive extension and Horse Park Drive extension for the 2021 forecast traffic analysis.

Based on the Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis (2009), the mid block capacity of a one lane in each direction carriageway was estimated at approximately 1,500 vehicles per hour. No duplication was foreseen for the Mirrabei Drive Extension.

Traffic generation for the proposed Group Centre and suburb developments was calculated using the ACT Residential Subdivision Code and the RTA Guide to Traffic Generating Developments (2002). Based on SIDRA computer modelling outputs, the proposed intersection arrangements for both morning and evening peak scenarios for the Mirrabei Drive Intersections and Moncrieff West Internal intersections would provide acceptable levels of service.

The Brown Consulting traffic report provided a detailed traffic engineering assessment of the generation and distribution of traffic and investigated key intersections and their performance for the Moncrieff West estate. The full traffic report can be found in Appendix J.

6.7 Subdivision

On 6 April 2020, a subdivision of Block 1 Section 23 Moncrieff into Blocks 4 and 5 Section 23 Moncrieff was lodged for planning approval with EPSDD. The submission included public works such as driveway crossings, utility services, and associated works necessary for the subdivision. The development application was approved on 4 May 2020.

The subdivision specifically included the construction of a new footpath along the western verge of Hoffmann Street, extending from Block 5 and connecting to the fully paved verge in the southern verge of O'Keefe Avenue. Additionally, as part of this subdivision, new services were installed, including a sewer main extension from the intersection of O'Keefe Avenue and Hoffmann Street, running south along the western verge of Hoffmann Street. A new potable water connection was provided to Block 4 Section 23 from the water main in Hoffmann Street, and a new stormwater connection was provided to Block 5 Section 23 at its north west corner. A new driveway was also designed off Hoffmann Street to provide access to Block 5. See Figure 17 below for an excerpt of the approved subdivision plan, showing these upgrades.

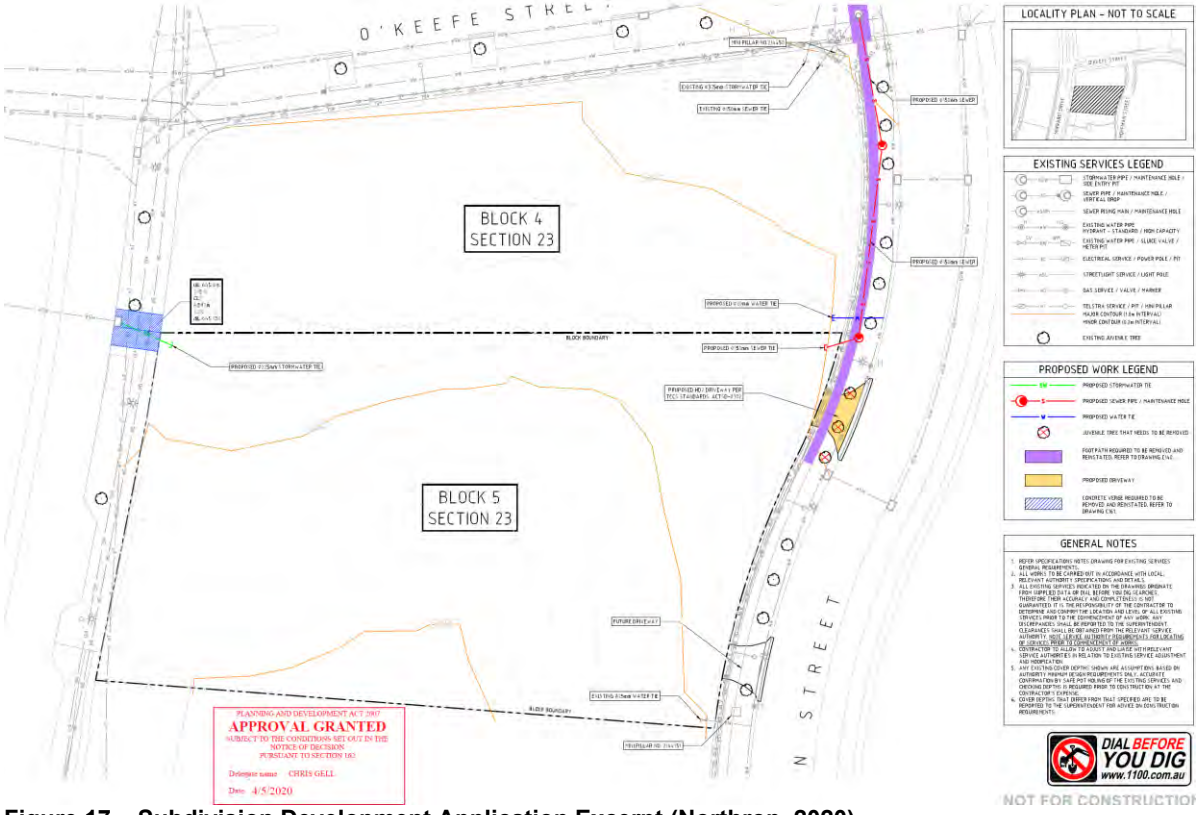


Figure 17 – Subdivision Development Application Excerpt (Northrop, 2020)

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.

Reference is also made to WAE drawings contained within Appendix A, detailing existing services in close proximity to the subject site.

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 information indicates that there is a sewer tie connection to Block 4 Section 23 Moncrief, located at the north east corner of the block, which is its lowest point. During the subdivision of Blocks 4 and 5 Section 23, a new DN150 sewer main was installed along the west verge of Hoffmann Street, extending beyond the subject site and terminating just past its southern boundary, where a DN150 service tie is provided to Block 5. Sewer manholes over the main to the immediate east of the subject site were located during a site inspection. See photos in Figure 19 and Figure 20 of several of these manholes as observed on site.

According to WAE information, the sewer tie to the subject site is a DN150 pipe at an approximate depth of 1.97m, with a grade of 1.37%. Current Icon Water Standards, however, require a sewer tie to have a minimum grade of 2% and a maximum depth of 1.5m. The sewer tie connects to a manhole at the intersection of Hoffmann Street and O'Keefe Avenue. Refer to Figure 21 for a photo of this manhole near the north east corner of the site. From this manhole, the downstream sewer main crosses O'Keefe Avenue as a DN150 pipe and connects to a DN250 main that continues east along the northern verge of O'Keefe Avenue. This DN250 sewer main then diverts through the open space area north east of the site.

For further details on existing sewer infrastructure within and surrounding the site, refer to Figure 18, which is extracted from the BYDA information.

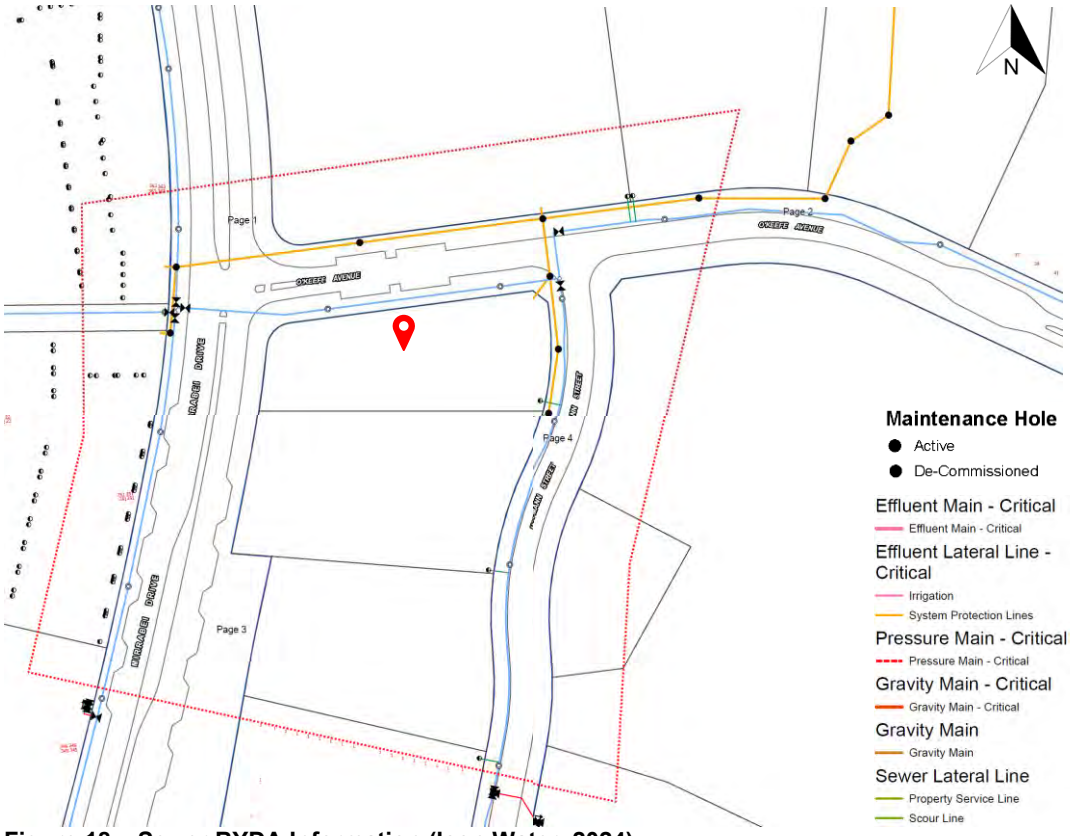


Figure 18 – Sewer BYDA Information (Icon Water, 2024)

Figure 19 – Sewer Manhole in West Verge of Hoffmann Street South East of Site

Figure 20 – Sewer Manhole in West Verge of Hoffmann Street East of Site

Figure 21 – Sewer Manhole at Intersection of Hoffmann Street and O'Keefe Avenue

7.3 Water Supply

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

A DN150 water main is located in the southern verge of O'Keefe Avenue, adjacent to the subject site's northern boundary. This main includes two hydrants spaced approximately 63 to 65m apart, positioned north of the site. The DN150 main connects to another DN150 water main running just behind the western kerbline of Hoffmann Street. Along Hoffmann Street, the DN150 main has two hydrants located east of the subject site, spaced at approximately 48m and 32m from the nearest hydrant in O'Keefe Avenue along the main. Refer to Figure 24 and Figure 25 for photographs of the fire hydrants north east and north west adjacent the site's northern boundary, respectively. Additionally, the photo in Figure 23 below shows a hydrant located in Hoffman Street, east of the site.

To the west of the subject site, a DN150 water main is also present in the west verge of Mirrabei Drive, with hydrant spacing on this main between 51 and 59m. Figure 26 shows a photo of a hydrant that was located in Mirrabei Drive, south west of the site. The DN150 main running along the western verge of Hoffmann Street crosses O'Keefe Avenue at the intersection, where it has a 90 degree bend and continues east along the northern verge of O'Keefe Avenue.

As part of the subdivision of Block 1 Section 23 into Block 4 and Block 5 Section 23, a new potable water service tie has been provided to the subject site, located approximately 3.6m from the south east corner of the block. The WAE information documents this water tie as a DN25 PE PN16 connection, with a stop valve both at the main and at the end of the tie. The WAE information also indicates that the water tie is approximately 300mm deep at its end point.

For further details on existing water infrastructure surrounding the subject site, refer to Figure 22, which is extracted from the Icon Water BYDA information.

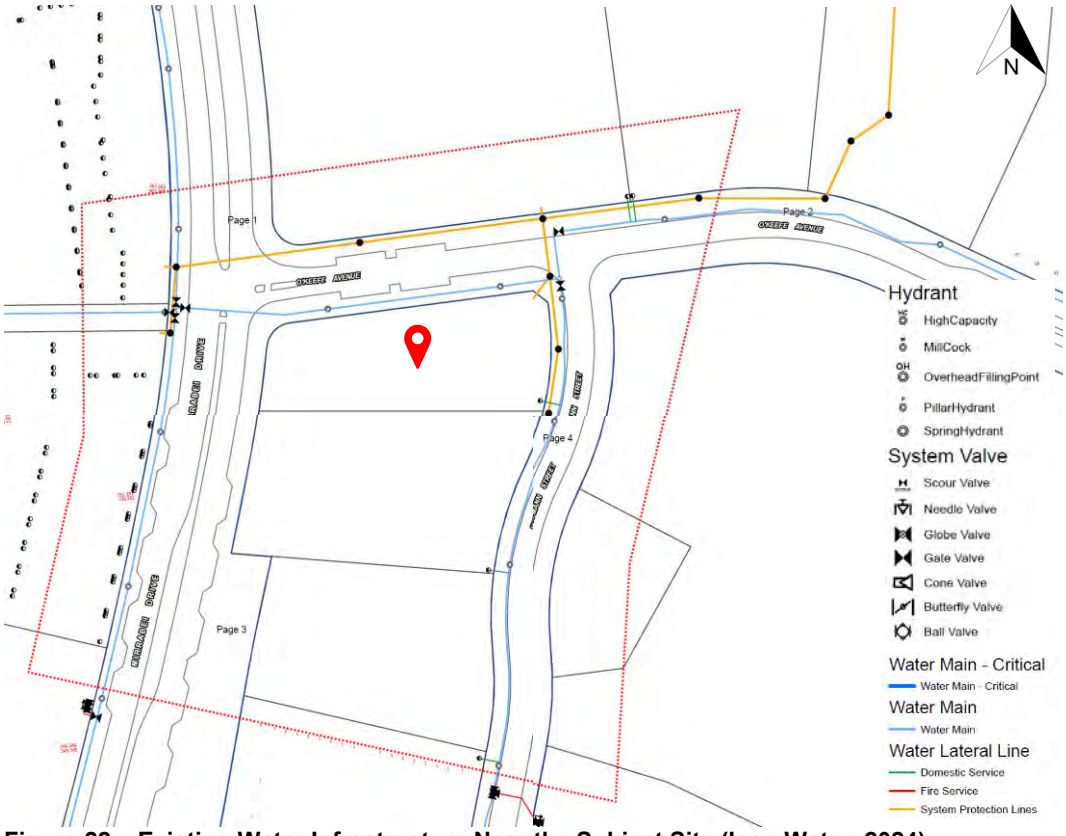


Figure 22 – Existing Water Infrastructure Near the Subject Site (Icon Water, 2024)

Figure 23 – Hydrant in West Verge of Hoffmann Street North East of Site

Figure 24 – Hydrant in Southern Verge of O'Keefe Avenue North of Site

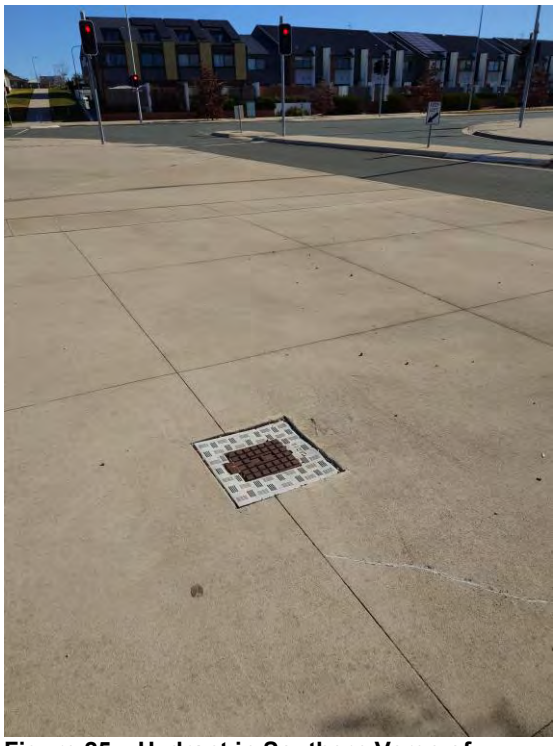


Figure 25 – Hydrant in Southern Verge of O'Keefe Avenue North West of Site

Figure 26 – Hydrant in West Verge of Mirrabei Drive South West of the 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.

Stormwater infrastructure surrounds the subject site, with a network of kerbside sumps and pipes located along the adjacent roads. A DN300 and DN375 pipe network is present on Mirrabei Drive, approximately 95m north of its intersection with O'Keefe Avenue. Similarly, a DN300 and DN375 pipe network with kerbside sumps exists south of the O'Keefe Avenue intersection on Mirrabei Drive, with a high point located approximately 65m south of the intersection. This stormwater network, which drains both the road and adjacent developments, crosses Mirrabei Drive via a DN675 pipe and continues east along the southern verge of O'Keefe Avenue. A stormwater sump on O'Keefe Avenue, where this DN675 pipe connects to can be seen in Figure 30. At the intersection of O'Keefe Avenue and Hoffmann Street, a DN375 stormwater tie is provided at the southeast corner of the subject site. According to WAE information, this tie has a grade of 4.24% and is approximately 2.04 meters deep at its end. At this point of connection, the DN675 stormwater main in O'Keefe Avenue increases to a DN750 pipe, which deflects from its alignment at the back of the kerb to the centreline of O'Keefe Avenue and continues to the east. The stormwater manhole in the centreline of O'Keefe Avenue at this upsizing of pipe can be seen in Figure 32 below.

A high point in Hoffmann Street is located approximately 85 meters south of its intersection with O'Keefe Avenue. A DN300 pipe and sump network conveys stormwater flows from the road toward the previously mentioned DN750 main in the centreline of O'Keefe Avenue. Figure 29 shows a photo of a kerbside sump in Hoffman Street, east of the site. At the junction of the Hoffmann Street pipe connection, the DN750 main again upsizes to a DN900 stormwater main, which extends east where through a splayed bend in the pipe, changes direction to the north toward the open space corridor (Block 2 Section 80 Moncrieff), north east of the subject site. Access to this open space area is provided via a driveway off O'Keefe Avenue, leading to a gross pollutant trap (GPT) located approximately 20 meters north of O'Keefe Avenue. The GPT features a hardstand service area for maintenance access. A DN900 stormwater pipe discharges from the GPT and continues north east, crossing Horse Park Drive and continuing to convey stormwater flows to the north east. See below Figure 31 and Figure 33 for photos of the access gate to the GPT from O'Keefe Avenue and the GPT, respectively.

For visual reference, refer to the excerpt from the WAE services drawing, provided in Figure 27 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 28 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.

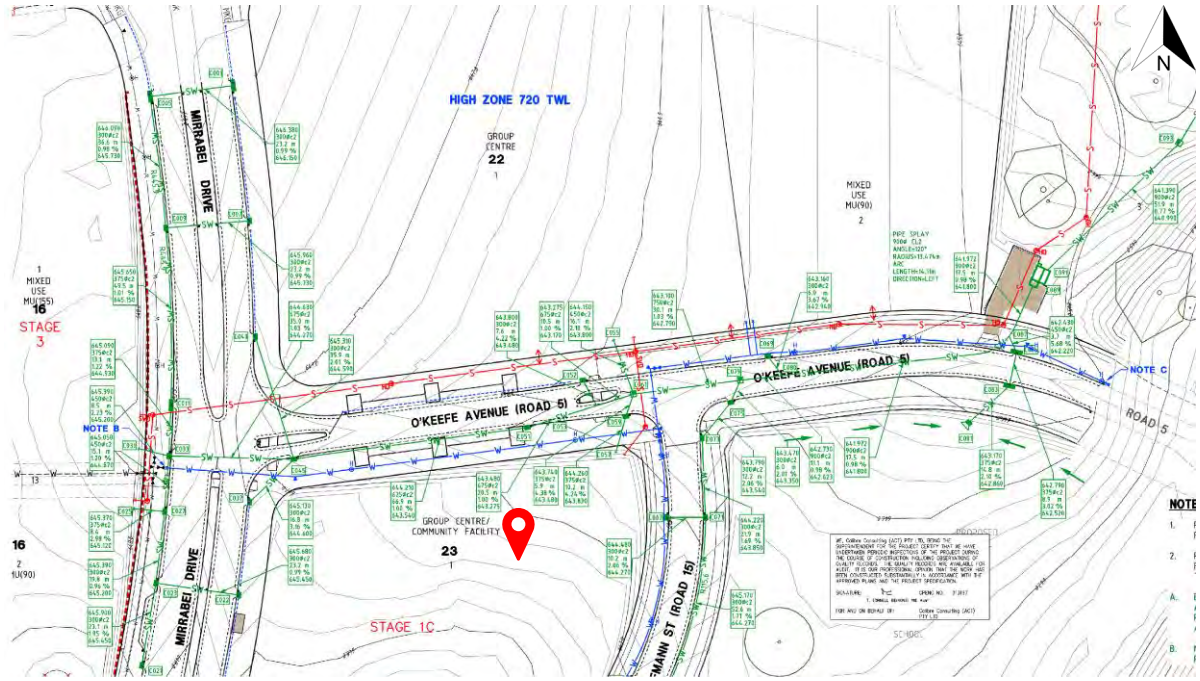


Figure 27 – Existing Stormwater Infrastructure in Proximity of the Site (Brown Consulting, 2015)

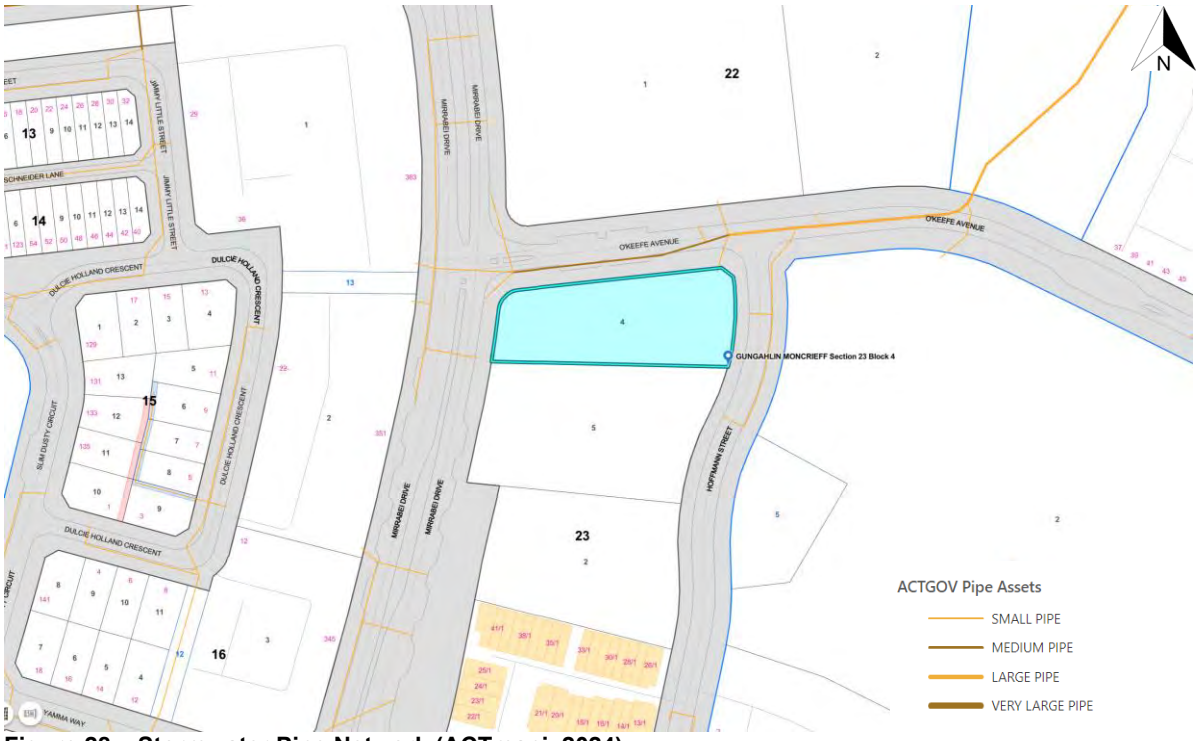


Figure 28 – Stormwater Pipe Network (ACTmapi, 2024)

Figure 29 – Stormwater Sump in West Verge of Hoffmann Street East of Site

Figure 30 – Stormwater Sump at Intersection of O'Keefe Avenue and Mirrabei Drive

Figure 31 – Access Gate to GPT from O'Keefe Avenue

Figure 32 – Stormwater Manholes in O'Keefe Avenue North East of the Site

Figure 33 – Gross Pollutant Trap North East of the Site in Open Space

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 3% grade over an overland flow path distance of approximately 110 metres. The slope across the subject site is generally consistent, with steeper gradients occurring near the boundary edges.

The subject site is bounded by existing roadways that impede overland flows from entering the site. However, overland flows from the south in Block 5 Section 23 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 5 to the south. The current development that is taking place on Block 5 Section 23 is expected to change the dynamic of overland flow through the subject site due to regrading. The general topography and grading of the subject site together with that of the adjacent Block 5 Section 23 can be seen in Figure 35 below, which is a photo taken from the west boundary of Block 4 Section 23, looking east over 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 10 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 34 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 the development on Block 5 Section 23 Moncrieff.

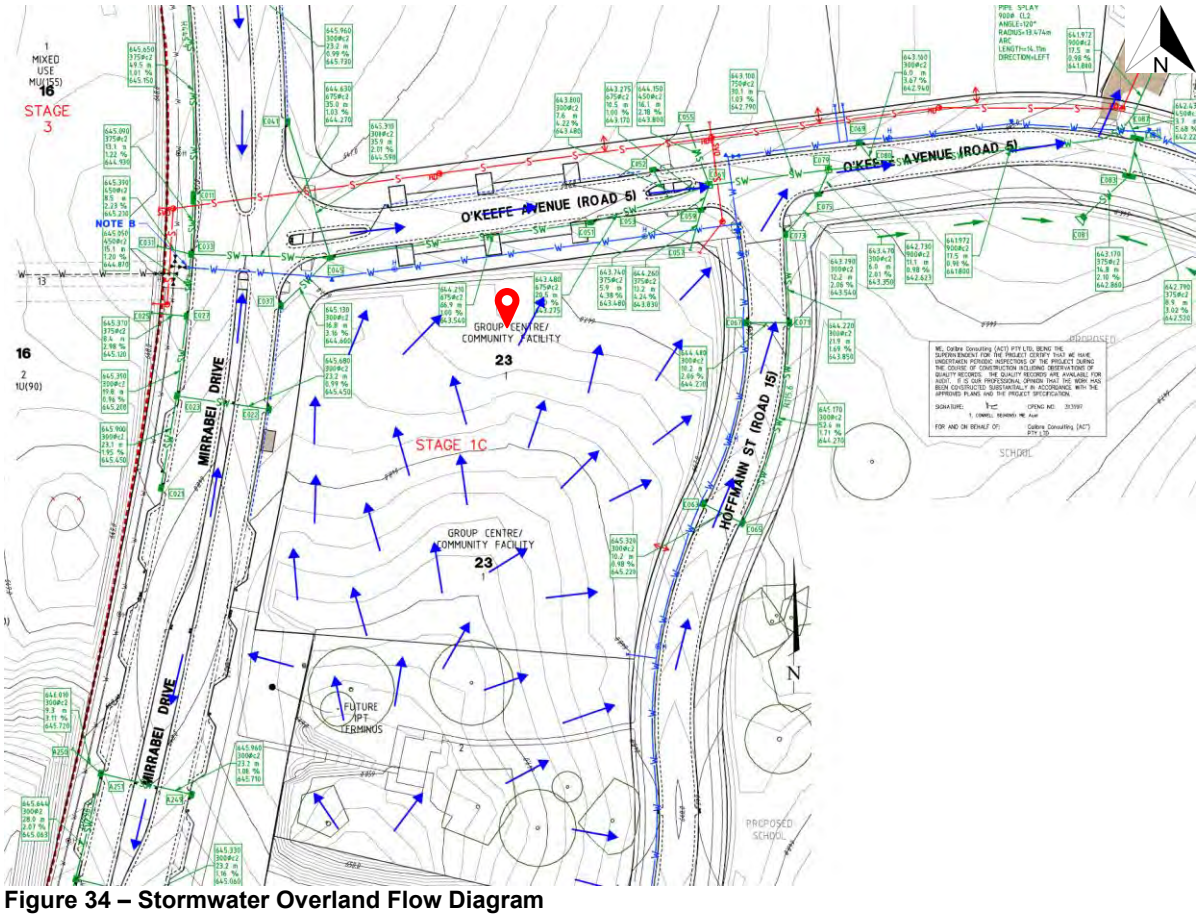


Figure 34 – Stormwater Overland Flow Diagram

Figure 35 – General View of the Site from the West Boundary Looking East

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 east verge of Mirrabei Drive, with a Type 6 pit near the north west corner of the site. Another P100 conduit extends from this pit and crosses Mirrabei Drive, terminating near Block 1 Section 16 Moncrieff. See Figure 38 below for a photo of the Telstra Type 6 pit in Mirrabei Drive. The Telstra service in Mirrabei Drive, adjacent the west boundary of the subject site is shown in the BYDA to be contained within a P100 conduit.

Although these are the only Telstra services shown in proximity of the subject site, during a site inspection, Telstra pits were identified in the southern verge of O'Keefe Avenue. An example of this is shown in Figure 37 below.

Refer to Telstra BYDA information that has been produced from digital data provided in Figure 36 below.

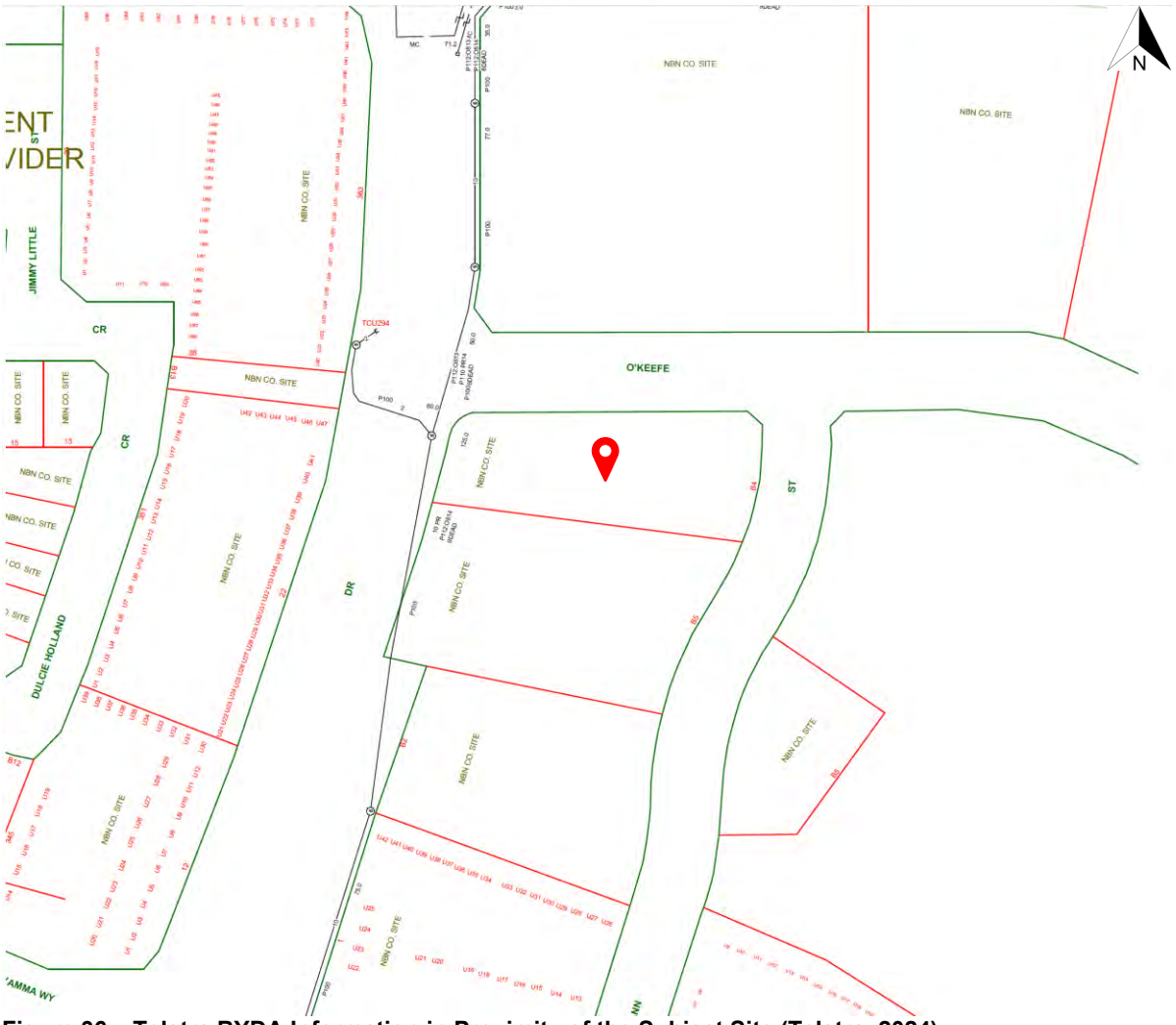


Figure 36 – Telstra BYDA Information in Proximity of the Subject Site (Telstra, 2024)

Figure 37 – Telstra Pit in Southern Verge of O'Keefe Avenue North East of Site

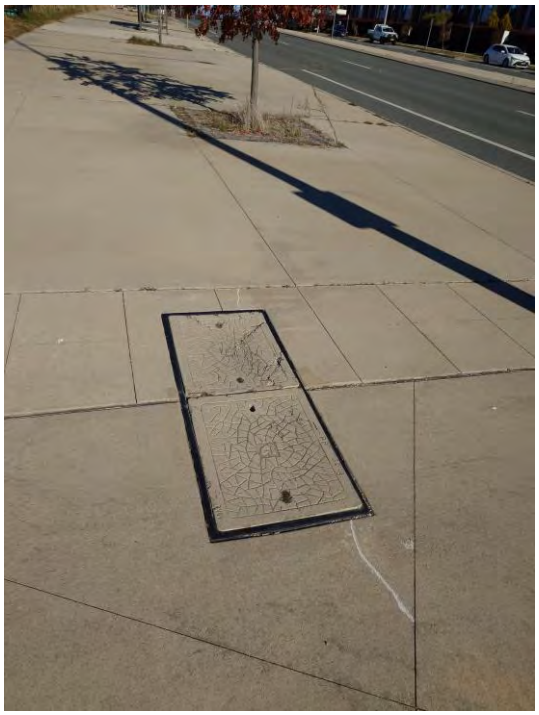


Figure 38 – Telstra Pit in East Verge of Mirrabei Drive West of Site

7.6.2 NBN

BYDA information indicates that the subject site is not directly serviced by NBN; however, NBN services are present in the eastern verge of Mirrabei Drive. The NBN line in Mirrabei Drive appears to be along a similar conduit alignment as the previously mentioned Telstra service, as indicated by the NBN BYDA mapping shown in Figure 39 below. A photo of an NBN pit in Mirrabei Drive is also provided in Figure 42, which shows its location to a nearby Telstra pit.

Additionally, NBN labelled pits were observed during a site inspection in O'Keefe Avenue, similar to the Telstra pits identified, mentioned previously. These NBN pits are located within the southern verge of O'Keefe Avenue, north of the site. Examples are shown in Figure 40 and Figure 41, below.

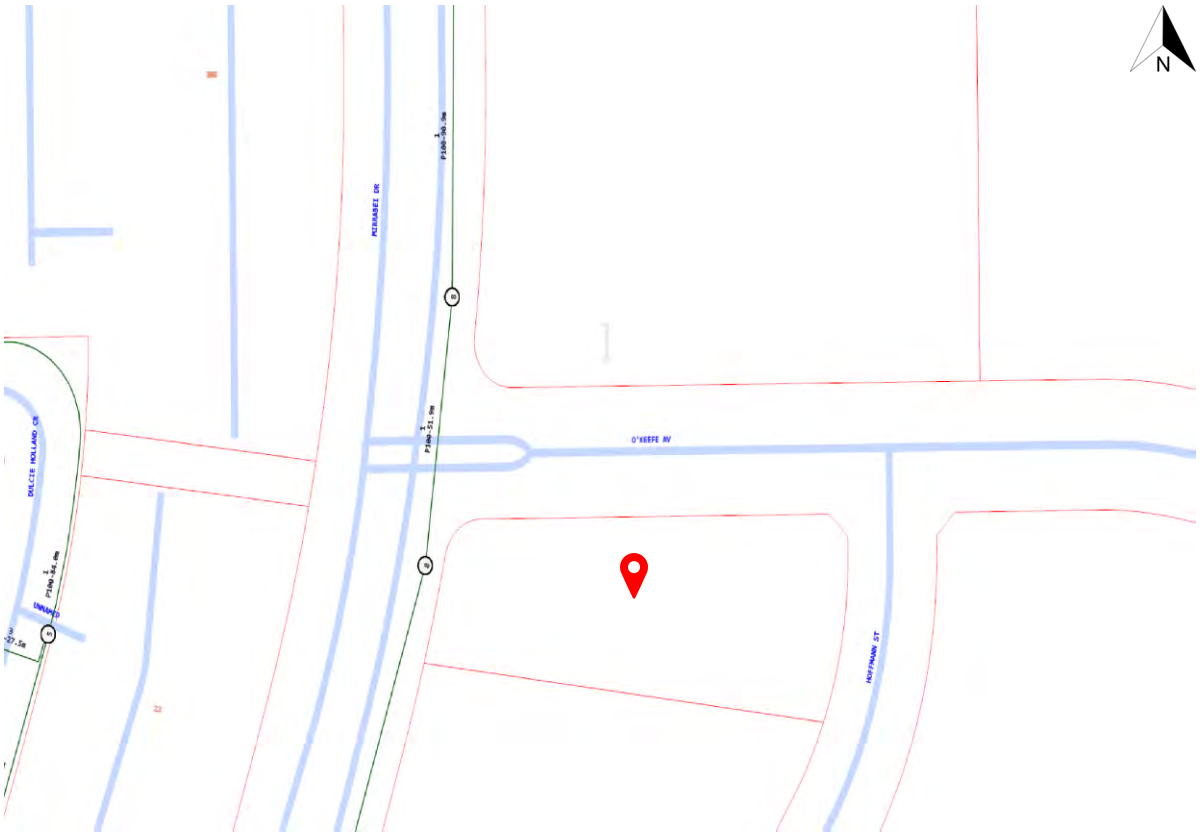


Figure 39 – NBN BYDA Information Near the Subject Site (NBN, 2024)

Figure 40 – NBN Pit in Southern Verge of O'Keefe Avenue North of Site

Figure 41 – NBN Pit Near Intersection of O'Keefe Avenue and Mirrabei Drive

Figure 42 – NBN Pit in East Verge of Mirrabei Drive West of Site

7.7 Gas Supply

A DN110 210kPa polyethylene distribution gas main is located in the east verge of Mirrabei Drive, approximately 1.7 meters from the subject site's western boundary. Branching from this DN110 gas main is a DN32 210kPa nylon distribution gas main, which runs approximately 900mm from the site's boundary along the southern verge of O'Keefe Avenue. This DN32 gas main continues south within the western verge of Hoffmann Street, maintaining a 900mm distance from the site's eastern boundary.

In addition, a DN50 210kPa nylon distribution gas line is located in the northern verge of O'Keefe Avenue. This DN50 gas line also branches from the previously mentioned DN110 main that is in Mirrabei Drive.

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 43 below, which is an excerpt from the BYDA information.

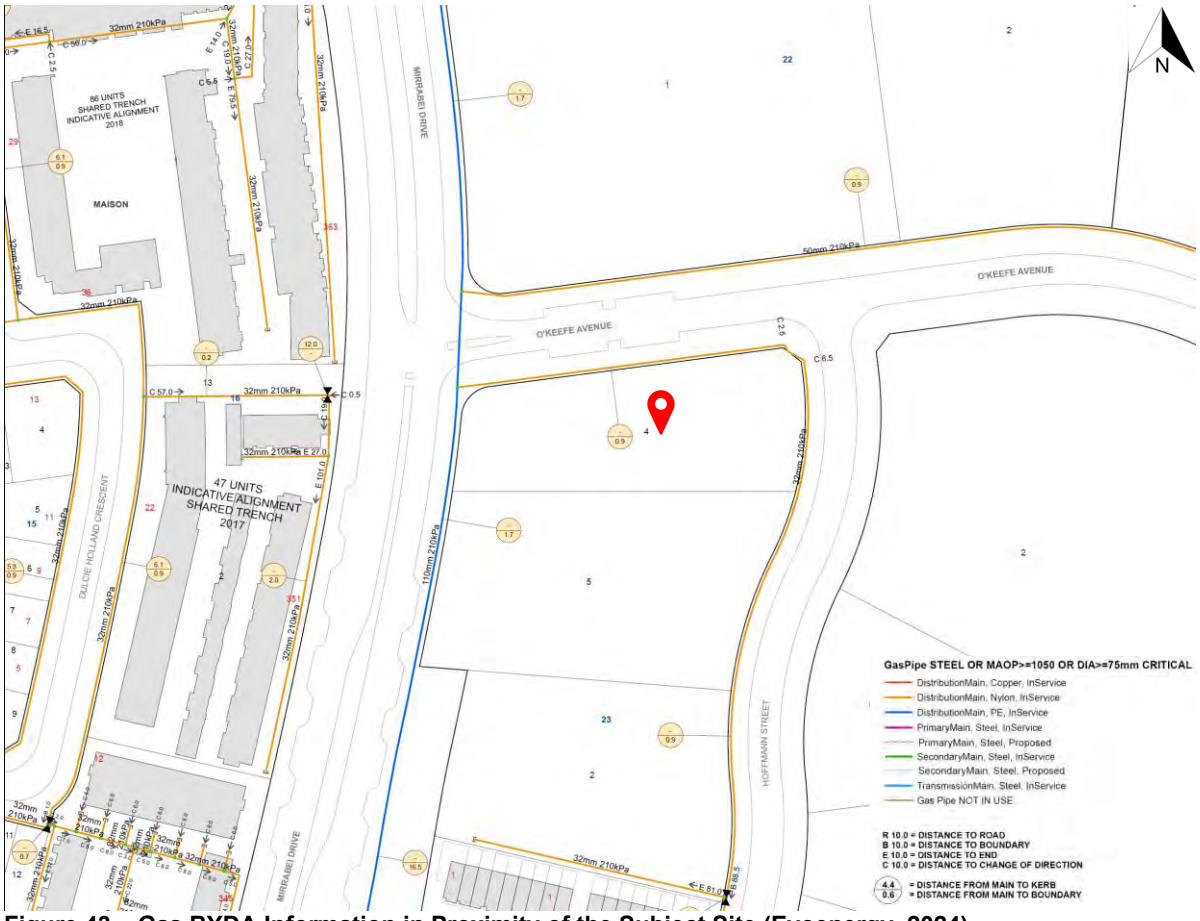


Figure 43 – Gas BYDA Information in Proximity of the Subject Site (Evoenergy, 2024)

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 their associated underground infrastructure are located within the southern verge of O'Keefe Avenue, with two streetlights positioned along the subject site's northern boundary. These streetlights are spaced approximately 52m apart. Similarly spaced streetlights and underground electrical lines are also present in the northern verge of O'Keefe Avenue. Refer to Figure 46 and Figure 47 below for photos of the two streetlights in O'Keefe Avenue, north of the subject site.
- Streetlights and underground infrastructure are installed in both the eastern and western verges of Mirrabei Drive. The streetlights in the eastern verge, adjacent to the subject site, are spaced at approximately 37m. See Figure 48 below for a streetlight in Mirrabei Drive, adjacent the subject site.
- On Hoffmann Street, streetlights and associated underground infrastructure are positioned in the western verge, with an approximate spacing of 2m. Figure 45 shows a photo of one of the streetlights on Hoffmann Street, near the site's north east corner.

See Figure 44 below for the location of the above-mentioned streetlight assets as provided by TCCS in BYDA information within the vicinity of the subject site.

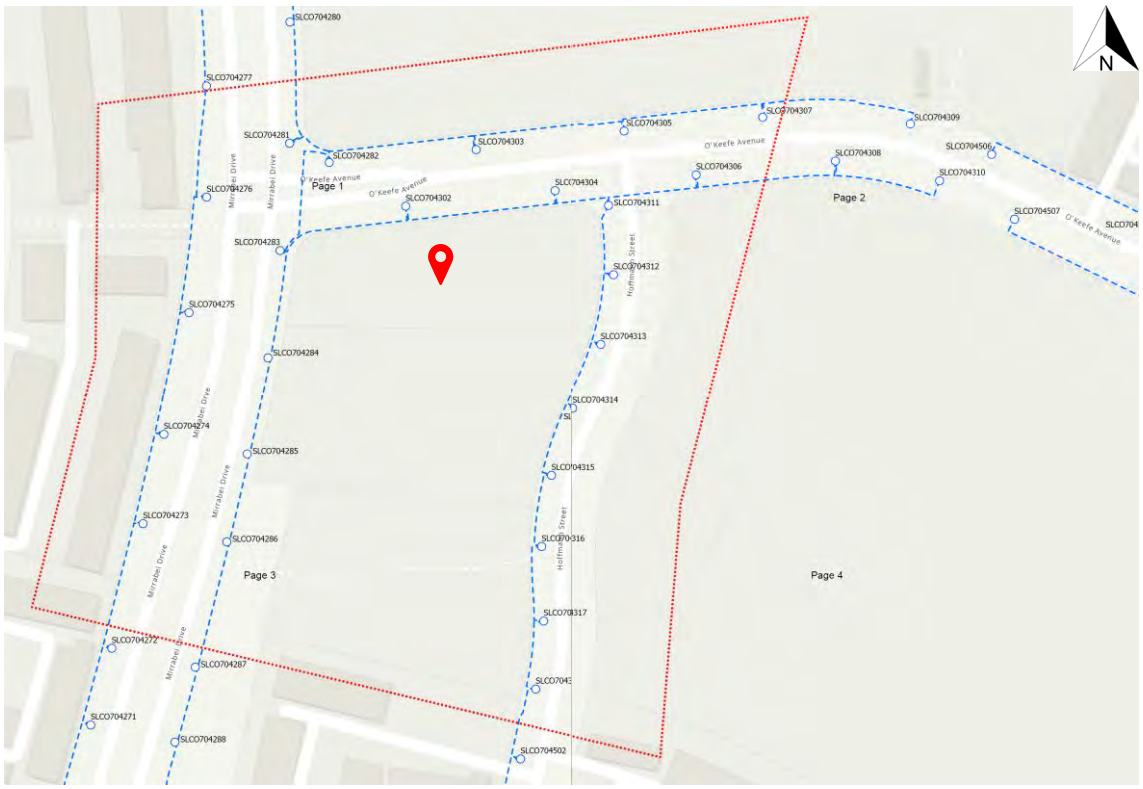


Figure 44 – Streetlight BYDA Information (TCCS, 2024)

Figure 45 – TCCS Streetlight at Intersection of Hoffmann Street and O'Keefe Avenue

Figure 47 – TCCS Streetlights in O'Keefe Avenue

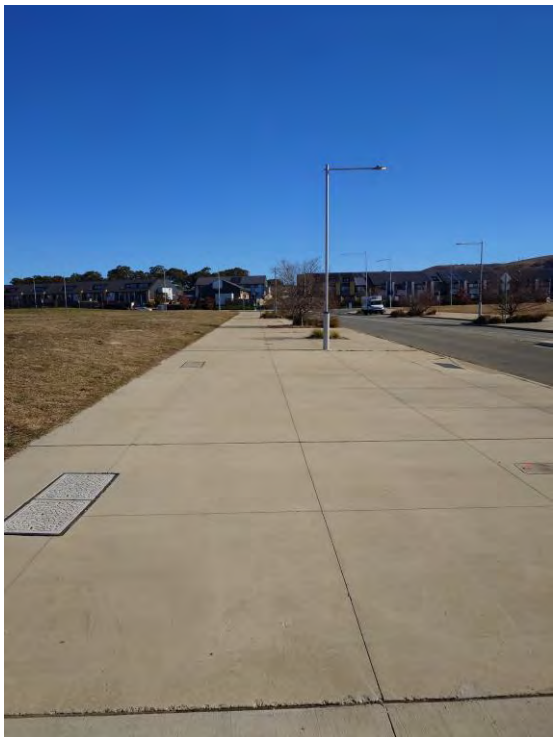


Figure 46 – TCCS Streetlights North of Subject Site

Figure 48 – TCCS Streetlights on Mirrabei Drive West of the Site

Based on DBYD 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:

- Underground high voltage (HV) lines are located within the west verge of Mirrabei Drive, directly west of the subject site. These HV lines cross Mirrabei Drive at the intersection with O'Keefe Avenue and continue to cross O'Keefe Avenue into its northern verge.
- Additional underground HV lines run along the northern verge of O'Keefe Avenue, extending eastward beyond the subject site.
- A substation (S 11057) is located in the open space within Block 2 Section 80 Moncrieff, northeast of the subject site. Refer to Figure 51 below for a photo of this electrical substation. The abovementioned HV line in the northern verge of O'Keefe Avenue connects to this substation, both entering and exiting it, while another HV line continues northward from the substation toward Horse Park Drive.
- Underground low voltage (LV) lines are present in the west verge of Hoffmann Street, connecting to a link pillar in the northeast corner of the subject site, which serves as the service point for the site. See Figure 50 for a photo of this link pillar's location relative to the subject site. The LV lines in Hoffmann Street originate from the abovementioned substation, with several LV lines located in the northern verge of O'Keefe Avenue, crossing the road to continue south along Hoffmann Street.
- An underground electrical service line is also shown in BYDA information within the O'Keefe Avenue's south verge. This line terminates at the link pillar servicing the site and extends to the west toward Mirrabei Drive.

Refer to Figure 49 for the electrical BYDA information, which shows HV lines as red dashed lines, LV underground lines as green dashed lines, and service lines as lighter green dashed lines, representing the underground services.

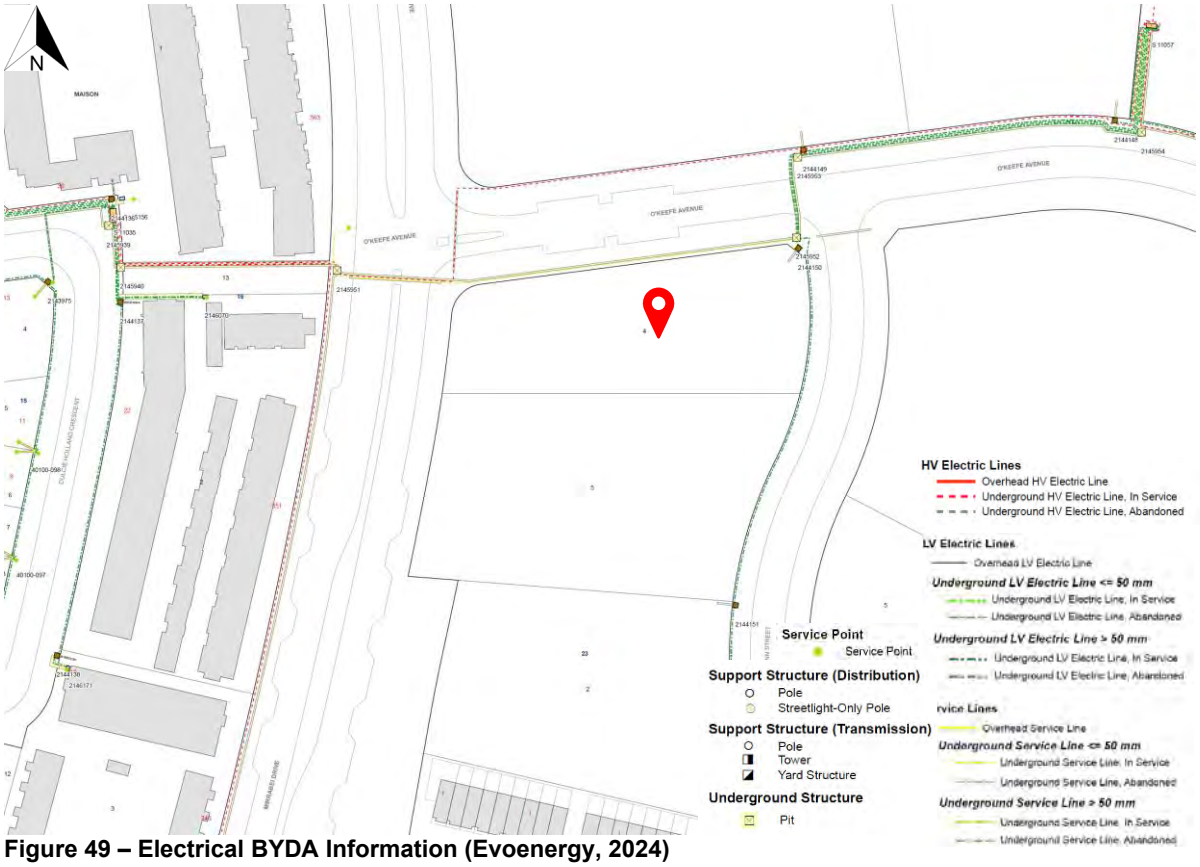


Figure 49 – Electrical BYDA Information (Evoenergy, 2024)

Figure 50 – Electrical Mini Pillar Near North East Corner of the Site

Figure 52 – Electrical Mini Pillar and Substation in Distance North East of Site

Figure 51 – Electrical Substation (S 11057) North East of the Site

7.9 Boundaries and Easements

As mentioned in Section 6.7 of this report, a subdivision of Block 1 into Blocks 45 and 5 Section 23 Moncrieff was created and registered by Deposited Plan 11653 in 2019. An excerpt of the Deposited Plan is provided in Figure 54 below and in full in Appendix K.

A review of ACTmapi does not show any easements within the site's block boundary. Furthermore, 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 coordinated reference markers (CRM14065) on the kerb near the intersection of O'Keefe Avenue and Mirrabei Drive, north east of the site. See Figure 55 below for a photo of the CRM kerb survey marker at this intersection.

Refer to Figure 53 for an extracted image from ACTmapi showing the location of this and other nearby survey markers and easements that are situated surrounding the site.

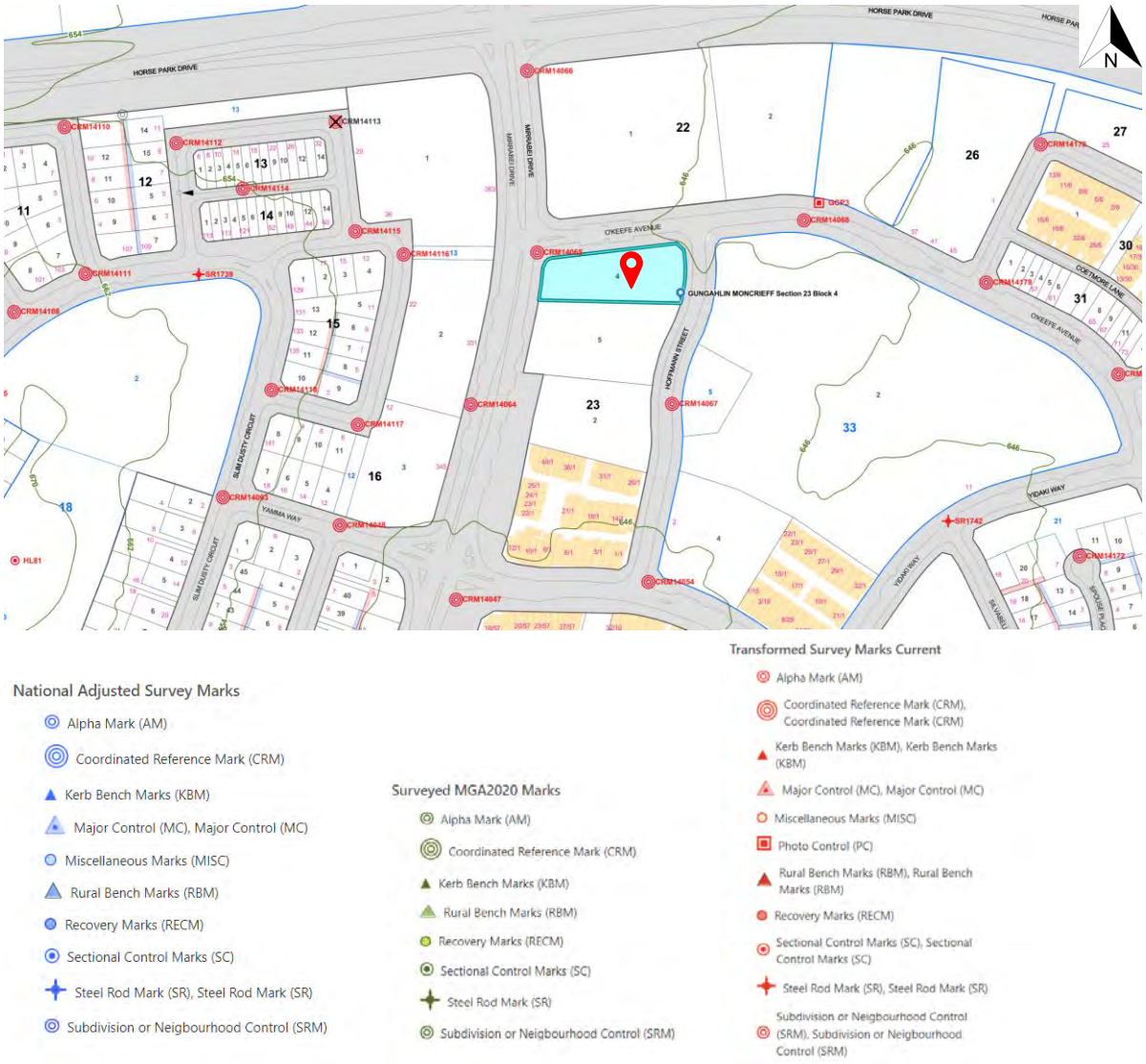


Figure 53 – Existing Survey Markers and Easements Surrounding the Site (ACTmapi, 2024)

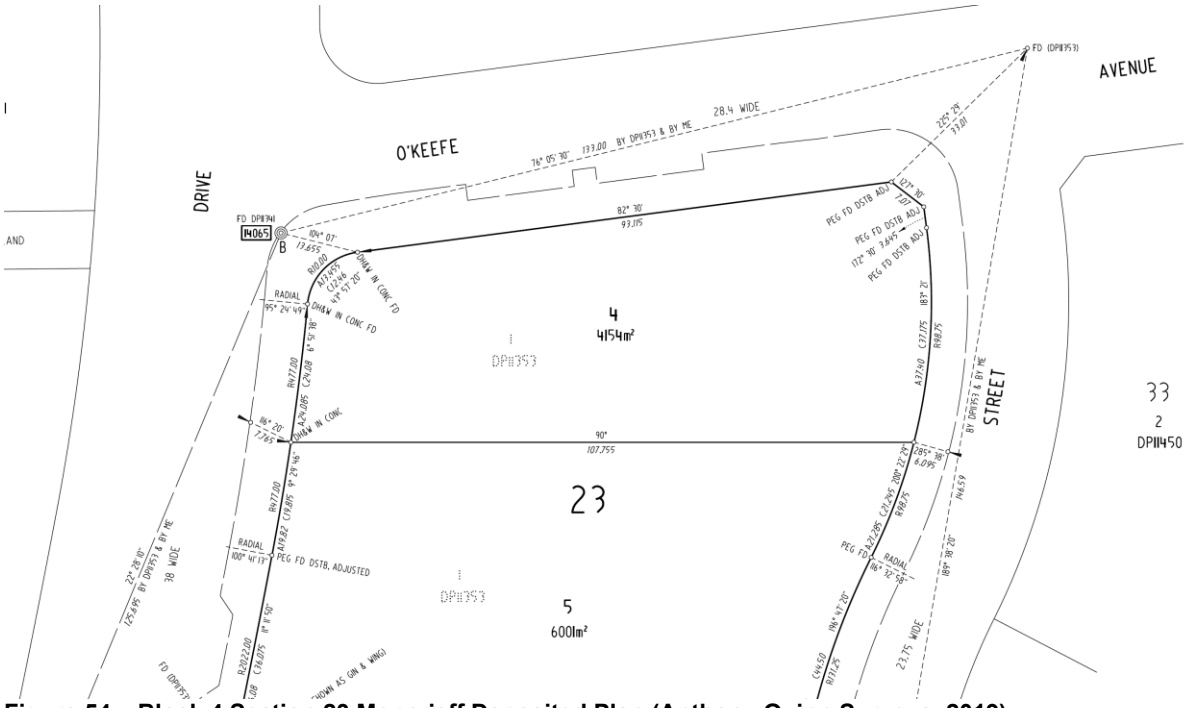


Figure 54 – Block 4 Section 23 Moncrieff Deposited Plan (Anthony Quinn Surveys, 2019)

Figure 55 – Existing Kerb Survey Marker (CRM14065)

7.10 Transport

7.10.1 Traffic and Vehicular Access

The subject site is located within the suburb of Moncrieff, bordered by Mirrabei Drive to the west, O'Keefe Avenue to the north, and Hoffmann Street to the east. The site is approximately 160m south of Horse Park Drive, a major arterial road that provides connectivity to the wider Gungahlin district. Mirrabei Drive functions as a Major Collector road, consisting of two single lane carriageways, each with a 1.5m wide on road cycle lane. A grassed central median, approximately 6m wide, separates the carriageways, narrowing to a 2.5m wide concrete median island to accommodate right turn bays at intersections. The road reserve along Mirrabei Drive, adjacent to the subject site, is approximately 38m wide, and the road is signposted with a speed limit of 60km/h. A speed restriction sign and general road geometry of Mirrabei Drive can be seen in Figure 61 and Figure 63, respectively.

O'Keefe Avenue is generally in line with the geometric classification of a Minor Collector Road, with a road reserve width of approximately 28.5m. A general photo of O'Keefe Avenue north of the subject site can be seen in Figure 58 below. Although there is no posted speed limit, indicating a default speed of 50km/h, a 40km/h school zone sign is situated east of the Hoffmann Street intersection, approximately 550m in advance of Taqwa School, located to the south east of the site. The school zone restriction sign that is O'Keefe Avenue can be seen in Figure 62 below.

Hoffmann Street, similarly not having a posted speed limit, defaults to 50km/h. The road reserve of Hoffmann Street is approximately 23.8m wide. Figure 57 provides a general perspective view of Hofmann Street, adjacent to the subject site.

Horse Park Drive, a major arterial road with a road reserve of 60m, has a dual carriageway and comprises of two lanes in each direction, separated by a concrete central median of varying width. Horse Park Drive has on road cycle lanes in both carriageways and is signposted with a speed limit of 80km/h near the subject site. The signalised intersection of Mirrabei Drive and Horse Park Drive can be seen in Figure 64 with Figure 65 showing an overall perspective of Horse Park Drive looking east from this intersection.

Both the intersection of O'Keefe Avenue and Mirrabei Drive, and the intersection of Mirrabei Drive and Horse Park Drive, are signalised. Refer to Figure 59 and Figure 60 for photos of the intersection of O'Keefe Avenue and Mirrabei Drive.

The subject site does not have a formal access to either O'Keefe Avenue or Hoffman Street and current planning restrictions mentioned in Section 2 of this report, does not allow an access onto Mirrabei Drive. Due to the indented on street parking on O'Keefe Avenue, and proximity to the signalised intersection on Mirrabei Drive, it is more likely that an access to the subject site would be from Hoffmann Street.

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 56 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
O'Keefe Avenue	Minor Collector
Hofmann Street	Access Street B
Mirrabei Drive	Major Collector
Horse Park Drive	Arterial

Figure 56 – Extract from the Active Travel Infrastructure Practitioner Tool (2024)

Figure 57 – Hoffmann Street East of Site Looking North

Figure 58 – O'Keefe Avenue North East of Site Looking West

Figure 59 – O'Keefe Avenue and Mirrabei Drive Intersection Looking West

Figure 60 – Mirrabei Drive Intersection with O'Keefe Avenue Looking North

Figure 61 – Mirrabei Drive West of Site Looking South

Figure 62 – School Zone Sign on O'Keefe Avenue North East of Site

Figure 63 – Speed Restriction Sign on Mirrabei Drive

Figure 64 – Horse Park Drive and Mirrabei Drive Signalised Intersection

Figure 65 – General View of Horse Park Drive from Mirrabei Intersection Looking East

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 66 to Figure 71 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 well within each respective roads' capacity in both the 2026, 2031 and 2041 morning and afternoon peak periods.

Mirrabei Drive, south of O'Keefe Avenue, is projected to carry 261 vehicles per hour (vph) southbound and 76 vph northbound during the morning peak in 2026, operating within 45% of its

geometric capacity. In the afternoon peak, volumes shift to 87 vph southbound and 230 vph northbound, still within the 25% to 45% capacity range. By 2031, morning peak volumes are expected to slightly decrease to 251 vph southbound and increase to 113 vph northbound, while afternoon peak traffic grows to 143 vph southbound and 260 vph northbound. By 2041, traffic volumes rise to 281 vph southbound in the morning and stabilise at 116 vph northbound, with the afternoon peak projected at 76 vph southbound and 261 vph northbound, remaining within 45% of road capacity throughout the forecast period.

North of O'Keefe Avenue, Mirrabei Drive is anticipated to have 269 vph southbound and 102 vph northbound during the 2026 morning peak, staying within 45% of its capacity. Afternoon peak hour volumes are forecast at 119 vph southbound and 238 vph northbound. By 2031, the morning peak reaches 268 vph southbound and 144 vph northbound, while the afternoon peak increases to 182 vph southbound and 276 vph northbound. By 2041, morning traffic increases to 302 vph southbound, with 145 vph northbound, and afternoon volumes are projected at 176 vph southbound and 269 vph northbound, all remaining within 45% of the road's capacity.

O'Keefe Avenue is forecast to have 63 vph eastbound and 81 vph westbound during the 2026 morning peak, staying within 25% of its geometric capacity, with afternoon volumes at 87 vph eastbound and 63 vph westbound. In 2031, morning volumes increase to 71 vph eastbound and 85 vph westbound, and afternoon volumes rise to 94 vph eastbound and 71 vph westbound. By 2041, the road is projected to have 68 vph eastbound and 76 vph westbound in the morning peak hour and 83 vph eastbound and 68 vph westbound in the afternoon peak hour, consistently operating within 25% of the road's capacity.

Hoffmann Street shows minimal traffic, with only 1 vph northbound during both the morning and afternoon peaks across all forecast years (2026, 2031, and 2041), operating well within 25% of capacity. It is unlikely, once developments are established on Blocks 4 and 5 Section 23, that this traffic volume will remain that low and is expected to increase. Block 5 Section 23 currently has its access onto Hofmann Street and it is likely that Block 4 Section 23 will also have its access onto Hoffman Street, which will result in a significant increase in traffic on this section of the road.

Horse Park Drive, a major arterial road, is projected to carry 481 vph eastbound and 119 vph westbound during the 2026 morning peak hour, shown to be operating within 70% of the capacity eastbound. In the afternoon, traffic volumes are shown to be 135 vph eastbound and 445 vph westbound. By 2031, morning peak hour volumes drop to 390 vph eastbound and 176 vph westbound, while afternoon peak traffic reaches 177 vph eastbound and 351 vph westbound. By 2041, Horse Park Drive is forecast to have 413 vph eastbound and 168 vph westbound during the morning peak, and 166 vph eastbound and 340 vph westbound in the afternoon. All of these projected traffic volumes in 2031 and 2041 are shown to be within 25% of the road's capacity. The capacity analysis for the 2026 morning and afternoon peak periods indicates that the highest trafficked carriageways are operating between 45% and 70% of the road's capacity. As a result, it is assumed that upgrade works are planned for Horse Park Drive to accommodate future traffic demands and therefore show the road operating within 25% of its capacity in the future 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 O'Keefe Avenue, taking the most conservative scenario of 165 vph in the 2031 PM peak in both directions, this would translate to approximately 1,650 vehicles per day (vpd), which is within the Minor Collector classification provided in MIS 01 of 1,001-3,000 vpd.

When examining the most trafficked section of Mirrabei Drive, north of O'Keefe Avenue, located north west of the subject site, the traffic volume in the critical southbound carriageway is 3,020 vpd in the 2041 AM peak. This volume falls within the Major Collector classification range in MIS 01, which is 3,001-6,000 vpd. Mirrabei Drive is separated into two single lane carriageways, providing sufficient capacity to accommodate this traffic flow.

The section of Hoffmann Street that is adjacent the site has very low traffic volume numbers; however, it can be safely assumed that this section falls under an Access Street B category of 0-1,000 vpd as stipulated in MIS 01.

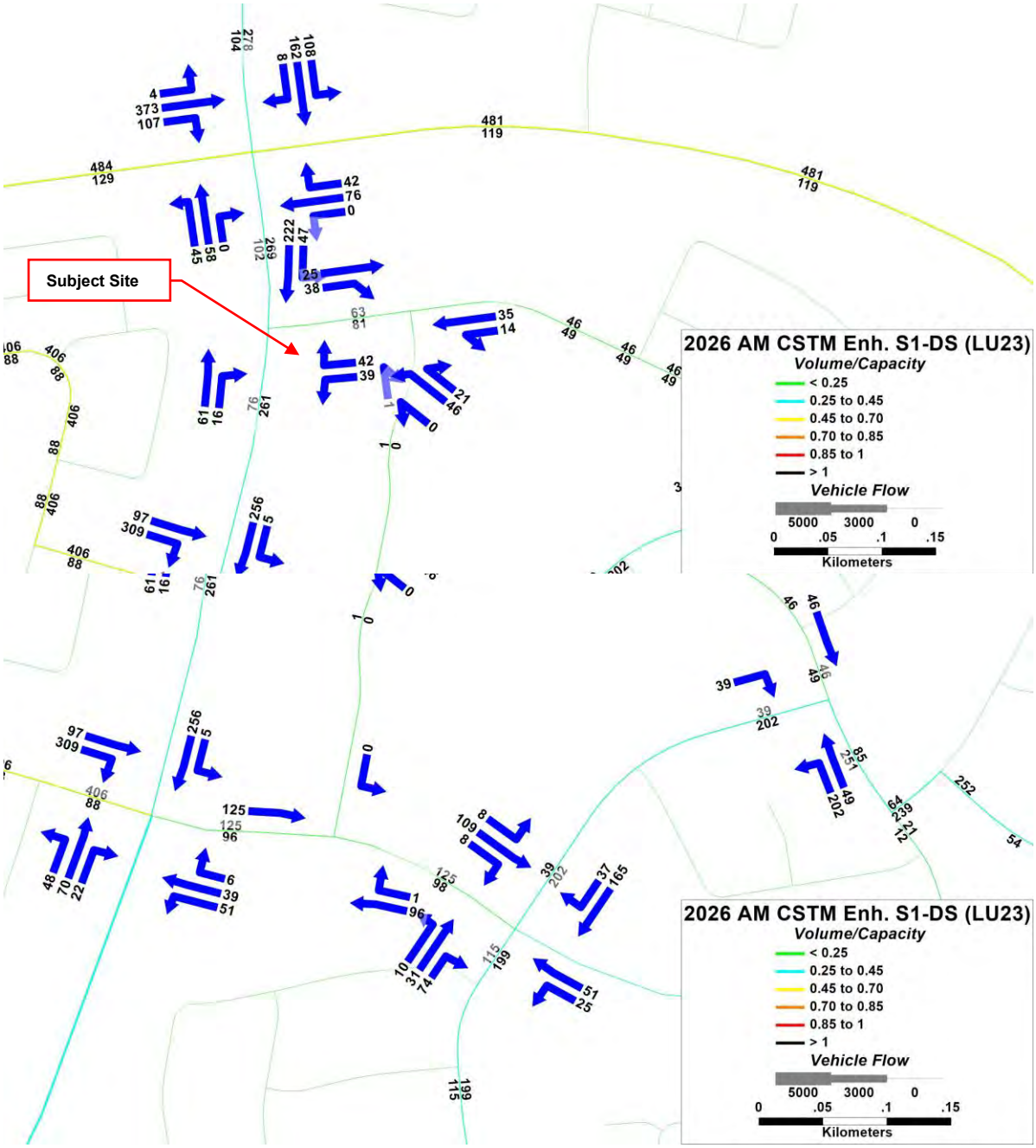


Figure 66 – CSTM Modelling – 2026 AM Peak Volumes (TCCS, 2024)

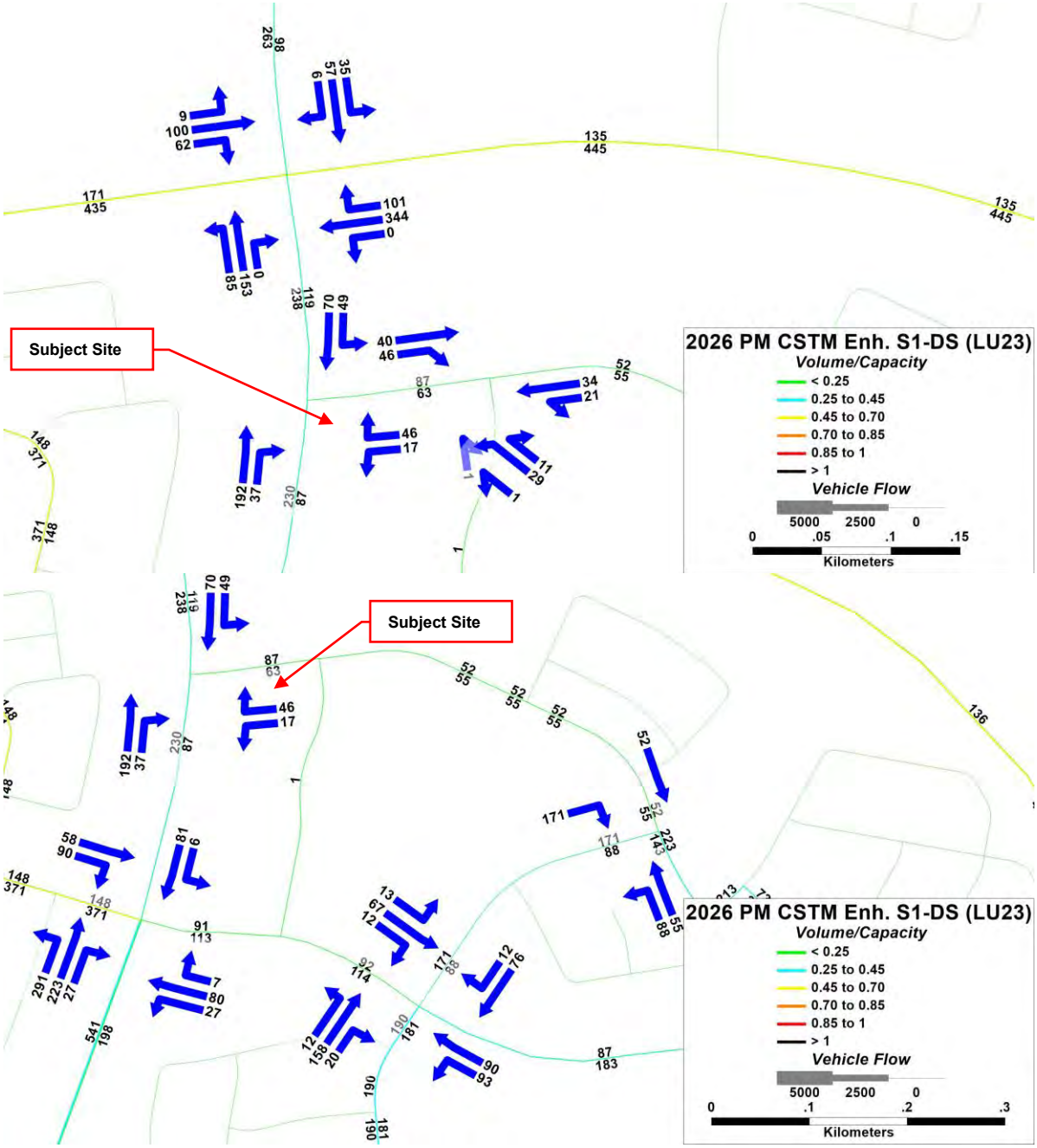


Figure 67 – CSTM Modelling – 2026 PM Peak Volumes (TCCS, 2024)

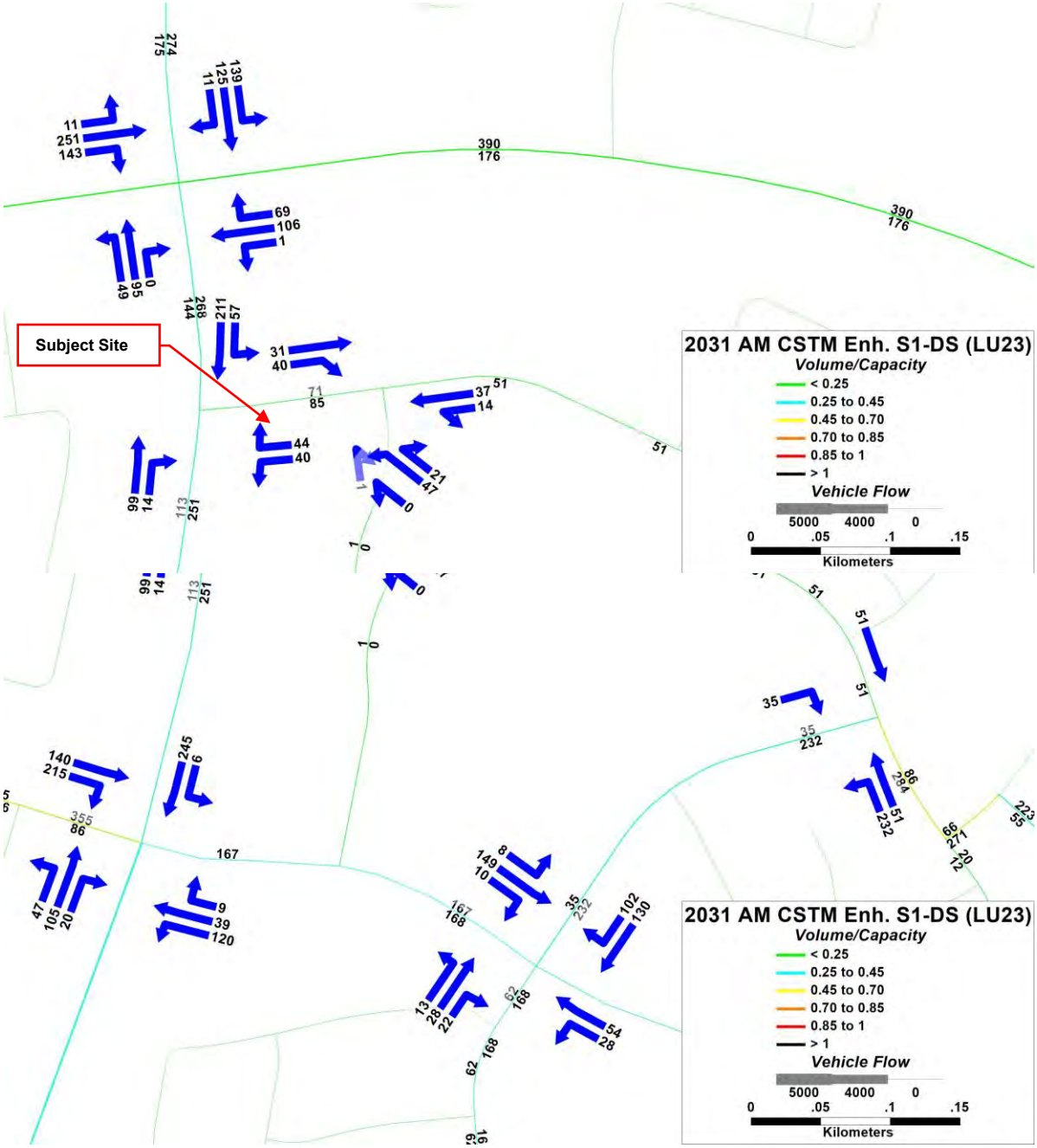


Figure 68 – CSTM Modelling – 2031 AM Peak Volumes (TCCS, 2024)

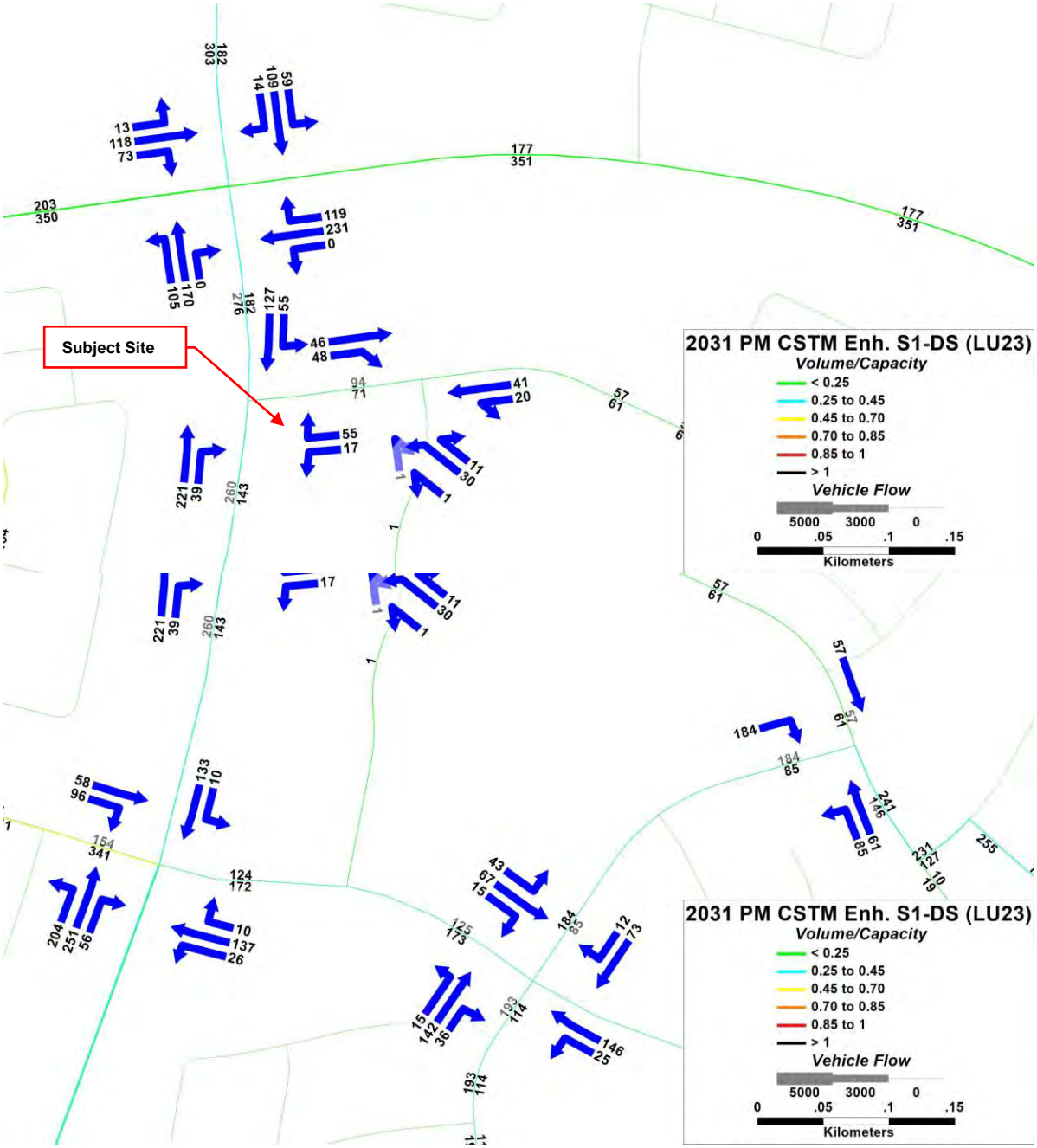


Figure 69 – CSTM Modelling – 2031 PM Peak Volumes (TCCS, 2024)

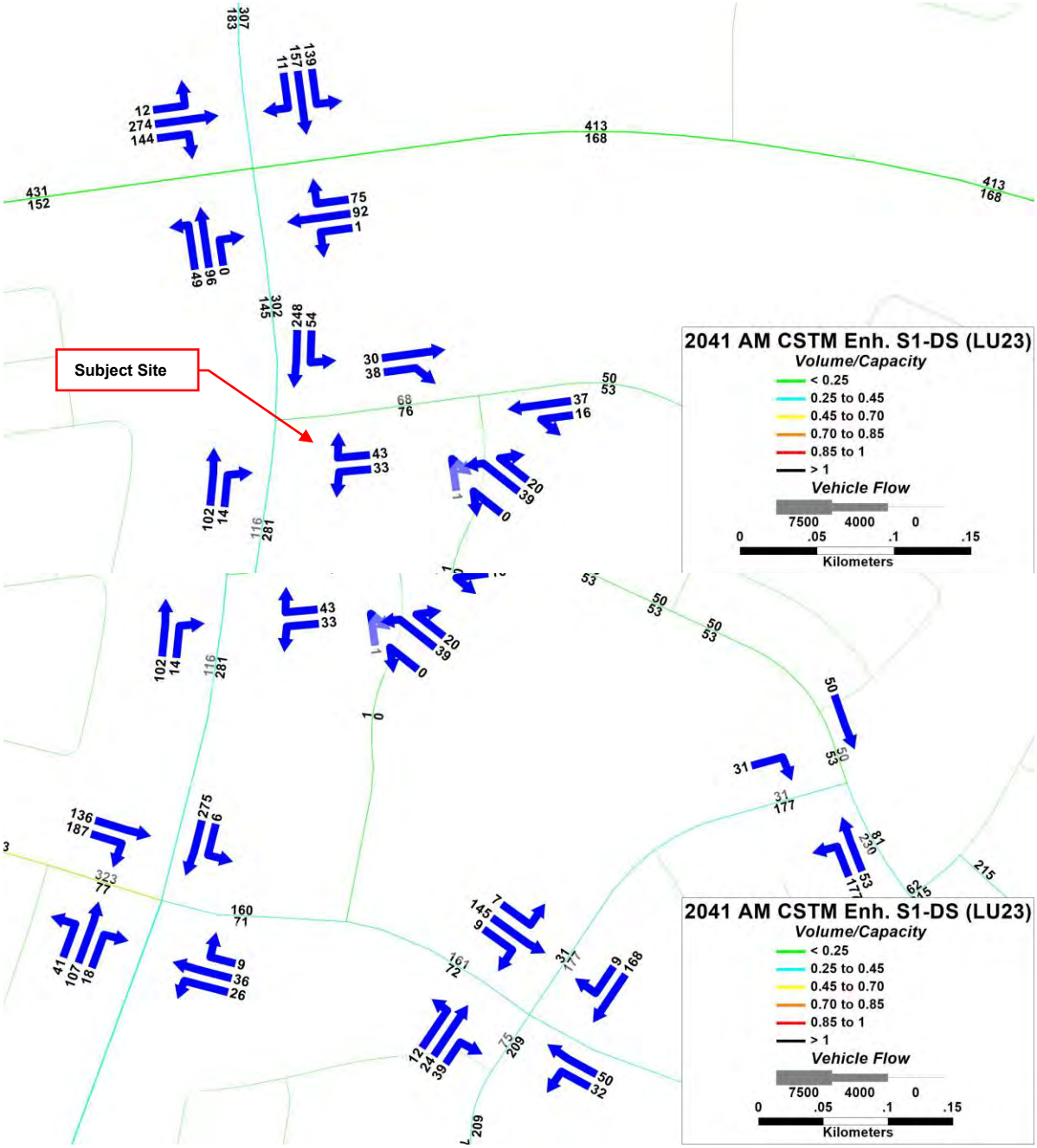


Figure 70 – CSTM Modelling – 2041 AM Peak Volumes (TCCS, 2024)

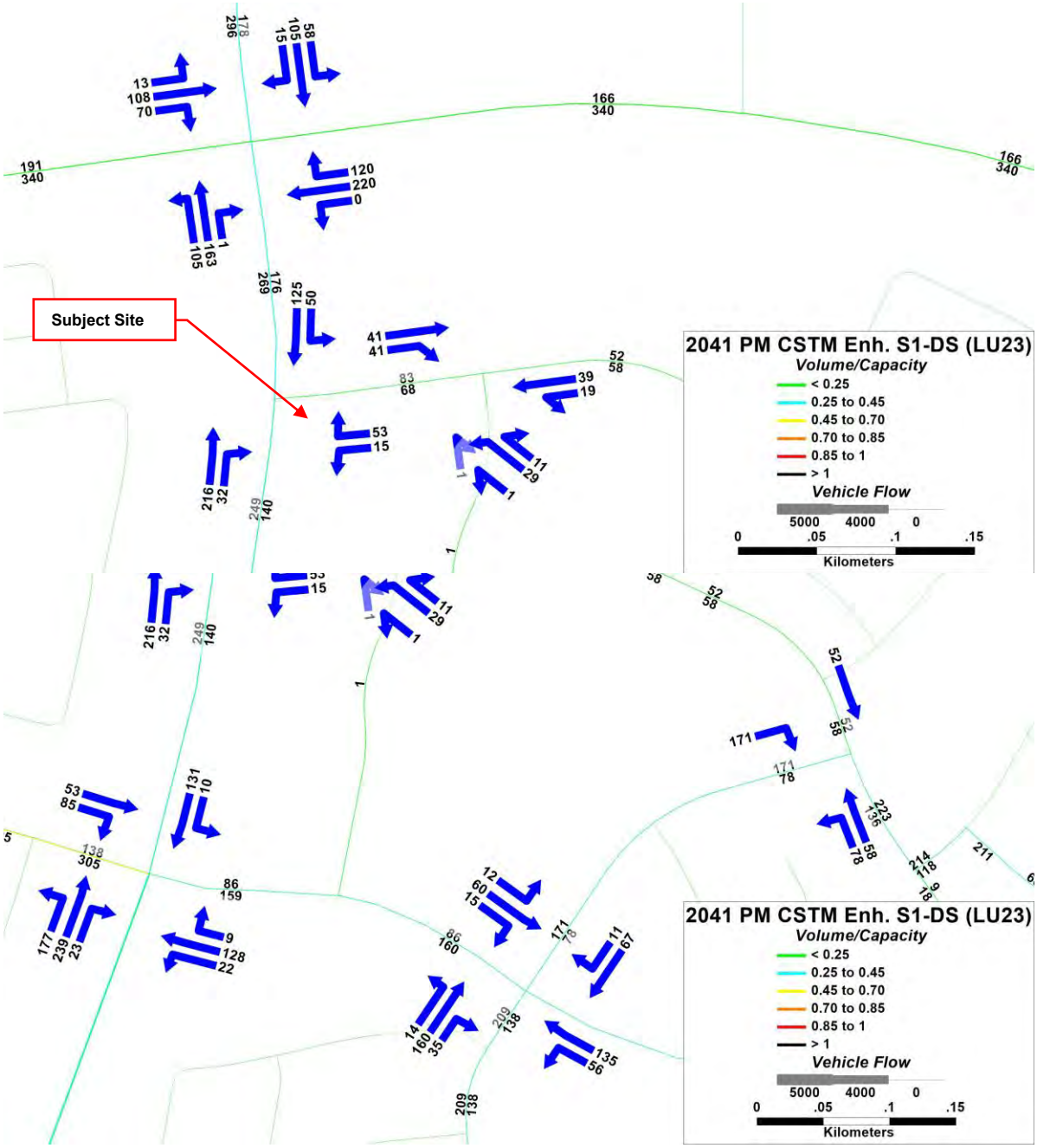


Figure 71 – CSTM Modelling – 2041 PM Peak Volumes (TCCS, 2024)

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 72 and Table 2 below. The data confirms that the site is located in an area (CSTM Zone 021401) that is a mix of residential, employment, and school enrolment (Taqwa School). To understand the broader demographic changes over the forecast years, all Moncrieff demographic numbers are provided in Table 2. Population projections indicate a moderate variation over the projected future years, with 358 in 2026, rising slightly to 374 by 2031, before decreasing to 343 in 2041. Employment figures remain stable, with 67 employed in both 2026 and 2031, dropping marginally to 62 by 2041. School enrolment is expected to increase from 237 in 2026 to 255 in 2031, maintaining this level through to 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
Moncrieff	**021401**	**358**	**374**	**343**	**67**	**67**	**62**	**-**	**-**	**-**	**237**	**255**	**255**
Moncrieff	021402	2,905	3,030	2,784	264	267	247	-	-	-	-	-	-
Moncrieff	021403	2,692	2,807	2,579	201	203	188	-	-	-	-	-	-
Moncrieff	021404	2,305	2,404	2,209	164	166	154	-	-	-	-	-	-

Figure 72 – Canberra Strategic Transport Model (CSTM) Zone ID (TCCS, 2024)

7.10.2 Parking

Car parking is available on O'Keefe Avenue, north of the subject site, where 12 indented car parking bays are provided. These car parking spaces are signposted as 30 minute parking only. The photos in Figure 75 and Figure 76 show the on street parking bays in O'Keefe Street and Figure 74 shows the parking restriction sign for this parking.

Additionally, 14 indented parking bays are available within 100 meters of the subject site along Mirrabei Drive. The parking bays on Mirrabei Drive are signposted as 2 hour parking. A sign showing this on Mirrabei Drive is provided in Figure 73 below.

On street parking on Hoffmann Street is permitted. For a distance of 100m from the south east corner of the site, approximately 42 standard passenger vehicles can be accommodated on Hoffmann Street as on street parking.

There are therefore a total number of approximately 68 parking spaces in a 100m radius area of the subject 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 (Community Facility Zones) Technical Specifications 2024 (effective: 20 March 2024) establishes parking generation rates, considering the site's location and intended uses. For various community use residential type developments, the parking provision rates as applicable to a community facility zone are:

Community and Supportive Housing:

- Residents:
    - 1 space per single bedroom dwelling.
    - Minimum average of 1.5 spaces per two bedroom dwelling (each allocated 1-2 spaces).
    - 2 spaces per two bedroom dwelling.
    - 2 spaces for dwellings with three or more bedrooms.
- Visitors:
    - 1 space per 4 dwellings (if the complex has 4+ dwellings).
    - Accessible visitor parking must be at least 3% of total visitor spaces (rounded up).

Residential Care Accommodation:

- 0.25 spaces per bed/unit.
- 1 space per staff residential unit.
- 1 space per non resident peak shift employee.

Retirement Village:

- 1 space per self-care unit.
- 1 space per 4 hostel/nursing home units or beds.
- 1 space per staff residential unit.
- 0.5 spaces per non-resident peak shift employee.

The Planning (Community Facility Zones) Technical Specifications stipulates the location requirements for long stay, short stay, and operational parking for uses within a community facility zone for residential use, which is as follows:

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

In accordance with Clause 20.1 of the Community Facility Zones Technical Specifications, electric vehicle ready parking only needs to be provided to at least 20% of non-residential parking spaces in new community facility 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 parking on the adjacent roads to service the needs of a future development needs to be agreed with TCCS.

Figure 73 – On Street Car Parking on Mirrabei Drive

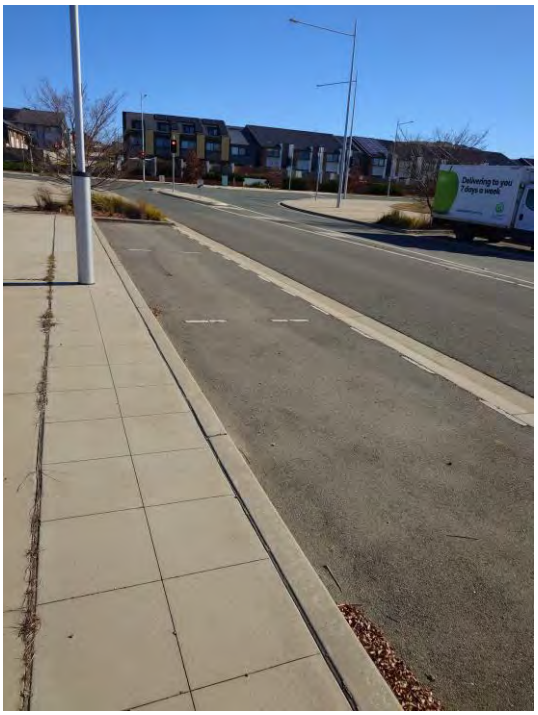


Figure 75 – On Street Car Parking on O'Keefe Avenue

Figure 74 – Car Parking Signs on O'Keefe Avenue

Figure 76 – On Street Car Parking on O'Keefe Avenue

7.10.3 Pedestrian and Cycle Access

Fully paved plain concrete verges are present along O'Keefe Avenue to the north and Mirrabei Drive to the west of the subject site. The photos in Figure 81 and Figure 82 provide a general view of these fully paved verges adjacent the subject site. In addition, a fully paved concrete verge extends along the northern verge of O'Keefe Avenue for the length of the subject site. The west verge of Mirrabei

Drive, directly west of the site, features an approximately 2.0m wide concrete path. Beyond the intersection with O'Keefe Avenue, this path transitions into a fully paved verge. The fully paved verge in the east verge of Mirrabei Drive transitions to an approximately 2.5m wide asphaltic shared path, south east of the site. This shared path can be seen in Figure 78 below.

A signalised intersection at O'Keefe Avenue and Mirrabei Drive facilitates pedestrian and cyclist access, with on road cycle lanes, approximately 1.5 meters wide, available in both southbound and northbound carriageways of Mirrabei Drive. Refer to Figure 83 below for a photo of the southbound cycle lane on Mirrabei Drive, adjacent the site.

Hoffmann Street has an approximately 1.5m wide concrete footpath along its west verge, and an asphalt shared path, approximately 2.5m wide, in the east verge. This shared path in Hoffmann Street connects to another 2.5m wide asphalt shared path extending to the east along the southern verge of O'Keefe Avenue. See Figure 79 below for a photo of the path in the west verge of Hoffmann Street, adjacent the site.

A central road median with a pedestrian refuge is situated near the north east corner of the site on O'Keefe Avenue, providing connectivity from the shared path in the west verge of Hoffmann Street to the fully paved verge in the northern part of O'Keefe Avenue. Beyond the intersection with Hoffmann Street, an approximately 1.5m wide concrete path continues to the east in the northern verge of O'Keefe Avenue. This path in the northern verge of O'Keefe Avenue can be seen in Figure 80 below.

An excerpt from the CBR Cycle Routes map in Figure 77, published by ACT Government Transport Canberra, illustrates two principal routes in close proximity to the subject site. The C1 Gungahlin to Canberra City principal route extends from Horse Park Drive, along Mirrabei Drive to the south toward the Gungahlin Town Centre and beyond. Also, in close proximity to the site is the C9 principal route that is within the Horse Park Drive road reserve, which bypasses the Gungahlin Town Centre to continue toward Canberra Airport. These principal routes near the subject site ensure a well connected network for pedestrians and cyclists in the region and available to a future development on the subject site.

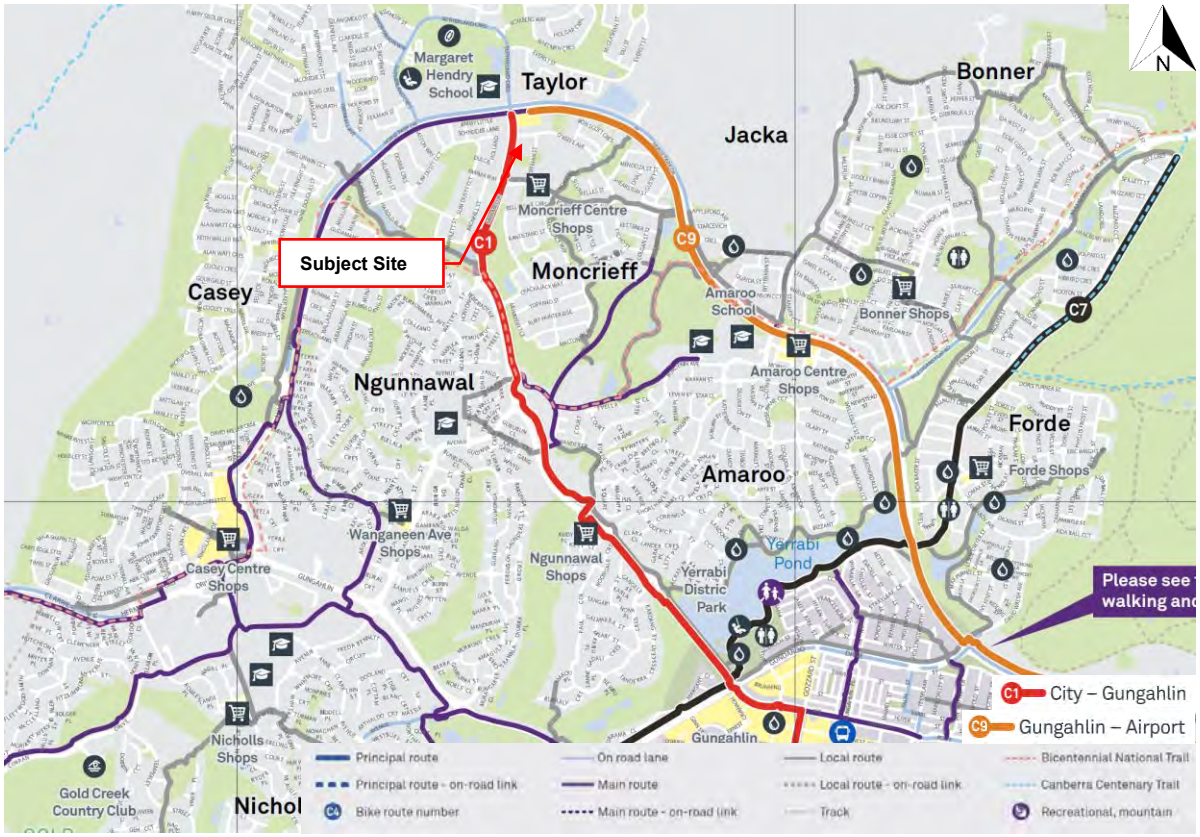


Figure 77 – CBR Cycle Routes (Transport Canberra, 2024)

Figure 78 – Shared Path in East Verge of Mirrabei Drive

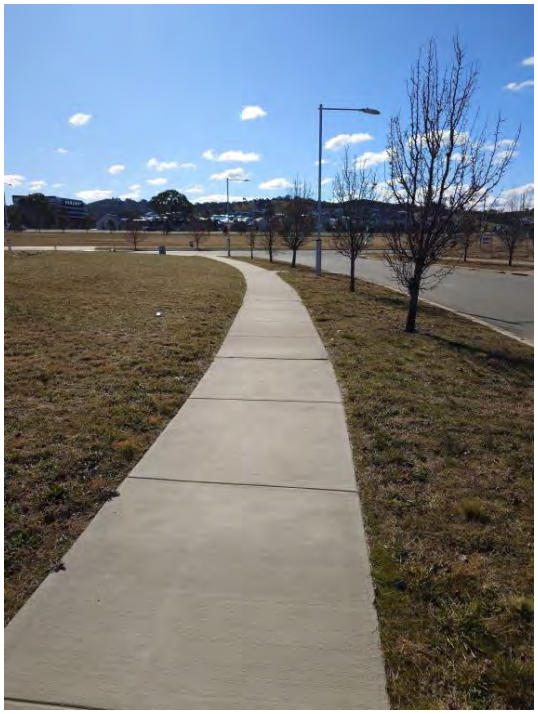


Figure 79 – Footpath in West Verge of Hoffmann Street

Figure 80 – Path in Northern Verge of O'Keefe Avenue

Figure 81 – Fully Paved Verge North of Site in Southern Verge of O'Keefe Avenue

Figure 82 – Fully Paved Verge at Intersection of O'Keefe Avenue and Mirrabei Drive

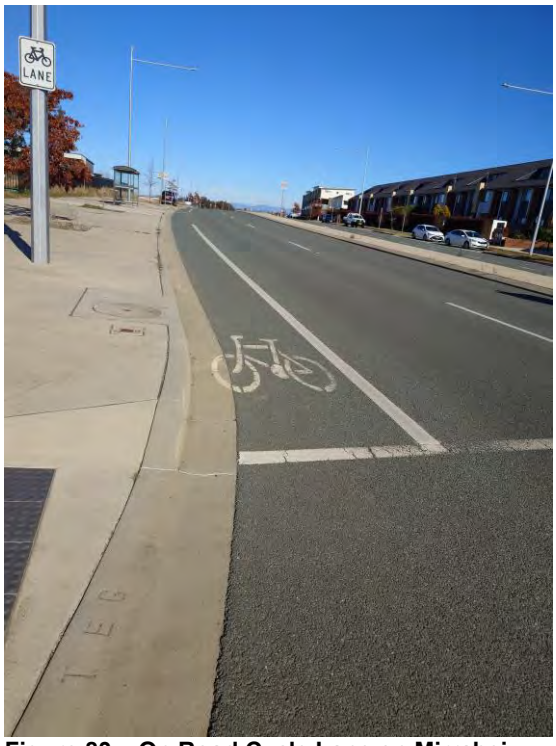


Figure 83 – On Road Cycle Lane on Mirrabei Drive

7.10.4 Transport Canberra and Bus Servicing

The subject site is located adjacent to a local bus route servicing the northern portion of the suburb of Moncrieff. Consequently, Transport Canberra bus stops are in close proximity to the site. The southbound bus stop on this local route is situated approximately 6 metres south of the south east corner of the subject site, along Mirrabei Drive.

There are two bus routes that service the area. These routes are:

- Bus No. 25, which services between Gungahlin Place, Amaroo, Moncrieff, Taylor, and Casey.
- Bus No. 26, which services between Gungahlin Place, Casey, Taylor, Moncrieff, and Amaroo.

Refer to Figure 84 for an excerpt from the Transport Canberra bus route map showing these bus routes in relation to the subject site and Figure 85 for a photograph of a bus stop on Mirrabei Drive.

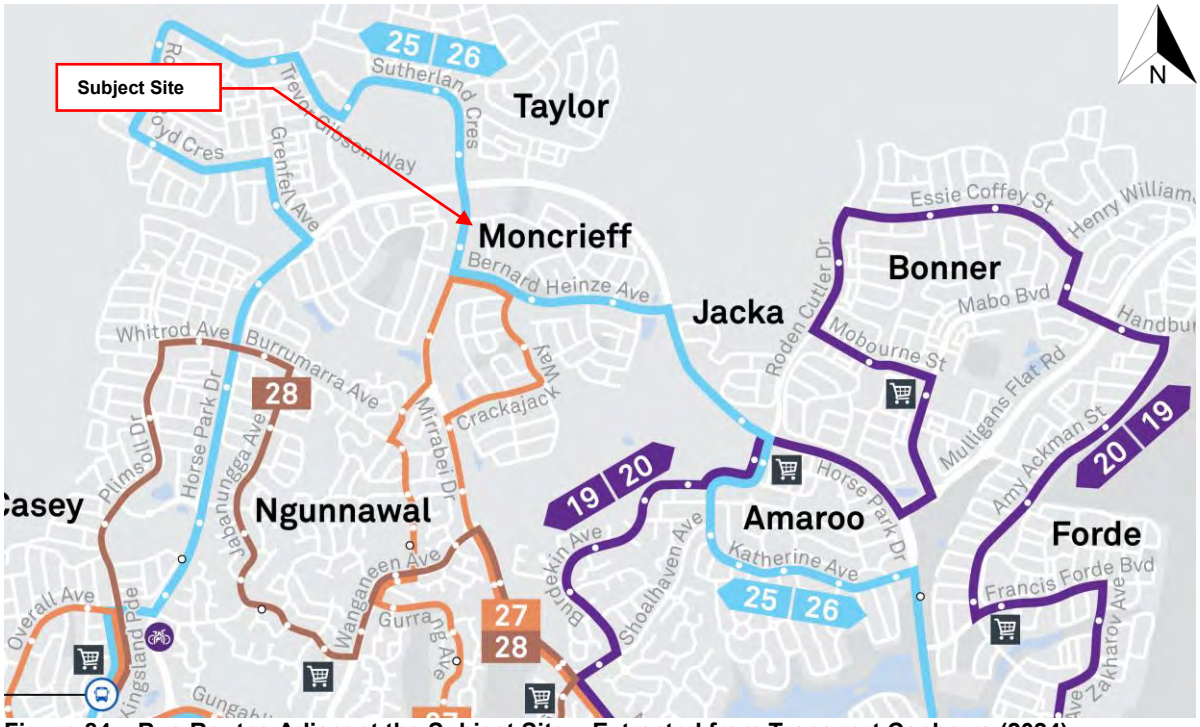


Figure 84 – Bus Routes Adjacent the Subject Site – Extracted from Transport Canberra (2024)


Figure 85 – Bus Stop Shelter on Mirrabei Drive South West 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).

The ACTmapi mapping shows that there are no apparent heritage factors pertaining the subject site nor in the close vicinity of the site. See below Figure 86 for an extract of the heritage mapping from ACTmapi.

To validate the information sourced from ACTmapi and previous estate EDP heritage studies presented in Section 6.5 of this report, the ACT Heritage Council was consulted. The ACT Heritage Council advised that a review of the ACT Heritage Register confirms Block 4 Section 23 Moncrieff does not contain any nominated or registered heritage places, nor any Aboriginal places or objects. The ACT Heritage Council previously advised in 2019 that there were no Heritage Act 2004 constraints to the development or use of Block 4 Section 23 Moncrieff, as all previously recorded heritage places in the area had been salvaged in accordance with prior ACT Heritage Council approvals. Additionally, the Council noted that an inspection of historic aerial imagery confirms that since 2015, Block 4 Section 23 Moncrieff has been subject to widespread clearing and disturbance from earthworks and urban development within the suburb of Moncrieff, effectively reducing the site's archaeological potential.

Following their review, the ACT Heritage Council advised that there are no heritage constraints for future development within Block 4 Section 23 Moncrieff. 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 23 Moncrieff, 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.

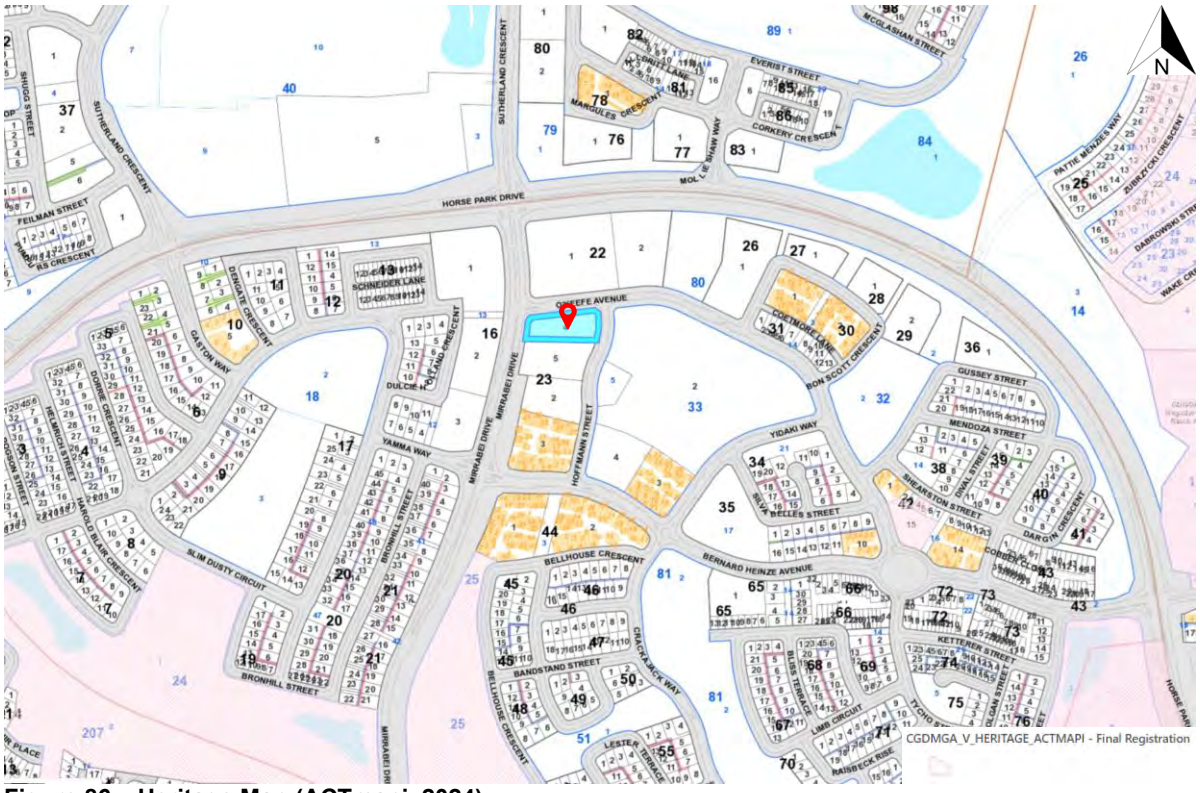


Figure 86 – Heritage Map (ACTmapi, 2024)

7.11.2 Ecological

Reviewing ACTmapi data indicates that the subject site does not contain ecologically sensitive habitat areas. Extracts from ACTmapi mapping can be seen for threatened fauna in Figure 87 and for ecological communities in Figure 88 below.

The subject site is not within an Environmental Offset area.

The ACTmapi database indicates that there are no registered trees within the site.

The Conservator of Flora and Fauna were consulted to validate these findings and the advice received was that Block 4 Section 23 Moncrieff is mapped as part of the Ecological Network and may provide potential core habitat for native bees. However, the Conservator also noted that as the block is less than 1 hectare in size, the Biodiversity Strategic Offset Development (BSUD) does not need to be addressed. The Conservator therefore advised that there are no identified constraints to development on this block.

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

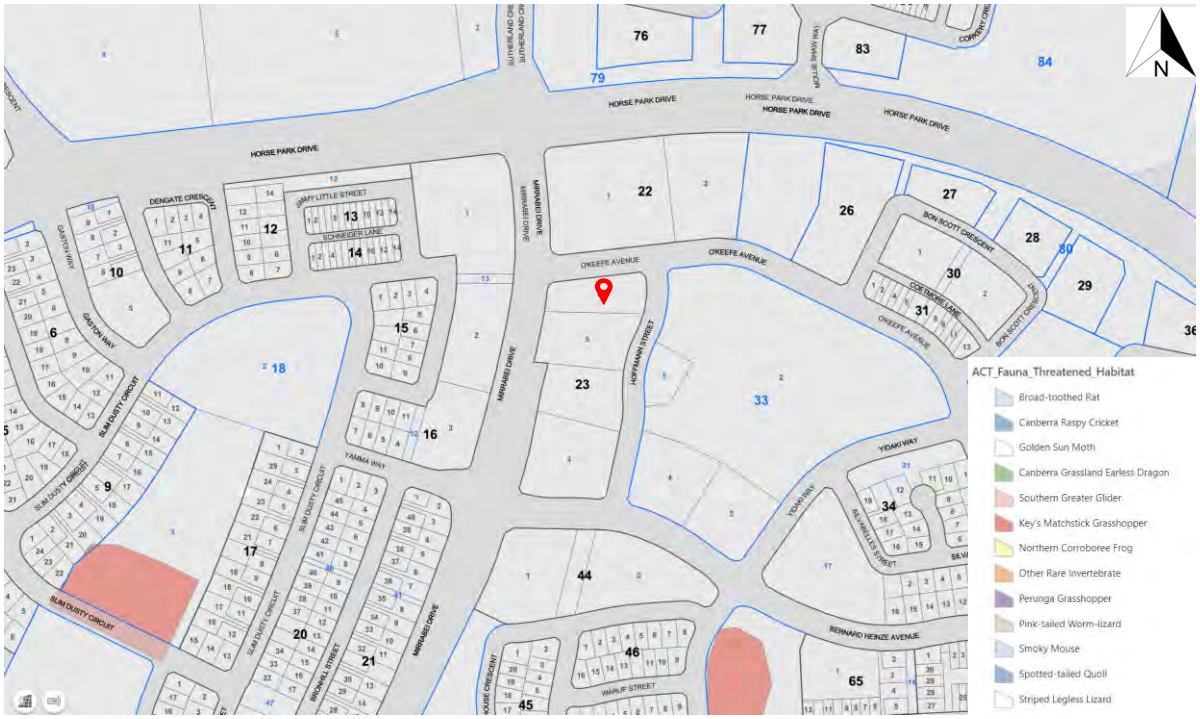


Figure 87 – Ecological Fauna Map (ACTmapi, 2024)

Figure 88 – Ecological Communities Map (ACTmapi, 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 records for Block 4 Section 23 Moncrieff indicate the block is not listed on the EPA's contaminated sites management database or geographic information system. The EPA required a contamination assessment for the entire area prior to the development of the suburb of Moncrieff. In response, the EPA reviewed the report titled 'Stage 2 Contamination Investigation Proposed Residential Development Moncrieff ACT' by SLR Consulting Australia Pty Ltd, dated 19 April 2011, which included the land now occupied by Block 4 Section 23 Moncrieff. The EPA endorsed the consultant's findings that the investigation area was suitable for its intended land uses under the ACT Territory Plan, including low density residential development, subject to the implementation of a Construction Environmental Management Plan (CEMP). The CEMP, titled 'Moncrieff Gungahlin Construction Environmental Management Plan', dated 6 September 2011 by SLR Consulting Australia Pty Ltd, was also endorsed by the EPA, with specific conditions for managing the site during development works. The EPA's records confirm that the development works within Moncrieff were undertaken in accordance with the endorsed CEMP.

On 22 July 2019, the EPA reviewed the report titled 'Report on Preliminary Site Investigation for Contamination Proposed Future Development Block 4 Section 23, Moncrieff' by Douglas Partners Pty Ltd, dated 28 June 2019. The EPA assessed the report and supported the consultant's findings that the site is suitable, from a contaminated land perspective, for the land uses permissible under its current zoning (CF: community facilities).

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 relatively distant from a recorded Bushfire Prone Zone. The site however is nearby a Strategic Bushfire Management Zone, the closest being the Outer Asset Protection Zone recorded directly north and east of the subject site. Refer to Figure 89 and Figure 90 for a bushfire prone area map and strategic bushfire management zone map, respectively, reproduced from ACTmapi in proximity to the subject site.

ACT Fire & Rescue advised that a proposed development at Block 4 Section 23 Moncrieff is located outside the area declared as a Bushfire Prone Area by the Emergency Services Agency (ESA). While bushfire protection measures are not mandatory, ACT Fire & Rescue suggested considering the implementation of such measures, as they can enhance the survival of any structure in the event of a nearby bushfire or structural fire.

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 community facility 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.

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

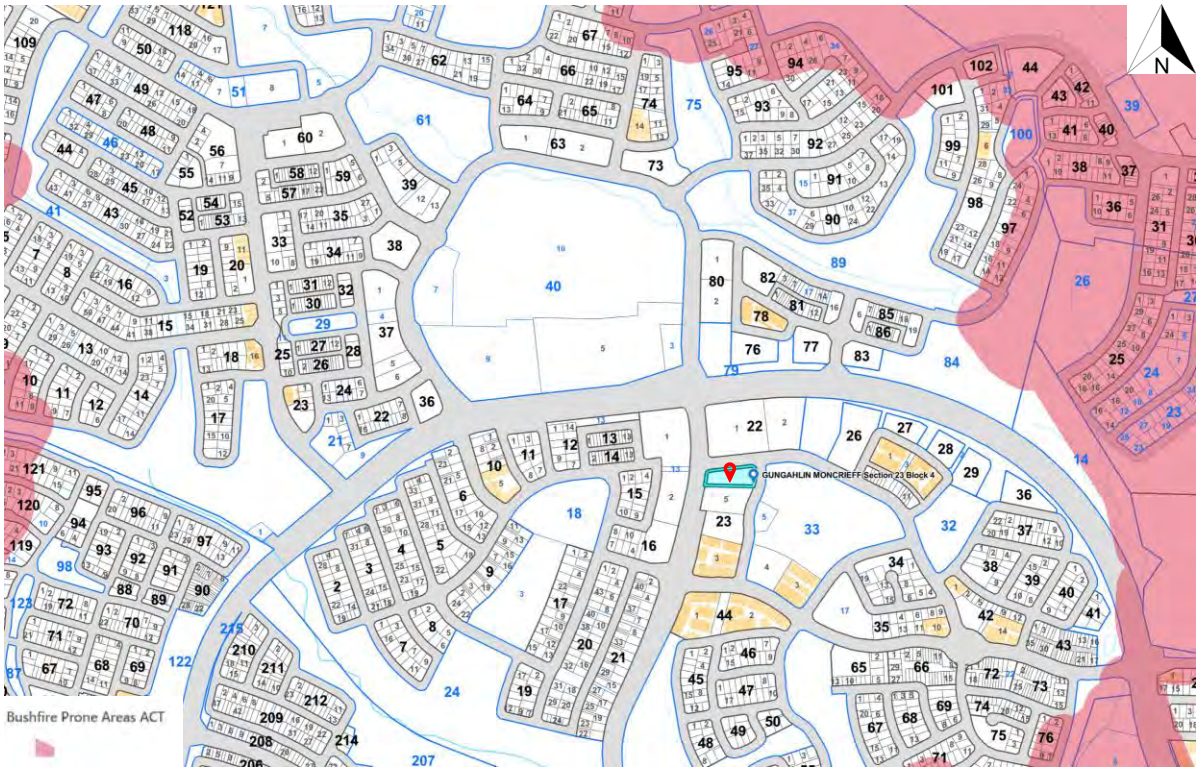


Figure 89 – ACTmapi Bushfire Map (ACTmapi, 2024)

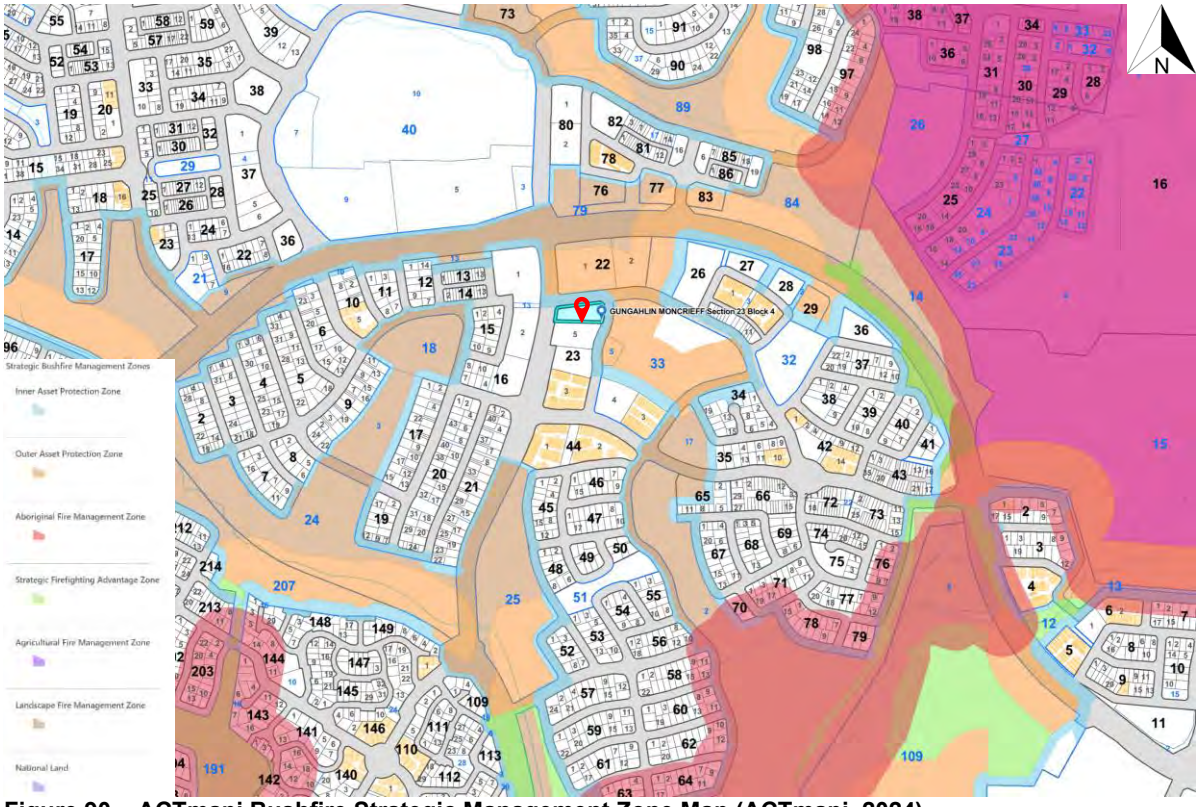


Figure 90 – ACTmapi Bushfire Strategic Management Zone Map (ACTmapi, 2024)

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 fully paved verges of O'Keefe Avenue are present north of the subject site. These trees were observed on site to be recently planted saplings. See Figure 91 and Figure 94 below for photos of these trees taken north of the site.
- Deciduous street trees were also observed in the east and west verges of Mirrabei Drive. The trees that were in the east verge of Mirrabei Drive, adjacent the subject site were young saplings of varying condition, planted within the fully paved street verge. See Figure 92 and Figure 93 below for photos that capture the condition and maturity of these trees.
- Deciduous street trees are planted in the east and west verges of Hoffmann Street. These trees are relatively young and can be seen in Figure 95 adjacent the subject site's east boundary.
- Based on ACTmapi information, none of these trees present on and in close proximity to the site are registered trees.
- 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 91 – O'Keefe Avenue Street Trees

Figure 93 –Street Tree South West of Site

Figure 92 – Mirrabei Drive Street Tree

Figure 94 – Street Tree on O'Keefe Avenue

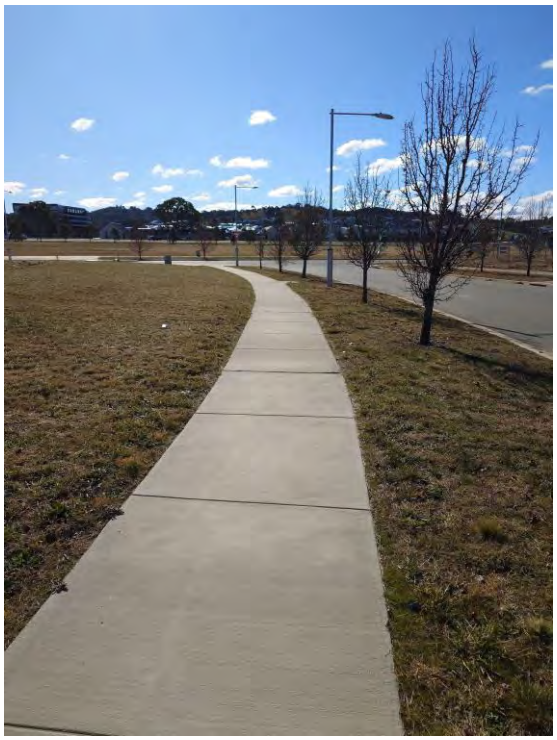


Figure 95 – Street Trees in West Verge of Hoffmann Street

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 GPT in the open space to the north east of the site, continuing north east into Taylor East Pond. Taylor East Pond then discharges into Ginninderra Creek, which conveys flows through several ponds to Gungahlin Pond and then ultimately to Lake Ginninderra. 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 and commercial 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 north east corner, being the lowest point of the block. The sewer tie for the subject site has been constructed at an approximate depth of 1.97m, with a grade of 1.37%. However, according to current Icon Water standards, the sewer tie must have a minimum grade of 2% and a maximum allowable depth of 1.5m. The adequacy of the sewer tie will need to be confirmed with Icon Water, once the actual development is known.

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 98 to 122 dwellings and 2,500m^2 of ground floor shops, for which the summary is provided in Table 3 and Table 4 below, respectively.

Table 3 – Sewer Loading Calculations Based on 98 Residential Dwellings and 2,500m^2 Commercial

Item	Classification	Unit	EP per Unit	Yield		EP
1	Shops and offices	Gross lettable floor space (Ha)	300	0.250	GFA	75
2	High Density Residential	per dwelling	2	98	dwellings	196

TEP =	246
ADWF =	0.517
PDWF =	1.738
NSA (res) =	0.478
NSA (commercial) =	0.239
A_{Eff} (res) =	0.478
A_{Eff} (commercial) =	0.078
GWI (res) =	0.007
GWI (commercial) =	0.003
RDI (res) =	0.344
RDI (industrial) =	0.056
DF =	2.148

Q = 2.148 L/s

Table 4 – Sewer Loading Calculations Based on 122 Residential Dwellings and 2,500m^2 Commercial

Item	Classification	Unit	EP per Unit	Yield		EP
1	Shops and offices	Gross lettable floor space (Ha)	300	0.250	GFA	75
2	High Density Residential	per dwelling	2	122	dwellings	244

TEP =	294
ADWF =	0.618
PDWF =	2.040
NSA (res) =	0.478
NSA (commercial) =	0.239
A_{Eff} (res) =	0.478
A_{Eff} (commercial) =	0.078
GWI (res) =	0.007
GWI (commercial) =	0.003
RDI (res) =	0.344
RDI (industrial) =	0.056
DF =	2.450

Q = 2.450 L/s

Icon Water was consulted to confirm whether the anticipated sewer flows can be accommodated by the sewer main network in O'Keefe Avenue. Icon Water advised that the existing sewer network is expected to accommodate the proposed foul flow. Icon Water further advised that this assessment has been based on the initial details provided and will require further analysis if any changes to the future development on the site are proposed.

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, which was installed as part of the subdivision of Block 1 Section 23 into Blocks 4 and 5 Section 23. The water tie is available in the subject site's south east corner and is DN25 HDPE class PN16.

Based on a super high density residential development of between 98 and 122 dwellings and a 2,500m^2 gross floor area of ground floor shops, the peak water demand for both of these scenarios were calculated and summarised in Table 5 and Table 6 below, respectively.

Table 5 – Potable Water Demand Calculations Based on 98 Residential Dwellings and 2,500m^2 Commercial

Development Type	Peak Day Demand Rate (L/s/block area ha)	Peak Hour Demand Rate (L/s/block area ha)	Comments	Relevant Areas (Ha)	Peak Hour Demand (L/s)	95th Percentile Demand (L/s)
Neighbourhood and District centres	0.332	0.83	Block Area	0.2500	0.0021	0.0014

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	98	2.495	1.647
				Total Peak Demand	**2.497**	**L/s**

Table 6 – Potable Water Demand Calculations Based on 122 Residential Dwellings and 2,500m^2 Commercial

Development Type	Peak Day Demand Rate (L/s/block area ha)	Peak Hour Demand Rate (L/s/block area ha)	Comments	Relevant Areas (Ha)	Peak Hour Demand (L/s)	95th Percentile Demand (L/s)
Neighbourhood and District centres	0.332	0.83	Block Area	0.2500	0.0021	0.0014

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	122	3.106	2.050
				Total Peak Demand	**3.109**	**L/s**

Based on these calculated potable water demands, Icon Water advised that their initial analysis indicated the existing water network has sufficient capacity to supply both options, including fire flow, at the requested Fire Risk Type category (FRT3).

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 O'Keefe Avenue or Hoffmann 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 63 to 65 metres on the DN150 main north of the site in O'Keefe Avenue, an additional hydrant is anticipated to be needed on this main to provide the necessary fire coverage to the site. Hoffman Street and Mirrabei Drive, however, had estimated hydrant spacings adjacent the site at 48m and 59m, respectively. It is therefore not expected that these mains will require additional fire hydrants installed on them. 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 communicated 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 DN375 stormwater tie at 4.24% grade is provided near the lowest point of the block, in its north 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 'Group and neighbourhood shopping centres' and assessed for the 10% AEP in the minor storm event, as per 'Table 8-3 Minor System Design AEP' within TCCS MIS 08. This is due to the commercial zoned Block 1 Section 22, north of the subject site.

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 south of the block, where a catchment has been identified to potentially flow toward the site, will also need to be carried out. Alternatively, Work as Executed survey information from the adjacent development currently under construction in Block 5 Section 23 can be used to inform a stormwater analysis. 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 southern boundary of the subject site, where there is potential for the southern 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 DN375 stormwater tie to the block for connection and the ability of the downstream DN750 stormwater pipe network to accept these flows.

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 and Telstra telecommunication lines are located in close proximity to the site, within the eastern verge of Mirrabei Drive. Additionally, NBN and Telstra labelled pits were observed on site within the southern verge of O'Keefe Avenue, although the BYDA information did not indicate any services for NBN or Telstra in this location. Despite this, it is assumed that the existing services within Mirrabei Drive can be connected to the site, subject to 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 or Telstra 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 subject site has a direct electrical service connection via a link pillar that is situated near the north east corner of the block.

Based on the development presented in Section 3 of this report, the preliminary electrical demand for a 98 and 122 apartment complex has been estimated as 820kVA and 940kVA, respectively. This was based on the assumption of the following dwelling split and commercial provision:

- 45% 1 Bed Residential Dwellings (6A per dwelling)
- 40% 2 Bed Residential Dwellings (7A per dwelling)
- 15% 3 Bed Residential Dwellings (8A per dwelling)
- Office type commercial (100VA/m^2)

Electric vehicle charging was also allowed for in the estimated maximum electrical demand in both scenarios for residential and commercial development types.

Evoenergy were consulted and advised that, there are currently capacity constraints within the existing 11kV network serving the area of the proposed development. However, an extension of the 11kV feeder is planned to address these constraints. Evoenergy also indicated that the timing of the project completion would assist in coordinating the 11kV feeder extension. Based on the projected maximum demand for the development, Evoenergy requires the installation of a new substation on the block, with a space allocation of 14.2m x 6.2m to accommodate this infrastructure.

Evoenergy reinforced that accurate advice can only be provided at the Preliminary Network Analysis (PNA) or connection application stage. 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 S 11057 and advise the least cost technically feasible solution to supply the development on the subject site.

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 (S 11057) to the north east of the site, to confirm earthing requirements.

8.7 Gas

While the site does not have a direct gas service connection, DN32 gas mains are situated within the verges of O'Keefe Avenue and Hoffman Street, directly 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 doesn't have a formal vehicular access. It is assumed that Hoffmann Street would provide the most appropriate access, as it's prohibited in the Territory Plan to have a driveway access off Mirrabei Drive. Additionally, the indented parking and the site's close proximity to the signalised intersection make it unlikely that access from O'Keefe Avenue would be feasible. 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 to the site.

Parking numbers were calculated based on a high density residential development of between 98 and 122 dwellings, with the following split in dwelling type:

- 45% 1 Bed Residential Dwellings
- 40% 2 Bed Residential Dwellings
- 15% 3 Bed Residential Dwellings
- 2,500m^2 GFA of commercial – assuming an office space

Using the parking provisions outlined in the Planning (Community Facility 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:

- 98 Dwellings – 133 car parking spaces + 25 visitor parking spaces + 50 parking spaces for commercial = **208** total parking spaces.
- 122 Dwellings – 165 car parking spaces + 31 visitor parking spaces + 50 parking spaces for commercial = **246** total parking spaces.

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

As there are approximately 68 parking spaces within 100m of the subject 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 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 CSTM model output and demographic data used in the model does not reflect the yield presented in the Hill Thalis master planning work for the subject site (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 23 Moncrieff 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 7 – 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 8 – 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.	Medium
An updated noise assessment to inform a future development on the site is not available.	Medium
The available underground electrical services that service the site are potentially inadequate to provide electricity to a development similar to that considered in this report. Timing of Evoenergy upgrades with respect to a proposed development is unknown. Any upgrade requirements to electrical infrastructure, including a substation on the site, is potential, but currently unknown. The existing substation is located to the north east of the site and may need assessment if vulnerable usage is proposed on the site.	Medium

Description of Potential Constraint	Allocated Risk Rating
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
Stormwater hydrological and hydraulic analysis for the proposed development has not been undertaken. The adequacy of overland flow management through the site is not known.	Low
Some trees that are located in road verges surrounding the northern and eastern areas of the site may be protected under the ACT Urban Forest Act 2023. All of these trees will need to be protected/considered as part of any development proposal in a Tree Management Plan. A professionally undertaken tree survey and arborist assessment is not available on the trees surrounding the site.	Low
The site currently does not have a driveway access. A driveway access to the site is most likely limited to Hoffmann Street. Access to Mirrabei Drive is not permitted. Access to O'Keefe Avenue is constrained by its signalised intersection and indented parking bays.	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 on O'Keefe Avenue does not meet Icon Water and ACT Fire & Rescue requirements. The provision of hydrants may change if the Fire Risk Type is reviewed to be higher once the development is known.	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 would inhibit development in its current form. Therefore, the subject site is deemed viable for future development as a high density residential and commercial 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 23 Moncrieff has been assessed in this Site Investigation Report based on an indicative development scenario, with a focus on compiling with 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 near an area identified by the ESA to be a Strategic Bushfire Management Area. 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.

- **Noise Assessment:** It is recommended that a full noise assessment be undertaken to current standards to inform the design and layout of the proposed development. This assessment would provide an insight into potential noise impacts from Mirrabei Drive and to a lesser extent, Horse Park Drive. The findings would guide the appropriate build type, the strategic placement of habitable areas, and the determination of suitable setbacks.

- **Electrical Service:** In conjunction with Evoenergy, determine the timing of the proposed development with respect to Evoenergy's electrical feeder extension works. This is to be undertaken once actual development demands are calculated. 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. Allow 14.2m x 6.2m of space on site for a potential on site substation, which is to be confirmed with Evoenergy at the PNA stage.

- **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 developments for holistic compatibility. The proposal is to be made in accordance with Territory Plan requirements and EPSDD's Development Application process.

- **Geotechnical Investigation:** The site is recommended for 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 existing 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 south in Block 5 Section 23, that is currently conveyed through the

site. Verify whether the size and grade of the existing DN375 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. The arborist is to also produce a Tree Management Plan, which is to be endorsed by 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 or access driveway, replacement trees at a ratio and location agreed to with TCCS and EPSDD Climate Change and Energy will need to be considered.

- **Site Access Point:** Assess the most appropriate access point to the site given the constraints and limitations of O'Keefe Avenue and the Gungahlin District Policy not allowing access off Mirrabei Drive. 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.

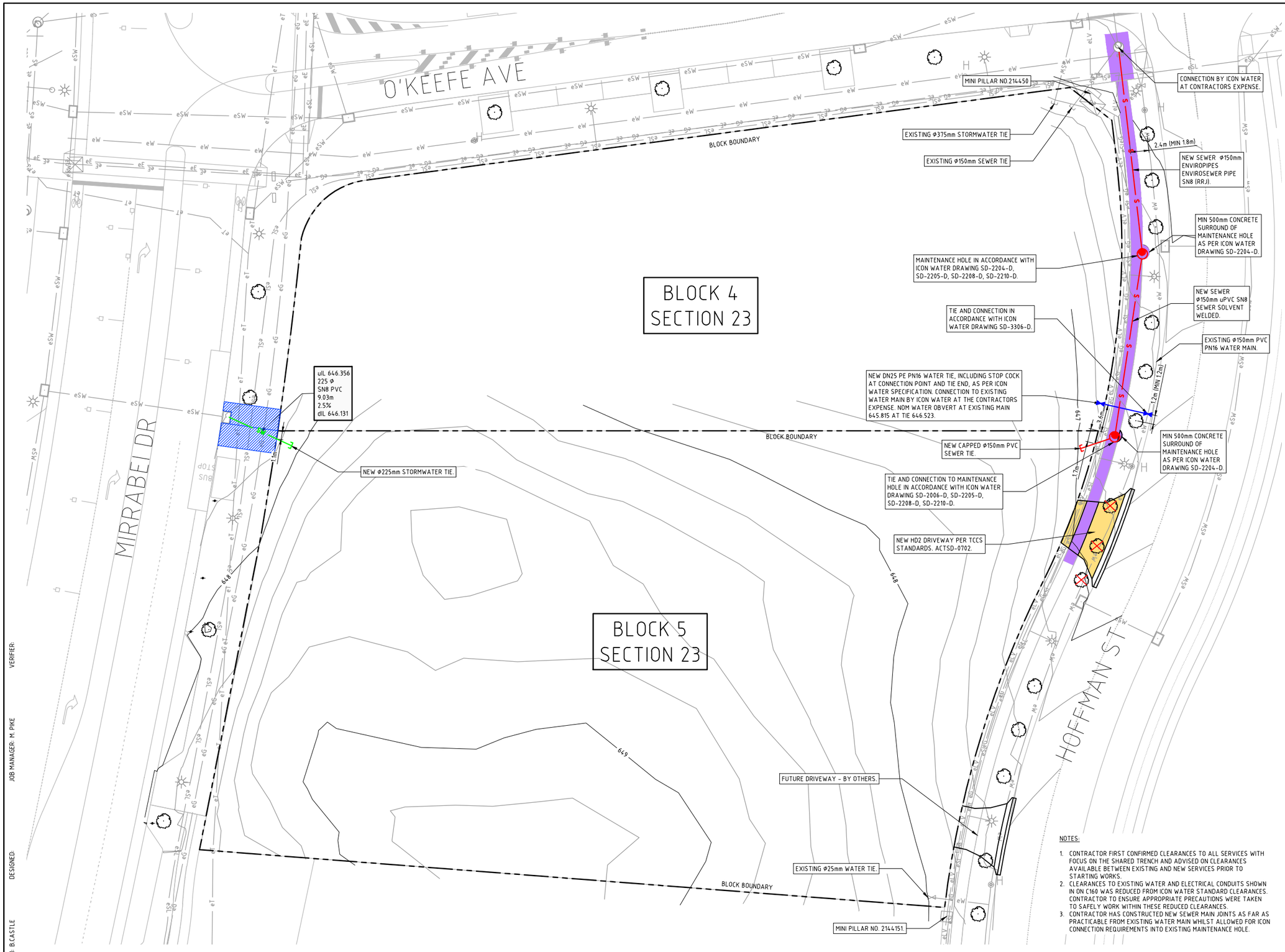
- **Potable Water Supply:** For a potable water service to the site that is suitably sized, work closely with Icon Water to establish a connection to their existing DN150 main either in O'Keefe Avenue or Hoffmann Street. This is to be established once the development and its potable water demand, including firefighting water demand, is known. Determine best locations for additional hydrants on existing mains to meet the Fire Risk Type of the development, with at least one additional hydrant being needed on the main in O'Keefe Avenue. 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.

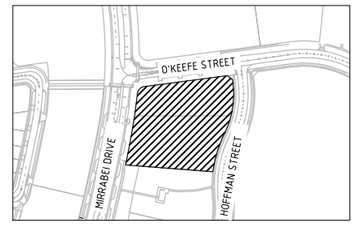
- **Telecommunications Service:** Liaise with NBN or Telstra for a telecommunications service connection to the site, if required.

Appendix A

Work As Executed Drawings



LOCALITY PLAN - NOT TO SCALE



EXISTING SERVICES LEGEND

- eSW — STORMWATER PIPE / MAINTENANCE HOLE / SIDE ENTRY PIT
- eS — SEWER PIPE / MAINTENANCE HOLE / VERTICAL DROP
- eSRM — SEWER RISING MAIN / MAINTENANCE HOLE
- H eW HC — EXISTING WATER PIPE HYDRANT - STANDARD / HIGH CAPACITY
- SV eW WM — EXISTING WATER PIPE / SLUICE VALVE / METER PIT
- eE — ELECTRICAL SERVICE / POWER POLE / PIT
- eSL — STREETLIGHT SERVICE / LIGHT POLE
- eG — GAS SERVICE / VALVE / MARKER
- eT — TELSTRA SERVICE / PIT / MINI PILLAR
- 646 — MAJOR CONTOUR (1.0m INTERVAL)
- MINOR CONTOUR (0.2m INTERVAL)
- EXISTING JUVENILE TREE RETAINED

NEW WORK LEGEND

- SW — NEW STORMWATER TIE
- S — NEW SEWER PIPE / MAINTENANCE HOLE
- W — NEW WATER TIE
- JUVENILE STREET TREE THAT HAS BEEN REMOVED
- FOOTPATH THAT HAS BEEN REMOVED AND REINSTATED. REFER TO DRAWING C140.
- PROPOSED DRIVEWAY REFER TO C130
- CONCRETE VERGE THAT HAS BEEN REMOVED AND REINSTATED. REFER TO DRAWING C161.

GENERAL NOTES

1. REFER SPECIFICATIONS NOTES DRAWING FOR EXISTING SERVICES GENERAL REQUIREMENTS.
2. ALL WORKS HAS BEEN CARRIED OUT IN ACCORDANCE WITH LOCAL, RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
3. ALL EXISTING SERVICES INDICATED ON THE DRAWINGS ORIGINATE FROM SUPPLIED DATA OR DIAL BEFORE YOU DIG SEARCHES, THEREFORE THEIR ACCURACY AND COMPLETENESS IS NOT GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY. NOTE SERVICE AUTHORITY REQUIREMENTS FOR LOCATING OF SERVICES PRIOR TO COMMENCEMENT OF WORKS.
4. CONTRACTOR ALLOWED TO ADJUST AND LIAISE WITH RELEVANT SERVICE AUTHORITIES IN RELATION TO EXISTING SERVICE ADJUSTMENT AND MODIFICATION.
5. ANY EXISTING COVER DEPTHS SHOWN ARE ASSUMPTIONS BASED ON AUTHORITY MINIMUM DESIGN REQUIREMENTS ONLY. ACCURATE CONFIRMATION BY SAFE POT HOLING OF THE EXISTING SERVICES AND CHECKING DEPTHS IS REQUIRED PRIOR TO CONSTRUCTION AT THE CONTRACTOR'S EXPENSE.
6. COVER DEPTHS THAT DIFFER FROM THAT SPECIFIED HAVE BEEN REPORTED TO THE SUPERINTENDENT FOR ADVICE ON CONSTRUCTION REQUIREMENTS.

NOTES:

1. CONTRACTOR FIRST CONFIRMED CLEARANCES TO ALL SERVICES WITH FOCUS ON THE SHARED TRENCH AND ADVISED ON CLEARANCES AVAILABLE BETWEEN EXISTING AND NEW SERVICES PRIOR TO STARTING WORKS.
2. CLEARANCES TO EXISTING WATER AND ELECTRICAL CONDUITS SHOWN IN ON C160 WAS REDUCED FROM ICON WATER STANDARD CLEARANCES. CONTRACTOR TO ENSURE APPROPRIATE PRECAUTIONS WERE TAKEN TO SAFELY WORK WITHIN THESE REDUCED CLEARANCES.
3. CONTRACTOR HAS CONSTRUCTED NEW SEWER MAIN JOINTS AS FAR AS PRACTICABLE FROM EXISTING WATER MAIN WHILST ALLOWED FOR ICON CONNECTION REQUIREMENTS INTO EXISTING MAINTENANCE HOLE.

DIAL BEFORE YOU DIG www.1100.com.au

VERIFIER:
JOB MANAGER: M. PIKE
DESIGNED:
DRAWN: B.CASTLE

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
E	FOR ICON APPROVAL	BC		WB	17.06.20
F	FOR ICON APPROVAL	BC		WB	29.06.20
G	FOR CONSTRUCTION	BC		WB	02.07.20
H	FOR ICON APPROVAL	BC		WB	31.08.20
I	FOR ICON APPROVAL	BC		WB	18.09.20
J	WORK AS EXECUTED	BC		WB	17.11.20

CLIENT
ENVIRONMENT, PLANNING AND SUSTAINABLE DEVELOPMENT DIRECTORATE
ACT Government
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT

ALL SETOUT TO ARCHITECT'S DRAWINGS. DIMENSIONS TO BE VERIFIED WITH THE ARCHITECT AND ON SITE BEFORE MAKING SHOP DRAWINGS OR COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY.

0 2.5 5.0 7.5 10.0 12.5m
PLAN
SCALE 1:250 @ A1

NORTHROP
Canberra
Level 6, 224 Bunda Street (PO Box 213) Canberra ACT 2608
Ph (02) 6285 1822 Fax (02) 6285 1863
Email canberra@northrop.com.au ABN 81 094 433 100

PROJECT
MONCRIEFF SECTION 23
BLOCKS 5 AND 4
PROPOSED SITE SERVICING

DRAWING TITLE
CIVIL WORKS
SITE PLAN
SHEET 1 OF 2

JOB NUMBER **CR200090**
DRAWING NUMBER **C050**
REVISION **J**
DRAWING SHEET SIZE = A1

NOTES:

1. REFER TO DRAWING C13004-140+ FOR NOTES AND LEGEND.
2. REFER TO DRAWING C13004-212 FOR STRUCTURE SCHEDULE TABLES.
3. WATER TIES AT 4.25m OFFSET FROM NEAREST BDY UNLESS OTHERWISE SPECIFIED.

A. CONSTRUCT NEW MANHOLE OVER EXISTING MAIN. ActewWATER TO BREAK INTO EXISTING MAIN AT CONTRACTORS EXPENSE. DEMOLISH REDUNDANT MAIN.

B. ICON WATER TO REMOVE ISOLATION AT EXISTING VALVE AT CONTRACTORS EXPENSE

PIPE MATERIALS

SEW ALL MAINS, CLASS SN8 RRJ PVC, SOLID WALL IN ACCORDANCE WITH AS1260.
ALL CURVED PVC SEWERS UP TO 225mm TO HAVE SOLVENT WELDED JOINTS FOR RADII LESS THAN 250m.
TIES, CLASS SN10 uPVC

W 100ø–225ø MAINS,
–CLASS PN16 PVC TO AS 1477
–OPVC CLASS PN16 TO AS4441
–MPVC CLASS PN16 TO AS4765
TIES, CLASS PN16 HDPE
300ø MAINS –DICL

FOR CONTINUATION REFER TO DRAWING C13004-211+

DULCIE HOLLAND CRESCENT (ROAD 03)
DULCIE HOLLAND CRESCENT (ROAD 16)
MIRRABEI DRIVE
GROUP CENTRE/ COMMUNITY FACILITY
23
1
FUTURE IPT TERMINUS
HOFFMAN ST (ROAD 15)
PROPOSED SCHOOL
STAGE 3
16
3
MU(60)
16
2
MU(90)
STAGE 1C
23
MU(74)
3
NOTE B
YAMMA WAY (ROAD 02))
SLIM DUSTY CIRCUIT (ROAD 03)
BRONHILL ST(ROAD 06)
BERNARD HEINZ (ROAD 01)
STAGE 1B
20
STAGE 1A
21
C3
25ø
150ø
R125.6
R114.4
SVD

WE, Calibre Consulting (ACT) PTY LTD, BEING THE SUPERINTENDENT FOR THE PROJECT CERTIFY THAT WE HAVE UNDERTAKEN PERIODIC INSPECTIONS OF THE PROJECT DURING THE COURSE OF CONSTRUCTION INCLUDING OBSERVATIONS OF QUALITY RECORDS. THE QUALITY RECORDS ARE AVAILABLE FOR AUDIT. IT IS OUR PROFESSIONAL OPINION THAT THE WORK HAS BEEN CONSTRUCTED SUBSTANTIALLY IN ACCORDANCE WITH THE APPROVED PLANS AND THE PROJECT SPECIFICATION.

SIGNATURE: CPENG NO. 313197
T. CONNELL BE(HONS) ME Aust

FOR AND ON EEHALF OF: Calibre Consulting (ACT) PTY LTD

		DESIGN	DRAWN	CHECK	APPROVED	DATE	AMENDMENT DETAILS
FIRST ISSUE		TIMI	JB/TI			01/04/14	
AMENDMENTS	A	SB	SKT/JB			02/05/14	WATER PRESSURE ZONE INFORMATION ADDED & WATER TIE ADJUSTED
	B	HMR	VVB			02/07/14	PIPE MATERIAL INFO BOX ADDED
	C	HMR	SC			15/07/14	CHANGES AS PER ACTEW COMMENTS
	D	GG	HG			17/11/15	WORK AS EXECUTED
	E						
	F						

WORKS AS EXECUTED INFORMATION PROVIDED BY GROUP ONE PTY. LTD.

WORK AS EXECUTED
2015/11/17
A. Connell BE(Hons), ME Aust, CPEng. Date
CALIBRE CONSULTING (ACT) Pty Ltd

WAE No. 2015/002245
PROJECT No.

A3 PLOT SCALE (METRES) A1 PLOT
1:1000 10 5 0 10 20 1:500

CONSULT AUSTRALIA

CLIENT ACT Government Economic Development; Land Development Agency CANBERRA FIRST

PROJECT MONCRIEFF WEST ESTATE STAGE 1

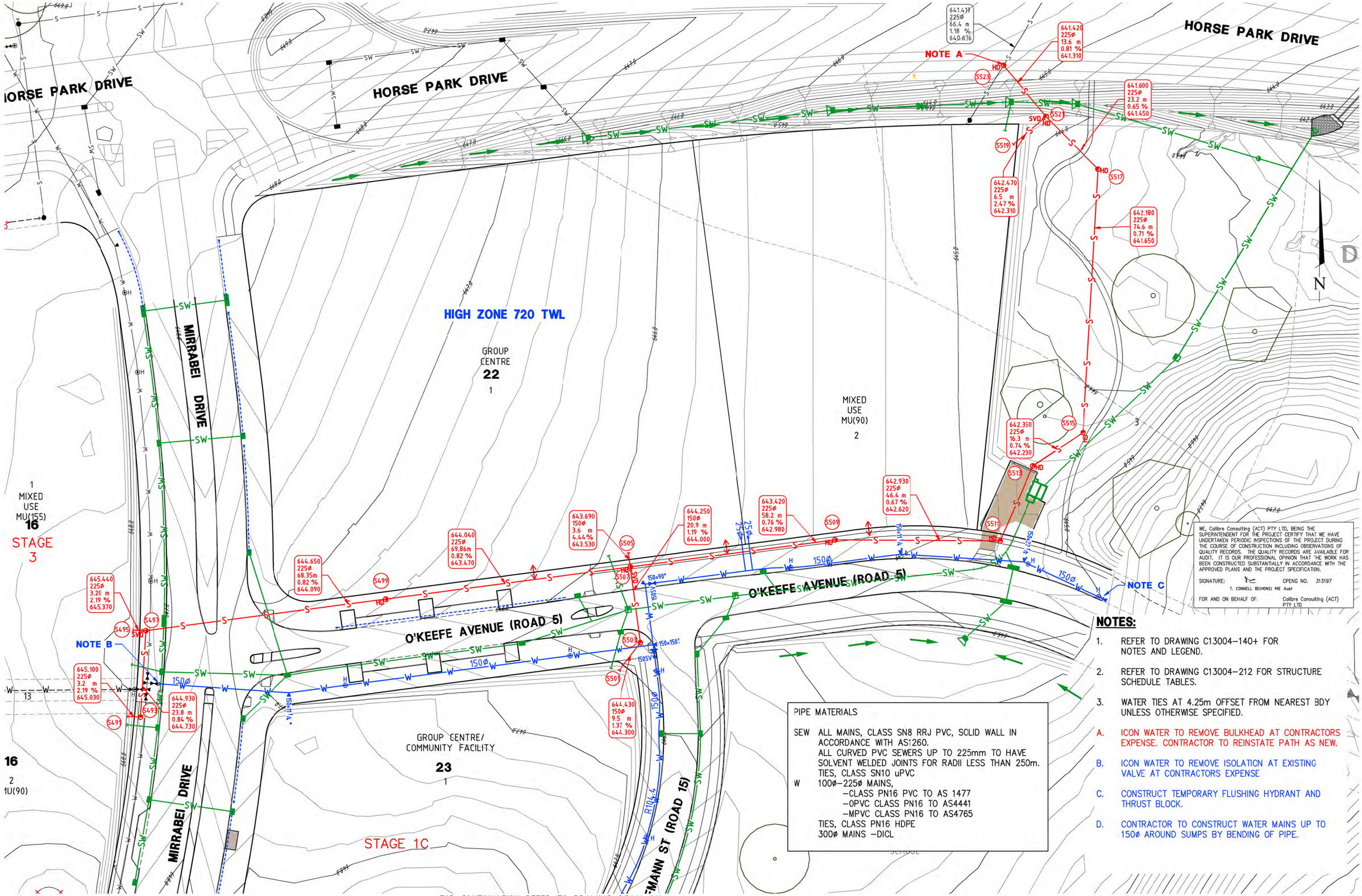
BROWN

www.brownconsulting.com.au

DRAWING TITLE STAGE 1C - SEWER AND WATER SHEET 1 OF 2 SECTION 23

DRAWING NUMBER C13004-210+

AMEND. D



WE, Calibre Consulting (ACT) PTY LTD, BEING THE SUPERINTENDENT FOR THE PROJECT CERTIFY THAT WE HAVE UNDERTAKEN PERIODIC INSPECTIONS OF THE PROJECT DURING THE COURSE OF CONSTRUCTION INCLUDING OBSERVATIONS OF QUALITY RECORDS. THE QUALITY RECORDS ARE AVAILABLE FOR AUDIT. IT IS OUR PROFESSIONAL OPINION THAT THE WORK HAS BEEN CONSTRUCTED SUBSTANTIALLY IN ACCORDANCE WITH THE APPROVED PLANS AND THE PROJECT SPECIFICATION.

SIGNATURE: T. CONNELL BE(HONS) MIE Aust — CPENG NO. 313197

FOR AND ON BEHALF OF: Calibre Consulting (ACT) PTY LTD

NOTES:

1. REFER TO DRAWING C13004-140+ FOR NOTES AND LEGEND.
2. REFER TO DRAWING C13004-212 FOR STRUCTURE SCHEDULE TABLES.
3. WATER TIES AT 4.25m OFFSET FROM NEAREST BDY UNLESS OTHERWISE SPECIFIED.

A. ICON WATER TO REMOVE BULKHEAD AT CONTRACTORS EXPENSE. CONTRACTOR TO REINSTATE PATH AS NEW.

B. ICON WATER TO REMOVE ISOLATION AT EXISTING VALVE AT CONTRACTORS EXPENSE

C. CONSTRUCT TEMPORARY FLUSHING HYDRANT AND THRUST BLOCK.

D. CONTRACTOR TO CONSTRUCT WATER MAINS UP TO 150ø AROUND SUMPS BY BENDING OF PIPE.

PIPE MATERIALS

SEW ALL MAINS, CLASS SN8 RRJ PVC, SOLID WALL IN ACCORDANCE WITH AS1260.
ALL CURVED PVC SEWERS UP TO 225mm TO HAVE SOLVENT WELDED JOINTS FOR RADII LESS THAN 250m.
TIES, CLASS SN10 uPVC

W 100ø–225ø MAINS,
–CLASS PN16 PVC TO AS 1477
–OPVC CLASS PN16 TO AS4441
–MPVC CLASS PN16 TO AS4765
TIES, CLASS PN16 HDPE
300ø MAINS –DICL

FOR CONTINUATION REFER TO DRAWING C13004-210+

	FIRST ISSUE	DESIGN	DRAWN	CHECK	APPROVED	DATE	AMENDMENT DETAILS
AMENDMENTS	A	SB	SKT			02/05/14	WATER PRESSURE ZONE INFORMATION ADDED. SEWER VERTICAL DROP ADDED.
	B	HMR	VVB			02/07/14	PIPE MATERIAL INFO BOX ADDED, SMH COVERS CHANGED TO HD
	C	HMR	SC			15/07/14	CHANGES AS PER ACTEW COMMENTS
	D	HMR	SC			23/07/14	CHANGES TO NOTE A & C AS PER ACTEW COMMENTS
	E	AMK	AMK			14/08/14	S519 TO S523
	F	GG	HG			17/11/15	WORK AS EXECUTED

WORKS AS EXECUTED INFORMATION PROVIDED BY GROUP ONE PTY. LTD.

WORK AS EXECUTED
2015/11/17
A. Connell BE(Hons), MIE Aust, CPEng. Date
CALIBRE CONSULTING (ACT) Pty Ltd

WAE No. 2015/002246
*PROJECT No.

A3 PLOT 1:1000 SCALE (METRES) 10 5 0 10 20 A1 PLOT 1:500

CONSULT AUSTRALIA

CLIENT ACT Government Economic Development; Land Development Agency CANBERRA'S FIRST

PROJECT MONCRIEFF WEST ESTATE STAGE 1

BROWN

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DRAWING TITLE STAGE 1C - SEWER AND WATER SHEET 2 SECTIONS 22 & 23

DRAWING NUMBER C13004-211+

AMEND. F

P:\E:\H:\C13000\C13004\drawing\C13004-210 1C-HYDRAULICS.dwg 18th-Nov-2015 4:26PM USER: Hamish Giddens
Xref's Various

NOTES:

1. REFER TO DRAWING C13004-140+ FOR NOTES AND LEGEND.
2. REFER TO DRAWING C13004-217 FOR STRUCTURE SCHEDULE TABLES.

FOR CONTINUATION REFER TO DRAWING C13004-216+

SLIM DUSTY CIRCUIT (ROAD 03)
DULCIE HOLLAND CRESCENT (ROAD 16)
DULCIE HOLLAND CRESCENT (ROAD
YAMMA WAY (ROAD 02)
SLIM DUSTY CIRCUIT (ROAD 03)
BRONHILL ST(ROAD 06)
MIRRABEI DRIVE
HOFFMA
HOFFMANN ST (ROAD 15)
BERNARD HEINZ (ROAD 01)

GROUP CENTRE/ COMMUNITY FACILITY
23
1

FUTURE IPT TERMINUS

PROPOSED SCHOOL

16
2
MU(90)

STAGE 3
16
3
MU(60)

STAGE 1A
STAGE 1B
STAGE 1C

23
MU(74)
3

20
21

NOTE B

C021
C063
C065
B001
B003
B007

646.010
300ø2
9.3 m
3.11 %
645.720

645.960
300ø2
23.2 m
1.08 %
645.710

645.644
300ø2
28.0 m
2.07 %
645.063

645.330
300ø2
23.2 m
1.16 %
645.060

645.013
300ø2
28.8 m
1.66 %
644.534

644.566
300ø2
21.1 m
1.81 %
644.184

645.320
300ø2
10.2 m
0.98 %
645.220

644.890
300ø2
10.2 m
1.08 %
644.780

644.700
300ø2
40.0 m
4.87 %
642.779

642.779
300ø2
4.2 m
4.87 %
642.576

A250
A251
A249
A255
A253
A257

SVD
SW
MS

N

WE, Calibre Consulting (ACT) PTY LTD, BEING THE SUPERINTENDENT FOR THE PROJECT CERTIFY THAT WE HAVE UNDERTAKEN PERIODIC INSPECTIONS OF THE PROJECT DURING THE COURSE OF CONSTRUCTION INCLUDING OBSERVATIONS OF QUALITY RECORDS. THE QUALITY RECORDS ARE AVAILABLE FOR AUDIT. IT IS OUR PROFESSIONAL OPINION THAT THE WORK HAS BEEN CONSTRUCTED SUBSTANTIALLY IN ACCORDANCE WITH THE APPROVED PLANS AND THE PROJECT SPECIFICATION.

SIGNATURE: CPENG NO. 313197
T. CONNELL BE(HONS) ME Aust
FOR AND ON BEHALF OF: Calibre Consulting (ACT) PTY LTD

		DESIGN	DRAWN	CHECK	APPROVED	DATE	AMENDMENT DETAILS
FIRST ISSUE		TIMI	JB/TI	CEK	TC	01/04/14	
AMENDMENTS	A	CPL	TIMI	CEK	TC	15/04/14	SUBSOIL FOR TREE PITS ADDED.
	B	CPL	TIMI	CEK	TC	02/05/14	STORMWATER INFO BOXES AMENDED.
	C	GG	HG		TC	17/11/15	WORK AS EXECUTED
	D						
	E						
	F						

WORKS AS EXECUTED INFORMATION PROVIDED BY GROUP ONE PTY. LTD.

WORK AS EXECUTED
2015/11/17
A. Connell BE(Hons), MIE Aust, CPEng. Date
CALIBRE CONSULTING (ACT) Pty Ltd

IWAE No. 2015/002248
PROJECT No.

A3 PLOT SCALE (METRES) A1 PLOT
1:1000 10 5 0 10 20 1:500

CONSULT AUSTRALIA

CLIENT: ACT Government Economic Development; Land Development Agency CANBERRA FIRST

PROJECT: MONCRIEFF WEST ESTATE STAGE 1

BROWN

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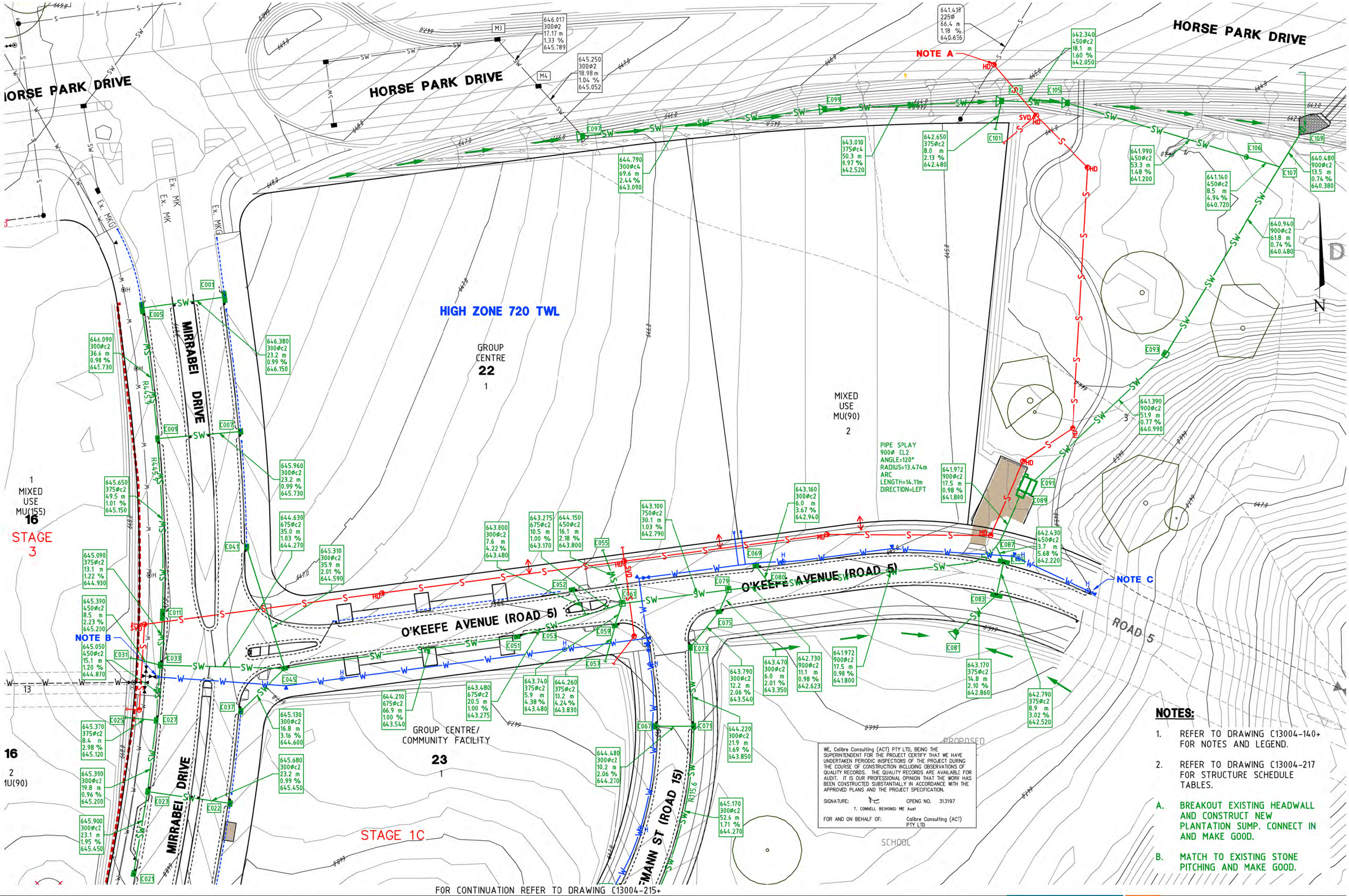
DRAWING TITLE: STAGE 1C - STORMWATER SHEET 1 OF 2 SECTION 23

DRAWING NUMBER: C13004-215+
AMEND.: C

FILE: I:\C13000\C13004\Drawing\C13004-215 1C-HYDRAULICS.dwg 18th-Nov-2015 4:26PM USER: Hamish Giddens
Xref's: Various



NOTES:

1. REFER TO DRAWING C13004-140+ FOR NOTES AND LEGEND.
2. REFER TO DRAWING C13004-217 FOR STRUCTURE SCHEDULE TABLES.

A. BREAKOUT EXISTING HEADWALL AND CONSTRUCT NEW PLANTATION SUMP. CONNECT IN AND MAKE GOOD.

B. MATCH TO EXISTING STONE PITCHING AND MAKE GOOD.

FOR CONTINUATION REFER TO DRAWING C13004-215+

AMENDMENTS		DESIGN	DRAWN	CHECK	APPROVED	DATE	AMENDMENT DETAILS
FIRST ISSUE		TIMI	JB/TI			01/04/14	
	A	CPL	TIMI			15/04/14	SUBSOIL FOR TREE PITS ADDED, GRADING REVISED
	B	CPL	TIMI			02/05/14	CULVERT & SWALES ADDED. NOTE 'A' AMENDED. C052 ADJUSTED. C095 DELETED.
	C	TIMI	TIMI			15/07/14	C103 & C105 ADJUSTED. C106 ADDED. CULVERT AT C121 & 123 DELETED.
	D	GG	HG			17/11/15	WORK AS EXECUTED
	E						
	F						

WORKS AS EXECUTED INFORMATION PROVIDED BY **GROUP ONE PTY. LTD.**

WORK AS EXECUTED
2015/11/17
A. Connell BE(Hons), MIE Aust, CPEng. Date
CALIBRE CONSULTING (ACT) Pty Ltd

IWAE No. 2015/002249
PROJECT No.

A3 PLOT SCALE (METRES) A1 PLOT
1:1000 10 5 0 10 20 1:500

CONSULT AUSTRALIA

CLIENT: ACT Government Economic Development; Land Development Agency CANBERRA FIRST

PROJECT: MONCRIEFF WEST ESTATE STAGE 1

BROWN

www.brownconsulting.com.au

DRAWING TITLE: STAGE 1C - STORMWATER SHEET 2 SECTIONS 22 & 23

DRAWING NUMBER: C13004-216+ AMEND. D

FILE: I:\C13000\C13004\Drawing\C13004-216 1C-HYDRAULICS.dwg 18th-Nov-2015 4:26PM USER: Hamish Giddens
Xref's: Xpaths

Appendix B

BYDA and Work as Executed Information

Job No 36741328

byda.com.au

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	31/08/2025	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
351 Mirrabei Drive	351 Mirrabei Drive Moncrieff ACT 2914	-

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
239582409	Evoenergy	(02) 6293 5770	NOTIFIED
239582408	Icon Water	(02) 6248 3111	NOTIFIED
239582405	NBN Co NswAct	1800 687 626	NOTIFIED
239582407	Telstra NSW South	1800 653 935	NOTIFIED
239582406	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.

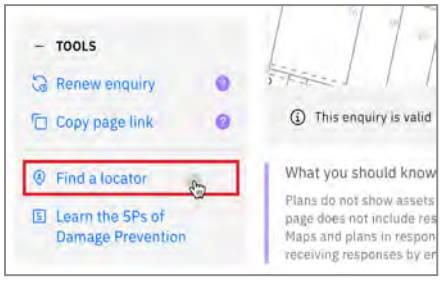
Protect

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.

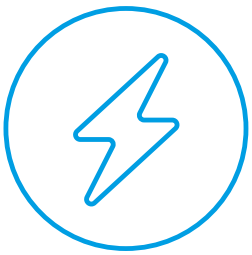
Prepare: Prepare for your job by engaging a DBYD Certified Plant Locator to help interpret plans and identify on-site assets. Contact **nbn** should you require further assistance.

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.

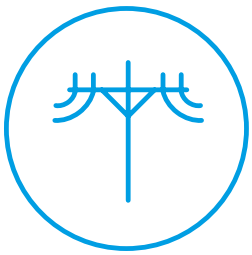
Protect: Protecting and supporting the exposed **nbn** underground asset is the responsibility of the worker. Exclusion zones for **nbn** assets are clearly stated in the plan and appropriate controls must be implemented to ensure that encroachment into the exclusion zone by machinery or activities with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

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

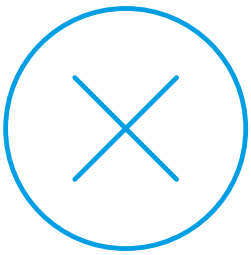
Working near **nbn**™ cables



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

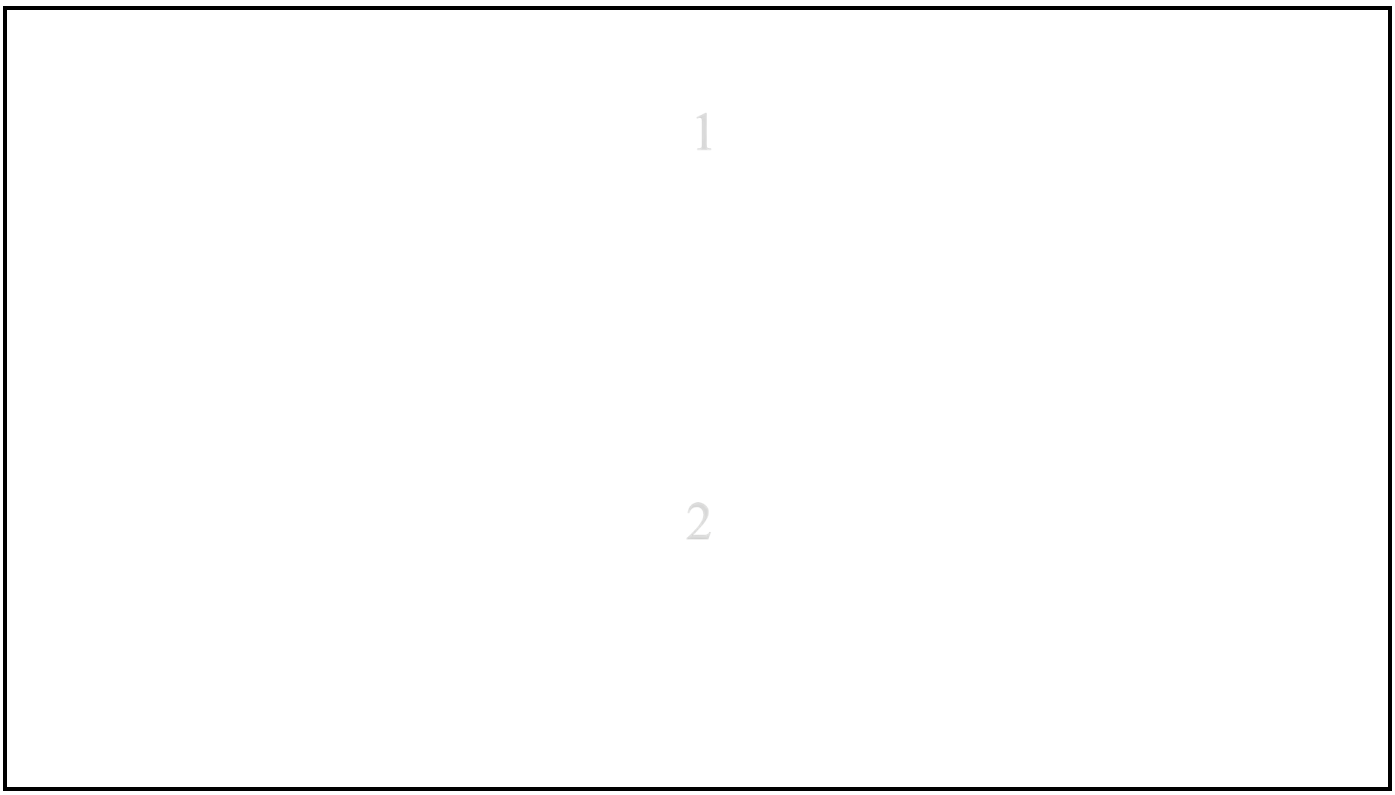
All **nbn**™ network facility damages must be reported online here.
For enquiries related to your DBYD request please call 1800 626 329.

DIAL BEFORE YOU DIG
www.1100.com.au

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

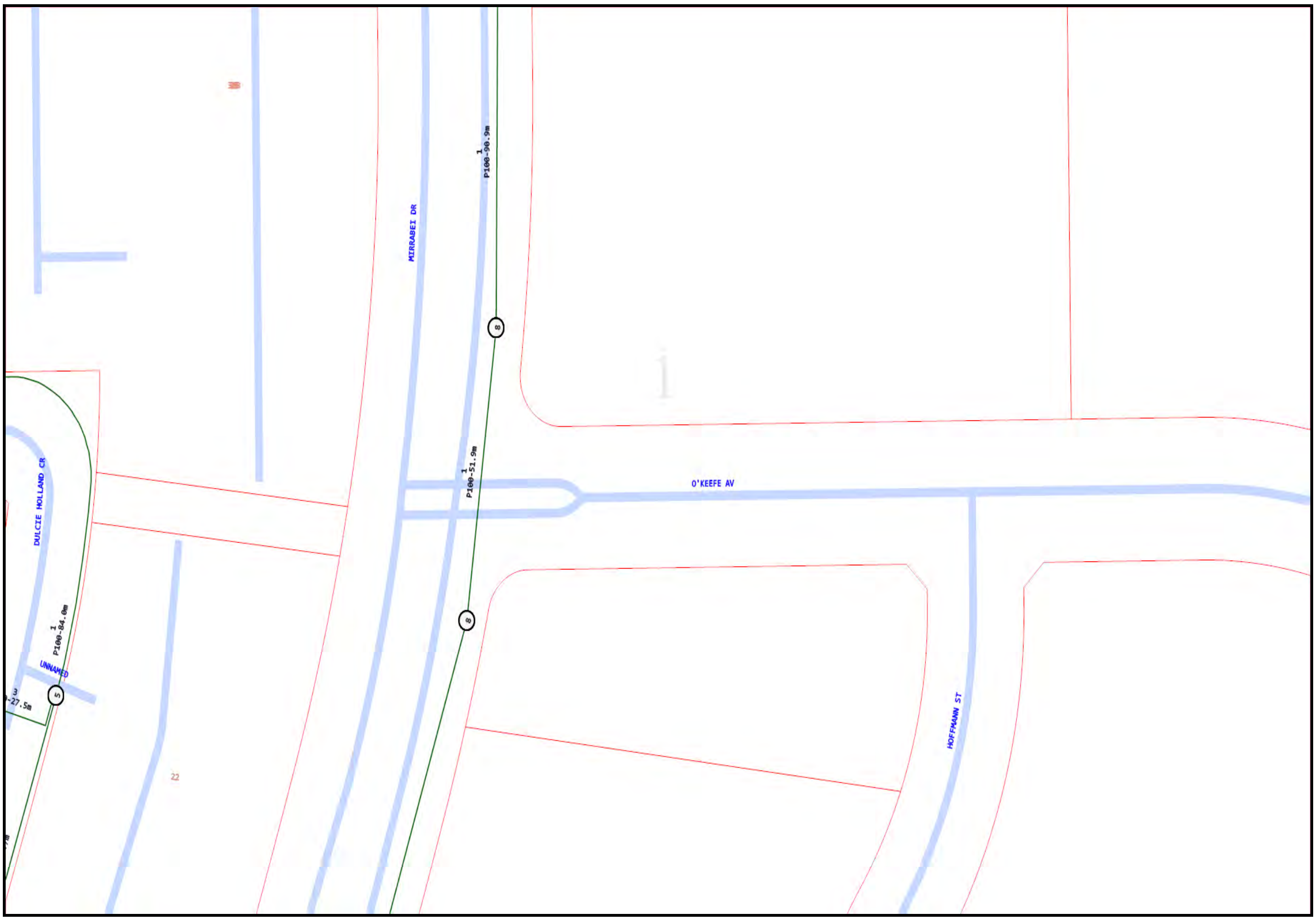
Dial before you dig Job #:	36741328
Sequence #	239582405
Issue Date:	22/05/2024
Location:	351 Mirrabei Drive , Moncrieff , ACT , 2914

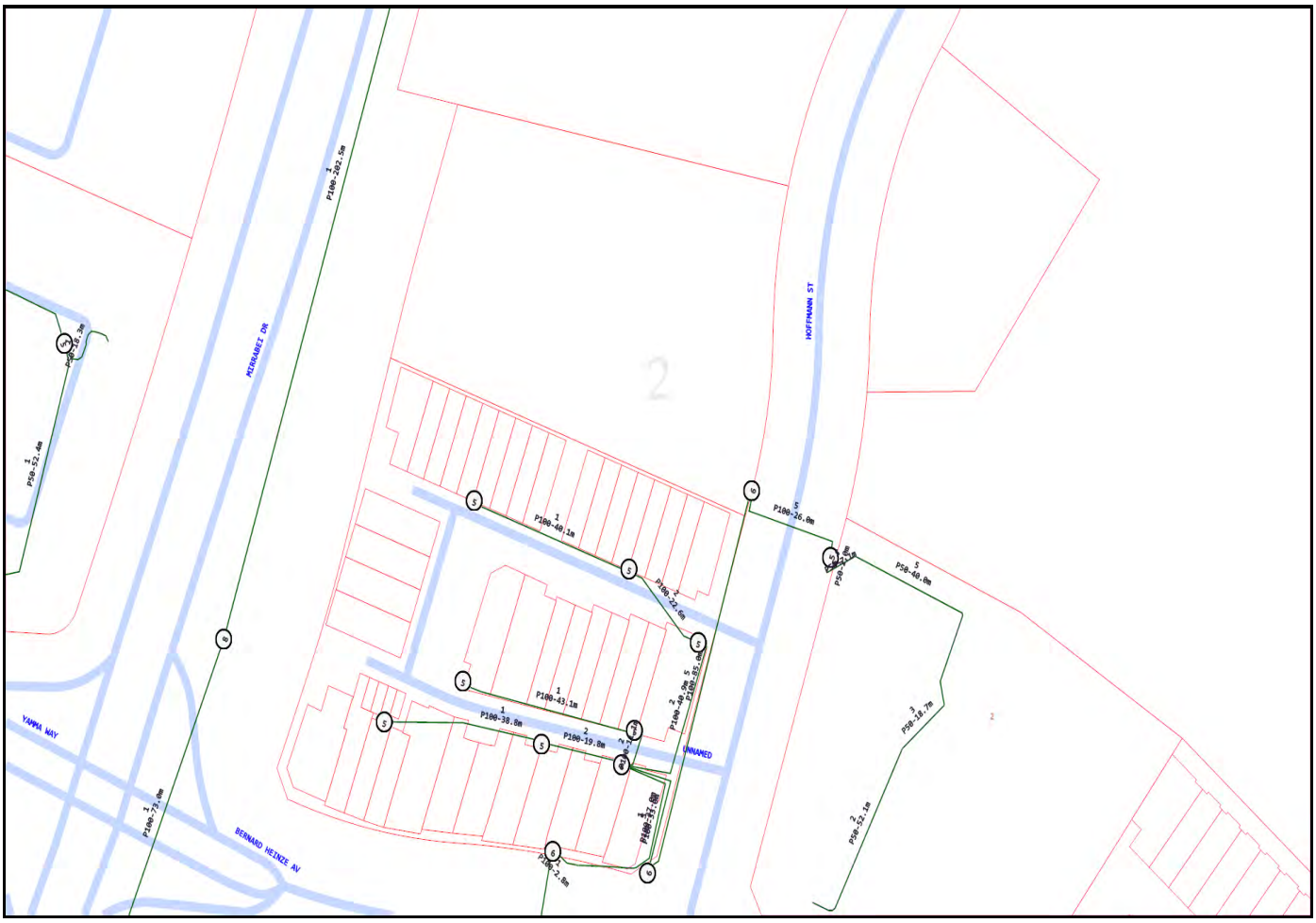
Indicative Plans are tiled below to demonstrate how to layout and read nbn asset plans



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


MIRRABEI DR
P100-90.9m
O'KEEFE AV
P100-51.9m
HOFFMANN ST
DULCIE HOLLAND CR
P100-84.0m
UNNAMED
22



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 #:	36741328	
Sequence #	239582405	
Issue Date:	22/05/2024	
Location:	351 Mirrabei Drive , Moncrieff , ACT , 2914	

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

ACT Government
Transport Canberra and City Services

Job # 36741328
Seq # 239582406

Provided by Transport Canberra and City Services

BEFORE YOU DIG
www.byda.com.au

Legend

- BYDA Enquiry
- Detailed map page
- No dig site assets

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

Index Sheet

Plans generated by SmarterWX™ Automate

0 37.5 75 150 m

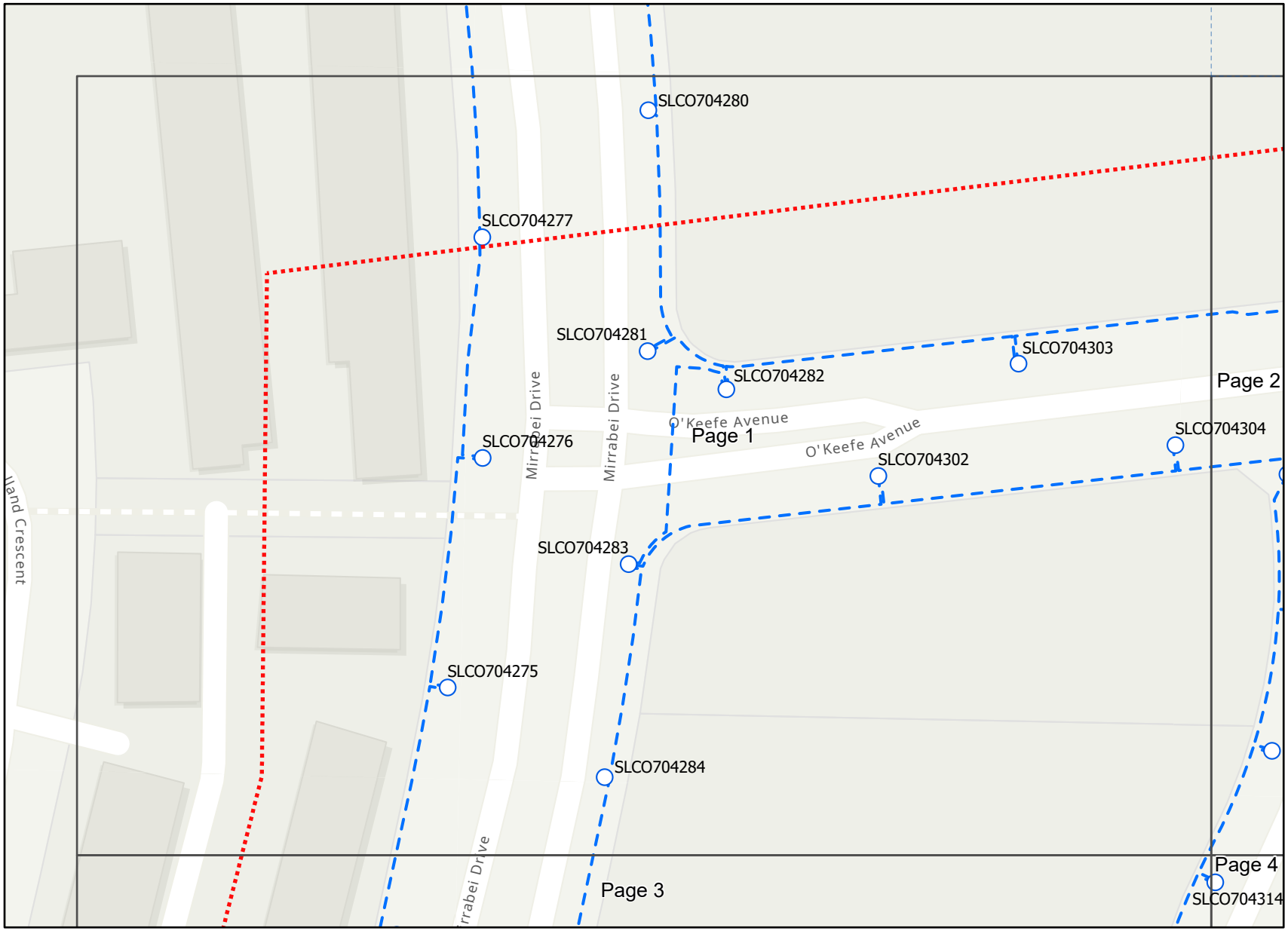
N

Scale 1:3,500

ACT Government
Transport Canberra and City Services

Job # 36741328
Seq # 239582406
Provided by Transport Canberra and City Services

BEFORE YOU DIG
www.byda.com.au



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

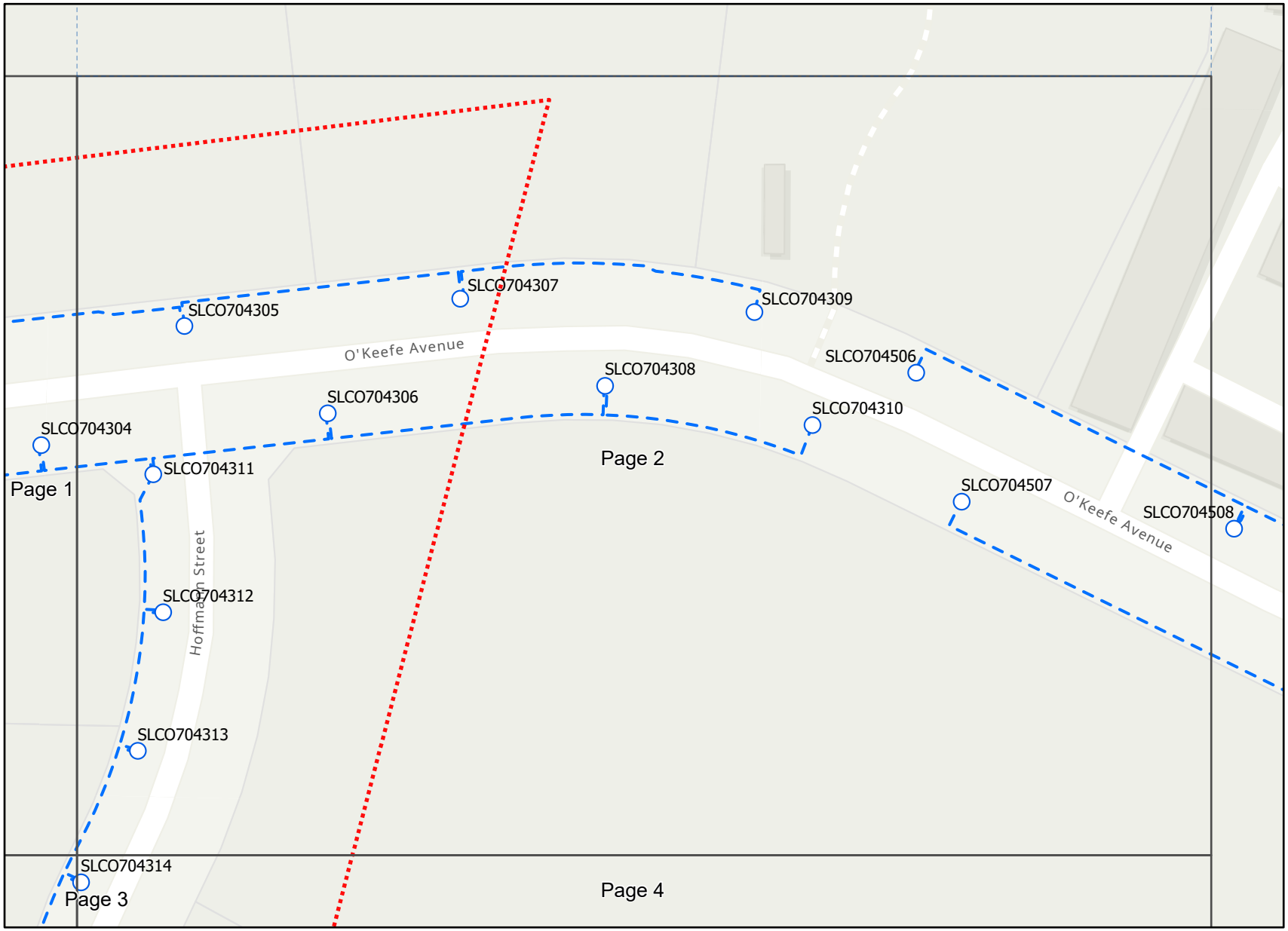
N

Scale 1:1,000

ACT Government
Transport Canberra and City Services

Job # 36741328
Seq # 239582406
Provided by Transport Canberra and City Services

BEFORE YOU DIG
www.byda.com.au



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

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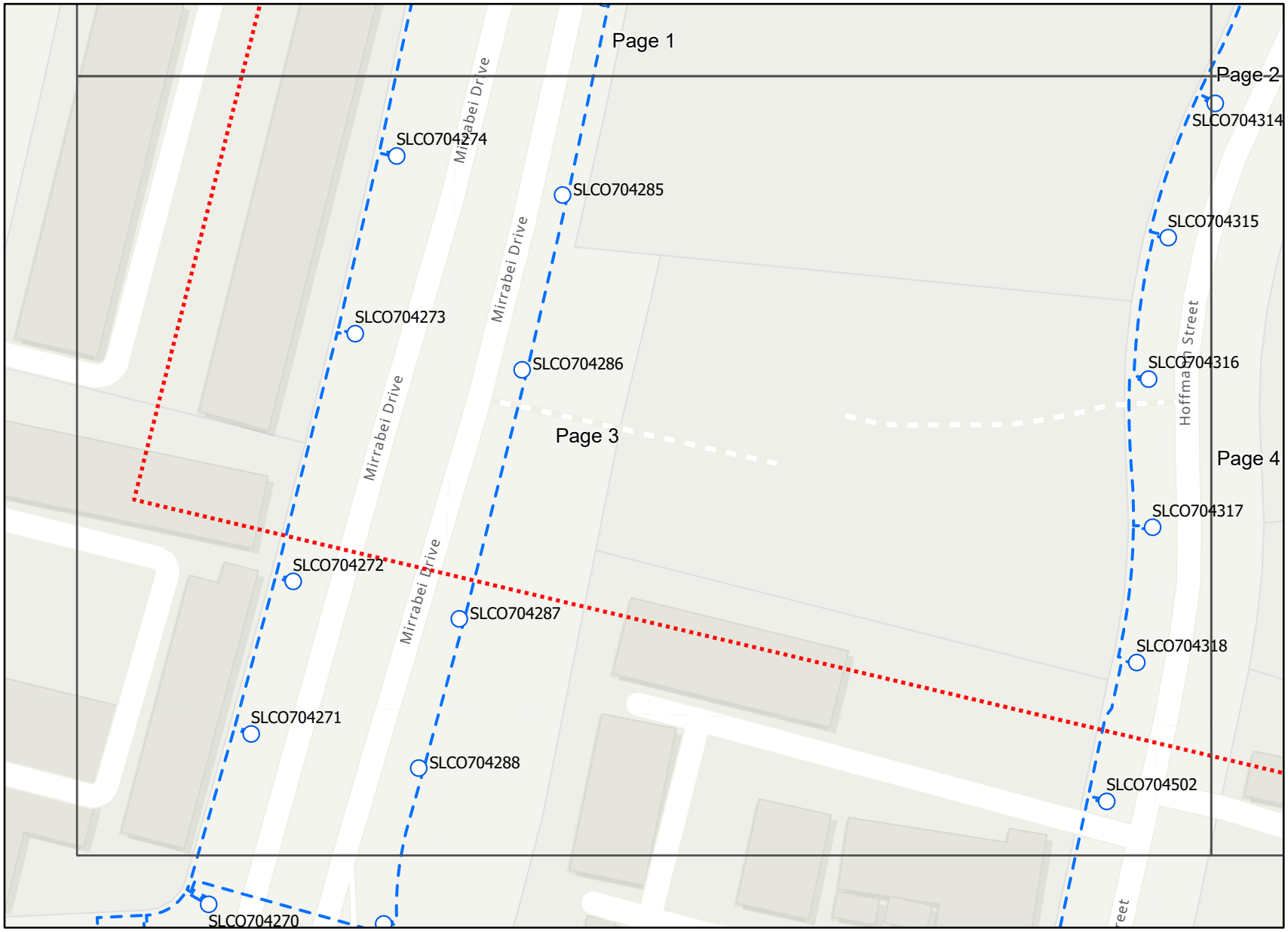
Scale 1:1,000

ACT Government
Transport Canberra and City Services

Job # 36741328
Seq # 239582406
Provided by Transport Canberra and City Services

BEFORE YOU DIG
www.byda.com.au



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

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Scale 1:1,000

ACT Government
Transport Canberra and City Services

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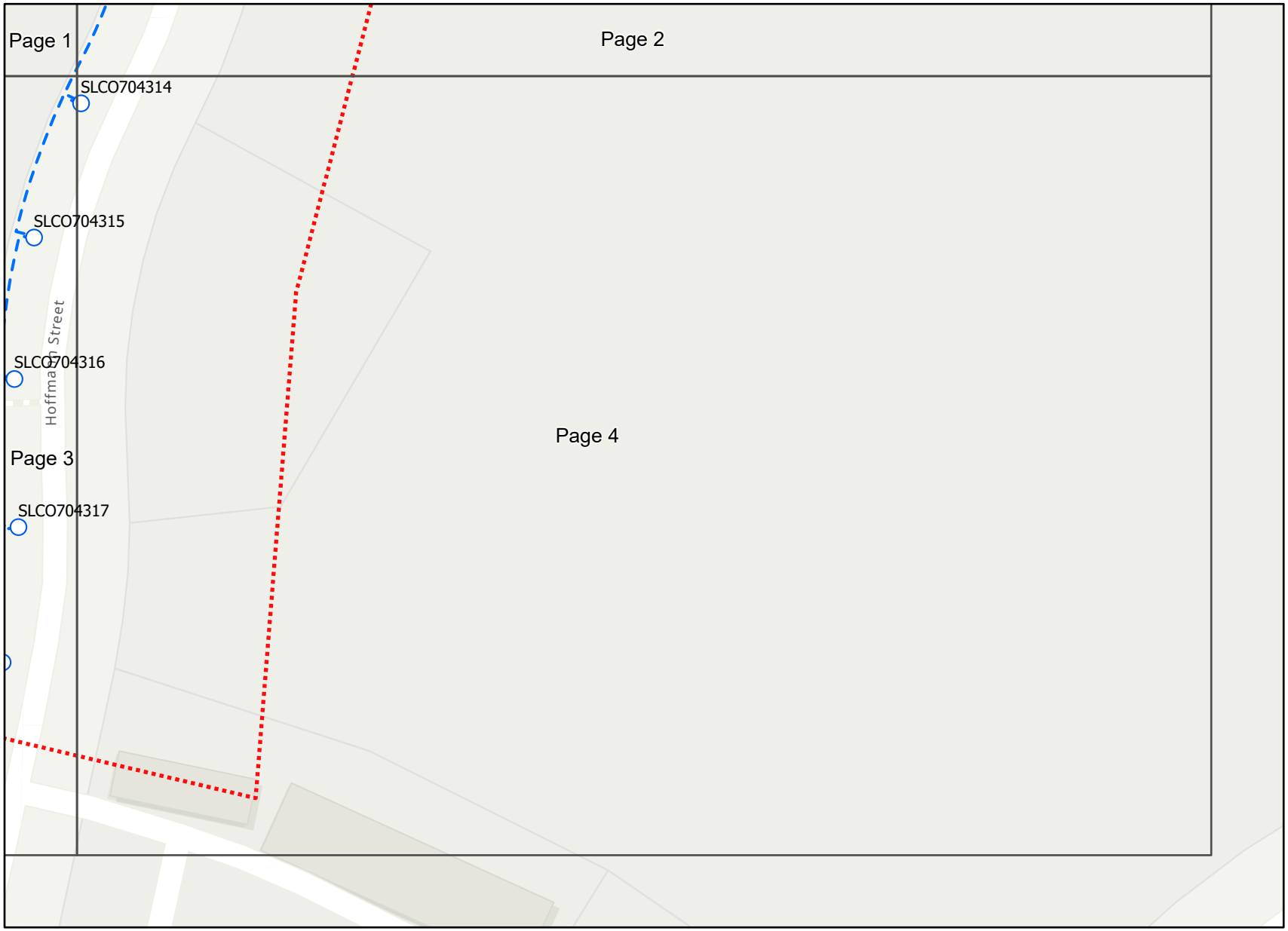
BEFORE YOU DIG
www.byda.com.au



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 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	36741328
Sequence Number	239582406
Enquiry Date	22 May 2024
Response	**AFFECTED**
Address	351 Mirrabei Drive Moncrieff ACT 2914
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:

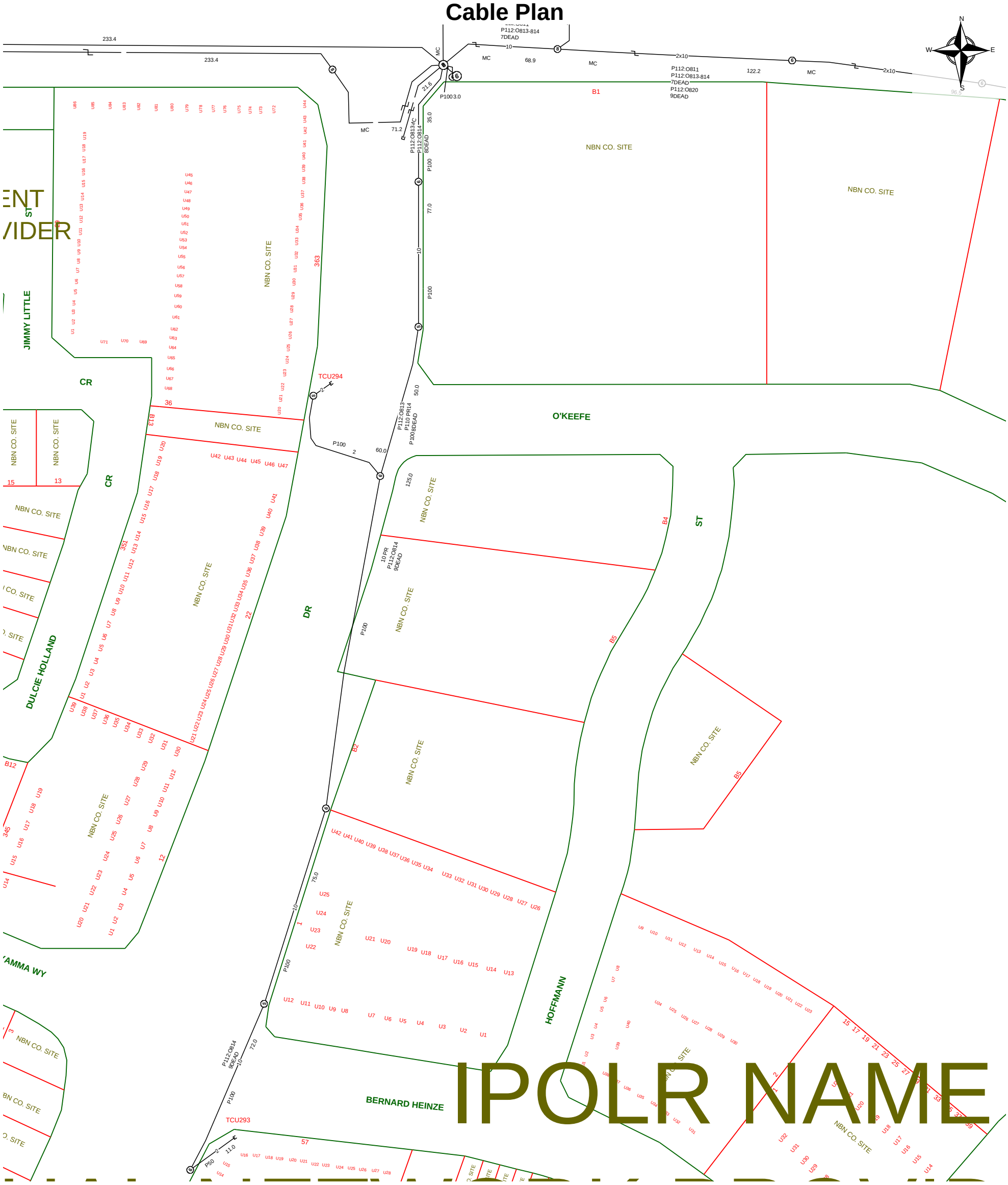
- The currency, accuracy or completeness of the information provided in the Asset Plan; or
- Any delays in respect of delivery or supply by TCCS of the information sought in connection with the location of the Assets.

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.

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

TELSTRA LIMITED A.C.N. 086 174 781

Generated On 22/05/2024 19:37:05

Sequence Number: 239582407

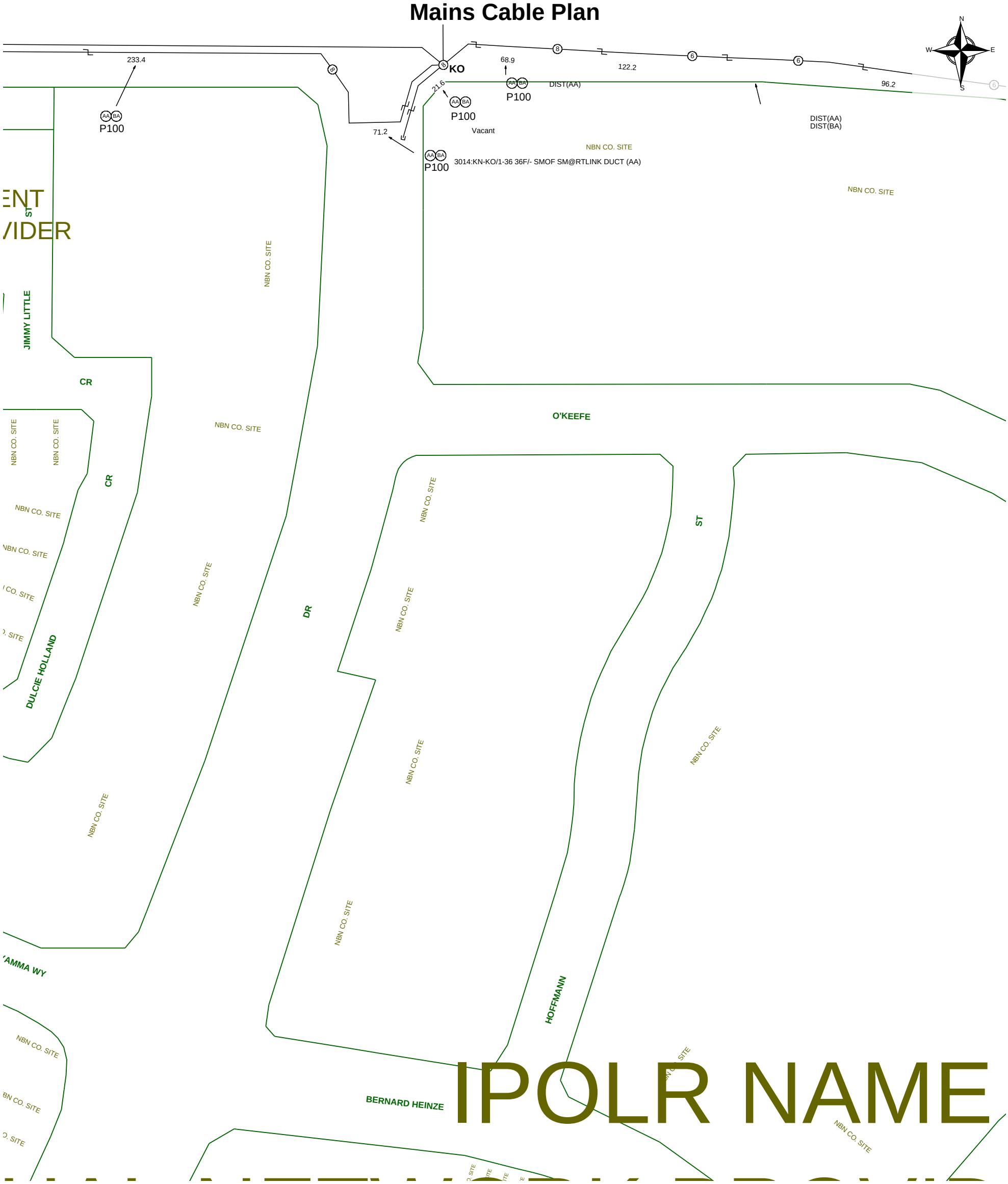
CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.

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

TELSTRA LIMITED A.C.N. 086 174 781

Generated On 22/05/2024 19:37:06

Sequence Number: 239582407

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.

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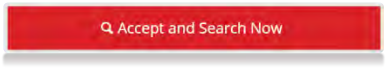
Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy.
Further on site investigation is required to validate the exact location of Telstra plant prior to commencing construction work.
A Certified Locating Organisation is an essential part of the process to validate the exact location of Telstra assets and to ensure the asset is protected during construction works.

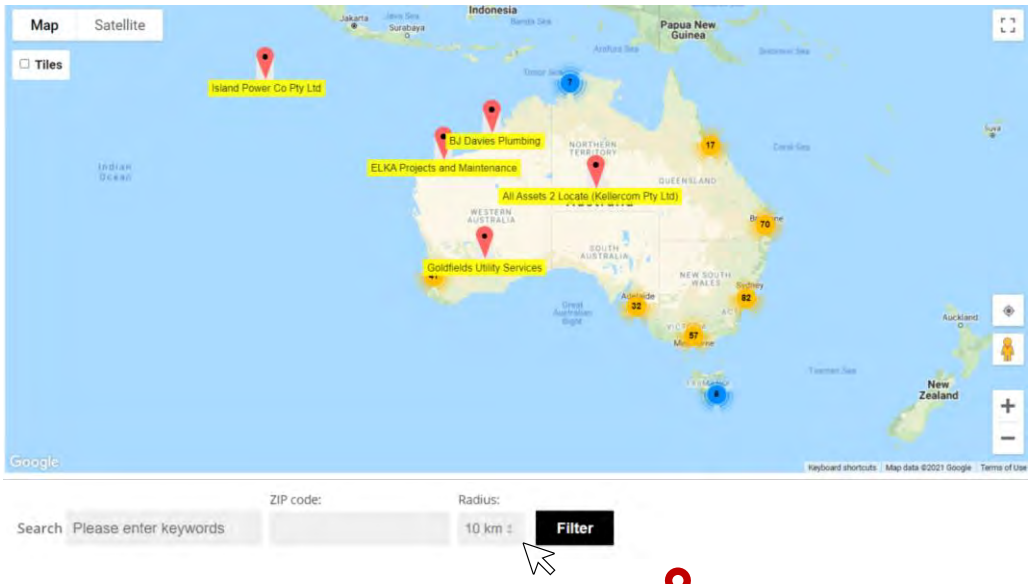
See the Steps- Telstra Duty of Care that was provided in the email response.

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

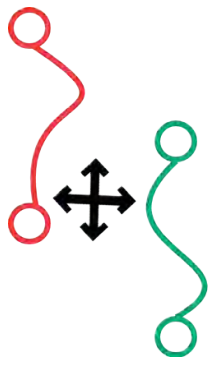
Ph: **13 22 03**

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).

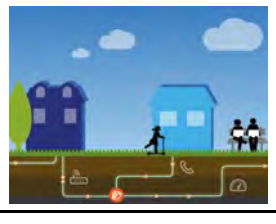
NetworkIntegrity@team.telstra.com

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)

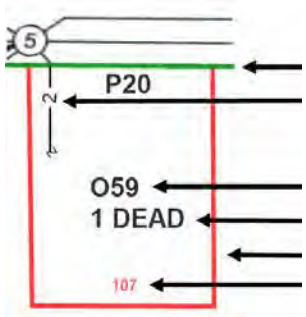
Above ground complex equipment housing (eg RIM)
Please Note: This equipment is powered by 240V Electricity

OC — Other Carrier Telecommunications Cable/Asset

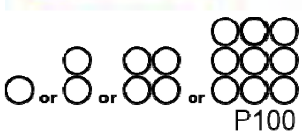
Dist — Distribution cables in Main Cable ducts

MC — Main Cable ducts on a Distribution plan

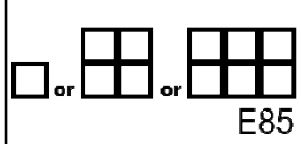
Blocked or damaged duct.



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)

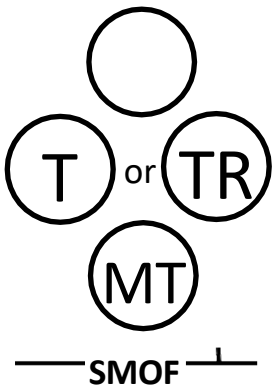
Elevated Joint
(above ground joint on buried cable)

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

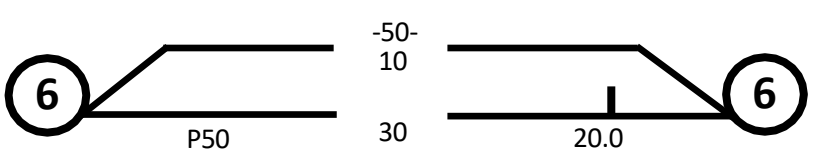
Marker Post, Transponder

Optical Fiber cable direct buried

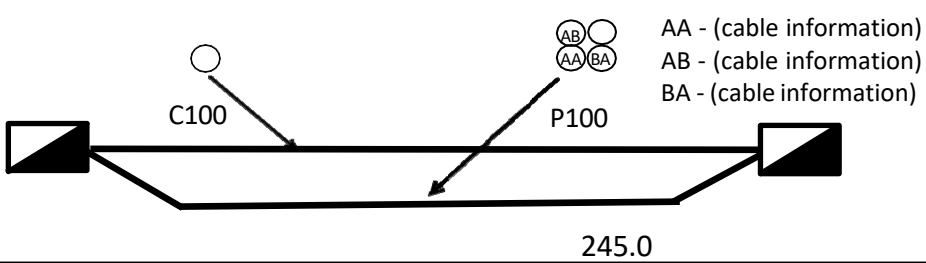
Some examples of conduit type and size:

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

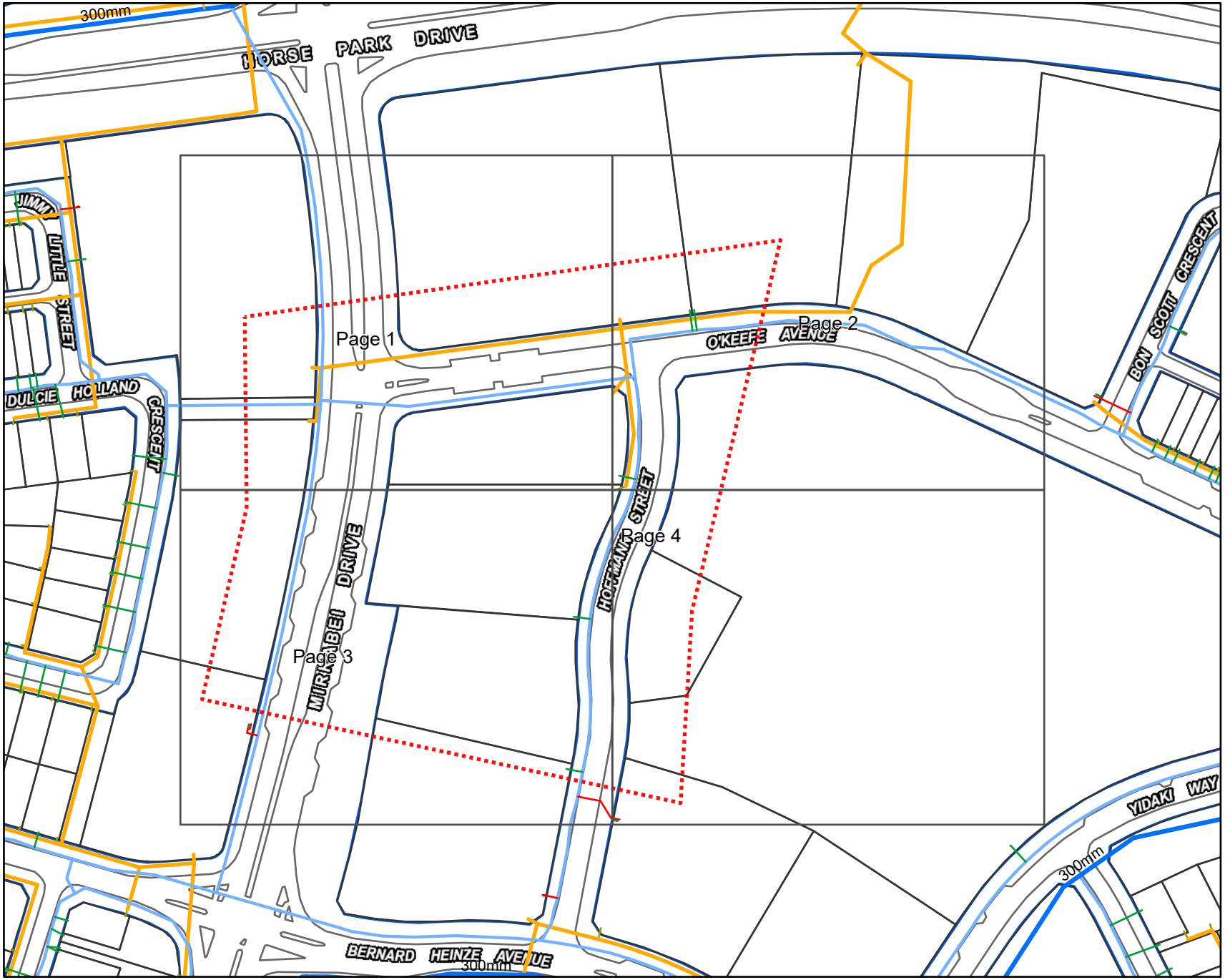
Some Examples of how to read Telstra Plans



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**

icon WATER

Job # 36741328
Seq # 239582408
Job site: 351 Mirrabei Drive , Moncrieff ACT 2914

BYDA Enquiry

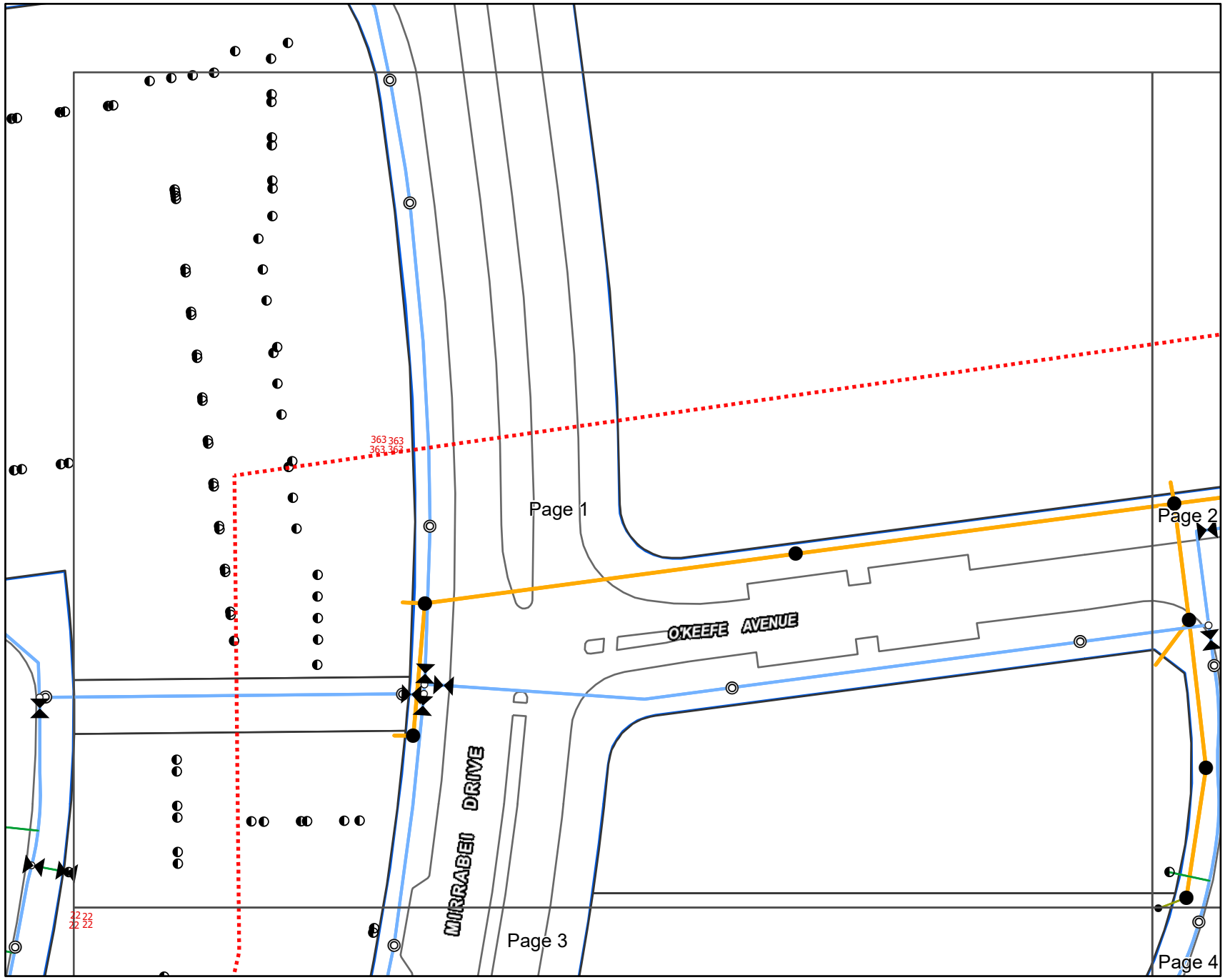
Detailed Map Page

N

0 10 20 40 60 80 m

Scale: 1:2,500

BEFORE YOU DIG www.byda.com.au



22/05/24 (valid for 30 days)

icon WATER

Water Network

Job # 36741328
Seq # 239582408
Job site: 351 Mirrabei Drive , Moncrieff ACT 2914

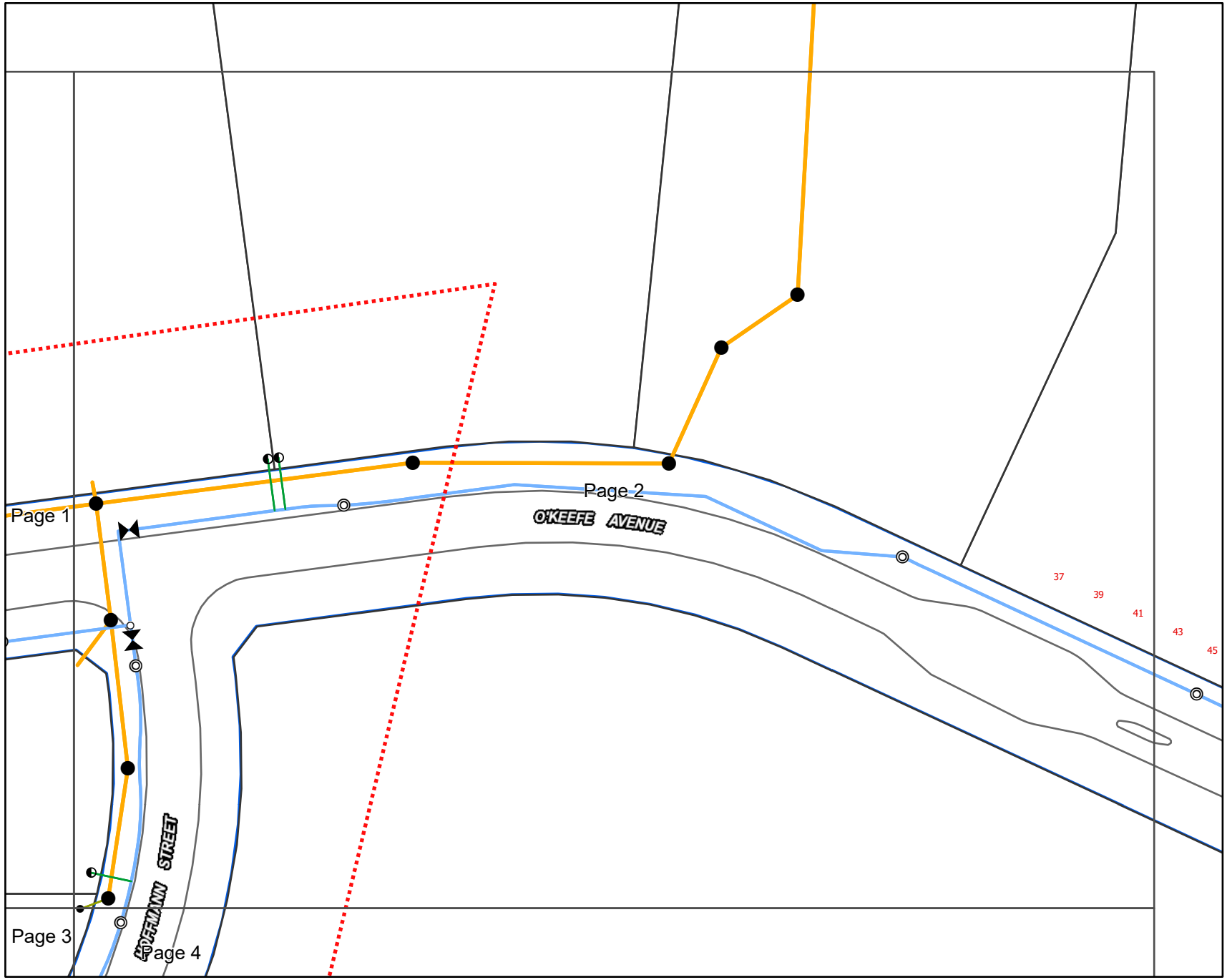
BYDA Enquiry

N

0 4 8 16 24 32 m

Scale: 1:1,000

BEFORE YOU DIG www.byda.com.au



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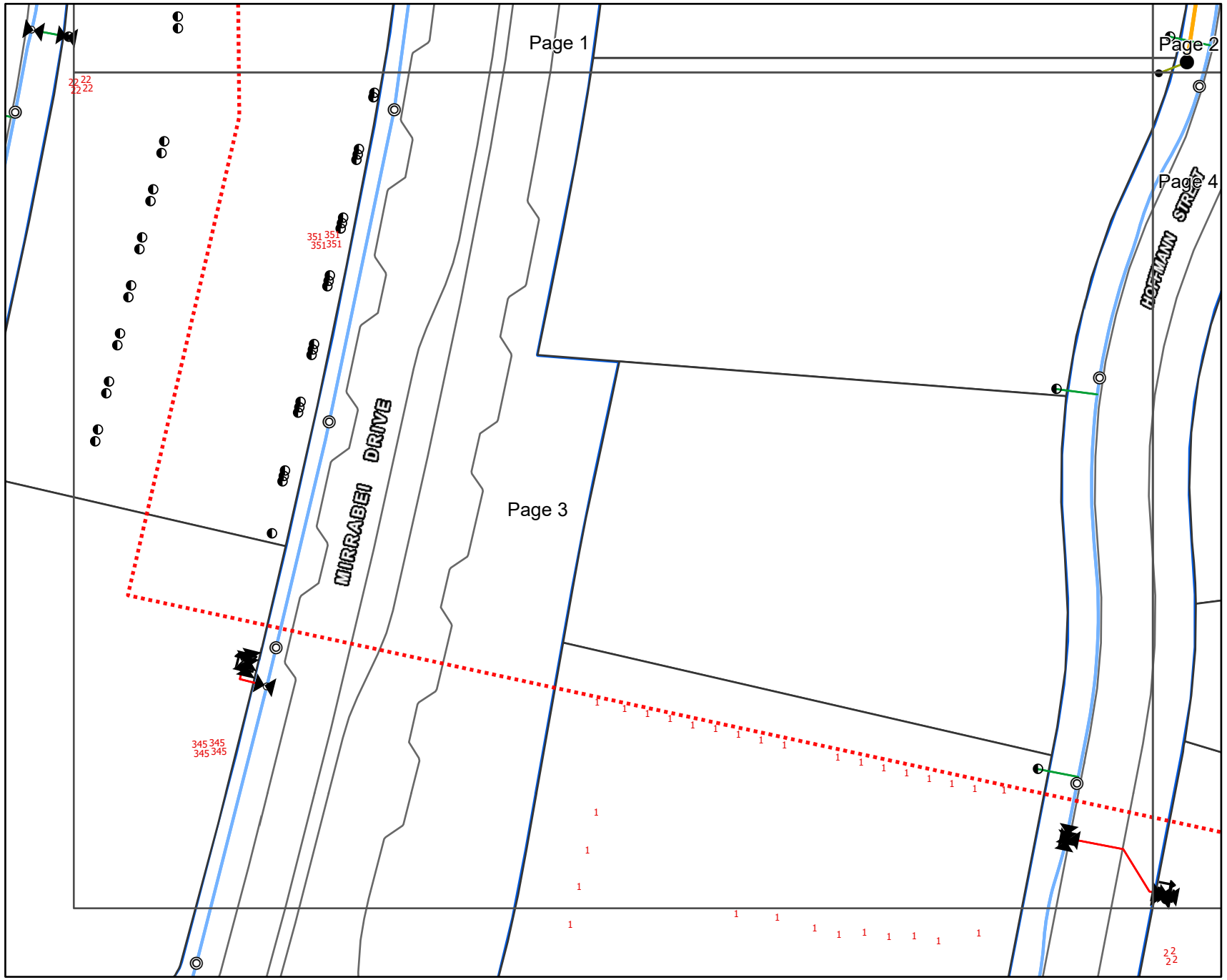

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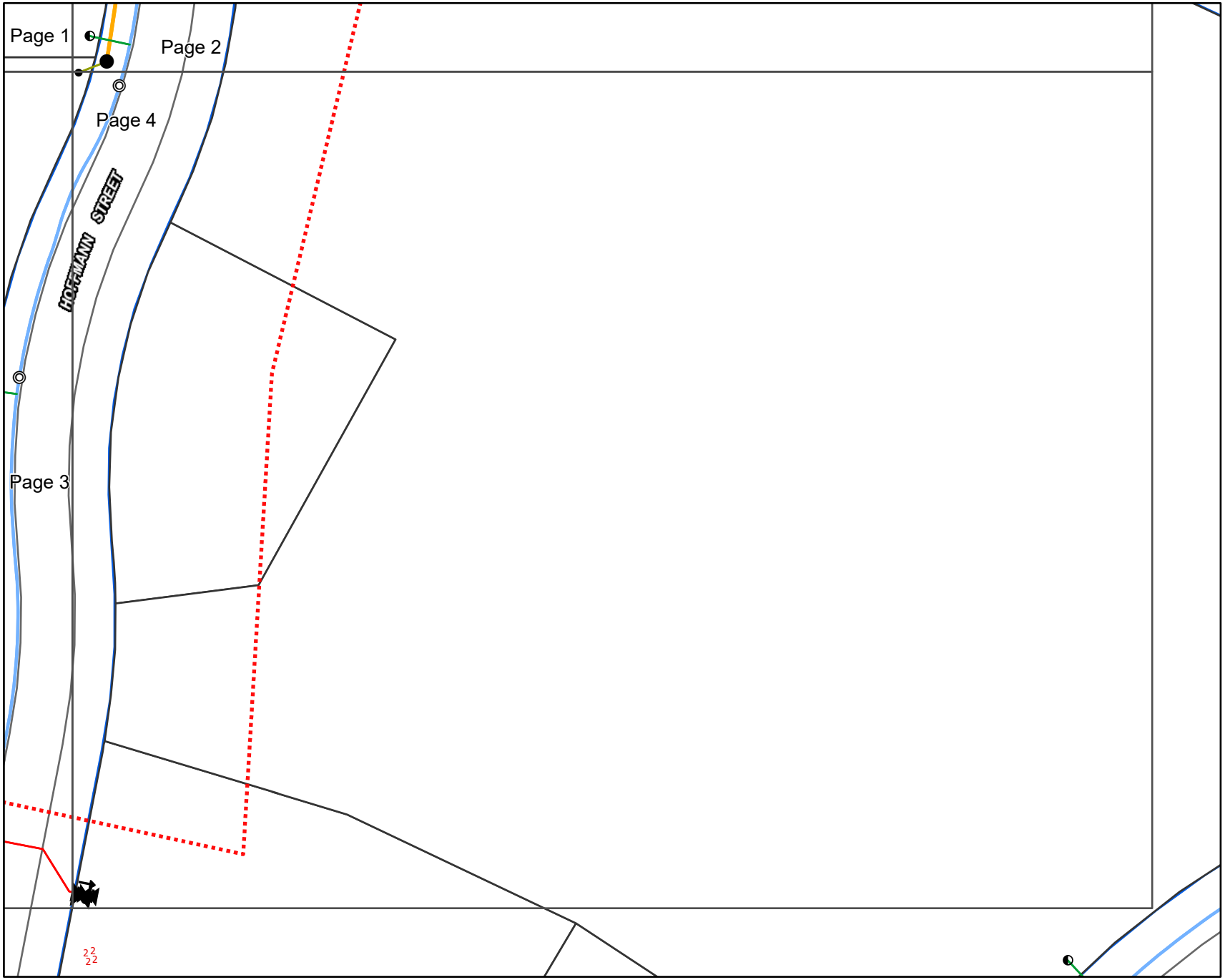


22/05/24 (valid for 30 days)

icon WATER

Water Network

Job # 36741328
Seq # 239582408
Job site: 351 Mirrabei Drive , Moncrieff ACT 2914

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: 36741328
BYDA Sequence No: 239582408

Work Details
Suburb: Moncrieff
Address: 351 Mirrabei Drive
Description:
Enquiry Date: 22 May 2024

Company: JPS Engineering Consultants
Contact: John Samoty
Telephone: +61417434996
Address: 28 Barrallier Street
Griffith 2914
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

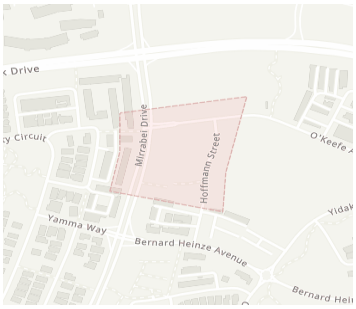
Asset location information

evoenergy

Applicant/Contractor **Job No.** **36741328** **BYDA Sequence No.** **239582409**

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

Work Details



Suburb: Moncrieff
Address: 351 Mirrabei Drive

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

BEFORE YOU DIG www.byda.com.au

evoenergy

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

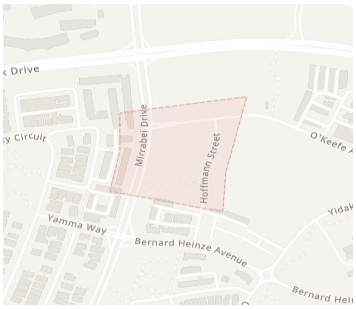
Asset location information

evoenergy

Applicant/Contractor **Job No.** **36741328** **BYDA Sequence No.** **239582409**

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

Work Details



Suburb: Moncrieff
Address: 351 Mirrabei Drive

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

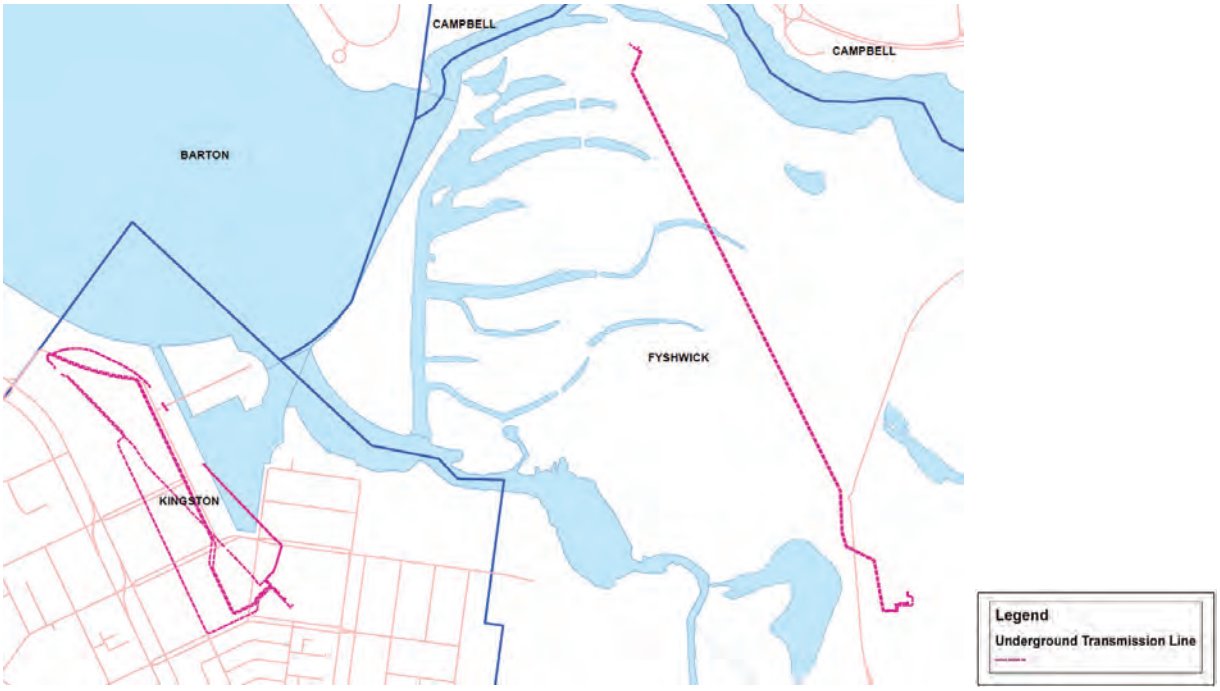
You must supply Evoenergy with your proposal of works including a written outline of your works and design plans for review.

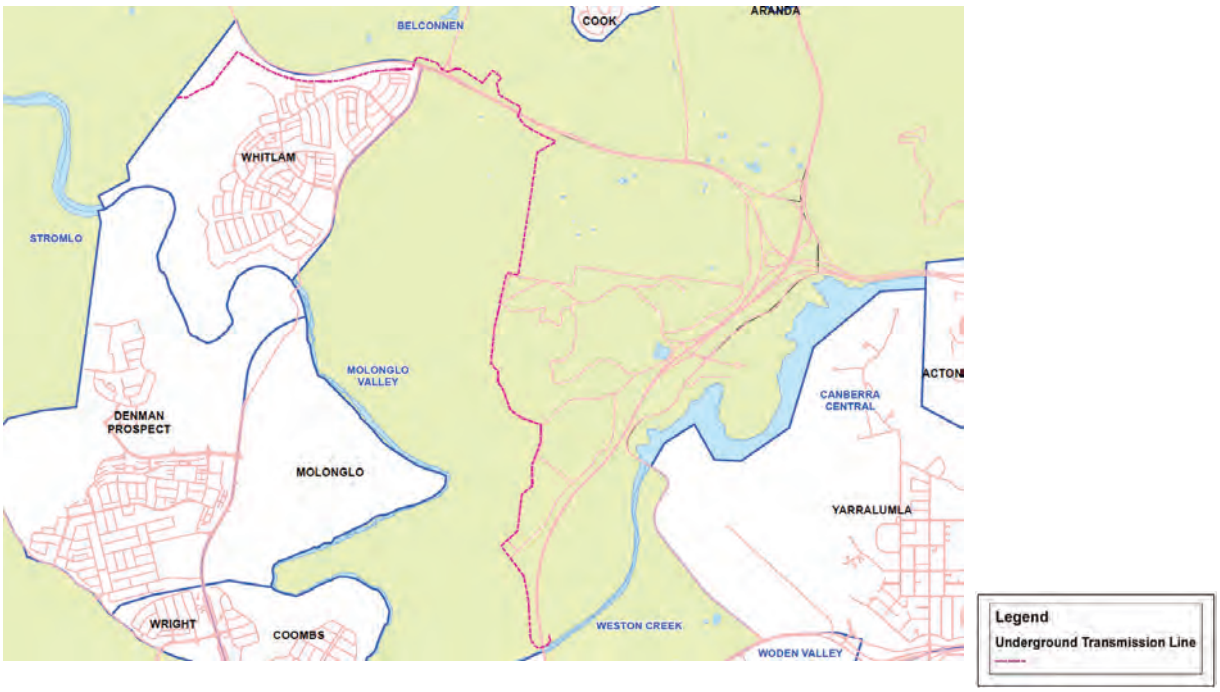
It may take up to four weeks for Evoenergy to review your works proposal. Following review, we will advise you of Evoenergy's requirements for protecting the Underground Transmission Line Assets.

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

Evoenergy Electricity Network

evoenergy

0 5 10 20 30 40 M

N W E S

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

Seq #: 239582409

351 Mirrabei Drive, Moncrieff

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

evoenergy

Seq #: 239582409

351 Mirrabei Drive, Moncrieff

Template: GasA2Portrait

Creation Date: 22-May-2024

Appendix C

Correspondence

From: ACTF&R Risk & Planning
To: John Samoty
Subject: RE: Fire Advice and Risk Rating - Block 4 Section 23 Moncrieff
Date: Friday, 5 July 2024 2:59:38 PM
Attachments: image001.png
image002.png
image003.png

OFFICIAL

Hi john,

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.

I offer the standard commentary here –

> This development is located **outside** of the area declared by the ESA as the Bushfire Prone Area. Applying bushfire protection measures is not mandatory however consideration should be given to bushfire protective measures as these simple measures can improve the survival of any structure in the event of a nearby bushfire or structural fire.

In reply to your water supply request, ACTF&R can confirm fire risk type FRT3 is applicable to this development - Block 4 Section 23, MONCRIEFF.

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 9:28 PM
To: ACTF&R Risk & Planning <ACTF-RRisk-Planning@act.gov.au>
Subject: Fire Advice and Risk Rating - Block 4 Section 23 Moncrieff

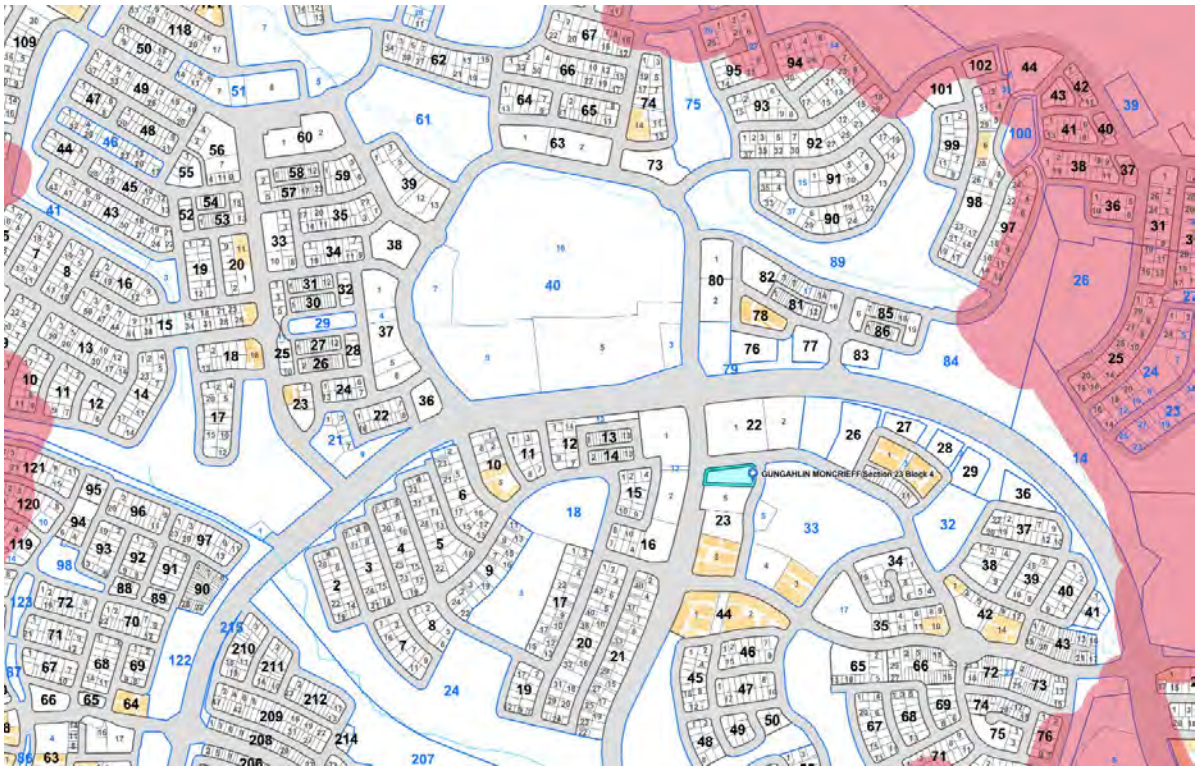
Dear ACT Fire & Rescue Team,

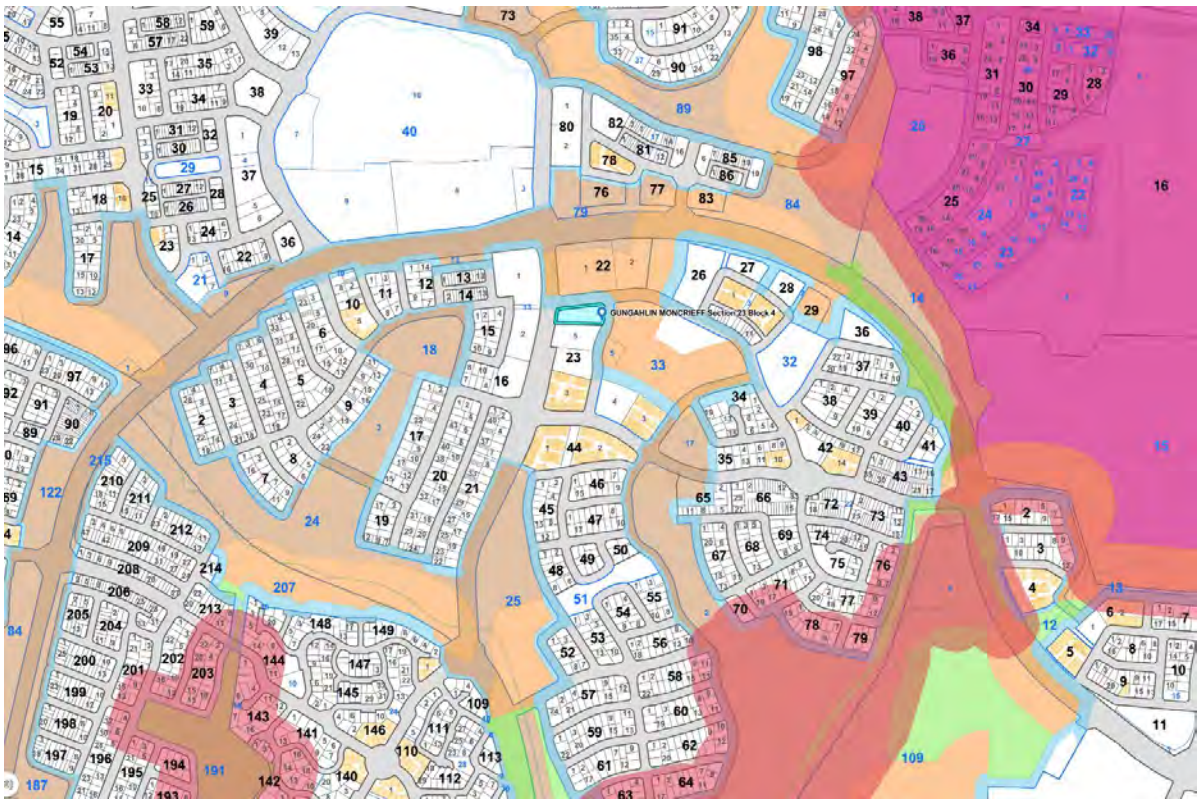
JPS Engineering Consultants are currently engaged by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 23 Moncrieff. See below an image of the site outlined and highlighted in blue.

The SLA are undertaking this due diligence report to understand the risks and opportunities to allow a proposed mixed use development. The intended yield for Block 4 Section 23 Moncrieff is in the range of 98-122 dwellings and 2,500m^2 of ground floor shops. The total building height will be up to a maximum of 6 storeys.

ACTmapi indicates that bushfire prone areas are quite distant from the site, however, there are strategic bushfire management zones that run directly east and north of the block. See below relevant extracts from ACTmapi.

I have also sourced the attached bushfire report that was undertaken to support the subdivision of Moncrieff in 2014. It shows an OAPZ north of Horse Park Drive and IAZ's a distant 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 23 Moncrieff - Site investigation report
Date: Friday, 5 July 2024 3:46:07 PM
Attachments: image001.png

Hello John,

Thank you for seeking ACT Heritage Council (the Council) advice in relation to a Site Investigation Report for Block 4 Section 23 Moncrieff, as indicated on the map you provided in your email.

Review of the ACT Heritage Register confirms that Block 4 Section 23 Moncrieff does not contain any nominated or registered heritage places, nor any Aboriginal places or objects. Previous Council advice issued in 2019 stated that there were no *Heritage Act 2004* constraints to the development or use of Block 4 Section 23 Moncrieff, as all previously recorded heritage places in the area have been salvaged in accordance with prior ACT Heritage Council approvals.

An inspection of historic aerial imagery also confirms that from 2015, Block 4 Section 23 Moncrieff was subject to widespread clearing and disturbance through earthworks and the urban development of the suburb of Moncrieff, 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 23 Moncrieff, 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; 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 10:53 AM
To: Heritage <Heritage@act.gov.au>
Cc: Bensley, Dianne <Dianne.Bensley@act.gov.au>
Subject: Block 4 Section 23 Moncrieff - ACT Heritage Council Advice

Dear Heritage Council,

JPS Engineering Consultants are currently engaged by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 23 Moncrieff. 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 mixed use development. The intended yield for Block 4 Section 23 Moncrieff is in the range of 98-122 dwellings and 2,500m^2 of ground floor shops. The total building height will be up to a maximum of 6 storeys.

I have sourced the attached 2010 Cultural Heritage Assessment, which indicates some Aboriginal artefacts and PADs identified in the Moncrief site, although with the construction of the subdivision, I assume that these artefacts have been relocated. The ACTmapi heritage module confirms this as there are no final or provisional heritage values within or immediately surrounding the subject site shown.

Based on this and your records, I would like to confirm if any heritage factors need to be considered as part of a proposed development in this location. 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:	Jennings, RussellC
To:	John Samoty
Cc:	Contaminated Sites
Subject:	RE: Contaminated Land Search - Application, X454BZZX, John Samoty [SEC=UNCLASSIFIED, DLM=Sensitive: Personal]
Date:	Wednesday, 10 July 2024 11:13:55 AM

OFFICIAL

Dear Mr Samoty

RE: CONTAMINATED LAND SEARCH

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

Block 4 Section 23 Moncrieff Gungahlin

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

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

Prior to the development of the new suburb of Moncrieff the EPA required that the whole area be assessed to determine whether these past activities had impacted the sites from a contamination perspective.The EPA reviewed the report titled "Stage 2 Contamination Investigation Proposed Residential Development Moncrieff ACT" (which included the land now occupied by SECTION 23 BLOCK 4 MONCRIEFF) dated 19 April 2011 by SLR Consulting Australia Pty Ltd.The EPA assessed the report and endorsed the consultant's findings that on the basis of the studies the investigation area was suitable for its intended landuses under the ACT Territory Plan including low density residential subject to the implementation of a Construction Environmental Management Plan (CEMP). The EPA subsequently endorsed a CEMP titled "Moncrieff Gungahlin Construction Environmental Management Plan" dated 6 September 2011 by SLR Consulting Australia Pty Ltd for the management of the site during development works subject to conditions. EPA records indicate that the development works within Moncrieff area was undertaken in accordance with the above CEMP.

22 July 2019, the Environment Protection Authority reviewed the report titled "Report on Preliminary Site Investigation for Contamination Proposed Future Development Block 4 Section 23, Moncrieff" dated 28 June 2019 by
Douglas Partners Pty Ltd.The Authority has assessed the report and supports the consultant's findings that
"the site is suitable, from a contaminated land perspective, for the land uses permissible under its current zoning (CF: community facilities)".

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 9:47 PM
To: Contaminated Sites <ContaminatedSites@act.gov.au>
Subject: Contaminated Land Search - Application, X454BZZX, John Samoty [SEC=UNCLASSIFIED, DLM=Sensitive: Personal]

Contaminated Land Search - Application

Form data summary

Customer details	John Samoty
Reference code	X454BZZX

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: Coghill, Stacee on behalf of ConservatorFloraFauna
To: John Samoty
Subject: RE: Block 4 Section 23 Moncrieff - Flora and Fauna Review
Date: Monday, 15 July 2024 2:26:04 PM
Attachments: image001.png

OFFICIAL

Hi John – Apologies at the delay getting this advice back to you. I have been very unwell and had to take a week off.

The block is mapped as part of the Ecological Network and provides possible core habitat for native bees. As the block is <1ha BSUD will not need to be addressed. I donk there are any constraints to development.

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 10:31 AM
To: ConservatorFloraFauna <ConservatorFloraFauna@act.gov.au>
Cc: Taylor, Karen <Karen.Taylor@act.gov.au>
Subject: Block 4 Section 23 Moncrieff - 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 23 Moncrieff. 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 mixed use development. The intended yield for Block 4 Section 23 Moncrieff is in the range of 98-122 dwellings and 2,500m^2 of ground floor shops. The total building height will be up to a maximum of 6 storeys.

Based on a review of ACTmapi records, there do not appear to be threatened habitat areas within or in close proximity to the site.

I've sourced the attached S211 exemption signed off by the Minister in November 2013, which facilitated in the Estate Development Plan/DA for the subdivision of Moncrieff. Also sourced is the attached 2010 report on observations of the Superb Parrot in the Gungahlin region, including over Moncrieff.

Based on this information and your records, could you please confirm whether there are any ecological constraints for future development on Block 4 Section 23 Moncrieff?

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:	Chandika Dassanayake
To:	John Samoty
Cc:	Network Connection Application; NetworkPlanning
Subject:	RE: Block 4 Section 23 Moncrieff - Electrical Advice Monday, 15 July
Date:	2024 11:55:15 AM
Attachments:	image001.png image003.png image004.png image005.png

Hi John,
At present Evoenergy has some capacity constraints in the 11kV network available in the area that you proposed.
However, 11kV feeder extension is being proposed to address the above constraints.
I would like to know the expected project completion timing , that may help Evoenergy to plan 11kV feeder extension work.

According to the maximum demand expectation, Evoenergy needs to install new substation in the block to supply the proposed development & the space requirement would be 14.2m x 6.2m.
However , formal advise will be provided at the PNA stage.

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

From: John Samoty <John.Samoty@jpsengineering.com.au>
Sent: Friday, July 5, 2024 9:13 PM
To: Chandika Dassanayake <Chandika.Dassanayake@evoenergy.com.au>
Cc: Network Connection Application <Network.ConnectionApplication@evoenergy.com.au>
Subject: Block 4 Section 23 Moncrieff - 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 23 Moncrieff. 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 mixed use development. The intended yield for Block 4 Section 23 Moncrieff is in the range of 98-122 dwellings and 2,500m^2 of ground floor shops. The total building height will be up to a maximum of 6 storeys.

The preliminary electrical demand for a 98 apartment and 122 aged care complex has been estimated as 820kVA and 940kVA, 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 and Commercial Zones Planning Technical Specification of one space per unit and 20% of non-residential parking spaces. This would mean 118 and 142 EV charging spaces for each scenario.

For your information, I have noted a substation in the open space area to the north east of the site, with photo 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: Dahal, Nabin
To: John Samoty
Cc: Hydraulic Asset Acceptance
Subject: RE: Block 4 Section 23 Moncrieff - Potable Water and Sewer Advice
Date: Tuesday, 23 July 2024 5:24:07 PM
Attachments: image001.png
image002.png
image003.png
image004.png

Good afternoon John

Please see response below:

Sewer Capacity

It is expected that existing DN 150 gravity main will be able to convey proposed foul flow. This is based on the initial details provided by the developer and will require further analysis if any change is proposed.

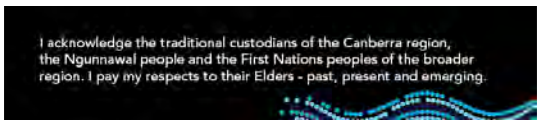
Water Capacity

Analysis indicated that existing water network will be able to provide adequate supply to both the options of proposed development including fire flow. This is based on the initial details provided by the developer and will require further analysis if any change is proposed.

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 4:44 PM
To: Hydraulic Asset Acceptance <HydraulicAssetAcceptance@iconwater.com.au>
Subject: Block 4 Section 23 Moncrieff - Potable Water and Sewer Advice

Dear Icon Water Team,

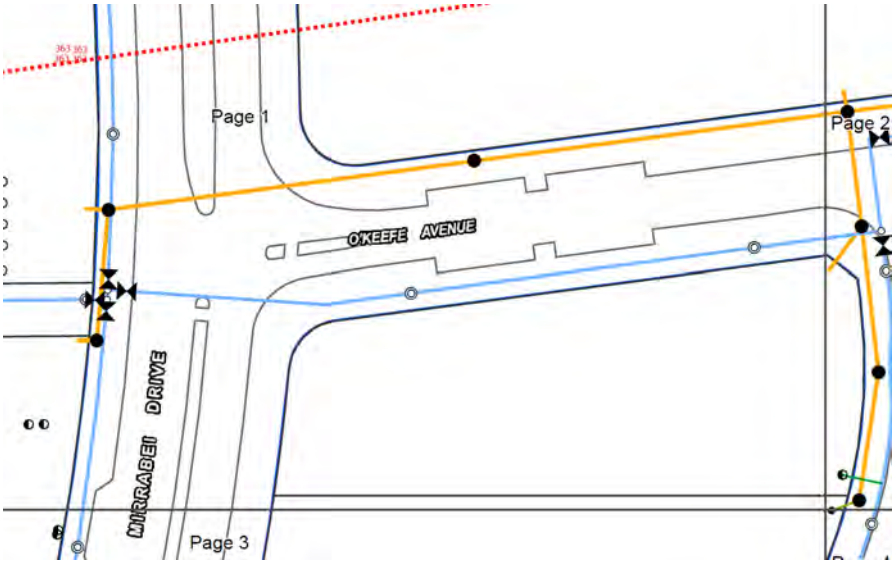
JPS Engineering has been engaged by the Suburban Land Agency (SLA) to undertake a Site Investigation Report for Block 4 Section 23 Moncrieff. See below an image of the site outlined and highlighted in blue.

The SLA are undertaking this due diligence report to understand the risks and opportunities to allow a proposed mixed use development. The intended yield for Block 4 Section 23 Moncrieff is in the range of 98-122 dwellings and 2,500m^2 of ground floor shops. The total building height will be up to a maximum of 6 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 is situated in the south east 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 98 dwelling and 122 dwelling options:

DEVELOPMENT OPTION - 98 Apartments & 2,500m^2 Commercial

Development Type	Peak Day Demand Rate (L/s/block area ha)	Peak Hour Demand Rate (L/s/block area ha)	Comments	Relevant Areas (Ha)	Peak Hour Demand (L/s)	95th Percentile Demand (L/s)
Neighbourhood and District centres	0.332	0.83	Block Area	0.2500	0.0021	0.0014

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	98	2.495	1.647
				Total Peak Demand	**2.497**	**L/s**

DEVELOPMENT OPTION - 122 Aged Care Apartments & 2,500m^2 Commercial

Development Type	Peak Day Demand Rate (L/s/block area ha)	Peak Hour Demand Rate (L/s/block area ha)	Comments	Relevant Areas (Ha)	Peak Hour Demand (L/s)	95th Percentile Demand (L/s)
Neighbourhood and District centres	0.332	0.83	Block Area	0.2500	0.0021	0.0014

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	122	3.106	2.050
				Total Peak Demand	**3.109**	**L/s**

Sewer

An existing sewer tie has been provided to the block in its north east corner, which can be seen in the above Before You Dig extract.

Based on the preliminary yield study, see below estimated sewage flows in each of the development scenarios:

DEVELOPMENT OPTION - 98 Apartments & 2,500m^2 Commercial

Item	Classification	Unit	EP per Unit	Yield		EP
1	Shops and offices	Gross lettable floor space (Ha)	300	0.250	GFA	75
2	High Density Residential	per dwelling	2	98	dwellings	196

TEP =	246
ADWF =	0.517
PDWF =	1.738
NSA (res) =	0.478
NSA (commercial) =	0.239
A_{Eff} (res) =	0.478
A_{Eff} (commercial) =	0.078
GWI (res) =	0.007
GWI (commercial) =	0.003
RDI (res) =	0.344
RDI (industrial) =	0.056
DF =	2.148

Q = 2.148 L/s

DEVELOPMENT OPTION - 122 Aged Care Apartments & 2,500m^2 Commercial

Item	Classification	Unit	EP per Unit	Yield		EP
1	Shops and offices	Gross lettable floor space (Ha)	300	0.250	GFA	75
2	High Density Residential	per dwelling	2	122	dwellings	244

TEP =	294
ADWF =	0.618
PDWF =	2.040
NSA (res) =	0.478
NSA (commercial) =	0.239
A_{Eff} (res) =	0.478
A_{Eff} (commercial) =	0.078
GWI (res) =	0.007
GWI (commercial) =	0.003
RDI (res) =	0.344
RDI (industrial) =	0.056
DF =	2.450

Q = 2.450 L/s

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
E John.Samoty@JPSEngineering.com.au

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

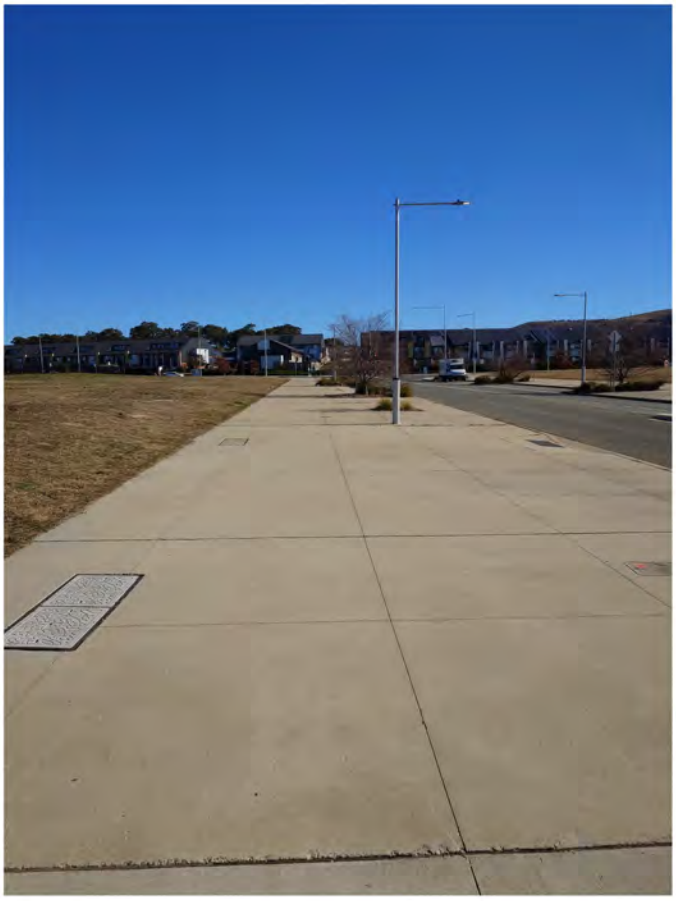


Photo #25

Photo #26

Photo #27

Photo #28

Photo #29

Photo #30

Photo #31

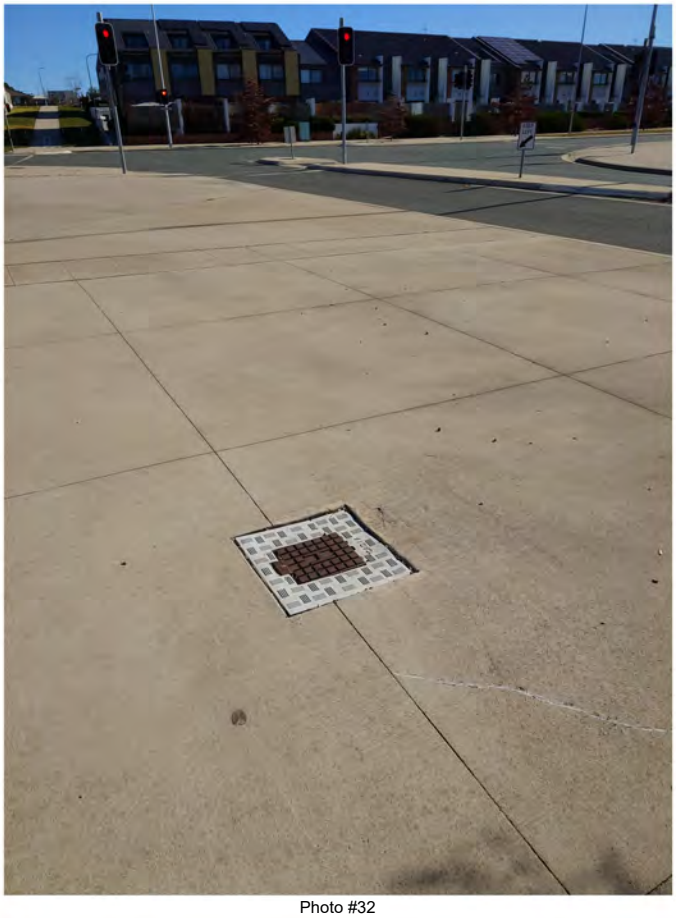


Photo #32

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

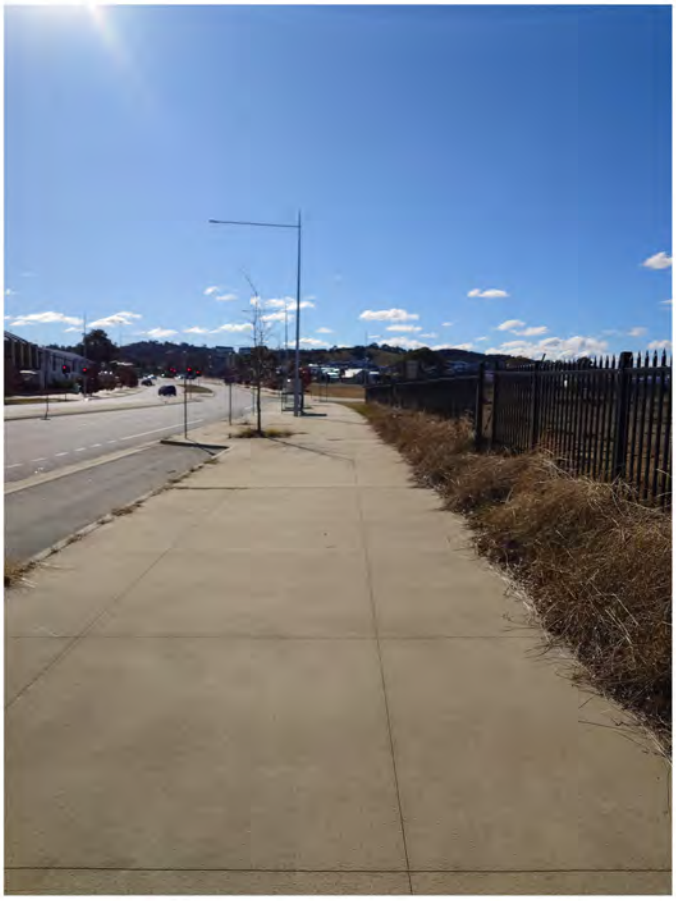


Photo #49

Photo #50

Photo #51

Photo #52

Photo #53

Photo #54

Photo #55

Photo #56

Photo #57

Photo #58

Photo #59

Photo #60

Appendix E

Brown Consulting EDP Report for Moncrieff West Estate

BROWN

Estate Development Plan Report

Moncrieff West

March 2014

C11075

Urban Development

Land Development Agency

Smart Consulting

COMMERCIAL IN CONFIDENCE

Brown Consulting (ACT) Pty Ltd
Level 6
121 Marcus Clarke Street
CANBERRA CITY ACT 2601

Ph: (02) 6211 7100

2013

DOCUMENT CONTROL

Moncrieff West Estate Development Plan Report

Issue	Date	Issue Details	Author	Checked
0	16/01/2012	Draft		
2	17/12/2012	Final	I. Mobbs	
V1	24/10/2013	Rewrite for EDP redesign to address Code changes – Submission November 2013	PL, JE	HR, PL
V2	05/02/2014	Adjusted to address comments on first EDP submission	PL, JE	HR, PL
V3	19/03/2014	ESDD submission with entity endorsements	PL, JE	HR, PL

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Tables

APPENDICES

1. Introduction

A Concept Plan was prepared for the suburb of Moncrieff in December 2008. In addition a Moncrieff Master Plan Guideline was produced by the LDA. This Estate Development Plan (EDP) incorporates the key planning objectives and principles outlined in the Concept Plan and Guideline.

The Moncrieff West Estate Development Plan provides the important planning requirements as the basis of future detail planning and development of the suburb. The EDP for Moncrieff East has been prepared by Indesco in parallel with this EDP for Moncrieff West to permit coordination of the EDP's for these two projects.

Moncrieff West Residential Estate is being developed by the ACT Government. It is being managed by the Land Development Agency, an agency established to develop land in the ACT on behalf of the Territory in accordance with the principles and policies laid down in the Territory Plan.

This Moncrieff West Estate Development Plan provides for 415 blocks, consisting of 7 multi-unit sites and two Commercial Sites. The estate contains blocks for; one or two storey housing and 2 - 4 storey multi-unit sites. Affordable Housing has been provided up to 20.3%.

Included within this EDP is the extension of Mirrabei Drive which passes through the middle of the suburb of Moncrieff together with provision for a future IPT route to the Moncrieff Group Centre and is to be designed and constructed with the Estate. The extension of Horse Park Drive adjacent to Moncrieff West has recently been designed and is currently under construction as Capital Works.

The Moncrieff EDP is supported by the subject plans listed below:

DRAWING SCHEDULE

Drawing Number	Plan Number	Drawing Title
C11075-CS+	0.1	Cover Sheet
C11075-DS+	1.1	Drawing Schedule
C11075-EDP.1+	2.1	Estate Development Plan Sheet 1 of 4
C11075-EDP.2+	2.2	Estate Development Plan Sheet 2 of 4
C11075-EDP.3+	2.3	Estate Development Plan Sheet 3 of 4
C11075-EDP.4+	2.4	Estate Development Plan Sheet 4 Of 4
C11075-BDP.1	3.1	Block Details Plan Sheet 1 of 4
C11075-BDP.2	3.2	Block Details Plan Sheet 1 of 4
C11075-BDP.3	3.3	Block Details Plan Sheet 1 of 4
C11075-BDP.4	3.4	Block Details Plan Sheet 1 of 4
C11075-LP+	4.1	Locality Plan
C11075-CMP+	5.1	Concept Master Plan
C11075-ST+	6.1	Staging Plan
C11075-LUP+	7.1	Land Use Plan
C11075-SAP+	8.1	Slope Analysis Plan
C11075-SWMP.1+	9.1	Stormwater Master Plan Catchment Layout Sheet 1 of 3
C11075-SWMP.2+	9.2	Stormwater Master Plan Catchment Layout Sheet 2 of 3
C11075-SWMP.3+	9.3	Stormwater Master Plan Catchment Layout Sheet 3 of 3
C11075-SWMP.4+	9.4	Stormwater Master Plan Sheet 1 of 4
C11075-SWMP.5+	9.5	Stormwater Master Plan Sheet 2 of 4
C11075-SWMP.6+	9.6	Stormwater Master Plan Sheet 3 of 4

Drawing Number	Plan Number	Drawing Title
C11075-SWMP.7+	9.7	Stormwater Master Plan Sheet 4 of 4
C11075-WSUD+	10.1	Water Sensitive Urban Design Outcomes Plan
C11075-SMP.1+	11.1	Sewer Master Plan Catchment Layout Sheet 1 of 3
C11075-SMP.2+	11.2	Sewer Master Plan Catchment Layout Sheet 2 of 3
C11075-SMP.3+	11.3	Sewer Master Plan Catchment Layout Sheet 3 of 3
C11075-SMP.4+	11.4	Sewer Master Plan Sheet 1 of 5
C11075-SMP.5+	11.5	Sewer Master Plan Sheet 2 of 5
C11075-SMP.6+	11.6	Sewer Master Plan Sheet 3 of 5
C11075-SMP.7+	11.7	Sewer Master Plan Sheet 4 of 5
C11075-SMP.8+	11.8	Sewer Master Plan Sheet 5 of 5
C11075-WMP+	12.1	Water Supply Master Plan
C11075-LMP.1	13.1	Landscape Master Plan Sheet 1 of 4
C11075-LMP.2	13.2	Landscape Master Plan Sheet 2 of 4
C11075-LMP.3	13.3	Landscape Master Plan Sheet 3 of 4
C11075-LMP.4	13.4	Landscape Master Plan Sheet 4 of 4
C11075-TMP.1	14.1	Tree Management Plan Sheet 1 of 4
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C11075-TMP.3	14.3	Tree Management Plan Sheet 3 of 4
C11075-TMP.4	14.4	Tree Management Plan Sheet 4 of 4
C11075-TIP.1+	14.5	Tree Impact Plan - Sheet 1 of 3
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C11075-TIP.3+	14.6	Tree Impact Plan - Sheet 3 of 3
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C11075-BCP.2	15.2	Block Compliance Plan Sheet 2 of 4
C11075-BCP.3	15.3	Block Compliance Plan Sheet 3 of 4
C11075-BCP.4	15.4	Block Compliance Plan Sheet 4 of 4
C11075-RHP.1+	16.1	Road Hierarchy And Traffic Analysis Sheet 1 of 2
C11075-RHP.2	16.2	Road Hierarchy And Traffic Analysis Sheet 2 of 2
C11075-RDP.1+	17.1	Road Details Plans Special Road Features Sheet 1 of 3
C11075-RDP.2+	17.2	Road Details Plans Special Road Features Sheet 2 of 3
C11075-RDP.3+	17.3	Road Details Plans Special Road Features Sheet 3 of 3
C11075-RDP.4+	17.4	Road Details Plans Sight Distance Sheet 1 of 3
C11075-RDP.5+	17.5	Road Details Plans Sight Distance Sheet 2 of 3
C11075-RDP.6+	17.6	Road Details Plans Sight Distance Sheet 3 of 3
C11075-RDP.7+	17.7	Road Details Plans Vehicle Turning Paths Sheet 1 of 12
C11075-RDP.8+	17.8	Road Details Plans Vehicle Turning Paths Sheet 2 of 12
C11075-RDP.9+	17.9	Road Details Plans Vehicle Turning Paths Sheet 3 of 12
C11075-RDP.10+	17.10	Road Details Plans Vehicle Turning Paths Sheet 4 of 12
C11075-RDP.11+	17.11	Road Details Plans Vehicle Turning Paths Sheet 5 of 12
C11075-RDP.12+	17.12	Road Details Plans Vehicle Turning Paths Sheet 6 of 12
C11075-RDP.13+	17.13	Road Details Plans Vehicle Turning Paths Sheet 7 of 12
C11075-RDP.14+	17.14	Road Details Plans Vehicle Turning Paths Sheet 8 of 12
C11075-RDP.15+	17.15	Road Details Plans Vehicle Turning Paths Sheet 9 of 12
C11075-RDP.16+	17.16	Road Details Plans Vehicle Turning Paths Sheet 10 of 12

Drawing Number	Plan Number	Drawing Title
C11075-RDP.17+	17.17	Road Details Plans Vehicle Turning Paths Sheet 11 of 12
C11075-RDP.18+	17.18	Road Details Plans Vehicle Turning Paths Sheet 12 of 12
C11075-XS.1+	18.1	Typical Cross Sections Layout & Chainage Plan Sheet 1 of 4
C11075-XS.2+	18.2	Typical Cross Sections Layout & Chainage Plan Sheet 2 of 4
C11075-XS.3+	18.3	Typical Cross Sections Layout & Chainage Plan Sheet 3 of 4
C11075-XS.4+	18.4	Typical Cross Sections Layout & Chainage Plan Sheet 4 of 4
C11075-XS.5	18.5	Typical Road Cross Sections Sheet 1 of 6
C11075-XS.6	18.6	Typical Road Cross Sections Sheet 2 of 6
C11075-XS.7	18.7	Typical Road Cross Sections Sheet 3 of 6
C11075-XS.8	18.8	Typical Road Cross Sections Sheet 4 of 6
C11075-XS.9	18.9	Typical Road Cross Sections Sheet 5 of 6
C11075-XS.10	18.10	Typical Road Cross Sections Sheet 6 of 6
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C11075-LS.02	19.2	Longitudinal Sections - Road 02
C11075-LS.03	19.3	Longitudinal Sections - Road 03 - Sheet 1 of 4
C11075-LS.04	19.4	Longitudinal Sections - Road 03 - Sheet 2 of 4
C11075-LS.05	19.5	Longitudinal Sections - Road 03 - Sheet 3 of 4
C11075-LS.06	19.6	Longitudinal Sections - Road 03 - Sheet 4 of 4
C11075-LS.07	19.7	Longitudinal Sections - Road 04
C11075-LS.08	19.8	Longitudinal Sections - Road 05
C11075-LS.09	19.9	Longitudinal Sections - Road 06 - Sheet 1 of 3
C11075-LS.10	19.10	Longitudinal Sections - Road 06 - Sheet 2 of 3
C11075-LS.11	19.11	Longitudinal Sections - Road 07 - Sheet 1 of 2
C11075-LS.12	19.12	Longitudinal Sections - Road 07 - Sheet 2 of 2
C11075-LS.13	19.13	Longitudinal Sections - Road 08
C11075-LS.14	19.14	Longitudinal Sections - Road 09 - Sheet 1 of 2
C11075-LS.15	19.15	Longitudinal Sections - Road 09 - Sheet 2 of 2
C11075-LS.16	19.16	Longitudinal Sections - Road 10 - Sheet 1 of 2
C11075-LS.17	19.17	Longitudinal Sections - Road 10 - Sheet 2 of 2
C11075-LS.18	19.18	Longitudinal Sections - Road 11 - Sheet 1 of 2
C11075-LS.19	19.19	Longitudinal Sections - Road 11 - Sheet 2 of 2
C11075-LS.20	19.20	Longitudinal Sections - Road 12
C11075-LS.21	19.21	Longitudinal Sections - Road 13
C11075-LS.22	19.22	Longitudinal Sections - Road 14
C11075-LS.23	19.23	Longitudinal Sections - Road 15
C11075-LS.24	19.24	Longitudinal Sections - Road 16
C11075-LS.25	19.25	Longitudinal Sections - Mirrabei Drive - Sheet 1 of 3
C11075-LS.26	19.26	Longitudinal Sections - Mirrabei Drive - Sheet 2 of 3
C11075-LS.27	19.27	Longitudinal Sections - Mirrabei Drive - Sheet 3 of 3
C11075-LS.28	19.28	Longitudinal Sections - Lane 01
C11075-PTNM.1+	20.1	Public Transport Network Systems
C11075-PTNM.2+	20.2	Off Road Movements Systems Moncrieff And Surrounds
C11075-PTNM.3+	20.3	Off Road Movements Systems Moncrieff West
C11075-PP.1+	21.1	On Street Parking Plan Sheet 1 of 4

Drawing Number	Plan Number	Drawing Title
C11075-PP.2+	21.2	On Street Parking Plan Sheet 2 of 4
C11075-PP.3+	21.3	On Street Parking Plan Sheet 3 of 4
C11075-PP.4+	21.4	On Street Parking Plan Sheet 4 of 4
C11075-WCP+	22.1	Waste Collection Plan
C11075-BEP.1	23.1	Building Envelope Plan
C11075-DIP.1	24.1	Development Intentions Plan Sheet 1 of 8
C11075-DIP.2	24.2	Development Intentions Plan Sheet 2 of 8
C11075-DIP.3	24.3	Development Intentions Plan Sheet 3 of 8
C11075-DIP.4	24.4	Development Intentions Plan Sheet 4 of 8
C11075-DIP.5	24.5	Development Intentions Plan Sheet 5 of 8
C11075-DIP.6	24.6	Development Intentions Plan Sheet 6 of 8
C11075-DIP.7	24.7	Development Intentions Plan Sheet 7 of 8
C11075-DIP.8	24.8	Development Intentions Plan Sheet 8 of 8
C11075-BTP.1	25.1	Block Typology Plans
C11075-BMP+	26.1	Bush Fire Risk Assessment And Management Plan
C11075-SG.1+	27.1	Fill Plan Sheet 1 of 4
C11075-SG.2+	27.2	Fill Plan Sheet 2 of 4
C11075-SG.3+	27.3	Fill Plan Sheet 3 of 4
C11075-SG.4+	27.4	Fill Plan Sheet 4 of 4
C11075-EMCP.1+	28.1	Environmental Management Concept Plan Sheet 1 of 4
C11075-EMCP.2+	28.2	Environmental Management Concept Plan Sheet 2 of 4
C11075-EMCP.3+	28.3	Environmental Management Concept Plan Sheet 3 of 4
C11075-EMCP.4+	28.4	Environmental Management Concept Plan Sheet 4 of 4
C11075-US.1+	29.1	Utilities Services Plan
C11075-US.2+	29.2	Utilities Services Shared Trench Detail
C11075-FP+	30.1	Fencing Plan
C11075-PCP.1	31.1	Planning Control Plan Sheet 1 of 4
C11075-PCP.2	31.2	Planning Control Plan Sheet 2 of 4
C11075-PCP.3	31.3	Planning Control Plan Sheet 3 of 4
C11075-PCP.4	31.4	Planning Control Plan Sheet 4 of 4
C11075-MIR.1	32.1	Mirrabei Drive - General Arrangement - Sheet 1 of 3
C11075-MIR.2	32.2	Mirrabei Drive - General Arrangement - Sheet 2 of 3
C11075-MIR.3	32.3	Mirrabei Drive - General Arrangement - Sheet 3 of 3
C11075-MIR.4	32.4	Mirrabei Drive - Traffic Control Devices - Sheet 1 of 3
C11075-MIR.5	32.5	Mirrabei Drive - Traffic Control Devices - Sheet 2 of 3
C11075-MIR.6	32.6	Mirrabei Drive - Traffic Control Devices - Sheet 3 of 3
C11075-MIR.7	32.7	Mirrabei Drive - Traffic Control Devices - Road 1/Road 2 Intersection
C11075-MIR.8	32.8	Mirrabei Drive - Traffic Control Devices - Road 5 Intersection
C11075-ELEC.1	34.1	Electrical Services Masterplan
C11075-IDP.1	35.1	Integrated Development Plans

The drawings listed above meet the requirements of the ACTPLA *Guidelines for the Preparation of Estate Development Plans*, May 2009.

1.1 Background

Moncrieff West forms part of the Moncrieff Concept Plan completed in 2008. LDA intends to commence the release of this land for development in the 2013-2014 financial year. A number of detailed studies have been undertaken including:

- Flora and Fauna;
- Aboriginal and Cultural Heritage;
- Contamination assessment;
- Infrastructure services.
- EPBC Referral
- Environmental Impact Statement

1.2 Site Characteristics

1.2.1 Location

Moncrieff is bounded by Horse Park Drive to the north and west, Amaroo to the east and Ngunnawal to the south. This EDP for Moncrieff West generally includes development to the west of the proposed extension to Mirrabei Drive and incorporates the Group Centre to the north east of the site.

The site is strategically positioned within 3 kilometres from Gungahlin Town Centre. Canberra's highest order commercial centre, Civic is a distance of 18.5 kilometres from the site. Belconnen Town Centre is at a closer distance of approximately 13.0 kilometres.

1.2.2 General Landform, Views and Drainage

The Moncrieff West site is distinctive, characterised by undulating topography. One distinct high point exists in the central portion of Moncrieff West with the majority of the site falling from this point

This outlook from Moncrieff West to the North takes in views of the future subdivision of Taylor while views to the south pickup parts on Ngunnawal.

The site is also characterised by a small water course running north with a major water course running east west in the southern boundary of the site.

Together these features create a memorable landscape and provide an opportunity to deliver a highly desirable landscaped residential community.

The landform consists of relatively flat terrain of 2.5% on the western portion, with slopes of approximately 14% surrounding the main hill.

1.2.3 Existing Vegetation and Habitat

Moncrieff West is characterised by open grasslands with scattered Eucalypts to the south. There is a large stand of Eucalypts of varying species, with a significant number of excellent trees to the north of the main the hill.

There is a large mixed species forward planting group of trees within the centre of the site however there are no significant trees within the plantation.

1.3 Heritage

Navin Officer undertook heritage investigations in 2009, prepared a Conservation Management Plan in 2010 and undertook detailed heritage investigations and collections culminating in a report prepared in in 2011. A copy of the Conservation Management Plan and report on investigations and collections are attached in **Appendix G**.

1.4 Planning Context

This EDP has been prepared to respond to the provisions of the Territory Plan, the Moncrieff West Concept Plan and ACT Government "Affordable Housing Action Plan – 2007".

The EDP addresses the following requirements and components which are detailed below:

- Land-use plans consistent with the Territory Plan
- Identification of the mandatory Planning Requirements
- Detailed subdivision design, and where appropriate, development controls
- A solar audit in accordance with Estate Development Code
- A tree survey and assessment report
- A landscape master plan plus a tree retention plan and a tree management report detailing any proposed activity for all tree proposed for retention, pruning or removal
- Master Plans for sewer, water and stormwater systems including details of sustainable urban stormwater initiatives, road hierarchy plan, drainage plan, longitudinal sections and pathways.

The land is defined as 'Residential, and Commercial'. There are no gazetted or constructed roads on the Moncrieff West site.

The Estate Development Plan has been prepared to satisfy the requirements of the Estate Development Code, October 2013. A table addressing each rule and criteria of this Code is included in **Appendix A**.

1.5 Gungahlin Strategic Assessment

The LDA has received approval from both the Federal and the ACT Government to The Plan to undertake urban and related development in the Gungahlin district of Canberra, (and in particular to the proposed area of Moncrieff) as described in the *Gungahlin Strategic Assessment Biodiversity Plan Final* (ACT Economic Development Directorate and ACT Environment and Sustainable Development Directorate, June, 2023) and this approval has been endorsed under the EPBC Act.

An approval under section 146B of the EPBC Act (strategic assessment provisions) has the same effect as an approval given under Part 9 of the Act. Actions approved under this decision do not require separate referral, assessment or approval under the EPBC Act.

A Section 2.11 EIS exemption under the Planning and Development ACT (2008) is nearing completion and Ministerial sign off is expected to be received by mid November 2013.

2. Moncrieff Concept Plan Planning Principles

The following planning principles were adopted for the Concept Plan and informed this development proposal:

Planning Principles	Development Proposal
The development of the suburb shall be sustainable in terms of economic, social, cultural and economic.	The development has been designed to provide a mix of dwellings that will ensure that the suburb is sustainable.
The development of the suburb shall be sustainable in terms of economic, social, cultural and economic.	The development has been designed to provide a mix of dwellings that will ensure that the suburb is sustainable.
The local neighbourhood is to be based on a walkable radius of 400m and focused on an activated along transport routed node such as shops or community use	A central playground has been provided that allows for pedestrian movement within a 400m radius. A group centre has been provided in accordance with the important planning requirements of the concept plan which is within walking distance of higher density dwellings, bus stops are provided within 400m radius of dwellings.
The road hierarchy should be legible and provide good safe access for all users and encourage high levels of public transport usage	The road network is simple and legible. Bus stops have now been incorporated into the plan to support and encourage public transport usage. Provision is made for future IPT to Moncrieff Group Centre.
Subdivision design should encourage housing diversity and optimism solar orientation. Higher density residential development is to be located around activity nodes	The subdivision design has provided housing diversity in accordance with market advice. Higher density development has been provided adjacent the proposed Group Centre. The estate satisfies the Estate Development Code requirements for solar access.
Aboriginal and historic places are to be recognised and significant sites conserved in public open space, where appropriate	The noted historic fence is unable to be conserved due to OH&S aspects. The design incorporates feature markers to indicate its location within the Hill Top open space. Refer to Landscape Masterplan drawing 13.2 for the location.
A Group Centre to be located at the intersection of Horse Park and Mirrabei Drives. The precinct design shall be based on the urban village. Each of the intersecting roads shall be designed as urban boulevards, with at-grade pedestrian crossings	The group Centre has been located as per the Concept Plan. At grade crossings on the intersecting roads have raised kerbs to address bus movements at intersection. Mirrabei Drive is designed as an urban boulevard rather than an arterial road as agreed with TaMS. The Group Centre, community facilities and CZ5 blocks address the intersection of Mirrabei Drive and Road 05 to create the urban village.
Significant hilltops and ridges to be retained in urban open space	The significant hill top in Moncrieff West has been retained. This hill top has also been linked towards the main open space running between Ngunnawal and Moncrieff
Incorporate Water Sensitive Design Elements such as retention ponds, swales and rainwater gardens for sustainable stormwater management and achieve targets identified in the Waterways – water Sensitive urban design general Code	Water sensitive design elements including swales, retention ponds and wetlands have been included in the design.

3. Moncrieff Concept Plan Planning Requirements

3.1 Dwelling Numbers and Housing Mix

The following section demonstrates how the development proposal for Moncrieff West meets the requirements of the Concept Plan by providing a variety of different housing and block types.

3.1.1 Dwelling Yield

Table 1 Moncrieff West Block Yield

BLOCK TYPE	BLOCK WIDTH	BLOCK DEPTH	DESCRIPTION	TOTAL
SR1 <250 m^2	9m	17m	Attached/Duplex	79
SR3 351-450 m^2	14-20	20-30m	Detached 1 and 2 storey	62
SR4 451-650 m^2	15-22	30m	Detached 1 and 2 storey	204
SR5 >651 m^2	≥22m	30m	Detached 1 and 2 storey	61
Community Use				2
Multi-unit (229 dwellings)			2 -4 storey	4
Mixed Use (245 dwellings)				2
			STAGE TOTAL	**414**

3.1.2 Housing Mix

The proposed subdivision results in the provision of a total of 414 blocks, which comprise 406 residential blocks and 4 multi-unit blocks, 2 mixed use site and 2 Commercial Block. The housing mix is reflected in the varying block areas and dimensions, with block sizes range from 210 m^2 to 1110 m^2. This will provide options to cater to a wide range of markets, provide affordability and choice, and promote housing design and innovation.

Affordable Housing has been provided within Moncrieff West with at least 20% of dwellings meeting the affordable housing obligations set out in the "Affordable Housing Action Plan 2007".

Consideration has been given to ensure that dwellings can be sighted to enable that their northern facades receive adequate sunshine in winter. A number of specific housing planning controls are proposed to promote high quality housing, improved resident amenity and high quality built form. The controls will ensure that solar access and private open space comply with the Territory Plan requirements.

The small blocks are generally orientated north south to enable compliance with the Block Compliance Tables.

One of the key objectives is to offer a range of housing types to encourage affordability and social mix. The proposal therefore provides a variety of specific housing typologies and corresponding specific block sizes to cater for such a mix throughout the Estate. The mix of housing types has been produced to create attractive and varied streetscapes. The outcome of the built form selection will introduce a strong sense of cohesiveness and contribute to community character and identity.

The dwelling mix consists of dwelling types:

- Single/two storey detached homes on blocks >500 m^2 which meet the requirements of the Territory Plan
- Single/two storey detached homes set on blocks 251-500 m^2
- Attached/duplex homes set on compact blocks up to 250 m^2
- Multi-unit dwellings 2 to 4 storey

3.2 Commercial Site

A site of 1.5Ha has been provided for the Group Centre, which includes a supermarket of approximately 2500m^2 and a retail component of 1500m^2.

The expected parking generation from this site has been calculated at 155 car parks, plus disabled parking. This is based on applying 5/100m^2 GFA for the store area and 2/100m^2 GFA for the shop area in accordance with the ACT Parking Code.

The Development Intentions Plan 34.4 demonstrates how the supermarket, retail, parking and semi-trailer access can be provided on the nominated 1.5Ha site.

3.3 Community Facility Site(s)

A site of 5Ha has been provided for a potential school, this is located in Moncrieff East EDP. The school site has been quarantined from Moncrieff EDP's in response to DET's ongoing demographic studies, which may move the school to Taylor.

A site of 1.0Ha has been provided adjacent the Group Centre for a community facility. Given the steep nature of the main hill top open space within Moncrieff West, it has not been considered for future small-scale community facilities.

3.4 Subdivision

The development proposal for Moncrieff West has been prepared to include all of the following:

- Pathways have been provided within the estate that link to existing or proposed future development.
- All blocks conform to the solar compliance tables.
- Housing diversity has been provided, with increased density provided along Horse Park Drive and adjacent the Commercial/Community precinct.
- The majority of road orientation allows for distant views out of the site, with the main central park area maintaining a visual link down the open space between Ngunnawal and Moncrieff West.
- Mirrabei Drive maintains distant views to both the north and south.

3.5 Roads and Access

The development proposal for Moncrieff West has been prepared to include of the following:

- Extension of Mirrabei Drive to Horse Park Drive. Mirrabei Drive is a major collector urban boulevard.
- Access to Moncrieff has been provided from Horse Park and Mirrabei Drive in a way that minimises rat running.
- Edge roads have been used as buffers between residential areas, open space areas and Horse Park Drive.
- Proposed street trees strengthen and enhance the different road hierarchy.

3.6 Public Transport and Inter-town Public Transport Route

The development proposal for Moncrieff West has been prepared to include of the following:

- The Inter-town Public Transport (IPT) corridor has been provided along Mirrabei Drive, with a terminus located at the commercial/community precinct.
- Bus routes and bus stops have been located to ensure at least 90% of dwellings are within 400m radius.

3.7 Pedestrian / Cycle Network

The development proposal for Moncrieff West has been prepared to include of the following:

- Pedestrian paths are provided along all streets, both sides of the roads.
- On road and off road paths connect across the Estate, connect the open space areas and link to existing networks along Horse Park Drive and Ngunnawal

3.8 Equestrian Trails

The development proposal for Moncrieff West does not impact on the existing equestrian trails.

3.9 Open Space

The development proposal for Moncrieff West has been prepared to include of the following:

- Native plants indigenous to the area have been incorporated where possible, with hills and significant internal ridges protected from development and enhanced with native vegetation.
- No development is on eastern escarpment.
- Open space spines retain existing drainage paths and the areas retained as Urban Open Space.
- Local parks and playgrounds are provided through the suburb.

3.10 Suburb Entry Features

Strong distinctive entry features including signage and formal planting is proposed at Mirrabei Drive roundabout, with formal planting proposed at Horse Park Drive Intersection.

3.11 Trees

Exceptional value trees have been retained in open space and the majority of the high value trees also retained in areas of open space, road reserves and within large blocks.

3.12 Water Sensitive Urban Design

The development proposal for Moncrieff West has been prepared to include of the following:

- Water quality control ponds and wetlands for catchment in the south west;
- Swale drains are provide at edge roads along Horse Park Drive and
- Permeable kerb on edge roads adjacent open space areas.

3.13 Urban Edge Treatment

The development proposal of the open space areas for Moncrieff West have included off-road paths that connect through the Estate and beyond into the adjacent suburbs and a playground located in the Hill Top reserve.

3.14 Staging of Development

The first stage of Moncrieff West is the southern section which can be accessed from the existing Mirrabei Drive. The second and third stages are to follow stage one, however as the Horse Park Drive extension is nearing completion, there is the potential to have stage one and two proceed concurrently.

3.15 Infrastructure/Services

Trunk infrastructure (stormwater, sewerage and water) along Horse Park Drive is nearing completion to allow connections for Moncrieff West to the north.

Trunk infrastructure connections for southern section are proposed as part of the Estate works.

Sewer and electricity are the only services identified that requires a significant extension from Ngunnawal to service Moncrieff.

3.16 Further Studies

The following investigations have been undertaken to support the development of Moncrieff:

- a tree survey and assessment, available on request;
- a contamination assessment report, Appendix H;
- an environmental assessment as part of the Gungahlin Strategic Assessment;
- a heritage assessment report, Appendix G;
- a bushfire risk assessment, Appendix C;
- an engineering/infrastructure/services assessment, included in the Estate Development Plan Documentation;
- a traffic and noise assessment, Appendix B and F;
- a geotechnical assessment, currently underway by Douglas and Partners;
- water sensitive urban design measures, included in the Estate Development Plan Documentation;
- an assessment to determine if aged person facilities are required, Appendix J.

4. Specific Planning Objectives and Principles

A set of objectives and specific planning principles were developed for the Estate as part of the planning process. They incorporate best practice design and planning principles of “Liveability” and “Sustainability” as well as embrace the overarching planning objectives, principles, and policies identified in the Territory Plan for development of residential areas. The EDP conforms to the requirements of the Estate Development Code.

4.1 Objectives

The Estate design meets all the following objectives:

- Maximises lifestyle opportunities.
- Provides a subdivision that is attractive, safe, convenient, easily walkable and accessible to public transport.
- A responsive and memorable planned place.
- Creating a community heart.
- Creating a connective network of green streets.
- Provides a distinctive urban character precinct with good building diversity.
- Provides a suburban character precinct with efficiency in block subdivision.
- Creating series of open spaces including a central hilltop park with children's playground, wetland ponds, sloping grasslands, woodlands, path linkages, seating with varied views and an urban hub plaza environment at the Group Centre.
- Offers a range of housing types to encourage social mix.

4.2 Principles

This section summarises key planning considerations used as a basis for developing the Estate Development Plan for Moncrieff West.

- The introduction of a collector road / bus route through Moncrieff West. Deviation of this route around the central hill to ensure maximum road grades are not exceeded.
- The introduction of a number of visual corridors through the site to capture the view of the central hill spine.
- Retention of a number of significant trees in the main open space park which provide habitat to the superb parrot and other fauna.
- Retention of grassland and open woodland in the open space to retain and enhance biodiversity.
- Enhancement of the creek corridor and its ecosystem to the south.
- Achieving optimum number of dwellings units on site consistent with identified constraints.
- Enhance verge width to emphasize entry into the estate.
- Provision of entry feature for wayfinding and landmarking.
- Provide dual carriageway road entry to further reinforce the entry into the estate from Horse Park Drive.
- Creation of a connective pedestrian network to serve the needs of the local community and surrounding neighbourhoods.
- Ensure that bushfire protection measures are integrated into the estate.
- Satisfy solar access requirements of the Estate Development Code.
- Extension of Mirrabei Drive through the estate to Horse Park Drive.
- Provision of an IPT corridor through the estate to the Moncrieff Group Centre and community facility.
- Provision of Moncrieff Group Centre and community facility.
- Higher density development in close proximity to the collector roads, Group Centre and IPT terminus.

5. Site Planning Potentials and Constraints

5.1 Potentials

Develop the EDP within the framework of the LDA master plan.

Ensure that the planning and design principles of the Moncrieff Concept Plan are incorporated into the EDP.

Capitalize on views to natural features within and beyond the site to Canberra landmarks.

Ensure that road hierarchy and open space pedestrian linkages interfaces with Moncrieff East.

5.2 Constraints

A number of constraints have been addressed in the development of the EDP, these are:

- A number of drainage easements will be required to pass through the site. These would ideally be contained within the road corridors.
- Steep terrain, particularly towards the central portion of the development.
- Upstream catchments from the adjoining future suburb of Taylor.
- Noise from the adjoining Horse Park Drive and Mirrabei Drive.
- Existing high value trees.
- Existing exceptional trees
- South facing slopes
- Grassland and open woodland
- Incorporating a future light rail , inter town public transport corridor and terminus

Refer to Appendix O – which outlines the subdivision planning concept which aimed to maximise the retention of trees for the proposed estate layout.

5.3 Planning Assumptions

The Estate Development Plan includes the following key elements:

A simple, legible and permeable road and pedestrian network which responds to identified design generators. These include natural drainage patterns, aspect and prospect. The block and section layout ensures that the maximum number of blocks obtain optimal solar access.

One playground site has been proposed within the site adjacent to a number of large significant trees.

Open space pedestrian linkages are wheel chair accessible where this can be accommodated with the existing topography.

- 406 residential blocks and 4 multi-unit blocks, 2 mixed use site and 2 Commercial Blocks (Local Centre) in Moncrieff West will allow for a diverse housing choice. The estate provides for 1 or 2 storey detached and attached dwellings to suit various block sizes.

6. Planning Proposal

The EDP responds to the requirements expressed in the Territory Plan – Estate Development Code (2013) and the Moncrieff Concept Plan (2008).

6.1 Urban Design Objectives

The urban design responds to the objectives outlined below:

- Maximise life style opportunities;
- Develop an integrated, diverse community with a strong identity and sense of place;
- Provide a high level of permeability and connectivity with adjoining estates;
- Provide ease of pedestrian movement both from within Moncrieff West to Moncrieff East
- Maximise Investment opportunity through ensuring quality design and delivery;
- Provide safe, compact and walkable residential precincts with easy access to recreational, retail-commercial and community facilities;
- Provide high quality, affordable, commercially viable, ecologically sustainable development;
- Ensure flexibility to meet the changing needs of the market through diverse house designs;
- Provide a variety of living options and affordable housing
- Design for efficiency of land use and increased amenities;
- Maximise the opportunity for visual and physical linkages throughout the site;
- Allow good pedestrian permeability while respecting the need to create safe and secure living environments;
- Optimise the opportunities for active and passive recreation within the precinct;
- Provide for a range of dwelling designs which address contemporary lifestyle, economic constraints and current market styles;
- Create a unique landscape setting providing an attractive public realm and opportunities for communal/social participation and reinforcement by the future residents.
- Provide a group centre with direct linkages to pedestrian street

6.1.1 Urban Design Principles

General

- Planning and development of Moncrieff West should incorporate environmental, social, cultural and economic sustainability principles;
- Detailed planning is to take advantage of the natural, cultural and heritage characteristics of the area to support and strengthen the community's identity;
- Deliver high quality, commercially viable, ecologically sustainable development;

Vehicular and Pedestrian Networks

- Provide a legible and connected road layout and pedestrian / cycle network;
- The local neighbourhood is based on easy walkable distances, and focus on an activity node such as a neighbourhood park;
- The road hierarchy should be legible, connected to the wider network and provide good and safe access for all users and support high levels of public transport usage;

- Roads include adequate on street parking, wide verges, street trees and pedestrian friendly walkways.
- Provide quiet leafy streets;
- Mirrabei Drive extension connecting to Horse Park Drive and Moncrieff Group Centre

6.2 Compliance with Planning Codes

The Territory Plan Estate Development Code guided the planning and design of the Master plan and Estate Development Plan including neighbourhood planning - street networks, block layout, and open space, physical infrastructure - construction and design of streets and on street parking, utilities, waste management, as well as storm water and integrated catchments management.

6.2.1 Estate Development Code – 4 October Issue

The development of Moncrieff West was prepared two years prior the introduction of the updated Estate Development Code. The project was then subsequently lodged for an EPBC, Section 146B approval in relation to the Gungahlin Strategic Assessment Plan and approval provided in 2013.

The proposed estate layout was assessed against the requirements of the new Estate Development Code. It was identified that the proposed layout was generally compliant to the new code, with the exception of shared path widths. In consultation with TaMS the proposed shared path network layout and nominated width of paths was developed and endorsed by TaMS. The noted exemptions to path widths have been identified in the table shown on drawing C11075-RHP.1 Plan 16.2 and associated typical cross section drawings.

6.2.2 Neighbourhood Design

The proposal meets the general intent and performance criteria of the Territory Plan in that the Estate is designed to provide a safe, convenient, accessible and attractive neighbourhood which meets the diverse and changing needs of the community. Refer also to the Section 4.1, which outlines the objectives of the design

6.2.3 Street Networks

The proposal meets the general intent and performance criteria of the Territory Plan in that the street network of the Estate is designed to have a clear and legible layout that is accessible, safe and convenient for all users. Refer also to Section 4.1.

6.2.4 Pedestrian and Cyclist Facilities

The proposal meets the general intent and performance criteria of the Territory Plan in that the street layout and associated paths encourage walking and cycling and that the network is safe and accessible for cyclists and pedestrians.

Paths are to be provided to both sides of the street in association with paths on the extremities of the estate that link to other suburbs.

6.2.5 Public Transport

The proposal meets the general intent of the rules and criteria outlined in the Territory Plan and the Moncrieff Concept Plan.

6.2.6 Public Open Space

The proposal meets the general intent and performance criteria of the Territory Plan. The design of the Moncrieff West Estate provides for attractive and accessible public open space that considers community requirements and

which incorporates landscaping and place-making elements that contribute to the character and identity of the Estate and relates to Moncrieff East.

Refer also to the Landscape Master Plan (LMP.1-4, 13.1-13.4) for information on the provision of facilities and play structures.

6.2.7 Block Layout and Building Envelope Plans

The EDP drawing, meets the general intent and performance criteria of the Territory Plan. The layout of the sections and blocks in Moncrieff West correlates to the road layout. The layout of blocks attempts to maximize internal and external solar access for housing, maximize street address, increase housing mix and provides diversity in response to site features. Dwellings allocated as meeting the "Affordable Housing Plan" objectives have been strategically located close to open parkland and are accessible to other nearby community amenities.

The layout of sections and blocks allows for a wide range of block size, block layout and therefore housing mix, in response to market analysis and consumer demands. The variation in block size and typology and resultant mix of housing will allow attractive and varied streetscapes.

Where possible, houses address open space areas to increase surveillance opportunities and to maximize the interface with the public realm.

Where appropriate, blocks have been orientated to take advantage and maximise the external views and to capture the views to open space areas within the site.

Building Envelope Plans have been prepared for those blocks that do not comply with Appendix A – Block Compliance Table, but do comply with the Test Block requirements.

6.2.8 Utilities, Waste Management and Sediment and Erosion Control

For information relating to provision of utilities, refer to Section 14 of this document.

For information relating to Waste Management arrangements, refer to Section 22 of this document.

For information relating to Sediment and Erosion control, refer to Drawing C11075-EMCP1-29.1 TO 29.3.

6.2.9 Traffic Generation Numbers

Trip generation rates in Table 1A of the Estate Development Code have been adopted to calculate traffic generation for the development of Moncrieff West.

7. Traffic Analysis and Road Hierarchy

As part of an overall assessment of the development of Moncrieff West, an assessment of internal traffic generation and road hierarchy has been undertaken by Brown Consulting (refer to drawings C11075-RHP1 and RHP2). A traffic study for Mirrabei Drive was also undertaken by Brown Consulting to inform the design of this road, refer to **Appendix B** for a copy of this traffic study. Indesco are undertaking the EDP for Moncrieff East concurrently with the Moncrieff West EDP and the traffic study undertaken by Indesco was also referenced to inform the Moncrieff West traffic study.

Horse Park Drive extension from Mirrabei Drive to Burramurra Avenue has recently been designed by Brown Consulting and is currently under construction. These works provide a stub road into the estate at Mirrabei Drive and Road 04.

7.1 Road Hierarchy

A summary of the traffic assessment for Horse Park Drive, Mirrabei Drive and the Moncrieff West internal estate is provided below:

Horse Park Drive

Traffic volumes on Horse Park Drive adjacent Moncrieff were obtained from the Roads ACT EMME2 model with a 2031 traffic volume of 12,600vpd adopted as the design traffic volume. This traffic volume makes this section of Horse Park Drive an arterial road with a single carriageway. This EMME2 model assumed that Moncrieff, Taylor and Jacka were completed and fully occupied by 2031.

Two intersections are proposed from Horse Park Drive into Moncrieff West, one being at Mirrabei Drive, the second being approximately 500m west of Mirrabei Drive at the location indicated on the Territory Plan and the Moncrieff Concept Plan. In accordance with the Territory Plan and Moncrieff Concept Plan, the adjacent Taylor road network is to connect to both of these intersections. The EMME2 model showed that traffic volumes from the Taylor legs would be 12,500vpd at the Mirrabei Drive intersection and 6,230vpd onto the second intersection with Moncrieff. It is noted that these are large traffic volumes which require additional lanes on the Moncrieff legs of these intersections in order to reduce traffic queue lengths within Moncrieff.

A SIDRA analysis was undertaken for both intersections onto Horse Park Drive to determine their configuration. Both intersections are proposed to be traffic signals. The Mirrabei Drive intersection is to be constructed initially as a four way intersection with traffic signals. The western intersection is to be constructed initially as an unsignalised tee and upgraded to a signalised four way intersection when Taylor is constructed.

The Mirrabei Drive intersection is required to have two straight through lanes in all directions to reduce queue lengths. Double right turn lanes are required from Horse Park Drive in both east and west direction to reduce queue lengths which therefore requires two lanes on the southbound carriageway of Mirrabei Drive.

The western intersection only requires single lane in each direction on Horse Park Drive with dedicated right turn lanes in both directions. Due to the traffic volumes from Taylor, a dedicated through lane and right turn lane are required on the Moncrieff West leg (Road 04) of this intersection to reduce queue lengths within Moncrieff West. A central island is also required to create this right turn lane which in turn restricts the access to blocks fronting Road 04.

The Horse Park Drive road reserve boundary is proposed to be 45m wide adjacent Moncrieff West. This accommodates all works required for Horse Park Drive within the road reserve.

Mirrabei Drive Extension

A brief statement of results of traffic modelling for Mirrabei Drive is included in **Appendix B.**

Traffic volumes on Mirrabei Drive through Moncrieff were obtained from the Roads ACT EMME2 model with a 2031 traffic volume of 11,900vpd adopted as the design traffic volume. This traffic volume means Mirrabei Drive requires a minimum single carriageway. This EMME2 model assumed that Moncrieff, Taylor and Jacka were completed and fully occupied by 2031. It is noted that a micro-simulation model of Mirrabei Drive was not conducted, hence the adoption of the EMME2 model traffic volumes along this section of Mirrabei Drive.

The developable area of Tayler and Jacka used in the EMME2 model has subsequently been reduced as a result of the Gungahlin Strategic Assessment. It would be desirable to have ESDD update the ACT Government EMME model to reflect this change in population. However, it is considered that the outcome of the design of Mirrabei Drive would not change, albeit the traffic midblock and intersection performance would be improved.

Based on the nature, function and character of this section of Mirrabei Drive through Moncrieff, Roads ACT has agreed to classify Mirrabei Drive as a Major Collector road in keeping with the intent of the Concept Plan for an Urban Boulevard. This results in a 60km/hr speed limit, parallel parking, on street bus stops, 7.5m verges with large trees and housing front the road.

Two intersections are proposed onto Mirrabei Drive. One intersection, with Road 05, is approximately 150m south of Horse Park Drive and provides access to the proposed Moncrieff Group Centre, the community facility and the Moncrieff East estate including school. The traffic volume on this road is approximately 4,676vpd making it a collector road which is appropriate order for road hierarchy. The second intersection is approximately 420m south of Horse Park Drive with collector roads (Roads 01 and 02) running east and west into Moncrieff East and West in accordance with the Territory Plan and Moncrieff Concept Plan.

Due to the location of the potential Moncrieff School and Group Centre, a safe pedestrian crossing of Mirrabei Drive including for school children from Moncrieff West is considered essential to be provided. The landform does not permit a pedestrian underpass to be located along Mirrabei Drive within Moncrieff West, hence it is proposed to signalise both intersections along Mirrabei Drive to provide safe pedestrian crossings of Mirrabei Drive to the school and Group Centre. A SIDRA analysis of these signalised intersections has been provided in **Appendix B**. Dual carriageway is provided between Horse Park Drive and Road 01/02 to reduce queuing and improve intersection performance.

The Moncrieff Concept Plan requires provision for a future IPT along Mirrabei Drive to the Moncrieff Group Centre. A corridor reserved for the IPT has been provided on the eastern verge of Mirrabei Drive within the road reserve. Draft TCD drawings have been included in the EDP submission to detail the configuration of Mirrabei Drive; refer to drawings C11075-MIR4 to MIR8.

The intersection with Road 01 and 02 is also signalised to allow for the future light rail. This intersection and adjacent property boundaries have been designed to allow an intersection upgrade to occur in the future for the IPT crossing of Road 01. The current and ultimate intersection arrangement is shown on drawing 17.1.

The section of Mirrabei Drive south of Roads 01 and 02 merges to a single carriageway with a connection onto the existing roundabout on Mirrabei Drive. Dual carriageway is not required on this road due to traffic volumes.

Moncrieff West

The proposed development at Moncrieff West will generate 4,782vpd from the main estate area between Horse Park Drive and Mirrabei Drive with 2,828vpd along Road 02 onto Mirrabei Drive and 1,954vpd along Road 04 onto Horse Park Drive. These two roads are therefore Minor Collector Roads which are appropriate hierarchy to connect to the main roads. The Moncrieff West development has been included in the Roads ACT EMME2 model and are therefore inclusive in the Horse Park Drive and Mirrabei Drive traffic volumes.

A collector road link is provided through the Moncrieff West estate between Horse Park Drive and Mirrabei Drive in accordance with the Territory Plan and Moncrieff Concept Plan. A road link directly between Horse Park Drive and Mirrabei Drive was not provided as it considered that this would lead to rat-running through the estate from high traffic volumes in Taylor. Also, a direct road link would traverse over the crest of the hill requiring a 5m deep road cutting through open space area where exceptional value trees are to be retained. The collector road route provided is therefore a slower route with two intersections and a 90 degree bend to slow traffic down along this road link to make the collector network more attractive and deter rat-running. The alignment of this collector road and bus route is also aligned for gradient requirements for a bus route of no greater than 8% longitudinal grade.

Due to the terrain and location of Group Centre, the estate is broken up into three distinct areas being the south eastern area of single dwelling residential development (Sections AA, AB, AC and AD), the south western area of single dwelling residential (Sections AE, AF, AG, AH, AI, AJ, AK and AL) and the northern area of multi-unit high density development focused around the Group Centre and proposed bus routes and future IPT terminal. A higher order road (Road 03) is provided through the estate to suit the land form and to provide a logical road hierarchy, access through the estate and two separate entry/exit routes from anywhere in the estate. The southern section of Road 03 also traverses the open space ridge to provide a second road access to each of the single dwelling residential areas.

A logical road hierarchy is achieved with intersecting roads being no more than 2 categories lower than the higher classification road. Refer Section 5.1 below. All roads from Moncrieff West onto arterial roads are collector roads, therefore complying with this road hierarchy requirement.

A bus route is provided along the northern section of Road 03. Road 02 has 8.0% longitudinal grade while the northern section of Road 03 has less than 8% longitudinal grade. The southern half of Road 3 has grades in excess of 8% and is therefore not suitable for a bus route through this southern area of the estate. The entire estate can be serviced from the proposed bus route along Mirrabei Drive and the northern part of Road 03.

Road 05 has traffic volumes of 4,626vpd and is a bus route, hence has been classified as a Major Collector road. Parallel parking is provided on both sides of this road. Safe pedestrian crossing is provided at the Mirrabei Drive traffic signal signals and a median pedestrian island at the Road 15 intersection.
The location of parallel parking bays on Road 05 and the Road 15 intersection provide room for the Group Centre developer to construct a driveway into the site for shoppers and a separate driveway for commercial vehicles for deliveries.

Parking demand generated by the development will be accommodated within the development site and no overflow parking will spread into the neighbouring suburbs. On block parking requirements can be fully provided on the Group Centre and Community Centre sites.

7.2 Traffic Generation

The following trip rates were used for this assessment:

- Peak hour traffic generation rate = **0.8 trips per dwelling** (0.6 trips for Multi-unit dwellings)
- Daily traffic generation = **8 trips per dwelling** (6 trips for Multi-unit dwellings)

7.3 Traffic Distribution

The traffic in Moncrieff West is directed towards either Hose Park Drive or Mirrabei Drive, both of which provide easy access to Gungahlin Town Centre, Belconnen Town Centre, Civic and to Moncrieff Group Centre and Moncrieff School. Based on the estate layout, key external attractors for motorists and linkages of Horse Park Drive and Mirrabei Drive to the broader road network, a roughly even split has been assigned towards each road. The internal road network provides ready access to each road and therefore to the Group Centre and School from anywhere in the estate.

7.4 Key Internal Intersections

The majority of internal intersections in Moncrieff West are on Local Access streets for which intersection performance is not a problem due to low traffic volumes. The key internal intersections within Moncrieff West are on the Minor Collector Road 03 intersections with Road 02, 04 and 13. Other key intersections are those of Road 01 and 15 and Road 05 and 15. The traffic volumes at these intersections have been modelled in SIDRA and will operate at a satisfactory Level of Service A. Refer to SIDRA analysis in **Appendix B**.

Several four way intersections are proposed in Moncrieff West. The key four way intersection on Road 03 has a roundabout to control traffic flows due to the higher traffic volumes at this intersection. The other four way intersections on Road 11 have lower traffic volumes and are therefore considered to be an acceptable arrangement.

Pavement thresholds are proposed on several intersections to delineate road hierarchy and priority movements at these intersections, refer Road Hierarchy Plan C11075-RHP1 for details.

8. Roads

8.1 Major Collector Roads

Road 01 is a major collector road which conveys traffic from the Moncrieff East onto Mirrabei Drive. The section of this road within Moncrieff West project is of variable width due to it being within the Mirrabei Drive intersection extent where a dedicated left turn lane onto Mirrabei Drive is required to reduce traffic queuing at this intersection. Road 01 narrows down to an 11m wide pavement at the Estate boundary with Moncrieff East to allow for on-road cycling on this road in both estates. This road is suitable for a bus route. A 2.5m wide path is proposed on the northern verge for major path linkage to the school and a 2.0m wide path on the southern verge.

Road 05 is a major collector road which provides access directly off Mirrabei Drive to the Group Centre, community facility, Moncrieff School and Moncrieff East. The Group Centre and Community facility are co-located on both sides of this road in order to provide an urban village environment. The pavement width is 10m wide with parallel parking on both sides and fully paved verges.

8.2 Minor Collector Roads

Road 02 is a minor collector road which conveys traffic from Moncrieff West onto Mirrabei Drive. This section of road has 10m wide pavement. Driveway access is permitted onto this road. This road forms part of the bus route through Moncrieff West. 2.0m wide paths are proposed on both verges of this road.

Road 03 is a minor collector road with 10m wide pavement and 7.5m wide verges. The wider pavement and verges will signify to motorists the role of this road in the road hierarchy compared to all other Access Street connections of narrower pavement and verge. A 2.0m wide path is proposed on one verge and a 1.5m wide path on the other side of this road. This road forms part of the bus route through the estate. Parallel parking bays are provided adjacent to the open space and playground. This road connects to Road 02 and 04 which are collector roads and an appropriate road hierarchy.

Road 04 is a minor collector road from Moncrieff West onto Horse Park Drive. The road pavement width is nominally 10m wide. This road forms part of the bus route through the estate. A 2.0m wide path is proposed on one verge and a 1.5m wide path on the other side of this road. A median island is required on the approach to Horse Park Drive to allow a right turn lane to be added in the future when the intersection is upgraded to a four way signalised intersection when Taylor is developed.

Road 15 is a minor collector road which provides vehicular access to the blocks in Section AQ which include the community facility/group centre block, future IPT terminus and a large multi-unit site. The road pavement is 10m wide permitting on street parking along this road. This road links onto two major collector roads which is appropriate hierarchy for this road.

8.3 Access Streets

The standard reserve for Access streets within Moncrieff West is 20m which is formed from 6.25m wide verges and a 7.5m wide road pavement. Access streets have 1.5m wide paths on both sides. Access streets that form an edge road have verge widths of 6.25m and 3.25m.

Road 03 forms a continuous loop within the Moncrieff West project, therefore the same road reserve width of 25m with 10m wide pavements has been provided, even though the road hierarchy of this road varies. This wider pavement and verges will clearly identify the road within the road hierarchy of the estate as a continuous circulating road through the estate.

Part of Road 11, 13, 14 and 16 have 20.8m wide road reserves to allow a 2.0m wide path on one verge and 1.5m path on the other verge in order to comply with Access Street B requirements and/or path hierarchy.

8.4 Parking

Visitor parking is sufficiently provided along the kerbside edge of all Access Street roads. A parking plan is provided which indicates available parking opportunities on garbage collection day where block frontages are less than 12.5m. Refer to drawings C11075-PP1 to PP4.

While the full requirement for visitor parking for the multi-unit sites is to be provided on site, parallel parking is proposed on Mirrabei Drive adjacent to multi-unit sites. Parallel parking bays are also provided on Road 03 to provide visitor parking to the adjacent open space and playground. The parallel parking bays on Road 05 and Mirrabei Drive will be short stay parking for the purpose of access to the Group Centre blocks and ground floor commercial/retail use permitted on Section AV. The parking bays on Mirrabei Drive are proposed to have 45 degree kerb entrance/exit to facilitate parking on the road. Parking bays on Road 05 have longer parking bays to allow the tree pits at each end of parking bays to be square to the road.

The Parking plans show where No Parking is to be signposted including Roads 01, part Road 04 and sections of Mirrabei Drive.

8.5 Street Lighting

ActewAGL will undertake the underground electricity reticulation and streetlighting design in accordance with the current Design Standards for Urban Infrastructure Part 12.

The following streetlighting design criteria will be adopted in the design (to be confirmed with TaMS at detailed design) of the streetlighting for Moncrieff West:

- Mirrabei Drive, streetlighting will be Category V3 with streetlight pole offset of at minimum 2.0m from the lane kerb line.
- Major Collector and Minor Collector roads. Streetlighting will be Category P3 due to the higher traffic volumes and higher pedestrian traffic anticipated on these roads and each of these being a bus route. The pole type will be the Forde style column as adopted on other recent LDA estates in Gungahlin. The minimum offset of light poles will be 1.85m behind the kerb line.
- Access Streets will be designed to Category P4. The Forde style light columns will be used with a minimum offset behind the kerb of 1.85m.

8.6 Traffic Noise

Moncrieff West is bounded by Horse Park Drive to the north and west and has Mirrabei Drive extension running through the estate. Horse Park Drive will be constructed as capital works while Mirrabei Drive will be designed and constructed with the Moncrieff West estate.

In undertaking the noise assessment the relevant road traffic noise criteria is defined in ACTPLA's Noise Management Guidelines (Draft), March 1996. The guidelines stipulate that for new developments, the maximum noise levels from traffic at a point one metre in front of the façade of the nearest affected residential dwelling should be 63 dB(A)L10 (18 hour). Within a recreational courtyard of private open space not facing the road source, the noise levels should be 58 dB (A) L10 (18 hour).

A noise assessment report for Horse Park Drive was prepared by UNSW at ADFA in December 2011 for the Horse Park Drive project. A copy of this report has been included in **Appendix F**. The following summarises the findings of this report:

The compact blocks on the northern end of Sections AH, AI, AJ, AK, AL, AM, AN, AO and AT will have noise levels below 63dBA at ground level while a second storey, if provided, would be subject to noise levels in excess of 63dBA. A second storey on these blocks would therefore require noise abatement measures to be incorporated into the building façade of the second floor.

A 1.8m high lapped and capped fence or a noise mound will be required adjacent Blocks a and b Section AL, Blocks a and b Section AM and Blocks a and b Section AO to reduce noise levels to the ground floor private open space areas of these blocks to below 58dBA. The noise levels of any second storey on these houses would exceed 63dBA and would therefore require noise abatement measures to be incorporated into the building façade of the second floor.

Noise levels to the multi-unit developments fronting Horse Park Drive may require noise abatement measures to be incorporated into the buildings or open space areas depending on the development type that occurs on each of these blocks, its proximity to Horse Park Drive and its height. This should be assessed by the developer of each multi-unit site.

A noise assessment report for Mirrabei Drive was prepared by UNSW at ADFA in October 2013 to inform the Moncrieff West EDP. A copy of this report has been included in **Appendix F**. The following summarises the findings of this report:

All blocks on the western side of Mirrabei Drive in Section AA are sufficiently close to the road to require noise abatement measures to be incorporated into the building facades fronting Mirrabei Drive.

Noise levels to the multi-unit developments fronting Mirrabei Drive may require noise abatement measures to be incorporated into the buildings or open space areas depending on the development type that occurs on each of these blocks, its proximity to Mirrabei Drive and its height. This should be assessed by the developer of each multi-unit site.

It is noted that the noise levels determined in the ADFA report for both Horse Park Drive and Mirrabei Drive are less than the maximum permissible for a commercial area; therefore the Group Centre will not require any specific noise abatement measures.

Where the predicted external traffic noise levels do not comply with the criterion additional treatments to the dwellings are available to control the traffic noise intrusion into the building. Treatments are only required for the appropriate level of the dwelling for the affected facade/s. These treatments would take the form of upgraded glazing to habitable rooms and external doors opening onto habitable rooms. Habitable rooms are defined as living, dining, and bedrooms. They exclude bathrooms, laundries and corridors. They may apply to open plan kitchens. These treatments may need to be supplemented with mechanical ventilation and air-conditioning to enable windows to be kept closed during high traffic noise periods.

Blocks affects by noise are highlighted on the Planning Controls Plans included in the EDP drawings.

9. Cycle and Pedestrian Systems

9.1 On Road Cycling

On road cycling is provided along Mirrabei Drive as it is a Major Collector. This road will have a speed limit of 60km/hr, hence 1.5m wide on-road cycle lanes are allowed for in each direction. Mirrabei Drive has a maximum longitudinal grade of 2.5% which is suitable for a cycling route and has good links to the broader off-road trunk path network.

Road 01 is a major collector road and has 1.5m wide on road cycle lanes on both sides of the road.

Road 05, while nominated as a major collector road, does not have provision for on-road cycling as the Group Centre is a destination location and does not link to any on road cycle lanes within Moncrieff East. Both verges to be fully paved permitting a shared use of this wide path in lieu of on-road cycling.

On road cycling is provided along Horse Park Drive to the north and west of Moncrieff West. The Mirrabei Drive on road cycle lanes will match up to the Horse Park Drive on road cycling.

On road cycling is not provided on existing Mirrabei Drive, hence the on road cycling commences north of the existing roundabout with Len Waters Street. Off road cycle paths are to be located at this roundabout with concrete cycle ramps provided onto the on road cycle lanes north of the roundabout to allow connection to the existing off road cycle path along the northern verge of existing Mirrabei Drive. This off road path continues along Mirrabei Drive to the Gungahlin Town Centre.

9.2 Trunk Paths

A 2.5m wide trunk path is proposed on the eastern side of Mirrabei Drive for its entire length from Len Waters Street roundabout to Horse Park Drive. This trunk path connects to an existing 2.5m wide major path which currently ends at the Len Waters Street roundabout and to the 3.0m wide major trunk path proposed along the Horse Park Drive southern verge providing connectivity to the broader network.

A 2.5m wide trunk path is proposed along the northern side of the creek to the south of Moncrieff West and links Horse Park Drive to Mirrabei Drive. A pedestrian, cycle and equestrian underpass is located on Horse Park Drive at this creek crossing to the immediate west of Moncrieff West Section AH which connects to this 2.5m wide path along the creek corridor to Casey and Taylor. This path at the underpass also has a link to the 3.0m trunk path along the southern verge of Horse Park Drive.

An at grade trunk path crossing of Mirrabei Drive is provided as there is insufficient clearance for a grade separated underpass under Mirrabei Drive extension.

A 2.5m wide trunk path is proposed on the northern verge of Road 01 and southern verge of Road 05 as these paths are a key path link to the proposed Moncrieff School.

The verges of Mirrabei Drive and Road 05 adjacent to the Group Centre are proposed to be fully paved due to the urban village and commercial environment with higher pedestrian usage.

9.3 Intermediate Paths

A 2.0m wide shared path is proposed along the western verge of Mirrabei Drive from Len waters Street to Horse Park Drive.

A 2.0m wide path is proposed along key pedestrian desire routes through the estate to create a logical path hierarchy. This includes 2.0m wide intermediate shared paths along Road 01, 02, 03, 04, 11, 13, 14 and 16. The Offroad Movements System plan, C11075-PTNM.3, Plan 20.3 shows the proposed estate path network highlighting the main pedestrian desire paths to the school, Group Centre and adjacent Trunk Paths surrounding the estate. 2.0m paths are provided on these key pedestrian corridors. This path network and path widths has been endorsed by TAMS.

9.4 Minor Paths

Minor paths are provided on both verges of all Access Street A and on one side of all Access Street B and Minor Collector roads. These paths are all 1.5m wide and are located 1.2m offset from the block boundary in accordance with the typical cross-sections for Moncrieff West. These minor path network has been endorsed by TAMS.

A Minor path network is proposed across the hill top open space area to link road and path networks to activate this open space area and provide access to the proposed playground.

A path network is provided across the entire estate linking all roads directly with open space areas, nature reserves and shops.

10. Land Contamination

A site audit of Block 588 was undertaken by JBS Environmental in 2006. The investigations of the site assessed the contamination status of the site as low and the site as suitable for residential land use. The Environmental Protection Authority (EPA) reviewed the Site Audit in 2006 and endorsed the recommendation of the audit. Clearance from ACTPLA and the EPA was provided through the Concept Plan for Block 588.

As the development has received approval from both the Federal and ACT government as part of the Gungahlin Strategic Assessment this report has been omitted from the EDP Report.

11. Public Transport

The existing and proposed local bus network is shown on the Public Transport Network Systems plan, drawing C11075-PTNM.1, Plan 20.1. The proposed local bus capable route through Moncrieff West and Moncrieff East including indicative bus stop locations has been nominated, demonstrating that 90% of all dwellings in the estate are less than 400m from a proposed bus stop. Brown Consulting and Indesco met with ACTION during the development of these two EDP's to coordinate the bus routes.

The Moncrieff Concept Plan and the ACT Strategic Transport Plan require an IPT route along Mirrabei Drive to the Moncrieff Group Centre with a terminus to be located at the Group Centre. This IPT is a long term network providing rapid public transport (light rail) between the major centres in the ACT. As the IPT will not occur for many years, a corridor reservation for the future IPT has been provided within the Mirrabei Drive road reserve as shown on drawing C11075-PTNM.1, Plan 20.1 and typical road cross-sections. This reservation is reflected on all the EDP drawings. This reservation complies with minimum requirements for horizontal geometry and vertical grading for a light rail system to be provided in the future within the corridor nominated.

A future IPT light rail terminus is proposed on the southern side of the Moncrieff Group Centre permitting the Group Centre to have direct frontage onto Mirrabei Drive while allowing the IPT terminus to be located at the Group Centre.

The road network for Moncrieff West and the IPT corridor and terminus location has been designed to minimise the number of road crossings of the IPT to reduce delays in the service and minimise intersection upgrades in the future. As such, the IPT corridor only crosses one road within Moncrieff West. The design of the intersection of Mirrabei Drive with Road 01 and 02 has been prepared to accommodate the ultimate arrangement with the IPT with adjacent block boundaries set to this ultimate IPT arrangement so as to not restrict the future IPT system. The EDP drawings show the design of this intersection without the IPT as this is what will be constructed with this project and will be sufficient for the short to medium term until the IPT in installed. Drawing C11075-RDP.1 shows the short to medium term intersection without the IPT and the long term intersection design with the IPT to demonstrate that this ultimate arrangement can be incorporated into the intersection and road reserve with minor upgrade works. The IPT corridor alignment deviates away from the intersection to permit splitter islands, paths and signals to be located at this intersection with the IPT.

The earthworks for Mirrabei Drive will be inclusive of the final alignment and level of the IPT corridor so that the adjacent multi-unit developments will be constructed to suit the ultimate IPT road reserve grading so as to not create any constraints to the IPT. No pedestrian access will be permitted from these multi-unit sites directly onto Mirrabei Drive.

12. Agency Liaison and Consultation

During the planning process and preliminary engineering design, there has been ongoing liaison and consultation with agency representatives from Actew Water, ActewAGL, ESDD, TAMS, ACTION and Rural Fire Services. Other Agencies and Authorities will be liaised with during the EDP approval process.

13. Stormwater Concept Plan

13.1 Existing Stormwater Infrastructure

There are currently no existing stormwater services within Moncrieff West estate except at the existing roundabout on Mirrabei Drive. The following summarises the major stormwater catchments for Moncrieff.

Western Catchment: the western catchment of Moncrieff drains a small catchment of Taylor and part of Horse Park Drive and flows into an existing creek along the southern boundary of Moncrieff.

Southern Central Catchment: the south eastern catchment of Moncrieff West flows south into the existing creek and floodway adjacent the existing Mirrabei Drive. Mirrabei Drive extension will become the main drainage path for this catchment.

Northern Catchment: the northern catchment drains north through proposed culverts under Horse Park Drive into Taylor.

An existing creek runs along the southern boundary of Moncrieff adjacent to Ngunnawal and drains part of Casey and Taylor. This creek discharges into an existing floodway that has been constructed on the northern side of existing Mirrabei Drive and which currently ends at the roundabout with Len Waters Street.

Horse Park Drive will be constructed prior to Moncrieff West estate, therefore, the Horse Park Drive stormwater culverts and pipes are shown as existing on the Moncrieff West stormwater master plans.

13.2 Proposed Stormwater Infrastructure

A stormwater master plan has been prepared for Moncrieff West. The stormwater master plan illustrates the schematic stormwater pipe layout for the development, catchment areas, 5 and 100 year ARI flows, velocity depth safety criteria and 100 year ARI flood extents.

The detailed stormwater design will be in accordance with the TAMS Design Standards. Flows up to and including the 5 year ARI event are generally to be piped whilst the major system comprising roads conveys the 100 year ARI flows. Flows up to and including the 10 year ARI will be piped through to the Group Centre.

Major features of the proposed stormwater network for the Moncrieff West estate include:

- Two water quality control ponds with detention capacity that will reduce peak developed flows to pre-developed levels prior to discharge downstream. Both of these ponds are off-line only treating the Moncrieff urban runoff before discharge to the creek.
- A trunk stormwater pipe through Road 08 and Road 11 to Pond 2. This pipe will convey stormwater flows from the upstream Taylor catchment through the Moncrieff West estate. This pipe has been sized to convey in excess of the 5 year ARI flows to limit overland (Qgap) flows to comply with velocity depth criteria as outlined in the Design Standards for Urban Infrastructure. It is assumed that a pond with detention capability will be provided in Taylor to reduce post-developed runoff from that catchment to pre-developed flow-rates.
- A 750mm diameter pipe is proposed along Road 05 to convey the 1 in 10 year ARI flow to provide appropriate flood protection to the Group Centre blocks.
- Grassed swales adjacent Horse Park Drive to convey overland flows to culverts under Horse Park Drive.
- Grassed swale on the eastern verge of Mirrabei Drive to provide water quality treatment of road runoff and convey 100 year ARI overland flows along this road.
- Culverts under Horse Park Drive. These are to be constructed with the Horse Park Drive project and have been sized to discharge all flows up to and including the 1 in 100 year ARI from the upstream catchment including Moncrieff West. The position and size of these culverts have been coordinated with the Horse Park Drive design.

Extension of the existing Mirrabei Drive grassed floodway under Mirrabei Drive extension running west adjacent to the proposed Pond 1. This floodway diverts creek runoff around Pond 1 and lowers the existing 100 year ARI flood extents in this area to protect the proposed development. The alignment of this floodway extension is through an existing large stockpile which will be removed. The floodway will be the same shape and size as the existing floodway which is grass lined with an open concrete invert. A number of drop structures will be required along this floodway extension to minimise earthworks adjacent the floodway and to maintain flow velocities less than 2.0m/s.

Large culverts under Mirrabei Drive at the floodway crossing. These are notionally 4x1800mm dia culverts to convey the 100 year ARI flows but may be designed as box culverts at detailed design.

Cutoff drains are proposed at the back of blocks where required in the hill top open space area to provide protection to the blocks from runoff off the open space.

13.3 Overland Flow Management

When stormwater flows exceed the capacity of the piped system (including an allowance for blockages), stormwater runoff will travel overland along the road network into swales and ponds.

Overland flows have been designed to meet the following criteria:

- Prevent flow up to the 100 year ARI from entering leased blocks.
- In road reserves to ensure velocity depth safety criteria is less than 0.4m2/s.
- In road reserves to ensure flow does not exceed a depth of 50mm above top of kerb.
- To ensure velocity of flows in swales is less than 2m/s to prevent scour.
- To ensure a minimum freeboard of 300mm to leased blocks in basins.
- Overland flows in Mirrabei Drive will also need to be carefully managed at detailed design to ensure that the appropriate number of lanes are not inundated during storm events in accordance with Section 1.3 of the TAMS Design Standards.

13.4 Water Sensitive Urban Design

Water quality ponds provide the main WSUD treatment for the Moncrieff West estate with ponds provided as follows:

Northern catchment. This catchment drains under Horse Park Drive and on to a large regional pond which is to be constructed on the northern side of Horse Park Drive to the east of this project as capital works by others. This regional pond will provide water quality and quantity treatment for this catchment of Moncrieff without the need for local measures on this estate.

South eastern catchment. This catchment will drain south to Pond 1 which will provide stormwater quantity and quality treatment for this Moncrieff West catchment only. This pond is an off-line pond separate to the adjacent creek and floodway allowing these large upstream flows to bypass the pond.

Western catchment. This catchment will drain to Pond 2 which will provide stormwater quantity and quality treatment for this Moncrieff West catchment only. This pond is an off-line pond separate to the adjacent creek allowing these large upstream flows to bypass the pond.

Other treatment train WSUD measures within Moncrieff include the following:

- Grassed swale in the eastern verge of Mirrabei Drive.
- Edge roads with one way crossfall and permeable kerb discharging overland flows to grassed open space areas.
- Tree pits along Road 05. These will provide water quality treatment to low flows from this fully paved road as well as being a landscaped feature along this road fronting the Group Centre.

A large proportion of the Moncrieff West site is too steep for grassed swales and tree pits and rain gardens, hence focusing the WSUD measures at the water quality ponds. The proposed ponds in combination with the other measures listed above provide a treatment train that ensures that the suburb meets the requirements of the ACTPLA Waterways Code. These measures provide extended detention and water quality treatment required for the estate. The Waterways Checklist for Pond 1 and Pond 2 is provided in **Appendix D**.

40% reduction in potable water usage will be met by the provision of rainwater tanks to all blocks exceeding 300m^2. These rainwater tanks will also provide some of the extended detention volume for the estate.

13.5 Water Quantity and Quality

The proposed Pond 1 and 2 and the regional pond to the north of Horse Park Drive by others will provide all stormwater quality and quantity treatment required for the Moncrieff West estate to meet the objectives of the ACTPLA Waterways Code.

14. Sewer Concept Plan

14.1 Existing Sewer Infrastructure

The existing sewer infrastructure adjacent Moncrieff includes the following:

- An existing DN375 sewer main stub adjacent to the Mirrabei Drive and Wanganeen Ave roundabout connects a DN 600mm trunk sewer main which follows the floodway downstream beside Mirrabei Drive.
- A 375mm dia sewer main has recently been constructed along the northern verge of Horse Park Drive up to Mirrabei Drive with ties under Horse Park Drive to service Moncrieff.

14.2 Proposed Sewer Infrastructure

All sewer flows from Moncrieff West estate will discharge to the existing trunk sewer mains in either Horse Park Drive to the north or Mirrabei Drive to the south. The Sewer Master Plan indicates the extent of catchments, taking into account the future development of Taylor, and shows the alignment of the sewer mains throughout the Moncrieff West estate. The Master Plans have been prepared in accordance with the requirements of Appendix D of the ACTEW Corporation 'Water Supply and Sewerage Standards.' The detailed design will also be undertaken in accordance with Part 3 of the 'Water Supply and Sewerage Standards.'

The following summarises the key design components of the sewer master plan:

- The northern catchment of Moncrieff West drains to Horse Park Drive with connection to a 375mm dia sewer main. Sewer main stubs have been constructed under Horse Park Drive with these road works in order to service the Moncrieff northern catchment.
- Block c Section AQ multi-unit site will drain east through Moncrieff East estate.
- The Moncrieff West project includes the construction of a trunk 300/375mm dia sewer main along Mirrabei Drive from Wanganeen Avenue roundabout to Mirrabei Drive extension and then adjacent the existing creek to Horse Park Drive. While this sewer outfall is adjacent the Moncrieff East estate, it will be constructed with the Moncrieff West estate due to the timing of Moncrieff West Stage 1 requiring this sewer outfall before the construction of Moncrieff east in this catchment.
- The south eastern catchment will connect to the proposed trunk sewer outfall at existing Mirrabei Drive.
- The western catchment will drain a future catchment of Taylor and will connect to the trunk sewer main adjacent to Pond 2. A sewer main has been constructed under Horse Park Drive with these road works that will be connected into the Moncrieff West estate sewer network when Taylor is developed.

- A 225mm dia sewer main has been constructed under Horse Park Drive at the underpass. The trunk sewer along the creek will connect to and drain this sewer main under Horse Park Drive.
- Inter-allotment sewers have been minimised to reduce the service easements on the blocks. Where back of blocks sewers are proposed, sewer maintenance access routes are provided and shown on the EDP drawings.

15. Water Concept Plan

15.1 Existing Water Infrastructure

There are no existing water supply mains within the estate. The following summarises the existing water mains adjacent the estate:

- 300mm dia water main at the roundabout of Len Waters Street and Mirrabei Drive. This is an intermediate zone main and has an existing stub to allow it to be extended through Moncrieff.
- A 300mm dia water main constructed along Horse Park Drive from Amaroo to the Moncrieff East Road 16 with the Horse Park Drive capital works. This water main is an intermediate zone main.
- A 300mm dia water main constructed along the northern verge of Horse Park Drive from Burramurra Avenue to Mirrabei Drive. This water main will be in the high zone. Three 150mm dia water main stubs will be constructed under Horse Park Drive for connection to Moncrieff West at Roads 04, 11 and Mirrabei Drive.

Moncrieff falls within two water pressure zones, being the intermediate zone which will service all blocks below about RL653 and the high zone serving blocks above RL653. The zone boundary is shown on the water masterplan.

15.2 Proposed Water Infrastructure

The Water Supply Master Plan indicates the alignment and size of the water mains for Moncrieff West. The Master Plan has been prepared in accordance with the requirements of Appendix D of the ACTEW Corporation 'Water Supply and Sewerage Standards.' The detailed design will also be undertaken in accordance with Part 2 of the 'Water Supply and Sewerage Standards.'

The proposed water design for Moncrieff West has the following features:

- A zone boundary is located through Moncrieff West and Moncrieff East.
- A 300mm dia water main is proposed by ActewAGL along the western verge of Mirrabei Drive and then through Moncrieff East to link the intermediate water mains at Len Waters Street and Horse Park Drive. No water ties are proposed to be connected to this main. 150mm dia water mains will run along Road 01 and 05 to service Moncrieff East and will connect to this 300mm dia main.
- 150mm dia water mains will be provided adjacent to all edge roads where a higher F5 fire category is required for bush fire requirements.
- F4 fire category is applicable to the Group Centre in accordance with the ACTEW Corporation 'Water Supply and Sewerage Standards.'
- F5 fire category is applicable to all multi-unit sites in Moncrieff West due to the proposed density of these developments.

The high zone water supply network has been modelled by Brown Consulting under peak flow and fire demand flow for the Moncrieff West high zone. The analysis indicates that sufficient pressures can be obtained throughout the estate area nominated within the high zone. A summary of the results can be seen on C11075-WMP.

The intermediate water zone has been modelled by Indesco and pressures documented as part of the Moncrieff East estate by Indesco.

16. Utilities

The following existing utility services are located at the roundabout of Len Waters Street with Mirrabei Drive:

- An existing 160mm dia gas main already has live ties under the roundabout for the extension of Mirrabei Drive.
- Telstra also has existing conduits under this roundabout for the extension of Mirrabei Drive.
- Existing 11kV cables are located along Maynard Street within Ngunnawal.
- Existing streetlighting is located at this roundabout.
- A Telstra mobile phone tower is located in the centre of the roundabout with an associated building on the eastern side of the roundabout.
- A trunk shared trench consisting of electricity, gas and communications constructed along the southern verge of Horse Park Drive from Burramurra Avenue to Amaroo with the two separate Horse Park Drive works.
- A trunk shared trench including three electricity conduits, two Telstra conduits, one TransACT conduit and a live 160mm dia gas main is proposed by the Service Authorities to be installed along Mirrabei Drive extension through Moncrieff West. This trunk shared trench will be utilised to extend existing services at Len Waters Street roundabout into the Moncrieff West estate to permit site servicing. This trunk shared trench will also permit connection to services in Horse Park Drive. Direct service connections to this trunk shared trench from blocks will not be permitted. Estate shared trenches will connect to this trunk shared trench to permit the estate to be serviced.

A typical cross-section of the trunk shared trench is shown on drawing C11075-US.2. This typical section is the same as that utilised on Horse Park Drive.

The utilities services layout for Moncrieff West is shown on drawing C11075-US.1. Services connections to existing mains at Mirrabei Drive are shown on drawing C11075-MIR.1.

17. Staging

It is proposed to construct the works in three (3) stages which will enable the progressive release of blocks to the market. Each stage has been broken into substages to permit handovers to Authorities progressively.

The proposed staging is shown in Drawing C11075-ST-6.1 - Staging Plan. This plan shows the nominated Stages 1 to 3.

The staging of Moncrieff West has been coordinated with the staging of Moncrieff East to ensure that active services are provided as each stage of the estate is developed.

18. Geotechnical Structure and Site Grading

18.1 Geotechnical Investigation

A geotechnical investigation and report is currently underway and will be provided prior to design approvals and construction.

18.2 Site Grading

Moncrieff West is an undulating site characterised by the main hill central within the estate with grades ranging from 10 and 20% and a drainage gully to the west and east of this hill both with grades of around 5%. The Slope Analysis Plan, C11075-SAP-8.1 - Slope Analysis Plan shows the grades across the site.

The Site Fill Plans (drawings C11075 – SG1 to SG4) provide a preliminary estimate of the earthworks required to construct the roads and grade blocks.

The site grading has been based on:

- Protection of high and exceptional value trees to be retained.
- Minimising back of block sewer easements by grading the sections to allow the sewer to drain to the road where possible.
- Minimising the slope of proposed blocks to aid house construction.
- Provide path grading that is less than 12.5% maximum permissible grade allowable under the TAMS Design Standards.
- Achieving maximum 8% grade along proposed bus routes.
- Generally allow roads to be minimum 1% longitudinal grade. It is noted that Road 07 is proposed to be graded at 0.8% grade due to the existing undulating terrain, to minimise extensive earthworks in this area while providing an overland flowpath. Road 06 is graded at 0.6% to reduce significant earthworks and provide optimal grading on the steep blocks adjacent this road. Road 05 has been graded at 0.9% to enable the low point location on this road to match the open space overland flow path to Horse Park Drive.

The earthworks will be undertaken in a staged manner with progressive stabilisation and will be undertaken in accordance with EPA Guidelines requiring approved sediment and erosion control measures. This will limit the risk of soil erosion from cut and fill operations.

Earthworks are provided for all roads, then on blocks where required to provide a satisfactory block grading. The road layout generally follows the contour around the steep hill of the site which reduced earthworks. The lack of east west roads between Mirrabei Drive and Road 3 is due to topography to allow roads to follow contours better for earthworks. The remainder of the side is fairly flat and only requires earthworks to satisfy Authority back of blocks servicing and for prevention of overland flow flooding. In some locations earthworks on blocks are undertaken to minimise earthworks required by builders which is considered an advantage as the developer has appropriate sediment and erosion controls in place while the builders typically do not.

19. Off Site Works

The following offsite works outside the estate boundary are as follows:

- Trunk sewer outfall from Mirrabei Drive extension to Wanganeen Avenue roundabout.
- 11kV electrical connection to existing at Maynard Street in Ngunnawal.
- Works at existing Mirrabei Drive roundabout.
- Path crossing at creek to Ngunnawal.

20. Landscape Master Plan

20.1 Character

The landscape design philosophy for Moncrieff West is based on the following key principles:

- To develop a landscape which is sympathetic to the intrinsic cultural and environmental values of the area.
- To provide a new landscape which will flourish in urban conditions and will be environmentally effective; now and into the future.
- To provide streetscapes and public domain to the Group Centre commercial hub that reflects the community focus of these areas providing attractive comfortable urban amenity

- To provide a public domain that shapes the character of the place. A public domain framework that is flexible and can accommodate development and redevelopment well into the future.
- To design a landscape that maximises the opportunity for people to identify with their home patch, their block, their immediate neighbourhood and to link with their hinterland, adjacent neighbourhoods and the district networks. Clarity of perception, address, connections, movement, and visual identity underpin the design.
- To provide open space areas that draw upon and work in harmony with on the existing topography and landscape character.
- Effective streetscapes and large scale urban landscapes require space, soils, water to flourish; the design for the commercial hub provides enhanced verge growing conditions for large scale trees (space, improved soils, WSUD throughout).
- To provide perimeter and open space landscapes for recreation, habitat, and visual aesthetics.

Open Space Elements

The following key open space elements are identified in the landscape master plan and are to be read in conjunction with viewing landscape plans LMP.1-4, 13.1 - 13.4.

Hilltop Park

The plan provides a distinctive open space embedded within the core of the proposed estate. The existing mature tree hilltop landscape provides the foundation for the landscape character of this open space.

The scheme celebrates the hilltop and ridge, and makes the most of the existing landform and existing trees which provide habitat for the fauna. The design ensures passive security and access to all parts of the park. This hill top is the focus of the main entry streets to Moncrieff West, and is highly visible to, and accessible from, all parts of the neighbourhood. The hilltop affords panoramic views beyond Moncrieff West, and equally importantly, it provides a landscape landmark when viewed from neighbouring suburbs and transport corridors. The open space includes paths, plantations, open grass areas, playground and bushland areas within its boundary. The scale of this space enables meaningful retention of key trees and natural features that can be sustained within such an urban setting. The retention of trees also provides important habitat for fauna.

A recreation path meanders through the parkland with a maximum 1 in 20 gradient, an accessible grade for wheelchair access. Wheelchair access is also provided to the lookout at the top of the hill.

Playground

A Central Neighbourhood Park is located at a lower knoll of the parkland surrounded by mature eucalypt trees. The paths to the playground are aligned with maximum 1 in 20 gradients for wheelchair accessibility and the picnic tables, to be detailed at a later stage, are to be wheelchair accessible.

The playground is to be detail designed to meet the Design Standards for Urban Infrastructure. Fixed play equipment over softfall and surrounding landscape for natural play is envisaged.

Existing trees will provide some shade; however, additional shade to the playground is to be provided by shade structure/s.

Local Parks

Each of the local parks are designed to retain high value or significant trees, integrated with its surrounding streets, footpaths and landscapes. Each of these parks defines the local home patch for the residents – these become places to visit and socialise, and to be proud of. Each path has seating to provide a focal element and from which local residents can take a rest and enjoy the neighbourhood.

20.2 Development Interface

The edge landscape is informal tree groupings, grassland, and recreation paths that link all parts of Moncrieff West to perimeter open spaces and to regional trails and bike routes.

20.3 Tree Survey and Retention

A detailed tree survey and assessment of Moncrieff was undertaken by DSB in 2008, Trees within the Mirrabei Drive corridor were reassessed as part of the North Gungahlin Roads and Ponds Review of Tree Assessment by JEA in October 2009. In 2010 LDA commissioned Scenic Landscape Architecture to provide a tree assessment report for additional trees and tree groups within Moncrieff.

The Tree Management Plans for Moncrieff West identify the status of the trees on site and nominates those trees to be retained and those recommended for removal.

Forward Planting Plantation

The forward planting was undertaken by NCDC more than 20 years ago and the trees were planted close together with the intention that they be thinned at a later date. The thinning did not occur and the intense competition from the dense planting on the rocky ridge with thin soils has resulted in the trees not thriving, but instead being of poor to fair condition trees. The trees should be thinned and the poorest condition trees removed to improve the growing environment for the remaining trees. The trees have not been individually assessed. The following is to be undertaken in the detail design and implementation:

- Carry out a detailed assessment of the trees and identify trees to be removed
- Remove trees identified for removal.
- Carry out tree surgery to remove dead branches and improve the structure of the remaining trees
- Remove stumps
- Chip the removed trees and prunings for recycling as mulch within the area

21. Block Compliance Plan

The Block Compliance Plan was prepared using the Estate Development Plan – Appendix A – Block Compliance Table. All blocks that comply have been noted as a direct comparison to the Block Compliance Table.

The results of the Block Compliance assessment indicate that 97% of the blocks in the Estate complied with the Block Compliance Table. Refer Dwg C11075 – BCP, drawings 1-4

The BCP also indicates two types of blocks, ones that do not comply with the Building Compliance Tables but do comply with the Test Block requirements and ones that comply with the Building Compliance Table but do not comply with the Test Block requirements. Both types of blocks are deemed as “limited development potential blocks.”

22. Capital Works

No further capital works are required in association with the Moncrieff West project. Horse Park Drive is currently under construction as Capital Works and is expected to be completed prior to commencement of construction of Moncrieff West.

23. Bushfire Protection Measures

A Bushfire Risk Assessment Review was prepared by Australian Bushfire Protection Planners Pty Ltd for Moncrieff West. The report is attached at **Appendix C**. A bushfire plan C11075-BMP presents the proposed bushfire protection measures for this estate.

24. Waste Collection Plan

A waste collection plan is provided which shows on street garbage collection will be provided for all blocks without direct frontage to the main street. Refer drawing C11075-WCP-22.1

25. Landuse Plan

A Landuse Plan (C11075-LUP-7.1) has been prepared to indicate the land use policy applicable to the site – refer also to Section 1.2 'Planning Context'.

26. Development Intentions Plan

Typical Development Intentions Plan has been prepared to show the building intent for the all Multi Unit sites. Refer drawings C11075-DIP-24.1 to 24.8.

27. Planning Controls Plan

Planning Controls Plans have been prepared to show additional information on block requirements to the Territory Plan – Single Dwelling Housing Code. Refer drawings C11075-PCP-31.1 to 31.4.

28. Building Envelope Plan

Building Envelope Plans have been prepared to show the building intent for all multi-unit sites. In addition building envelopes have been prepared for all blocks that do not comply with the Block compliance Table. Refer drawings C11075-BDP-23.1 to 23.4.

BROWN

Appendices

Smart Consulting

Appendix A Subdivision Code Response Table

Appendix B Traffic Report

Appendix C Bushfire Report

Appendix D Water Sensitive Urban Design Checklist

Appendix E Bird Hollows Report

Appendix F Traffic Noise Assessment

Appendix G Heritage

Appendix H Contamination

Appendix I CPTED Risk Assessment

Appendix J Retirement Housing and Facilities Needs Analysis Moncrieff

Appendix K Response to EDP Review Comments Circulation 18 November

Appendix L Endorsement Forms and Correspondence

Appendix M Bushfire Risk Assessment Correspondence

Appendix N Roads ACT and ACTION Correspondence

Appendix O A subdivision planning concept aiming to maximise the retention of trees

Appendix F

ABPP Bushfire Risk Assessment

UPDATED

BUSHFIRE RISK ASSESSMENT REPORT

FOR THE

MONCRIEFF ESTATE DEVELOPMENT PLAN

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE

LAND DEVELOPMENT AGENCY

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UPDATED

BUSHFIRE RISK ASSESSMENT REPORT

FOR THE

MONCRIEFF ESTATE DEVELOPMENT PLAN

AUSTRALIAN CAPITAL TERRITORY

PREPARED FOR THE

LAND DEVELOPMENT AGENCY

Assessment Number	Document	Preparation Date	Issue Date	Directors Approval
B132163	Final	1.3.2012	8.1.2014	*G.L.Swain*

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BACKGROUND TO UPDATED REPORT

Australian Bushfire Protection Planners Pty Limited was commissioned by the Land Development Agency [LDA] to prepare a revised Bushfire Risk Assessment that determines the level of bushfire risk, and the protection measures required to mitigate the risk to the proposed suburb of Moncrieff. The revised report was issued on the 13.3.2012.

The advice contained within the report provided the bushfire planning principles to be used in the planning of the new suburb.

A review of the proposed bushfire protection measures to the new suburb has resulted in changes being made to the extent of management of the planned Open Space areas and the width of the Asset Protection Zone to the north-western, northern and north-eastern aspects of the new suburb which includes the Horse Park Drive corridor.

The decision to manage the majority of the Open Space areas, except for the area to the south and east of the new suburb removes the need to provide and manage Asset Protection Zones and apply construction standards to the future dwellings located adjacent to the Open Space areas.

The increase in the width of the Asset Protection Zone to the north-western, northern and north-western aspects of the new suburb have been made so as to remove the requirement to apply building construction standards to dwellings which will ultimately be surrounded by residential development within the future suburb of Taylor and Jacka.

This report updates those sections of the revised report issued on the 13.3.2012 to address the decisions taken in respect to the management of the Open Space areas and the increased width of the Asset Protection Zone to the north-western, northern and north-western aspects of the new suburb.

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EXECUTIVE SUMMARY

Section 1 of this report outlines the background to the assessment and describes the site and details the site inspection carried out on the 30th August 2010.

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 determines the bushfire risk to the suburb by examining background information on the:

- Fire history of the area;
- Ignition and fire sources;
- Climate and weather;
- Wind and fire paths;
- Slope;
- Bushfire fuels;
- Assessment of the fuel hazard;
- Likelihood of each fire scenario;
- Description of the Asset Interface Classification;
- Risk statement; and
- Summary of the bushfire risk.

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 and examines the two elements of risk – ***likelihood*** which is described as the chances of a bushfire occurring, and ***consequence***, the impact of the bushfire when it occurs.

Section 4 also undertakes an assessment of the potential bushfire risk to the proposed new suburb and determines the level of risk to the future residential 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 5**.

This Section describes the measures for:

- Bushfire fuel reduction;
- Provision of temporary & permanent Asset Protection Zones;
- Construction standards;
- Water supply provisions for fire-fighting;
- Access for fire-fighting;
- Evacuation planning; and
- Standards for fire protection zones.

Section 6 and examines the residual risk once the bushfire protection measures recommended are implemented.

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The conclusions to the assessment are outlined in **Section 7** of the report. These include:

- The assessment undertaken in this report has found that the bushfire risk to the western, north-western and northern aspects to the suburb if Moncrieff, prior to the implementation of the recommended fire protection measures, is extreme;

- The assessment has also determined that there is a varying level of risk to future residential development which adjoins unmanaged vegetation retained within the Open Space areas within the new suburb; and

- If the protection measures recommended in this report are fully implemented to the western, north-western and northern aspects, the level of risk will be reduced from extreme to high.

Section 8 provides a graphical depiction of the recommended bushfire protection measures.

Graham Swain,
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SECTION 1

INTRODUCTION

1.1 Background.

The Land Development Agency has been engaged to complete the planning, design, construction, development and marketing of land in the new suburb of Moncrieff, ACT.

The new suburb of Moncrieff contains 190.2 hectares of land which is bound to the south by the existing suburbs of Ngunnawal and Amaroo and to the southwest by the new suburb of Ngunnawal 2C. The northern boundary is defined by the Horse Park Drive alignment, currently under construction.

The land to the northwest, north and northeast of the Horse Park Drive alignment forms the future suburbs of Taylor and Jacka however, until these suburbs are developed these areas remain bushfire prone and potentially subject to catastrophic bushfire events.

The Moncrieff Context Plan identifies that the new suburb will contain areas of Open Space, set aside for the retention of woodland/grassland vegetation. These areas are predominantly located in the southern portion of the suburb with a corridor running along the south-western edge, between the existing suburb of Ngunnawal and the new residential development within Ngunnawal Stage 2.

Corridors of Open Space land also occur throughout the proposed suburb, including discrete 'pocket' parks. Except for the larger area of open Space located in the south-eastern and eastern section of the new suburb the Open Space will be managed to remove the potential bushfire hazard.

The retained woodland/grassland vegetation on the unmanaged Open Space land will remain a hazard to the adjoining urban development.

This report therefore examines the bushfire risk to that part of the Moncrieff suburb which is exposed to a bushfire threat, including the exposure to a fire occurrence in the unmanaged woodland/grassland vegetation within the unmanaged Open Space lands and the woodland/grassland vegetation on the land which forms the future suburbs of Taylor and Jacka, to the northwest, north and northeast of Moncrieff.

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1.2 Aim of the Brief.

The aim of this report is to prepare a bushfire risk assessment in accordance with Australian Standard for Risk Management, AS/NZS ISO 31000:2009, the ACTPLA "*Planning for Bushfire Risk Mitigation 2009"* guideline and the *Strategic Bushfire Management Plan for the ACT (2009)* taking into account the status of the planning / construction of the adjacent development within the new suburb of Jacka, to the northeast, and the potential reduction of risk that the adjacent development, including the construction of Horse Park Drive and the future suburb of Taylor may have on the new suburb of Moncrieff.

1.3 Objective of the Brief.

The objective of the brief is to identify the bushfire constraints on the development of the Estate Development Plan, including any building or landscaping requirements to meet relevant bushfire regulations and guidelines.

1.4 The Project.

The project involves preparation of an ***Estate Development Plan*** for the suburb of Moncrieff.

The Moncrieff Concept Plan was prepared by ACTPLA and adopted onto the Register of Planning Guidelines on the 18th January 2008 under the Territory Plan. The Territory Plan identifies that Moncrieff contains Residential, Commercial, Community Facility and Urban Open Space. According to the Variation to the Territory Plan 130, it is proposed that Moncrieff will accommodate approximately 1800 dwellings, a group centre and a large community facility site. This community facility site is identified as a government secondary college reserve site.

Access to the suburb will be from Horse Park Drive and Mirrabei Drive with the main access provided by way of the signalised intersection of Horse Park Drive and Mirrabei Drive. Edge roads are to be utilised as buffers between areas of residential development and open space with edge roads or service roads utilised along Horse Park Drive.

The landscape setting and values are to be enhanced and bushland revegetation shall be undertaken on the steeply sloped ridge on the eastern edge of Moncrieff, overlooking the Amaroo Playing Fields.

Significant hilltops and ridges are to be retained in Open Space and managed remnant stands of woodland are to be retained within Urban Open Space [pocket parks] and open space, where appropriate.

Under *'Further Investigations'* the Concept Plan recommends that *'a bushfire risk assessment'* is required to be undertaken.

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Figure 1 – Territory Plan Landuse – ACTPLA – 2008

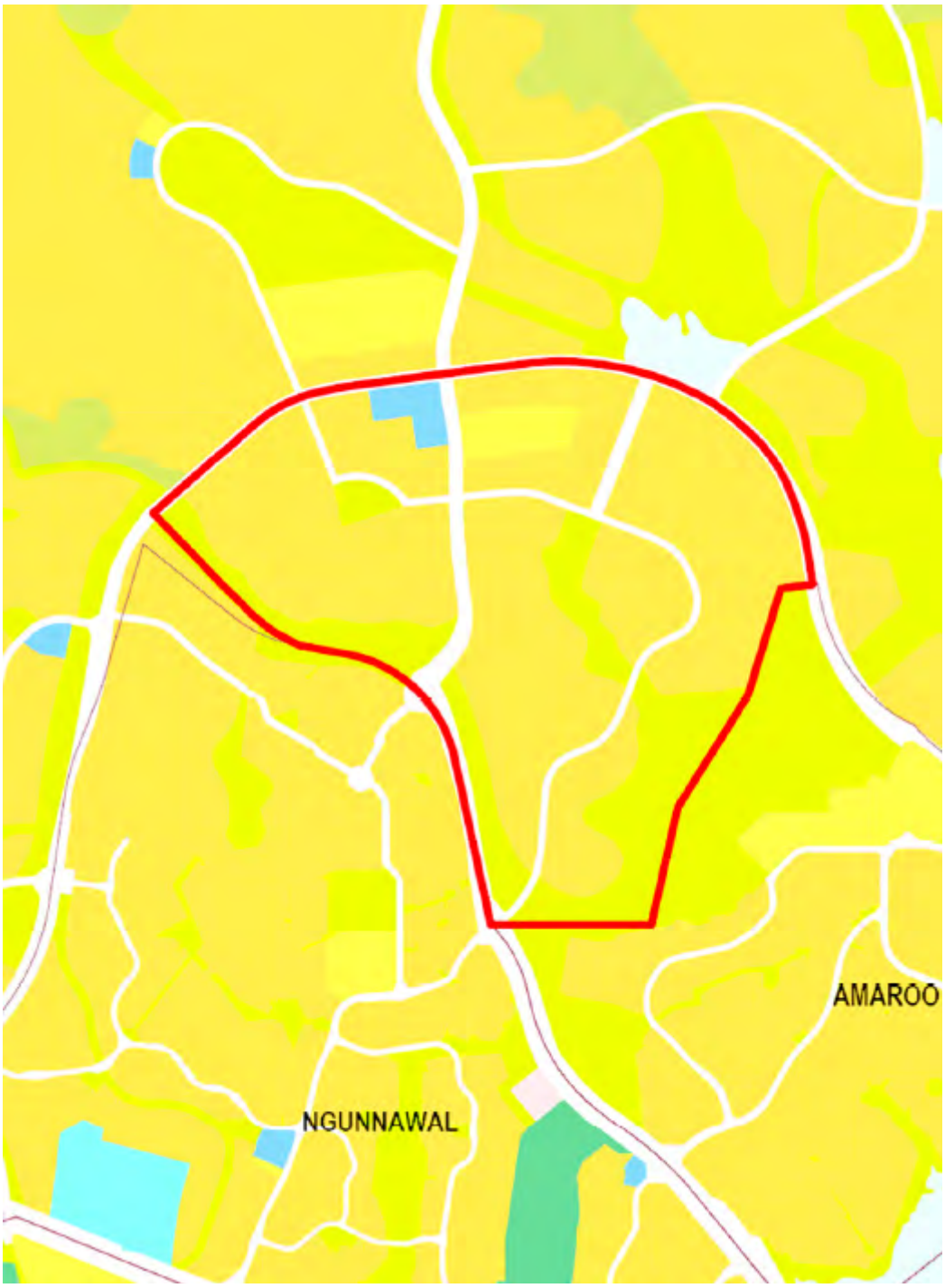

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Figure 2 – Moncrieff Concept Plan – ACTPLA – 2008

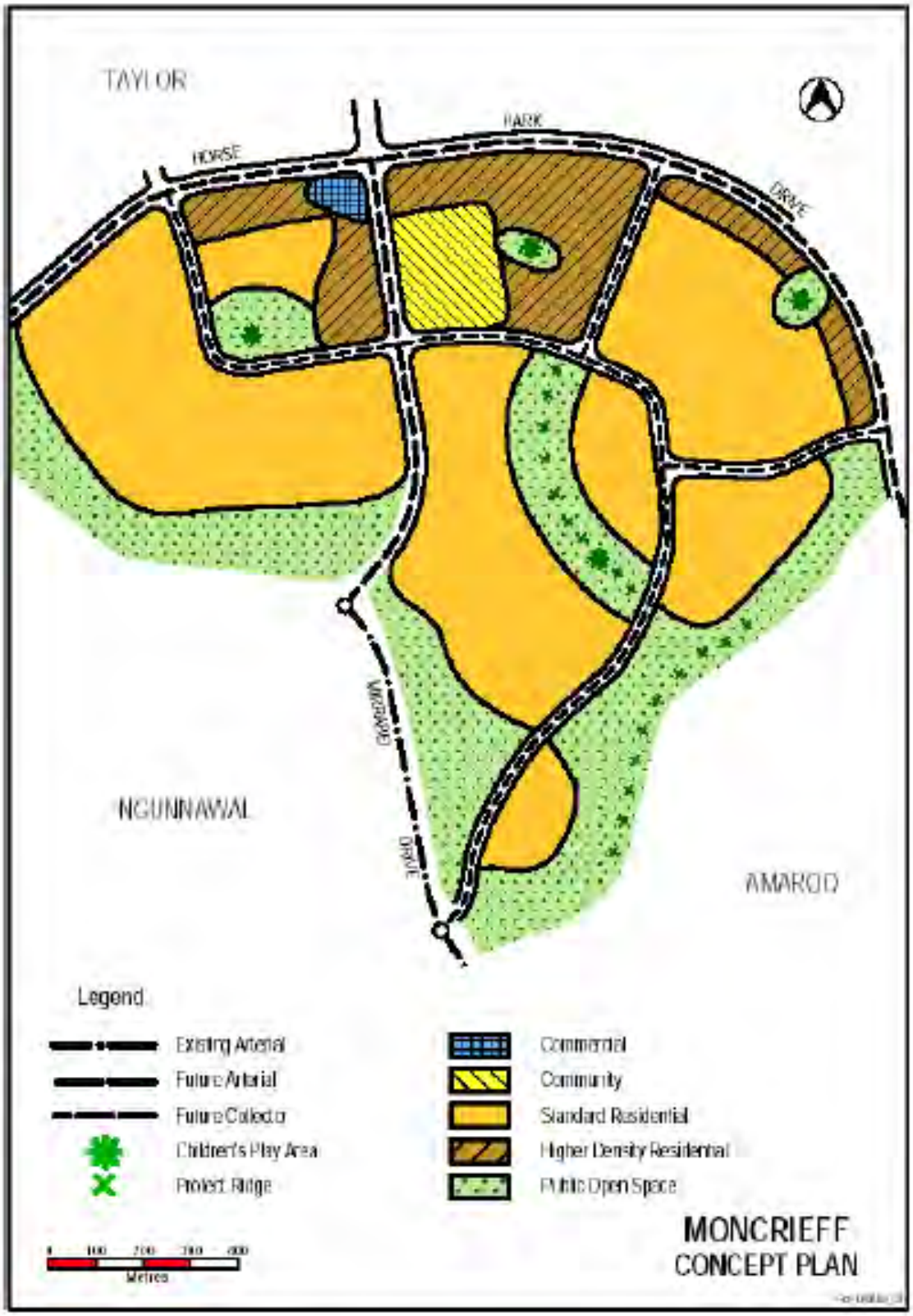

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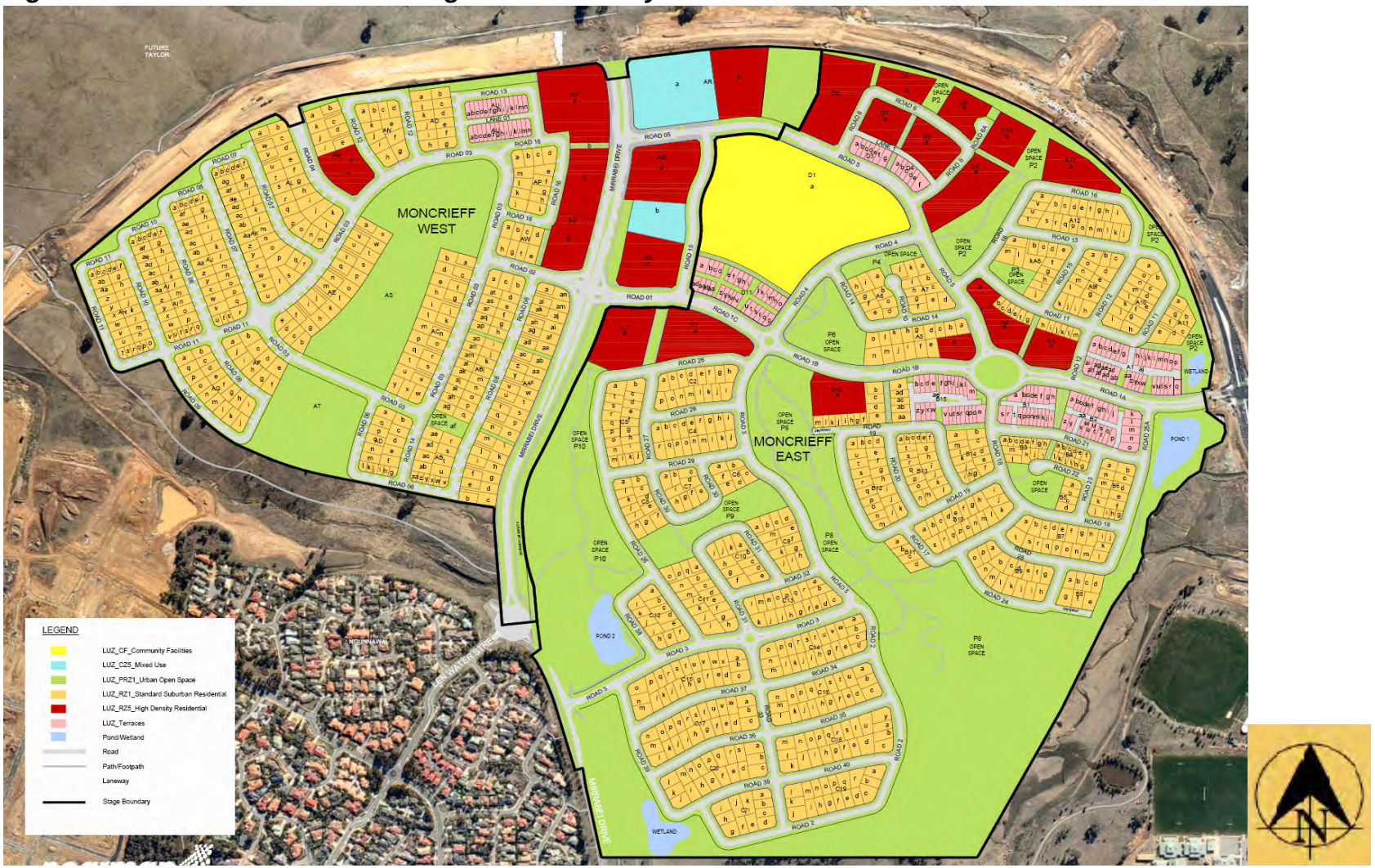
Figure 3 – Moncrieff Landuse Zoning Plan – Territory Plan.



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1.5 Project Site.

The Moncrieff development precinct contains approximately 190.2 hectares of land which extends to the north of the existing suburbs of Amaroo and Ngunnawal.

The Moncrieff development precinct is bound to the northwest, north and northeast by Horse Park Drive [currently under construction] with the future suburb of Jacka occupying the land to the northeast and the future suburb of Taylor located to the northwest.

The landform within the development precinct consists of gently undulating topography that falls to the northeast and southwest from a central ridgeline that occupies the south-eastern portion of the new suburb.

The land within the Moncrieff development precinct is currently leased grazing land.

Figure 4 – Location of the new suburb of Moncrieff showing the context of the surrounding development.

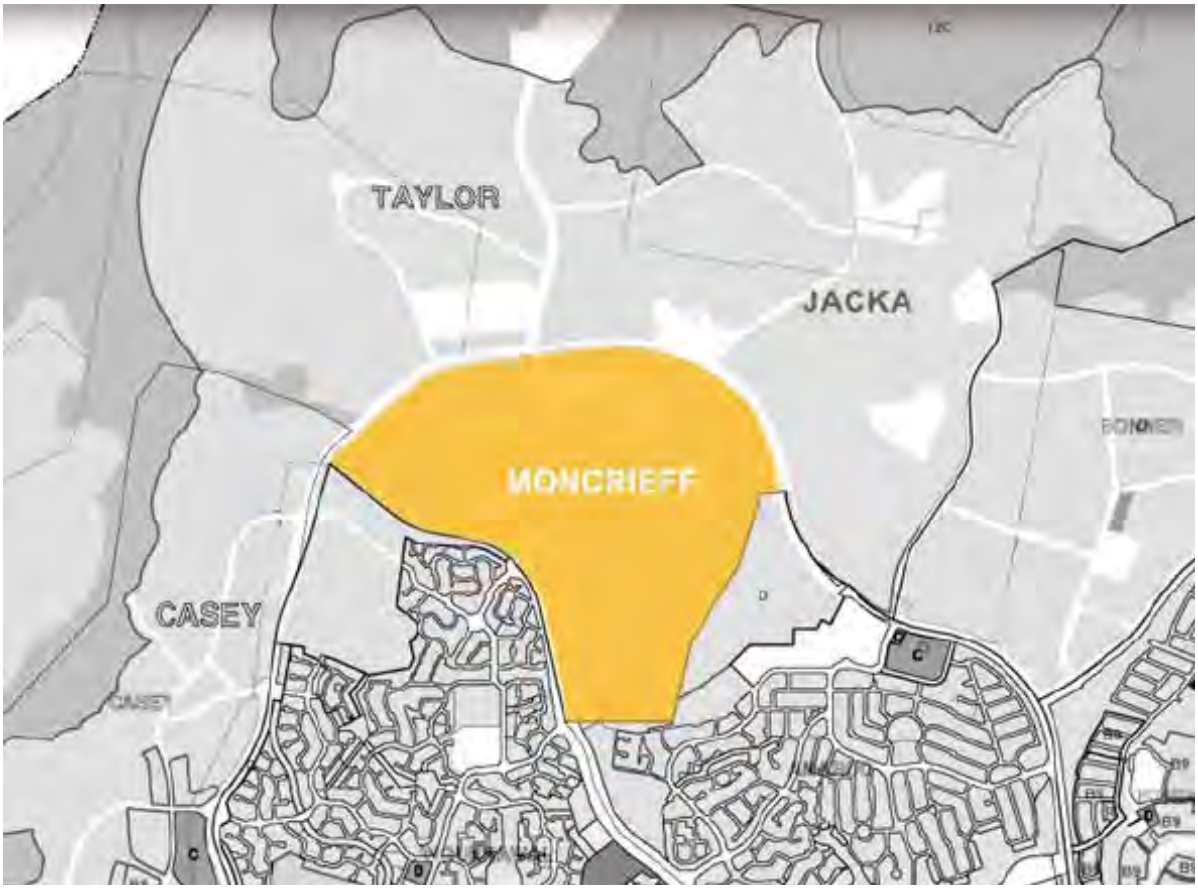

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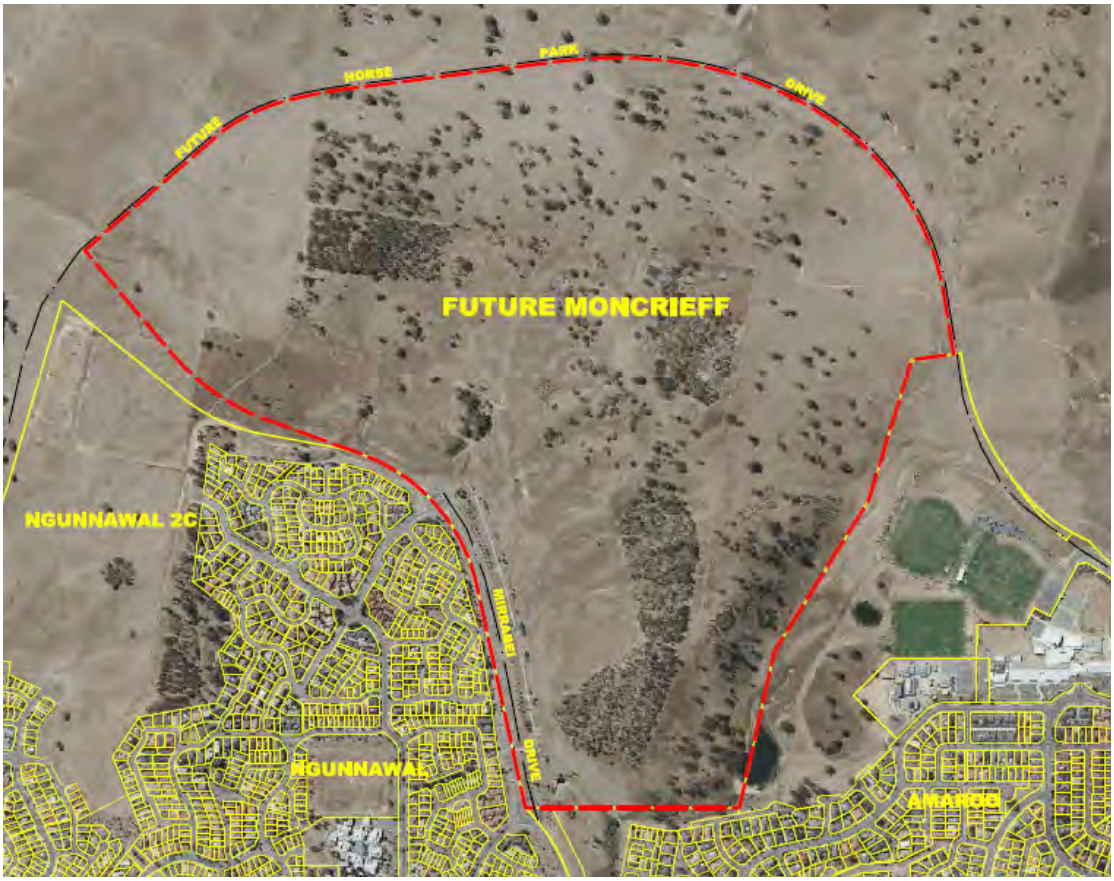
Figure 5 – Aerial Photograph showing location of the new suburb of Moncrieff and context of the surrounding development.



1.6 Study Area.

For the purpose of this report, the boundaries of the Moncrieff study area extend beyond the site boundaries to incorporate land within 400 metres of the Horse Park Drive alignment to the northwest, north and northeast and the suburbs of Amaroo & Ngunnawal to the south and southwest.

1.7 Scope of Study.

A Bushfire Risk Assessment is to be prepared, in accordance with Australian Standard for Risk Management, AS/NZS ISO 31000:2009. The assessment is to be undertaken with reference to the following methodology:

(a) Identify the fire scenarios including an assessment of:

- The exposure to possible ignition/fire sources;
- Vegetation type and likely fuel loads and fire hazards arising using the "Overall Fuel Hazard Guide" – Third edition (NRE May 1999);
- The impact of climate and likely fire runs during severe fire danger periods.

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(b) Identify and describe the surrounding natural environment and the likelihood of each fire scenario identified (before mitigation):

- The steepness, slope/terrain;
- Define each level of Likelihood stating assumed frequency of event assigned to each level of Likelihood.

(c) Identify and describe the proposed urban community and consequences of a bushfire (before mitigation):

- Type of proposed development (density, residential, aged care etc) refer to the *Moncrieff – Estate Development Plan*;
- Identify any "wicks" in to the suburb through connected open space with careful regard to fuel load and likely future maintenance regimes.
- Assumed fire impacts / consequence if exposed to fire events; including during severe/catastrophic fire danger periods.
- Define each level of consequence stating level of impacts.

(d) Analyse the inherent risk of each identified fire scenario.

- The best available information and techniques should be used and expressed in the terms of likelihood with all assumptions identified.
- Develop risk statements with assigned risk levels reflecting assigned likelihood and consequence of each fire scenario.

(e) Risk Mitigation Measures:

- ***Provide risk mitigation options following consideration of:***

❖ The necessary bushfire protection measures in accordance with Australian Standard AS3959-2009 "*Construction of Buildings in Bushfire Prone Areas*" and any addenda or amendments; and

❖ The ACT *Planning for Bushfire Risk Mitigation*

- ***Evaluate the mitigation measures with consideration of the following:***

❖ Protection zone requirements (home, inner and outer protection zone);

❖ Building standards;

❖ Location, treatment and connectivity to Stromlo Forest Park and the undeveloped land to the north and Stromlo Village to the south;

❖ Access for Emergency Services Vehicles;

❖ Engineering infrastructure including water supply, fire trails, edge roads.

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(f) Evaluate the fire scenarios to establish the residual risk:

- Evaluate the residual risk level following mitigation including the vulnerability of the proposed development, and possible consequences of fire during severe fire danger periods;
- Compare the residual risk level against best practice criteria;
- Rank the fire scenarios in order of risk level.

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SECTION 2
DESCRIPTION OF STUDY AREA

2.1 Site Inspection.

Graham Swain inspected the development precinct on the 30th August 2010 to assess the topography, slopes and vegetation classification within and adjoining the development precinct. Adjoining land was also inspected to determine the surrounding landuse / land management, vegetation communities and topography.

2.2 Existing Land Use.

The Moncrieff development precinct contains existing short term leased grazing land.

2.3 Surrounding Land Use.

a) North

The land to the north of the Moncrieff development precinct, beyond the Horse Park Drive alignment, is short term leased grazing land.

b) Northeast & east

The land to the northeast & east of the Moncrieff development precinct, beyond the Horse Park Drive alignment, is short and long term leased grazing land within the future suburb if Jacka and the Amaroo Playing Fields [to the east].

c) South

The existing suburbs of Amaroo and Ngunnawal extend to the south of Moncrieff.

d) Northwest

The land to the northwest of the Moncrieff development precinct, beyond the Horse Park Drive alignment, is short term grazing land within the future suburb of Taylor.

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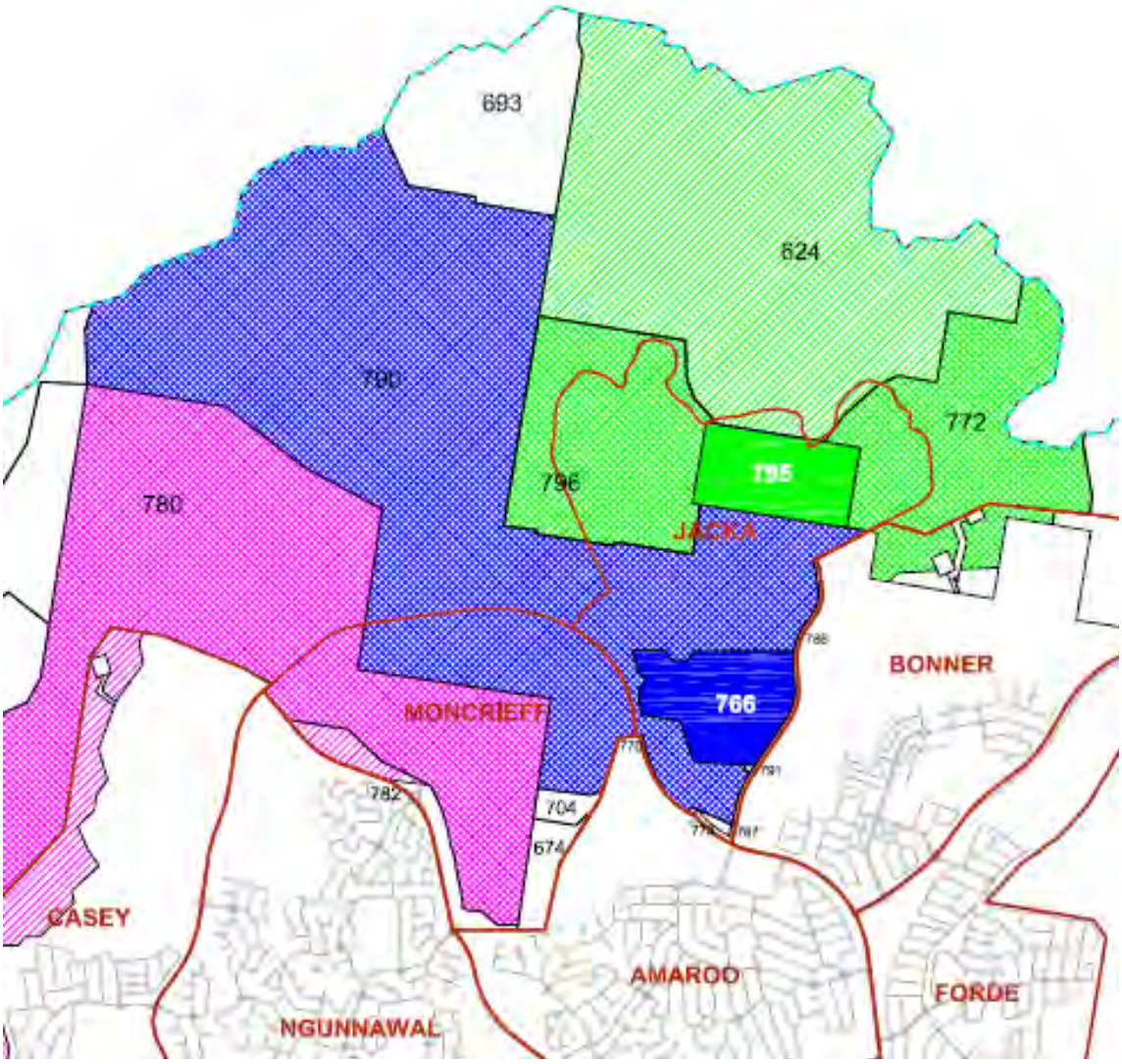
Figure 6 – Landuse Plan.



GUNGAHLIN LEASES AND LICENSES

Carmondy
Starr
Pattinson
99 year Lease
Short term Lease
Grazing Licence
GUNGAHLIN boundary
Division Boundary

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2.4 Topography.

2.4.1 Within the Development Precinct.

The Moncrieff development precinct contains a ridgeline [three hills] located within the central southern portion of the new suburb, within the proposed Grassland/Woodland Reserve.

The landform within the remainder of the development precinct falls to the northeast and north into Ginninderra Creek and to the southwest into a tributary of Ginninderra Creek. The land to the west of the ridgeline forms a saddle that rises to the west.

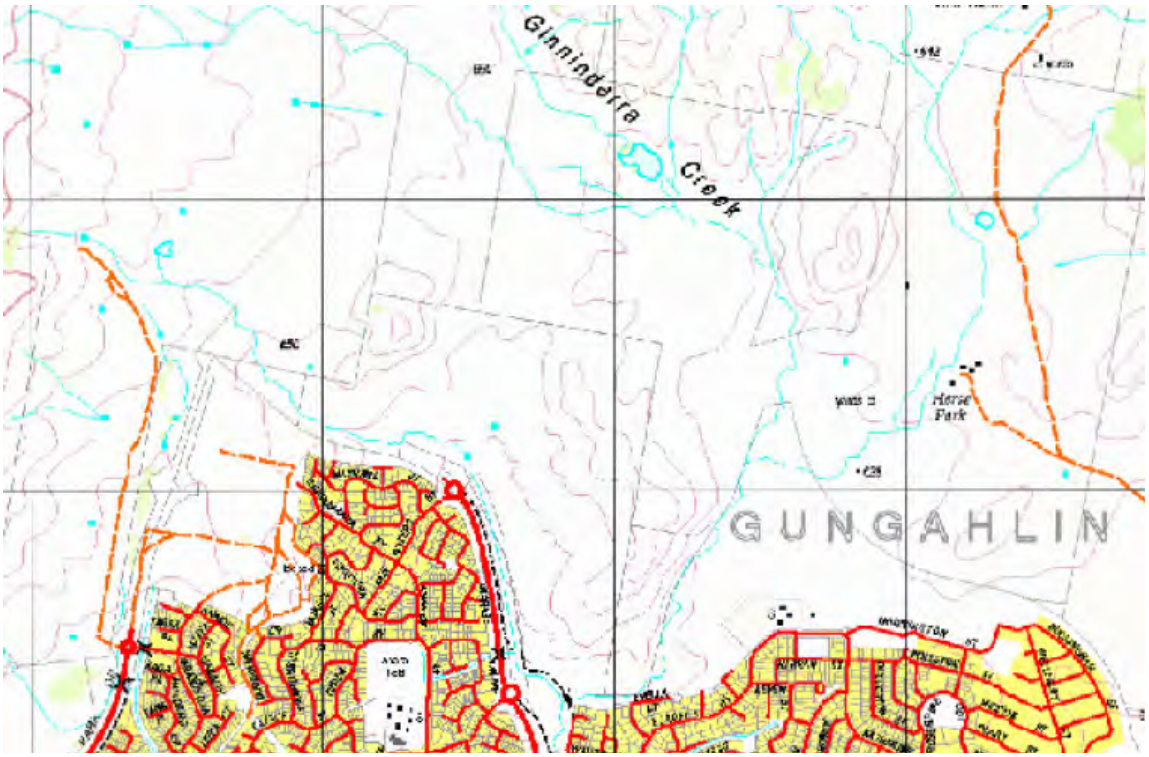
2.4.2 Beyond the Development Precinct.

The land to the northeast of the development precinct, beyond Ginninderra Creek, rises to form a ridgeline that runs in a northwest to southeast direction.

The land to the north, beyond the Horse Park Drive alignment, continues to fall to the north into Ginninderra Creek before rising to the north to the ridgeline.

The land to the northwest and west rises to the west across the future suburb of Taylor whilst the land to the southwest, beyond the tributary to Ginninderra Creek rises across the adjoining residential development within the suburb of Ngunnawal.

Figure 7 – Topographic Map.



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2.5 Vegetation within the Development Precinct.

The vegetation within the development precinct consists of Yellow Box-Red Gum Woodland, Lowland Woodland and secondary grassland.

2.6 Vegetation on Adjoining Lands.

(a) North, Northeast & East

At the time of the site inspection the vegetation to the north and northeast of the Moncrieff development precinct consisted of grazed grassland and scattered Yellow Box-Red Gum Woodland. The Amaroo Playing Fields to the east contain managed grass.

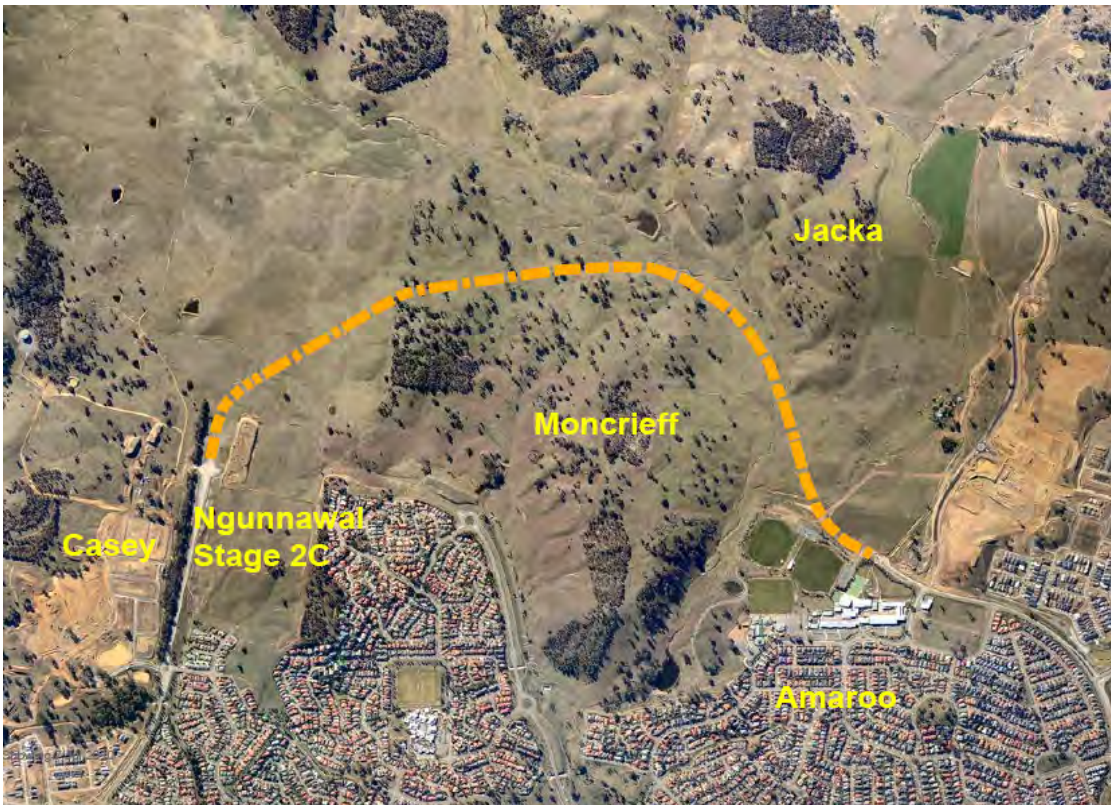
(b) South & southwest

The vegetation within the suburb of Ngunnawal consists of managed curtilages to the dwellings and grassland within the Ngunnawal Stage 2C precinct [recently removed as part of the construction of the Ngunnawal Stage 2C subdivision].

(c) West and Northwest

At the time of the site inspection the vegetation to the northwest and west of the Moncrieff development precinct consisted of grazed grassland and scattered Yellow Box-Red Gum Woodland/Lowland Woodland.

Figure 8 – Aerial Photograph of Moncrieff development precinct and surrounding lands.



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2.7 Site Photographs

Photograph No. 1 - Taken from Mirrabei Drive looking northeast to the ridgeline within the proposed Reserve.

Photograph No. 2 - Taken from the future Horse Park Drive looking east towards the woodland vegetation within the proposed Reserve.

Photograph No. 3 - Taken looking to the northeast across Moncrieff and the future suburb of Taylor.

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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.

A preliminary assessment of the risk to the development precinct was undertaken during the site inspection and identified that until development occurs to the north, within the future suburb of Taylor and within the future suburb of Jacka, the bushfire risk to the new suburb if Moncrieff remains.

Therefore, the following Risk Assessment and resultant recommendations seek to address the protection of the proposed residential development from future unplanned fire events that may occur within the surrounding woodland/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. 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.

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. 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.

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);

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- 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).*

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 south westerly wind influence.

- Fire in the landscape not effectively suppressed.

In the case of the Moncrieff development precinct, being located on the northern edge of the Gungahlin District, the problem is the potential exposure of the future residential development to woodland/grassland fires that will occur in the vegetation to the northwest, north and northeast within the future Taylor and Jacka development precincts and on the land further to the north and northwest, including the land within NSW.

A further concern is the potential for fires to occur in the woodland/grassland vegetation retained in the open space areas within the suburb of Moncrieff, burning under the influence of southwest, northeast and southeast winds.

This potential risk has been addressed with the decision taken that, except for the larger area of Open Space land to the south and east of the new residential precinct the Open Space land will be managed to comply with Clause 2.2.3.2 – Exclusions – low threat vegetation and non-vegetated areas as defined in Australian Standard A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.*

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The second part of the risk assessment process identifies the potential risk on the development within the Moncrieff precinct 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" – Third edition (NRE May 1999);
- The impact of climate and likely fire runs during severe fire danger periods;
- Wind effects; and
- The impact of surrounding land uses and fuel loads.

The following sections of this report undertake an assessment of these elements to establish the bushfire risk to the proposed development.

5.2 Fire History.

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.

The Strategic Bushfire Management Plan for the ACT [version two] 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 the Strategic Fire Management Plan for the ACT has identified that the Casey, Ngunnawal, Moncrieff, Amaroo, Bonner and Forde precincts were impacted in the 1979 bushfire season with a fire that ignited south of the Barton Highway extending to the northeast under the influence of a south-westerly wind.

5.3 Ignition / Fire Sources.

Causes of 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

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- 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.

Accidental ignition, especially from agricultural and recreational pursuits, of the grassland/woodland vegetation on the land to the west, northwest, north and northeast of the Moncrieff precinct will present a threat to the future development, pending development of the future suburbs of Taylor and Jacka.

Malicious fire ignition can occur wherever humans operate. Deliberately lit (arson) fires are probable within unmanaged woodland/grassland and lightning maybe an ignition source for fires within the vegetation on the ridgelines to the west, northwest [One Tree Hill] and north with resultant fire runs from the northwest and north spreading towards the northern edge of the Moncrieff precinct.

5.4 Climate.

The ACT has a relatively dry, continental climate with warm to hot summers and cool to cold winters. The climate of Canberra is strongly influenced by a band of high pressure systems located around the globe at about 30 – 40S, known as the sub-tropical ridge.

During summer, the sub-tropical ridge is located over southern Australia resulting in warm to hot conditions with winds generally from the east through to northwest.

The average annual rainfall is 629 mm with an average of 108 rain days per year with rainfall reasonably evenly distributed throughout the year with the wettest month being October and the driest being June.

Rainfall tends to be influenced by cold fronts during the winter 6 months and thunderstorm activity during the summer 6 months. While rainfall in most years is reasonably reliable, drier than average years are closely related to ENSO events in the Pacific Ocean and all significant droughts have occurred in El Nino years and these years tend to be significant bushfire seasons as well.

Rainfall across the ACT varies considerably, with much higher rainfall occurring in the ranges to the west and less rainfall to the east.

January is the hottest month with a mean daily maximum temperature of 27^{o}C and an average of 10 days of 30^{o}C or more with 2 days of 35^{o}C or more.

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Canberra tends to get cooler easterly winds penetrating from the coast during many summer evenings which can sometimes bring cloud in with the moister air.

The highest recorded maximum temperature was 42.2^{o}C on February 1st 1968 followed closely by 41.4^{o}C on the previous day [31st January 1968]. Relative humidity in Canberra is around 37 – 40% at 3pm in summer.

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 105 days of Extreme fire danger from the Forest Fire Danger Index (FFDI) at Canberra airport.

These were broken down into the following FFDI ratings:

- 61 days 50 – 59 FFDI;
- 25 days 60 – 69 FFDI;
- 9 days 70 – 79 FFDI;
- 4 days 80 – 89 FFDI; and
- 6 days 90 – 100.

Eighteen percent [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.
[Source SBMP for the ACT].

[The (McArthur) Forest Fire Danger Index (FFDI) was developed in the 1960s by CSIRO scientist A.G. McArthur to measure the degree of danger of fire in Australian forests. The index combines a record of dryness, based on rainfall and evaporation, with daily meteorological variables for wind-speed, temperature and humidity.

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A fire danger rating of between 12 and 25 on the index is considered a "high" degree of danger, while a day having a danger rating of over 50 is considered an "Severe" fire danger day. Since the Victorian Bushfires the Fire Danger Rating has been reviewed with 'Extreme' danger rating being for days that have an FDI greater than 75 and a Catastrophic rating occurs when the FDI exceeds 100.

Canberra generally is not very windy with, on average, 25 days of strong winds a year. Late Winter/Spring tends to be the windiest time with just over half of these days [13 days] occurring in the four [4] months between August and November.

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 ahead of the main fire front.

The new suburb of Moncrieff has an exposure to strong, hot and dry north-northwest, westerly and south-westerly wind influences. These winds can spread burning embers from both small and large fires over long distances and ignite cured grassland fuels ahead of the main fire front.

Fires that may occur in the vegetation on the land within NSW have the potential to rapidly burn upslope from the northwest and west with the hills and ridges changing the direction of the prevailing wind direction and causing turbulence on the lee side of the higher terrain to the northwest and west of the Moncrieff development precinct.

This turbulence will affect the rate of spread and direction of the fire, potentially spreading embers and smoke into the estate.

Fires which ignite in the Gungahlin Eucalyptus Plantation, to the north of the future suburb of Jacka, have the potential to shed embers onto the grassland vegetation on the leased land along Ginninderra Creek, to the northeast of the Moncrieff development precinct.

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 land to the north and northwest of the northern portion of the Moncrieff development precinct rises gently to the northwest to the foot-slopes of One Tree Hill, therefore providing a slight downslope fire path from the northwest and west.

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The calculated rate of spread across this undulating landscape is 0.85 km/h. However, the open nature of the landform will not prevent the rapid spread of fire across this landscape.

Wind effects on the lea side of the mountain which change wind speed and direction and cause turbulence such as ‘eddies’ and wind shear therefore negating any benefit that the downslope fire path from the west may have provided.

The upslope fire path from Ginninderra Creek, under north-easterly winds, will impact on the north-eastern edge of the development precinct.

Figure 9 – Fire Paths – Northwest, Northeast & Southeast.

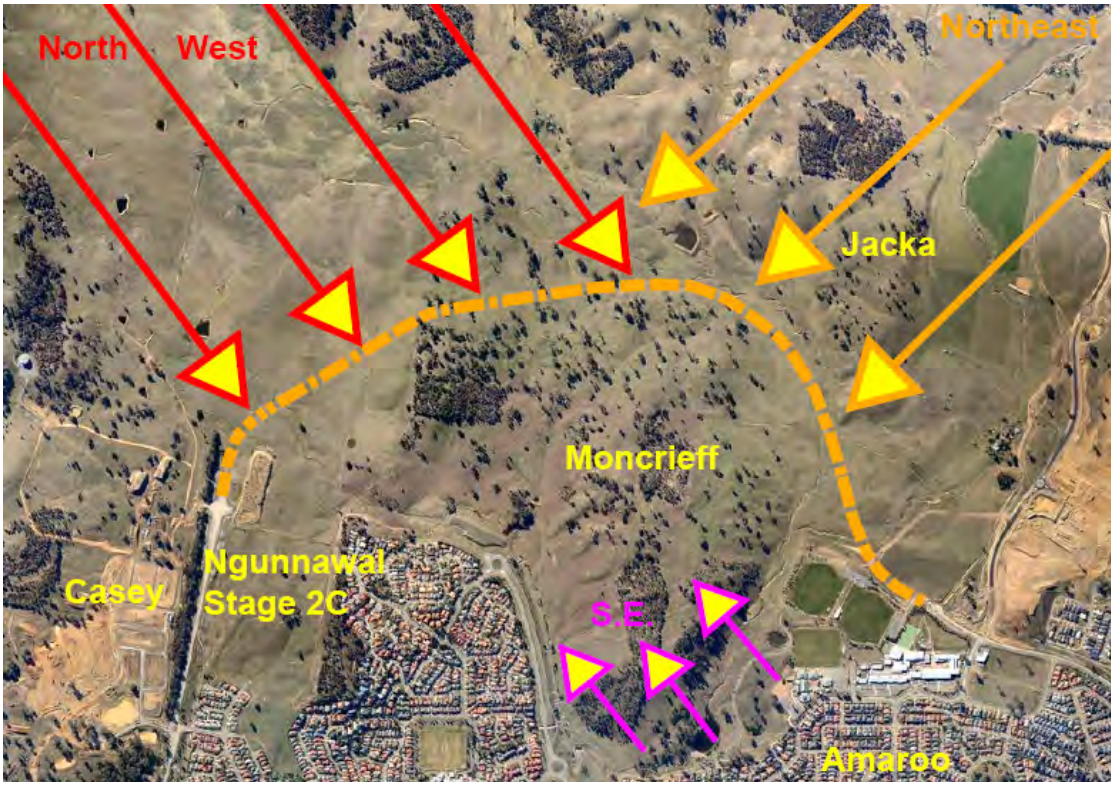

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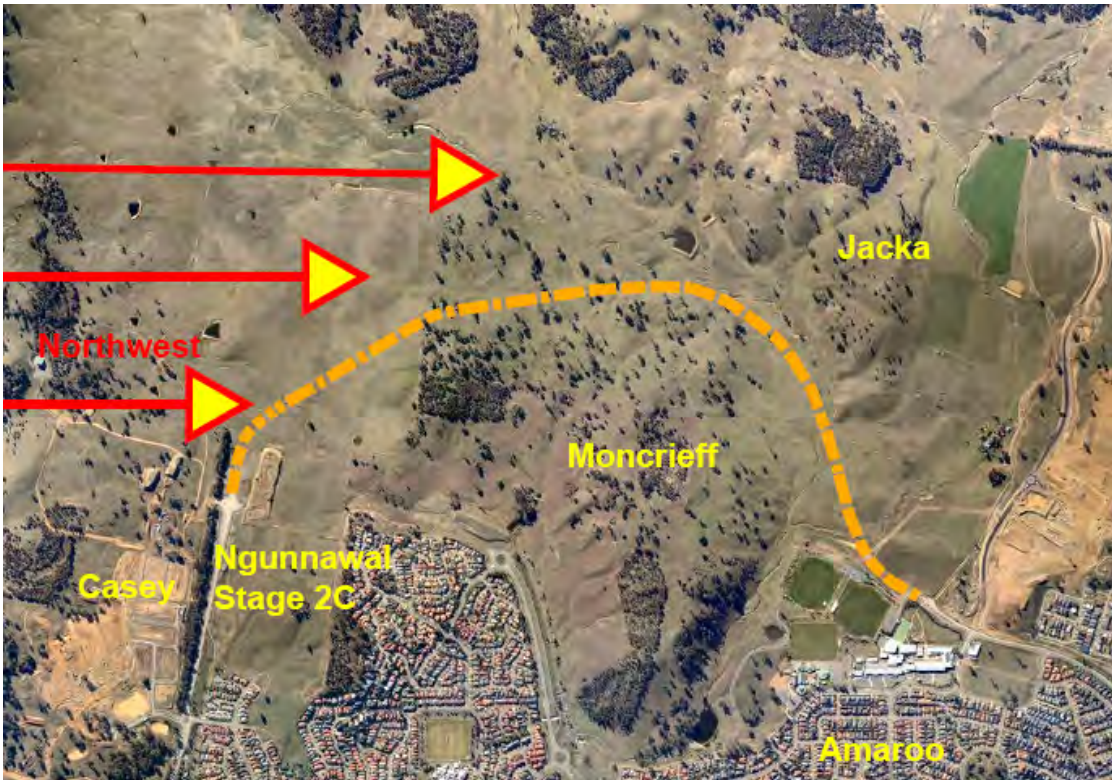
Figure 10 – Fire Paths – West.



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 and woodland vegetation on the grazing land to the west, northwest, north and northeast can be determined, from an assessment of the contributing fuel hazards and will reach maximum hazard when the current grazing practices are removed or not undertaken during any bushfire danger period when the Spring growth of grasses is prolific and curing of the vegetation occurs in early summer.

The fuel hazard on the land to the northeast, within the future suburb of Jacka and to the northwest, within the future suburb of Taylor will remain until development of these future suburbs permanently removes the combustible fuels.

The grassy woodland vegetation within the area of Open Space land to the south and east of the residential precinct will also retain bushfire fuels which will maintain a hazard to the adjoining development. The remaining Open Space land, including the 'Pocket Parks' will be managed to create a 'low threat' or 'exempt' vegetation classification in accordance with Clause 2.2.3.2 of Australian Standard A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.*

The predominant vegetation that will create the most significant fire impact on the Moncrieff development precinct will therefore be the grassland / woodland vegetation on the land to the west, northwest north and to the northeast and the grassy woodland vegetation within the area of unmanaged Open Space land.

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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 beyond the Moncrieff development precinct.

Surface & Near 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 0.9 – 1.2m high, the Surface Fine Fuel Hazard Rating can increase from High to Very High for unmanaged grassland vegetation.

Managed grassland [i.e. – grazed/slashed to a maximum height of 100 – 150mm during the Bushfire Danger Period] reduces the combustible fuel density and therefore the overall fuel hazard for managed grassland vegetation reduces to Low – Moderate – that is if the grazing continues on the land the leased land adjoining the suburb of Moncrieff.

5.7.2 *Grassy Woodland vegetation on the land to the northwest, north and northeast of the suburb and in the unmanaged Open Space lands within the suburb.*

Using the methodology provided within the DSE Overall Fuel Hazard Guide, the following Fuel Hazard observation was determined for the Grassy woodland vegetation on the land beyond the north-western, northern and north-eastern boundaries of the suburb and within the unmanaged Open Space area within the suburb – based on the assumption that management works do not mitigate the accumulation of combustible fuels within the existing and regenerating vegetation within the unmanaged Open Space area.

- ***Bark Hazard*** **:**

The Woodland vegetation includes Yellow Box-Red Gum, which has a smooth trunk and long ribbons of bark into the crown of the tree. Therefore this vegetation has a High Bark hazard.

- ***Elevated Fuel Hazard*** **:**

Elevated fuel comprises shrub, heath and suspended material. The level of hazard depends on the fuel continuity (horizontal and vertical), height, and proportion of dead material, thickness of the foliage and twigs and flammability [dryness] of the live foliage.

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The flammability of the elevated fuel is highest when:

- The foliage, twigs and other fuel particles are very fine (e.g. maximum thickness 1-2 mm);
- The proportion of dead material is high;
- The fuels are arranged with a high level of density and horizontal and vertical continuity that promotes the spread of flame;
- The live foliage has low, live fuel moisture content.

The vegetation type and time lapse since the most recent fire or management by grazing substantially determines the level of elevated fuel hazard.

The grassy woodland vegetation on the land beyond the new suburb is likely to continue to be grazed and therefore understorey vegetation will not be present with a resultant low level of Elevated Fuel Hazard.

The area set aside as unmanaged 'Open Space' to the south and east of the residential precinct contains grassland and grassy woodland vegetation which has been grazed. However, the Territory Plan requires that this area of vegetation be rehabilitated with native vegetation [woodland] which will include a grassy/shrub understorey layer to 1.2 – 1.5 metres.

Due to the extent of the scrubby, grassy component of this vegetation an estimated Elevated Fuel Hazard of Very High was determined for the unmanaged grassy woodland vegetation within the Open Space.

- ***Surface & Near Surface Fine Fuel Hazard*** **:**

Surface Fine Fuel Hazard is assessed by measuring litter-bed depth. Near surface fuels – i.e. grass tussocks, dead bracken, low shrubs or low wiregrass up to 0.5m high – interact with surface litter to increase fire behaviour and therefore need to be considered when assessing Surface Fine Fuel Hazard and the next highest Surface Fine Fuel Hazard rating.

Due to the extent of the 'near-surface fuels' component of the grassland vegetation, if not managed, an estimated Surface Fine Fuel Hazard of High has been determined.

Assessment of Overall Fuel Hazard – Grassy Woodland Vegetation:

The Overall Fuel Hazard for unmanaged Grassy Woodland vegetation is Very High.

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5.8 Asset Interface Classification [AIC].

The ACT ESA & 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. It 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 new suburb of Moncrieff identifies the following classifications:

Table 2: Asset Interface Classification – Moncrieff

	Length of Fire Run to Asset Interface (through unmanaged vegetation)		
Aspect of Fire Run	<100m	100 – 350m	>350m
North, northwest & west across land beyond Horse Park Drive – Unmanaged grassland & woodland vegetation			**Primary**
Northeast across land beyond Horse Park Drive – Unmanaged grassland vegetation			**Secondary**
South & Southeast across unmanaged Open Space Corridor – Unmanaged grassy woodland vegetation			**South Secondary** **Southeast Lee**
East across the unmanaged Open Space – Unmanaged grassy woodland vegetation			**Secondary**

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5.9 Likely Fire Scenarios.

The following fire scenarios have been identified as a probability for impact on the new suburb:

(1) Fire in the open grassy woodland vegetation to the west, northwest & north of the development precinct, burning under westerly, north-westerly and northerly winds across the adjoining grazing paddocks towards the western, north-western and northern edge of Moncrieff.

This potential fire impact will remain [until the development of the suburb of Taylor] if the current management practices are removed or are not effective during periods of growth in the grass vegetation.

This fire occurrence is possible during consecutive fire seasons when conditions are such that the grassland vegetation has not been grazed/managed and the Fire Danger Index is Extreme (FDI > 50);

(2) Fire in the open grassy woodland vegetation within the future suburb of Jacka, to the northeast of Moncrieff, burning under a north-easterly wind influence, towards the north-eastern edge of Moncrieff.

This potential fire impact is unlikely to remain for a long period as construction works will occur in the new suburb of Jacka, therefore removing the bushfire risk to the north-eastern aspect of Moncrieff.

However, if this is not the case the risk will remain that the north-eastern edge of Moncrieff could be impacted by a fire burning across the vegetation on the land to the west of Bonner.

(3) Fire in the Woodland vegetation within the unmanaged Open Space land to the south and east of the residential precinct.

The risk from the woodland vegetation within the unmanaged Open Space will increase once the current management practices [grazing] are removed and the rehabilitation of this vegetation commences.

Due to the location and shape of the unmanaged Open Space impact may be experienced under the influence of southerly, south-easterly and north-easterly wind influences – with varying levels of Asset Interface Classification [AIC], depending on the fire run length and aspect.

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5.10 Risk Statement.

Table 5 provides a statement of risk for each fire scenario that may impact the Moncrieff estate [prior to mitigation measures being adopted/implemented and/or the adjoining suburbs of Taylor and Jacka being constructed] and assigns risk levels reflecting identified levels of likelihood and consequences for a 'worst case' fire occurrence which may occur if the vegetation on the land to the north, northwest and west is not managed to reduce the combustible fuels available to burn during extreme to catastrophic fire weather conditions.

Table 2 provides a list of qualitative measures of consequence [or impact] whilst Table 3 provides a list of qualitative measures of likelihood – used to determine the level of risk in Table 5.

Table 4 provides a qualitative risk analysis matrix – used to determine the level of risk in Table 5.

Table 2 – 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 3 – 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 4 – Qualitative risk analysis matrix – used to determine the level of risk in Table 5.

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

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Table 5 – Bushfire Risk Register:
Extreme – Catastrophic 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 protection measures	Consequence Rating	Likelihood Rating	Level of Risk	Risk Priority
(1) Fire burning in unmanaged open grassy woodland to the west, northwest and north of Moncrieff – under westerly; north-westerly and northerly wind influences	Catastrophic	Possible	Good when managed by grazing Poor if current fuel management is not continued	5	C	Extreme	1
(2) Fire burning in unmanaged open grassy woodland to the northeast of Moncrieff – under the influence of north-easterly winds	Major	Possible	Good when managed by grazing. Poor if current fuel management is not continued	4	C	Extreme	2
(3) Fire burning in the unmanaged grassy Woodland vegetation in the Open Space areas – under southeast, southerly, north-easterly and easterly wind influences.	Moderate	Possible	Poor if fuel management is not undertaken	3	C	High	3

5.11 Summary of Bushfire Risk.

Fire ignitions that occur within the open grassy woodland vegetation on the land to the west, northwest and north of the future suburb of Moncrieff, if the current management practices are removed, will place the northern, north-western and western edge of Moncrieff at extreme level of risk from a catastrophic bushfire event.

Whilst the north-easterly aspect of Moncrieff is currently exposed to bushfire risk, the development works in the future suburb of Jacka will modify the vegetation on the leased grazing land and therefore remove the bushfire risk.

The rehabilitation of the woodland vegetation on the proposed Open Space land will increase the amount of unmanaged vegetation on the ridgeline in the southern portion of the suburb, which will lead to an increase in the level of bushfire risk to the adjacent development.

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SECTION 6

BUSHFIRE PROTECTION MEASURES.

6.1 Introduction.

Based on the following assumptions:

- The open grassy woodland vegetation on the leased land beyond the Horse Park Drive corridor is not adequately managed to prevent the spread of fire across the landscape towards the western, north-western, northern and north-eastern edge of the new suburb;

- The Open Space land within the suburb is managed to provide a low threat or exempt fuel hazard in accordance with Clause 2.2.3.2 of Australian Standard A.S. 3959 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'*;

- The Open Space land located to the south and east of the residential precinct is rehabilitated and is NOT managed; and

- Bushfire Protection Measures are applied to the western, north-western, northern and north-eastern aspects of the suburb in order to remove the need for the application of bushfire construction standards to the future dwellings the following fire protection measures shall be implemented:

6.2 Bushfire Protection Measures – Asset Protection Zones:

6.2.1 Western, north-western & northern aspect to Moncrieff

(a) Provision of Managed Inner Asset Protection Zone:

The full width of the Horse Park Drive corridor shall be managed as an Inner Asset Protection Zone.

(b) Provision of Managed Outer Asset Protection Zone:

There shall be provided an Outer Asset Protection Zone, of a minimum width of 300 metres, to the west, northwest, north and northeast of the Horse Park Drive carriageway. This recommendation is based on the road corridor being managed as an Inner Asset Protection Zone and shall remain in place pending development of the future suburb of Jacka and Taylor.

(c) Provision of Ember [HAPZ] Zone:

There is no requirements to provide an ember zone to the western, north-western, northern and north-eastern aspect of the suburb due to the provision of the 300 metre wide OAPZ.

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6.2.2 Development having exposure to the bushfire threat within the unmanaged Open Space Zoned lands.

The Asset Interface Classification for development which adjoins the grassy woodland vegetation within the unmanaged Open Space land varies, depending on aspect and the length of fire path.

Table 6 below provides a list of fire protection measures required to be applied to these interfaces.

Table 6: Fire Protection Zones to development adjoining the unmanaged Open Space Zoned land.

	Length of Fire Run to Asset (through unmanaged vegetation)			OAPZ	IAPZ	HAPZ	Figure Reference
Aspect of Fire Run	<100m	100 – 350m	>350m				
From the east across unmanaged grassy woodland vegetation within the Open Space			**Secondary**	**Nil**	**20m**	**230m – BAL 19 30 – 41m; BAL 12.5 remainder**	**No. 1**
		Lee		**Nil**	**10m**	**50m – BAL 12.5**	**No. 2**
From the south across unmanaged grassy woodland vegetation within the Open Space		**Secondary**	**Secondary**	**Nil**	**20m**	**230m – BAL 19 30 – 41m; BAL 12.5 remainder**	**No. 1**
From the southeast across unmanaged grassy woodland vegetation within the Open Space			**Lee**	**Nil**	**10m**	**50m – BAL 12.5**	**No. 2**
From the northeast across unmanaged grassy woodland vegetation within the Open Space			**Lee**	**Nil**	**10m**	**50m – BAL 12.5**	**No. 2**

Map Reference – refer to Section 9

6.3 Fuel Management Protocols:

(a) Asset Protection Zones:

The management of the Inner Asset Protection Zones, the Outer Asset Protection Zones recommended in this report shall comply with the management protocols as provided in Schedule C – Fuel Management Standards for Fire Management Zones of the '*Strategic Bushfire Management Plan for the ACT – Version 2 – October 2009'.*

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The full width of the Horse Park Drive corridor shall be maintained as an Inner Asset Protection Zone, including the road verges.

Street trees shall be planted in rows to permit mowing of the grass with a mature tree canopy separation of 10 metres in a single row or 10 metre off-set mature tree canopy separation in a multiple row planting.

The outer edge of the defined Outer Asset Protection Zone to the west, northwest, north and northeast of the new suburb shall be fenced with a stock proof fence, complete with access gates to permit stock movement and access for fire appliances and maintenance machinery.

The vegetation within this Outer Asset Protection Zone shall be monitored during late winter & spring and the gazetted Bushfire Danger Period. This monitoring shall determine the height, density and dryness [curing] of the grassland fuels in order to determine necessary management actions required to maintain the Grassland Fire Hazard to less than 35 when grassland curing has reached 70% – refer to Table 4 – Grassland Fuel Hazard treatment guide – *Strategic Bushfire Management Plan for the ACT – 2009.*

(b) Managed Urban Open Space Zones including Pocket Parks:

Clause 2.2.3.2 of Australian Standard A.S. 3959 – 2009 defines low threat vegetation as any of the following:

a) Vegetation of any type that is more than 100 metre from an asset;

b) Single areas of vegetation less than one [1] hectare and not within 100 metres of other areas of vegetation classified as bushfire prone vegetation;

c) Multiple areas of vegetation less than 0.25 hectares in area and not within 20 metres of an asset;

d) Strips of vegetation less than 20 metres in width, regardless of length and not within 20 metres of an asset or each other, or other areas of vegetation classified as bushfire prone vegetation;

e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops;

f) Low threat vegetation, including managed grassland, maintained lawns, golf courses, maintained public reserves and parklands, botanical gardens, vineyards, orchards, cultivated ornamental gardens, commercial nurseries, nature strips and wind breaks.

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The design and maintenance of the managed Open Space Zones shall achieve a 'low threat' vegetation classification as defined by Clause 2.2.3.2 of A.S. 3959 – 2009.

The managed Open Space Zones shall be prepared and rehabilitated to permit maintenance by mowing. This shall include but not limited to the following:

1. The zone shall be regraded to provide a slope of < 1:4 and be free of holes, logs rocks or other obstacles;

2. Planted with suitable grass;

3. Retained unmanaged pockets of grassy woodland shall have an area of less than one [1] hectare and be separated by more than 100 metres from unmanaged bushfire prone vegetation having an area of more than one [1] hectare;

4. Retained unmanaged multiple pockets of grassy woodland vegetation shall have an area of less than 0.25 hectares and shall not be located less than 20 metres from an asset;

5. Retained strips of unmanaged grassy woodland vegetation shall be no more than 20 metres in width, regardless of length and not within 20 metres of an asset or each other, or other areas of vegetation classified as bushfire prone vegetation;

6. Trees located within the mown areas of the Open Space Zone shall be under-pruned to permit mowing under the tree canopy.

6.4 Access for Fire-fighting Operations:

Edge roads shall be constructed within the Inner Asset Protection Zone setback to all bushfire prone interfaces and shall be continuous to allow access to the full length of the defined bushfire prone interface [e.g. unmanaged Open Space Zones and to the west, northwest, north and northeast aspect to the new suburb] and constructed to a width of 7.5 metres with corners, intersections and turning heads designed to accommodate both an Urban Pumper and Aerial Appliances in locations with multi-level development and Rural Fire Service Tankers (Refer to Access provisions provided by each Service).

Corners and round-abouts shall be constructed to provide access for urban and rural fire service vehicles with a turning circle of 24 metres, with an inner radius of 6 metres and an outer radius of 12 metres for corners. Bridges and road surfaces shall be designed to carry a live load of 25 tonnes.

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Internal estate roads shall have a minimum width of 5.5 metres with parking/passing bays located clear of the formed road width and a 3 metre verge to each side to allow unencumbered access by emergency crews to all sides of their vehicles. Corners and round-abouts shall be constructed to accommodate Urban Pumpers and Aerial Appliances in locations of multi-level medium density development.

Access gates shall be provided from Horse Park Drive into the Outer Asset Protection Zone to the west, northwest, north and northeast of the new suburb.

Provision shall also be provided for management/emergency service access into the managed Open Space Zones. Where Cycle/Pedestrian access is provided within the managed Open Space Zones a four [4] metre wide compacted gravel road-base shall be provided in order to provide access for emergency service vehicles.

6.5 Water Supplies for Fire Fighting Operations:

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 to edge roads.

6.6 Temporary Asset Protection Zones:

The provision of temporary Asset Protection Zones shall be determined at an individual development stage.

A minimum 200 metre wide managed Outer Asset Protection Zone shall be provided to the edge of a development stage, on land which is the subject of future residential development. Where the stage adjoins permanent Asset Protection Zones or managed Open Space land the management prescriptions prescribed within this report shall apply.

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SECTION 7

RESIDUAL RISK.

7.1 Introduction.

Table 7 evaluates the residual bushfire risk to the future development within the new suburb of Moncrieff, following the implementation of the recommended bushfire protection measures, and determines the vulnerability of the proposed development, the possible consequences and residual bushfire risk during catastrophic fire danger periods.

Table 7 – Bushfire Risk Register & Action Treatment Plan – extreme / catastrophic bushfire events, post implementation of the recommended protection measures.

The Risk What can happen?	The consequences of an event happening Consequences	Likelihood	Risk before mitigation	Strategy to reduce the risk	Consequences & Likelihood after mitigation measures applied	Residual Level of Risk
(1) Fire burning in unmanaged open grassy woodland to the west, northwest and north of Moncrieff – under westerly; northerly and northerly wind influences	Catastrophic	Possible	Extreme	Provision & management of Asset Protection Zones	Moderate / Possible *[Refer to Note 1 below]*	High *[Refer to Note 1 below]*
(2) Fire burning in unmanaged open grassy woodland to the northeast of Moncrieff – under the influence of north-easterly winds	Major	Possible	Extreme	Provision & management of Asset Protection Zones	Moderate/ Possible *[Refer to Note 1 below]*	High *[Refer to Note 1 below]*
(3) Fire burning in the unmanaged grassy Woodland vegetation in the Open Space areas – under southeast, southerly, north-easterly and easterly wind influences.	Moderate	Possible	High	Provision & management of Asset Protection Zones & construction standards to buildings	Minor/ Possible	Moderate

Note 1: *This level of residual risk will remain until such time that the new suburbs of Taylor & Jacka are completed and removes the bushfire risk to the west, northwest, north and north-eastern aspect of the suburb of Moncrieff.*

7.2 Summary of Residual Bushfire Risk.

Table 7 provides a review of the residual level of risk to residents and emergency services personnel and others within the future suburb of Moncrieff and has been determined on the basis that the recommended bushfire mitigation measures are implemented and maintained over the life of the development.

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The implementation and permanent management of the recommended Asset Protection Zones and the construction of the buildings [located adjacent to the unmanaged Open Space land] to the nominated bushfire protection standards will play a significant role in decreasing the bushfire hazards and the level of risk from fire events within the open grassy woodland vegetation to the west, northwest, north and northeast and the grassy woodland vegetation retained/rehabilitated in the proposed Open Space Zoned land that occurs within the southern portion of the proposed suburb.

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SECTION 8

CONCLUSION

The development proposal reviewed in this Updated Bushfire Risk Assessment [BFRA] is the Context Plan for the new suburb of Moncrieff which is located on the north-western edge of the existing residential development within the suburbs of Amaroo and Ngunnawal.

The proposed landuse in the new suburb consists of RZ1 Residential Suburban Zone; RZ4 Residential Zone – Medium Density; RZ5 Residential Zone – High Density; CZ5 – Commercial Mixed Use Zone; PRZ1 – Parks & Recreation Urban Open Space Zone, Open Space and Community Facilities.

This updated report has examined the likely fire-paths which may impact on the proposed suburb from external fire sources to the west, northwest, north and northeast and also, due to the proposal to establish an area of Open Space Zoned land containing unmanaged grassy woodland vegetation to the south of the residential precinct, the potential fire paths which may occur inside the suburb.

Following discussions with ESA and ACT Fire & Rescue recommendations have been made on the provision of statutory bushfire protection zones required to be implemented to the perimeter of the new suburb.

A decision has also been taken to increase the protection provided to the western, north-western, northern and north-eastern aspects to the suburb so that the statutory requirement to provide an 'Ember Zone' can be removed, thus removing the need to apply bushfire construction standards to dwellings which will ultimately be located within a wider residential precinct that includes the future suburb of Taylor and Jacka.

Consideration has also been given to the reduction of the potential bushfire hazard created within the Open Space Zoned lands and a decision taken that, except for the Open Space Zoned land to the south and east of the residential precinct, all remaining Open Space Zoned land will be maintained to provide a low hazard vegetation classification as defined by Clause 2.2.3.2 of Australian Standard A.S. 39509 – 2009 – *'Construction of Buildings in Bushfire Prone Areas'.* Management prescriptions that satisfy this requirement are provided in this updated report.

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REFERENCES:

- Strategic Bushfire Management Plan for the ACT – January 2005 & October 2009;
- The Canberra Spatial Plan – ACT Planning & Land Authority – March 2004;
- AS/NZ - 4360 : 2004 Risk Management;
- Emergency Risk Management – Applications Guide. (EMA) 2000);
- Overall Fuel Hazard Guide – NRE. May 1999;
- Planning for Bushfire Risk Mitigation 2006 & Update 2009.

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SECTION 9 – Plan of Bushfire Protection Measures.

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Appendix G

Superb Parrot Report

Report on the distribution, abundance and breeding status of the Superb Parrot (*Polytelis swainsonii*) during the 2009-10 breeding season, Gungahlin, ACT.

Lindsay Hansch

Prepared for the Canberra Ornithologists Group (COG)

By Chris Davey

7 April 2010

Report on the distribution, abundance and breeding status of the Superb Parrot (*Polytelis swainsonii*) during the 2009-10 breeding season, Gungahlin, ACT.

Background

The Superb Parrot (*Polytelis swainsonii*) is a listed threatened species under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* and as such must be considered in any development application. Within the ACT the species is declared vulnerable under the ACT's *Nature Conservation Act 1980* and is regarded as a non-breeding summer migrant restricted to the north western area of the ACT, in particular the area around Mt. Rogers in the suburb of Fraser.

The most significant threat to the Superb Parrot is widespread clearing, degradation and fragmentation of box woodland throughout the species' range, especially breeding and foraging habitats, and corridors of vegetation used for regular movements (Webster 1988). Until recently the nearest known breeding location was from the area of Captains Hill along the Wallaroo Road, NSW (35° 09' 04" S, 149° 01' 30" E), (Davey, 1997).

Martin (1996) produced a survey questionnaire and conducted a road survey within the Wallaroo Road area of the Yarrowlumla Shire, NSW and provided an estimate of the number of potential Superb Parrot nesting trees

Within the ACT, Davey (2002) reported on bird observations from Mulligan's Flat Nature Reserve between 1995 and 2000 and noted a single observation of a Superb Parrot only and of an individual hollow inspecting nearby the Reserve in 1996-97.

An unprecedented number of Superb Parrots including many dependent young were observed in the northern Belconnen suburbs over the summer of 2005-06 (Lashko 2006). The species was recorded from 10 Belconnen suburbs and was present from early December with small numbers remaining through to February. Records from the Canberra Ornithologists Group's (COG) database indicate that this influx has continued. Associated with this summer influx the birds appear to be arriving earlier and departing later with records in early September to late March and with dependent but begging young now often observed.

With an increase in sightings at Mulligan's Flat / Goorooyarroo Nature Reserves and breeding in trees in the adjacent suburb of Harrison, there is a strong possibility that breeding may now be occurring within the potentially suitable habitat to be found in areas reserved for urban development within the Gungahlin area. It is unknown why there has been a change in the occurrence and distribution of the Superb Parrot within the ACT or whether this change will be temporary or permanent. It cannot be assumed that the influx is due to an increase in their abundance.

The aim of the survey was to document the distribution and breeding status of Superb Parrots during the 2009-10 breeding season within and surrounding the proposed suburbs of Kenny, Throsby, Jacka, Moncrieff and Kinlyside and to determine the

condition of the tree-hollow estate within the areas proposed for development (but not including Kinlyside).

SUMMARY

- Superb Parrots sighted in Throsby
- Potential breeding sites noted in Throsby
- opportunistic obs. noted in other areas of ACT
- Tree survey: tree spp. recorded (Table 4), and hollows.
  Spp. with most hollows: E. mannifera
  E. rossii

  Hollows mostly 6-10 cm ϕ
- No. potential nesting trees extrapolated from tree survey, for each suburb in survey (Kenny, Throsby, Moncrieff, Jacka)
  - Throsby had 56, Kenny 37. (Table 7)

Methods

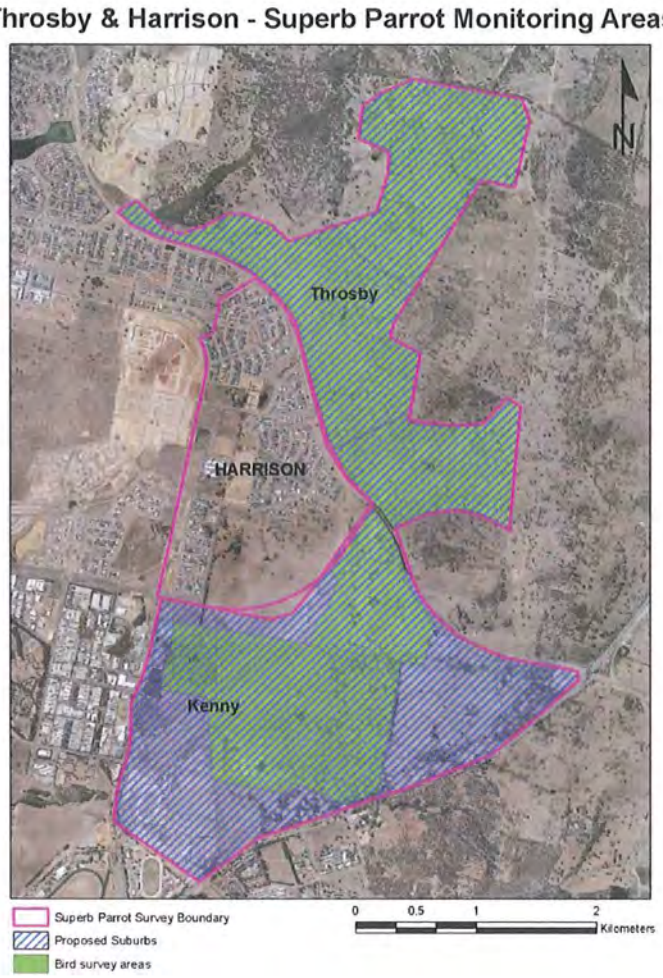
Superb Parrot survey

Members of the Canberra Ornithologists Group (COG) were advised of the survey and were asked to report to the COG Discussion List (Chat-line) any observations on the birds. Although it is recognised that this information is of limited use due to inconsistencies in observations, the lack of nil observations etc, it is possible to gain a general impression of where birds were located over urban Canberra and of their behaviour. Additional information was obtained from the ANU and from ACT Government rangers on sightings from Mulligan's Flat and Goorooyarroo Nature Reserves.

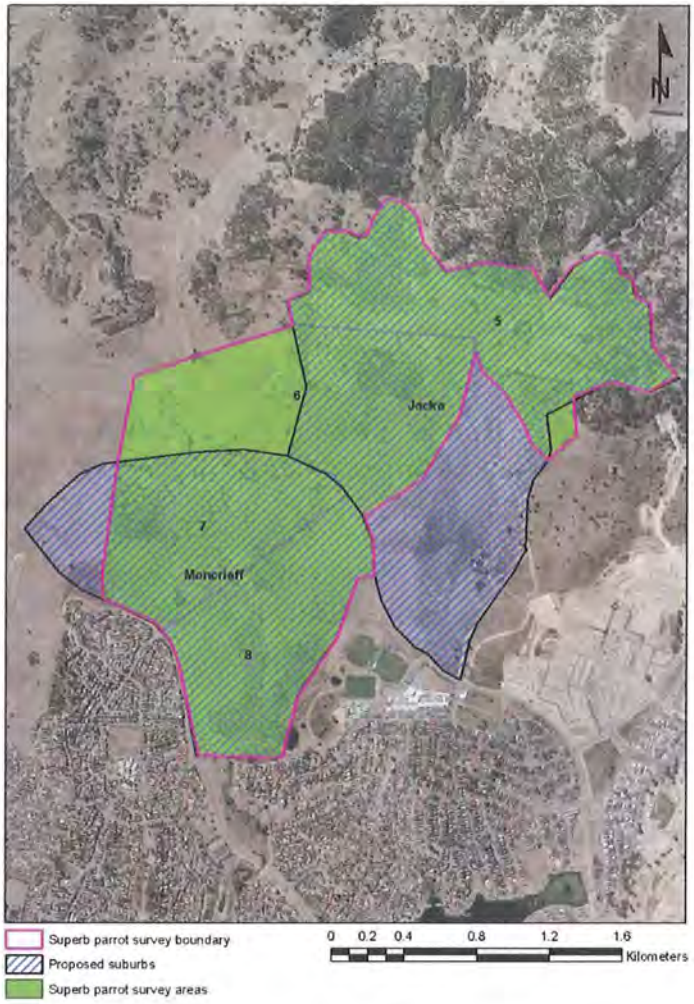
Over the mornings of 12 September, 17 October, 14 November and 12 December survey teams of COG members searched areas covered by the proposed suburbs of Kenny, Throsby, Jacka, Moncrieff and Kinlyside. Surveys started 1 hour after sunrise and continued until the individual teams were satisfied that their designated area had been adequately covered; usually taking 3-4 hours. All team members were familiar with the Superb Parrot and at least one member of each team was familiar with the calls.

For the purpose of the monthly breeding surveys the suburbs were sub-divided to facilitate ease of access and to ensure adequate coverage. Team 1 covered two areas in Kenny (area 1a and 1b) whilst team 2 covered a part of Kenny (area 2a) and part of Throsby (area 2b). Team 3 was assigned to area 3 and team 4 to area 4, both in Throsby. Teams 5 and 6 covered areas 5 and 6 in Jacka whilst Teams 7 and 8 covered areas 7 and 8 in Moncrieff, see Map 1 for details. For each survey observers were assigned to different teams. Finally, a dedicated team with prior knowledge of the area (through COGs regular woodland surveys) was assigned to Kinlyside.

Map 1. Superb Parrot survey areas in the proposed suburbs of Kenny, Throsby, Jacka and Moncrieff



Jacka & Moncrieff - Superb Parrot Monitoring Areas



All areas were covered on the four occasions except for Throsby (Areas 2b, 3 and 4) and a section of Kenny (area 2a) when lambing prevented access for the September survey. On all occasions the locations of any Super Parrots were recorded on an aerial photo of the area and details of behaviour noted. Many observers had trouble identifying specific trees from aerial photographs and just indicated the general area of the observation. It is, therefore, not possible to provide an accurate geo-location for all observations but the coordinates do indicate the general area of interest.

As well as noting the location and behaviour of individual Superb Parrots, observers involved in the monthly surveys also recorded the estimated abundance of all other bird species within the proposed suburbs. All data were recorded on a COG Observation Data Sheet for subsequent transcribing to the COG database.

Due to the preliminary nature of the survey and limited resources it was not possible to determine successful breeding with any accuracy. It was not possible to return to specific areas to confirm observations and no attempt was made to examine in detail any of the possible nesting sites. Rather, the definitions of breeding indicates an intention to breed and includes the following observations; females observed entering

or exiting hollows, copulations, aggressive interactions between pairs with a potential nest hollow near by and a male 'on station' indicated by the presence of a lone male perching quietly in a tree occasionally making a soft call and with a possible nest hollow in the same tree.

In addition, to the four bird surveys, a reconnaissance trip of Throsby Area 4 was carried out on 10 October and all sites were covered for the tree survey, see below for details. Apart from the bird surveys all other visits were conducted by Chris Davey.

Tree-hollow survey

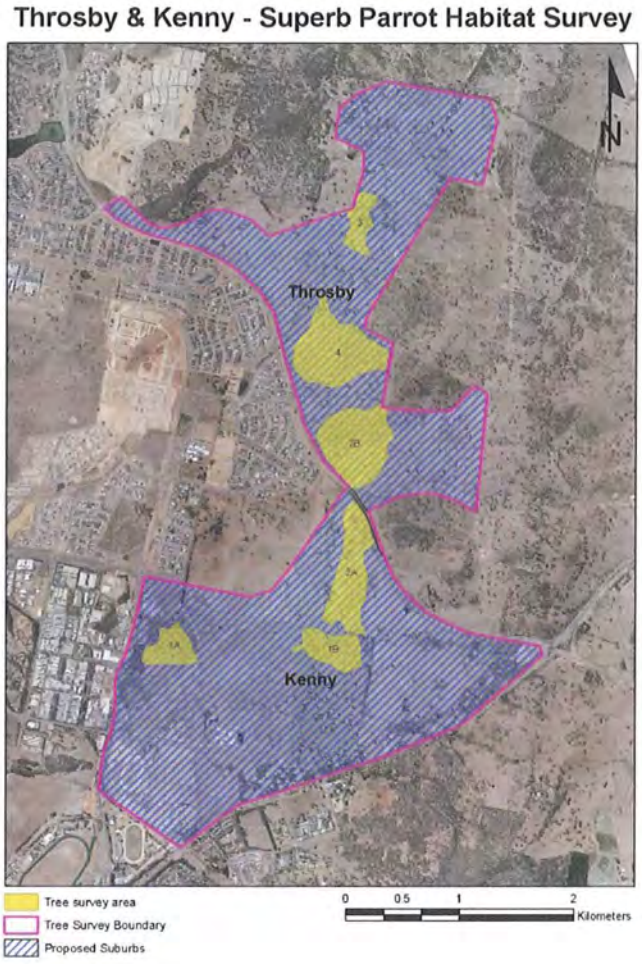
The Superb Parrot, along with most cockatoo and other parrot species, nest in tree hollows. The characteristics of their nesting hollows have been described by Webster (1988) and subsequently by Manning (2004) for his studies on the ecology of the Superb Parrot. Nine sites of trees were selected from aerial photographs to best represent the trees within the proposed suburbs of Kenny (3 sites), Throsby (3 sites), Jacka (1 site) and Moncrieff (2 sites), see Map 2. Each site contained about 75 trees (range 61- 91) with the number of trees and size of site limited by 3-4 hours of survey time for each site. The number of trees surveyed was therefore determined by the distance required to travel between each tree i.e. tree density. Sites were surveyed between 26 October and 19 December 2009.

All native hollow-bearing trees with a diameter at breast height (DBH) greater than 0.3 m were assessed then located and uniquely numbered on an aerial photo. The following attributes were recorded for each tree; tree species and DBH, number of hollows in the following size categories- small (up to 5 cm diameter), medium (6-10 cm), large (11 to 15 cm) and very large (greater than 15 cm diameter). The hollow size was estimated by eye and finally an assessment of the height of the tree from ground to the first major branch was noted. All attributes, except for height to start of first major branch follows Manning (2004).

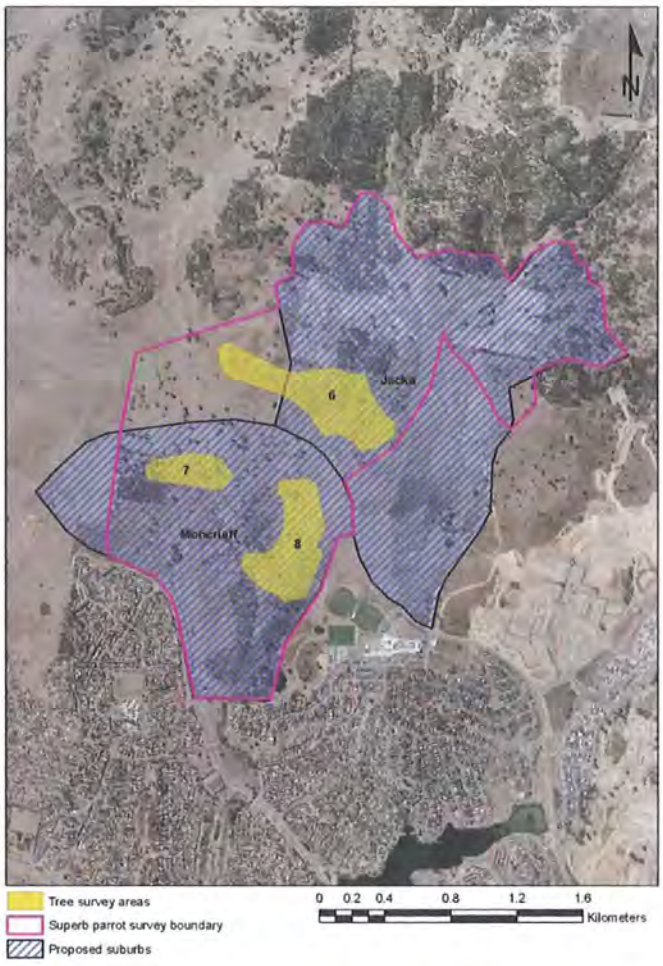
Some trees in the proposed suburbs of Kenny, Jacka and Moncrieff were found to have numbered tags nailed to the trunk. The labelled trees are assumed to be 'Registered Trees' and the tag number was recorded so that an assessment could be made of differences between registered and non-registered trees.

An overall estimation of the number of each hollow size category for each suburb was made by extrapolation. The number of trees in each tree survey site was counted from the aerial photographs and compared with the actual number surveyed and a correction factor calculated. The number of trees in each suburb was then counted from the aerial photographs and the correction factor applied. The ratio of each hollow size category at the tree survey site was then applied to each suburb.

Map 2. Tree survey areas in the proposed suburbs of Kenny, Throsby, Jacka and Moncrieff



Jacka & Moncrieff - Superb Parrot Habitat Survey



Results and Discussion

Superb Parrot survey

From postings to the COG Discussion List, the Superb Parrot returned to the Canberra area in 2009 around early September with the first report at Belconnen Golf Course on 1 September. By mid-September birds had been reported from Mulligan's Flat, Macquarie, flying over William Slim Drive, Harrison and Mt Rogers. With the first survey set for 12 September, the birds had returned approximately two weeks earlier. Bearing in mind the possibility of double counting when estimating the number of birds as they fly through areas that are being counted simultaneously, the estimated number of Superb Parrots observed in each survey area is shown in Table 1 with the number observed during the tree surveys shown in Table 2.

Table 1. Estimated number of Superb Parrots recorded during bird surveys within proposed suburbs of Gungahlin, ACT.

Suburb	Area	Survey dates			
		12-Sep	17-Oct	14-Nov	12-Dec
Kenny	1a	0	0	0	0
Kenny	1b	0	0	0	1

Kenny	2a	No survey	0	0	0
Throsby	2b	No survey	12+	8	20
Throsby	3	No survey	10	14	19
Throsby	4	No survey	23	8	2
Jacka	5	0	0	0	0
Jacka	6	0	0	0	0
Moncrieff	7	0	0	0	0
Moncrieff	8	0	0	0	0
Kinlyside	9	0	0	0	0

In the proposed suburbs of Jacka, Moncrieff and Kinlyside there were no signs of Superb Parrots during any of the bird surveys, or tree surveys. Apart from a single observation of a single bird flying over the area on 12 December no Superb Parrots were reported from Kenny.

Table 2. Estimated number of Superb Parrots recorded during tree surveys within proposed suburbs of Gungahlin, ACT.

Suburb	Area	Survey date	No. Superb Parrots
Kenny	1a	26-Oct	0
Kenny	1b	27-Oct	0
Kenny	2a	31-Oct	0
Throsby	2b	4 and 9 Nov	12, 13
Throsby	3	2-Nov	7 or 8
Throsby	4	10-Nov	0*
Jacka	6	14-Dec	0
Moncrieff	7	19-Dec	0
Moncrieff	8	24-Nov	0
Kinlyside	9	No survey	

* note: 3 seen on 10 Oct

In Throsby, unfortunately the area in which the birds were most likely to be observed during the September survey could not be assessed. From October onwards Super Parrots were reported from two distinct locations.

In Area 2b (East Throsby) Superb Parrots were recorded on all visits with pairs interacting over tree hollows, and possible nests at three locations (sites 1, 2 and 3), see Table 3. By early November there were indications of breeding at six additional locations (sites 8, 9, 10, 11, 12, 13).and juveniles were observed in mid- December. As with Area 3 there was much movement between the area and Harrison.

In Area 3 (North Throsby) birds were observed flying back and forth from area 4 (South Throsby) with an increase in numbers due to the presence of juvenile begging birds recorded in mid-December, see Tables 1 and 2. In mid-October, in addition to birds inspecting tree hollows, signs of breeding were observed at sites 5 and 6, see Table 3. On 2 November during the tree survey signs of breeding were observed at sites 5 and 7. In mid-December there was still a nest at site 7 with the female visible and sitting as well as begging young within the area.

Area 4 (South Throsby) during mid-October birds were observed flying to the 'Big Dam' at Mulligan's Flat and back and forth from Area 2b (East Throsby) and Area 3 (North Throsby) and from the suburb of Harrison. Signs of a possible breeding event was observed at site 14 with a male observed 'on station' calling softly presumably to a female in the hollow, see Table 3. By November and subsequently December the number of birds recorded flying over Area 4 was much reduced, see Tables 1 and 2.

Although difficult to estimate due to the amount of Superb Parrot movement in the area, by mid-October the minimum number of birds using the Throsby area would have been about 20 individuals. By mid-December by which time the birds were more localised and with juveniles there would have been in the order of 40 individuals using the area.

Table 3. Location and date of observations for 16 possible breeding sites within the proposed suburb of Throsby and surrounds, ACT.

Suburb	Site	Date	Latitude	Longitude	Observations
			Deg	Deg	
East Throsby	1	17-Oct-09	35.193969	149.170633	female in and out hollow
East Throsby	2	17-Oct-09	35.195658	149.173159	male on station
East Throsby	3	14-Nov-09	35.194081	149.169883	female enter hollow
East Throsby	4	14-Nov-09	35.194439	149.169283	attempt copulation
East Throsby	8	4-Nov-09	35.197056	149.170220	pair sit quiet next to hollow
East Throsby	9	4-Nov-09	35.195256	149.170620	male on station
East Throsby	10	4-Nov-09	35.195017	149.171568	male on station
East Throsby	11	4-Nov-09	35.195087	149.171225	male on station
East Throsby	12	4-Nov-09	35.194702	149.170949	male on station
East Throsby	13	4-Nov-09	35.196860	149.169085	possible nest
East Throsby		12-Dec-09			adults with begging young, in/out hollows
North Throsby	5	4-Feb-00	35.182229	149.167792	male look in hollow, call to female in hollow
North Throsby	6	17-Oct-09	35.178410	149.169778	male on station
North Throsby	5	2-Nov-09			v likely sp hollow
North Throsby	7	2-Nov-09	35.182219	149.166678	female seen on nest
North Throsby	7	14-Nov-09			female flushed off nest
North Throsby	7	12-Dec-09			flushed from nest site
North Throsby		12-Dec-09			adults with begging young in general area
South Throsby	14	17-Oct-09	35.191164	149.169992	male possibly on station
South Throsby		12-Dec-09			adults with begging young in general area
Mulligans Flat	15	3-Nov-09	35.176472	149.162028	on station and female into hollow
Mulligans Flat	16	3-Nov-09	35.176389	149.163333	possibly on station
Harrison	H		35.195537	149.155296	
Harrison School	HS		35.200901	149.153093	
Franklin Woods	FW		35.203436	149.147210	
BL	BL		35.180580	149.164416	

In addition to the surveyed suburbs there are eight other locations of interest.

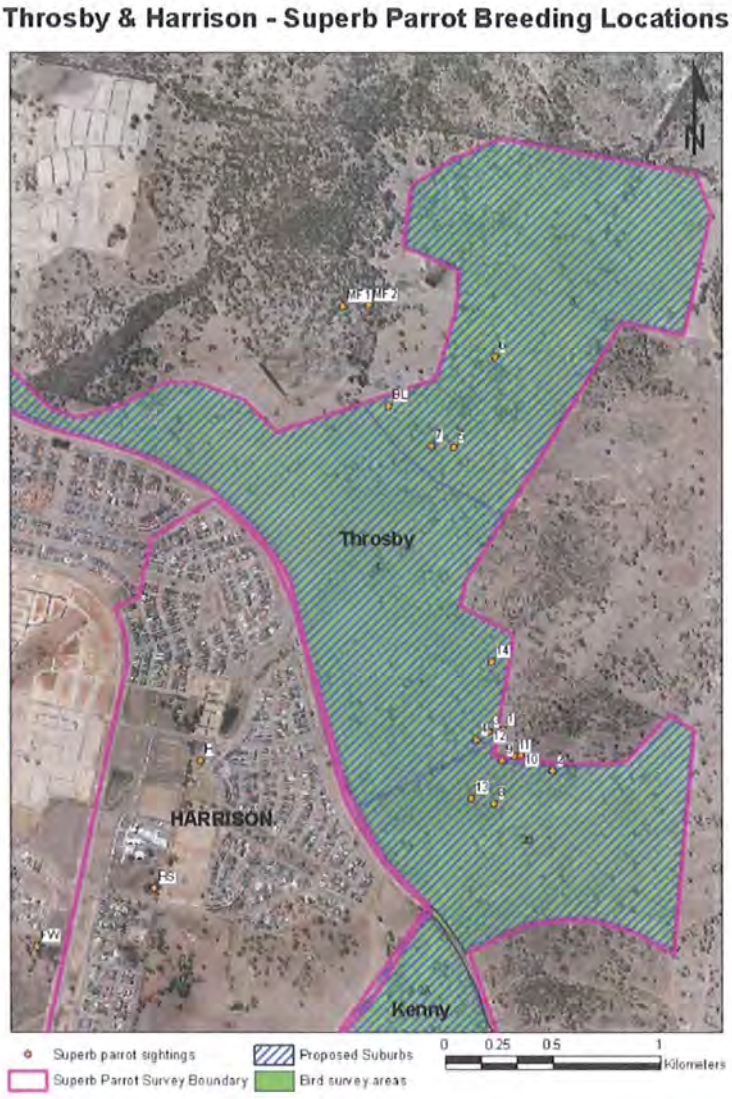
For many years Mt. Rogers (35 ° 11' 51.56" S, 149 ° 03' 17.43" E) has been known as a site where birds are reported first in the ACT and where adults and begging young go to feed post breeding. This pattern was repeated in 2009 with the first report received on 12th September and birds still present up to late November. The greatest number reported was of 50 individuals on 13th September.

Over the spring and summer months the area between and including the Kama Nature Reserve and north-east to Pine Ridge farm, otherwise known as Central Molonglo (35 ° 14' 48.94" S, 149 ° 00' 48.84" E), was regularly visited by Chris Davey for a study on the vulnerable Brown Treecreeper (*Climacteris picumnus*). The Superb Parrot was first recorded in the area on 28 September, from then on until late January birds were found scattered throughput the area. By early October the sex ratio appeared to be 1 female to every 5 males with much hollow inspecting and aggressive interactions. By the end of December flocks including begging juveniles were seen. There is no doubt that the Superb Parrot used the Central Molonglo area for breeding during the 2009-10 season.

The Gungaderra Creek starts near the neck joining Mulligan's Flat and Goorooyarroo Nature Reserves and flows south through the proposed suburb of Throsby, under Horse Park Drive, through the suburb of Harrison, passing north of the Harrison School and Franklin Woods and then continuing through the Gungaderra Grassland Reserve, under the Barton Highway to flow through Kaleen and finally to join the Ginninderra Creek. In previous years, a pair of Superb Parrots had been reported breeding at the Harrison School site (35 ° 11' 50.77" S, 149 ° 09' 35.23" E), see Map 3 and observations between mid-September and mid November confirmed that this happened again during 2009-10. The male being frequently observed 'on station' between 6 October and 2 November. Interestingly, the pair would depart the area always flying in a north- easterly direction, not up Gungaderra Creek, possibly to the east Throsby area from which birds had been observed flying in a westerly direction.

During a walk along the Gungaderra Creek from where it travels under Horse Park Drive to where it flows north of the Harrison School on 24 October, at least six males were noticed flying either up or down stream with a male being recorded 'on station' in a Blakely's Red Gum (*E. blakelyi*) in the Harrison Park at 35 ° 11' 43.93" S, 149 ° 09' 19.06" E, see Map 3 in an area reserved for 'Future Residential Development-Land Development Agency'. At the same time and in the same area a second male was noted to be 'on station'.

Map 3. Superb Parrot breeding locations.



On 21 October during a visit to the Franklin Woods (FW) (35 ° 12' 12.37" S, 149 ° 08' 49.96" E), see Map 3, two females and five to six males were seen. Although no signs of breeding were observed there are appropriate nesting sites in the area. When observing the pair at the Harrison School, on occasions birds were noticed flying in an north-east direction from the area of the Franklin Woods possibly to the east Throsby area and *vice versa*.

Regular observations from CSIRO Sustainable Ecosystems by Chris Davey (35 ° 13' 10.83" S, 149 ° 07' 27.67"E) indicated a daily back and forth north-east/ south-west pattern of movement over the site. Associated observations posted to the COG email Discussion list suggested that the birds were flying to and from the Kaleen district playing fields and ovals. Up to 22 birds were reported, and were regularly observed feeding on the ground suggesting a possible passage of birds to the playing fields from the Throsby, Harrison, Franklin Woods area. Both males and females were first noted flying over the site from early-September in flocks of up to nine birds but from late September onwards the passage consisted of single males until by early

November an increase in the number of birds was observed passing through. By mid-December the passage had ceased and on 16 December adults and young were seen feeding in acacias along Bellenden Street.

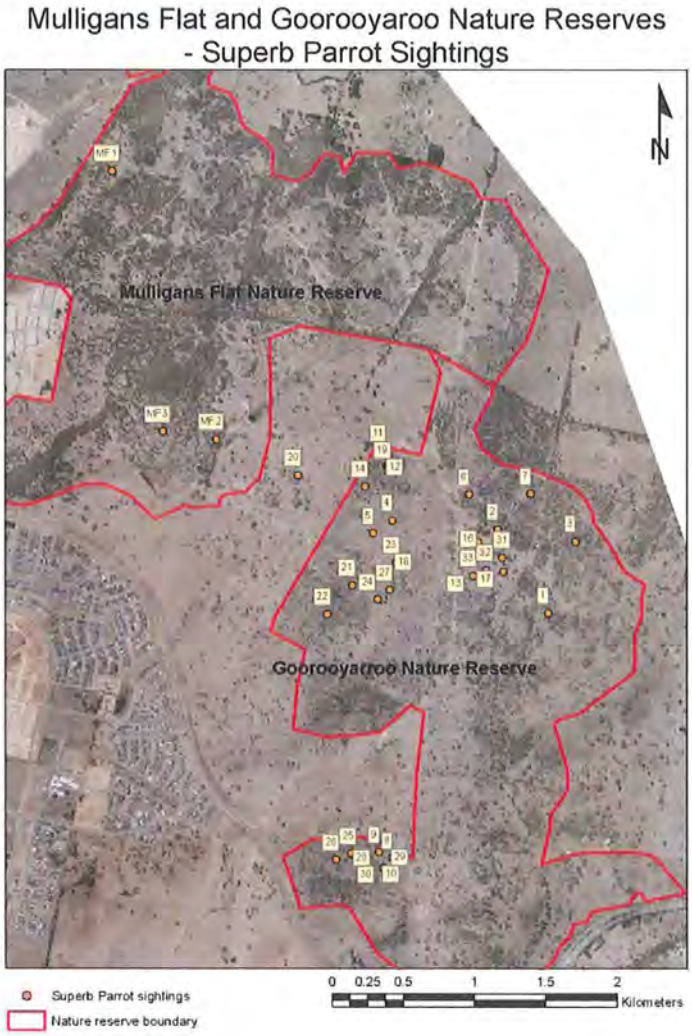
The Gungaderra Creek, therefore, appears to be an important area for the Superb Parrot linking north Throsby to Harrison and Franklin and then via CSIRO to Kaleen. It will be interesting to see how the birds continue to use the area with the continuing development of Harrison and Franklin. In addition, there appears to be traffic from the east Throsby area directly across the suburb of Harrison to the Harrison School area and the Franklin Woods.

Despite a frequent presence of Rangers from Parks and Conservation and frequent trips by COG members, there were few sightings from the Mulligan's Flat Nature Reserve. Birds were reported flying between north Throsby and the 'Big Dam' but the only report of birds breeding from within the Reserve was of a pair interested in a hollow at 35° 10' 35 .09" S, 149° 09' 43.09" E, see Map 3, site 15 with on the same day a single male possibly 'on station' at site 16, see Map 3.

At Goorooyarroo Nature Reserve, a couple of years previously, a pair had been observed breeding in a hollow at 35° 11' 59.55" S, 149° 11' 11.70" E (S. Holliday *pers. comm.*) but despite frequent visits has not been seen since.

Over the period 13- 21 October 2009 members from the Fenner School of Environment and Society, Australian National University, with the help of members from the Canberra Ornithologists Group, conducted their annual bird survey of both Mulligan's Flat and Goorooyarroo Nature Reserves. Observations are taken from standard points within the Reserves for 10 minute periods with each point being surveyed twice during the survey. Behaviour was not recorded. There were 39 records of Superb Parrots of which only three were from Mulligan's Flat with the remainder from Goorooyarroo Nature Reserve, see Map 4. Observations appear to suggest that the birds were primarily using two areas within the Reserve, at an area north-east of East Throsby and again in an area south-east of East Throsby

Map 4. ANU Superb Parrot sightings within Mulligan's Flat and Goorooyarroo Nature Reserves, October 2009.



There were nine postings to the COG email Discussion list in September, a similar number in October and November then rising to 28 in December and then 6 in January with a single reported observation in February. These observations emphasise the increase in the number of Superb Parrot after the emergence of young in December. Reports were received from 16 suburbs north of the Molonglo River and two from the south. The most distance posting was of birds reported from Hoskinstown and along the Captains Flat Road during late November/ early December.

Other bird observations.

During the course of the survey there were 106 bird species recorded from the area. Not surprisingly due to differences in tree cover and area size the number of species varied between the different suburbs. Kinlyside had the greatest species richness with 80 species, see Appendix I. Sixteen percent of species were seen in all survey areas whilst 47 percent were seen in three or less of the survey areas. Two species of

interest were of breeding observations on the Banded Lapwing (*Vanellus tricolor*) and the Fairy Martin (*Petrochelidon ariel*).

In early October 2009, a pair of Banded Lapwing was observed just outside the Mulligan's Flat Sanctuary fence on leased land grazed by sheep within the Throsby area, see Map 3, site BL. One was sitting on a nest and subsequent observations confirmed the successful hatching of 3 chicks. At the same time a second pair was observed in the same area but it was not possible to confirm a breeding event. By early November the first pair was still present but with a single chick only. It is unknown whether the chick fledged but subsequent observations confirmed that this pair laid a second clutch and on 20 January two adults and three chicks were observed in the same area as the first nest. These sightings are being prepared for publication in Canberra Bird Notes (C. Boekel *pers. comm.*).

Summary of bird observations

Ad hoc observations on the behaviour of the Superb Parrots, including observations on the sex ratio at various stages of the breeding season, indicate that the birds arrive in the ACT at the start of September, egg laying starts in the third week of September with young appearing approximately 60 days later towards the end of November. The adults and young then spread throughout northern urban Canberra and leave the ACT from the middle of January onwards. This routine is similar to that reported by Davey (1997) from observations of birds around Murrumbateman, NSW.

When possible, and if resources allow, the most appropriate way of using behaviour as a means of assessing breeding is to frequently revisit the area to confirm observations and if possible to record changes in behaviour by the adults as breeding progresses. Infrequent observations can therefore only provide an indication that birds are breeding or intend to breed in an area.

Despite four bird surveys over five areas in Jacka, Moncrieff and Kinlyside and four areas covered in Jacka and Moncrieff tree surveying, no Superb Parrots were found. Attention was paid to an additional three areas in Jacka that had been sown to oats- a favoured food item of the Superb Parrot, but again there were no sightings. At Kenny three areas were searched on three occasions during the bird surveys and three areas were covered for the tree survey but on one occasion only was a single Superb Parrot seen and that was flying over the area towards east Throsby.

Within the proposed suburb of Throsby there appears to be two areas in which breeding was observed. In north Throsby a female was observed sitting on a nest and subsequently flushed from the site on several occasions whilst most of the other breeding observations were of males 'on station'. Gungaderra Creek appears to be an important route for birds to travel from the area into Harrison and beyond, apparently to feed in suburban trees and from the herb layer at various ovals and other open-spaced grassy areas.

The area to the north-east of the breeding sites in east Throsby within the Goorooyarroo Nature Reserve needs to be examined in more detail to determine whether breeding occurs in the area.

The findings from the survey conducted during the 2009-10 breeding season should be regarded as preliminary and should be repeated next year with greater emphasis to confirm breeding by repeated frequent observations in those areas of Throsby in which there were indications of breeding in 2009.

Including the Superb Parrot, one hundred and six (106) bird species were recorded from the survey area. The Superb Parrot, Varied Sittella (*Daphoenositta chrysoptera*) and the White-winged Triller (*Lalage sueurii*) are all ACT listed threatened species whilst the Speckled Warbler (*Chthonicola sagittata*) and Diamond Firetail (*Stagonopleura guttata*) are regarded as species of concern in the ACT and as threatened within New South Wales. The Dusky Woodswallow (*Artamus cyanopterus*) and the Jacky Winter (*Microeca fascinans*) are also regarded as species of concern within the ACT.

In regard to breeding by two species of interest mentioned earlier, breeding by the Fairy Martin is now, unfortunately, a rare event in the ACT whilst the Banded Lapwing has not been reported breeding in the ACT since 1982 (Davey 1987). Wilson (1999) rated Banded Lapwings as never having been 'particularly numerous' in the ACT and by 1999 as 'presumed extinct in the ACT'. However, Taylor and Canberra Ornithologists Group (1992) rated Banded Lapwings as a 'rare breeding visitor'. The Canberra Ornithologists Group (COG) Annotated Checklist of the Birds of the Australian Capital Territory (COG web site) has recently been modified to: 'rare breeding vagrant'.

The Throsby area may benefit the Banded Lapwing with the proximity of the 'Big Dam' at Mulligan's Flat Nature Reserve and possibly protection from foxes (*Vulpes vulpes*) due to the baiting activity around the Reserve. For two pairs to be recorded, one of which bred twice, is a significant observation.

The survey has identified two locations within the proposed suburb of Throsby used by the Superb Parrot for nesting during the 2009-10 breeding season. This valuable information will allow appropriate management and suburb design decisions to be made. Superb Parrots were also present and possibly breeding within the Central Molonglo area and so there is every possibility that they could also be present and nesting within East Molonglo. This area also needs to be assessed for the presence of nesting Superb Parrots before further development approval is granted. In the process of surveying for Registered Trees within the East Molonglo area a measure of tree hollow abundance should be included as a part of the assessment process.

Tree survey

Tree species

The tree survey was conducted over nine sites, see Map 2. Within each site the number of trees surveyed varied between 69 and 91.

Three sites covered the proposed suburb of Kenny at which a total of 219 trees were surveyed. One site covered the proposed suburb of Jacka whilst two sites at which 154 trees were surveyed covered Moncrieff. At Throsby there were 253 trees surveyed from three sites.

The area is dominated by Blakelys Red Gum (*Eucalyptus blakelyi*), comprising approximately 44% of the eucalypts present, and Yellow Box *(E. melliodora)* with seven other eucalypt species noted. In addition, 8% of the trees were dead so could not be identified whilst just under 4% could not be identified. The frequency of each species varied with each proposed suburb with proportionally less Blakleys Red Gum in the suburbs of Jacka and Moncrieff, see Table 4.

TABLE 4. Number of tree surveyed within four proposed suburbs, Gungahlin, ACT.

Tree name	Kenny	Throsby	Jacka	Moncrieff
Dead	9	26	17	5
E.blakelyi	113	132	61	5
E.bridgesiana	4	1	1	1
E.dives	1	0	14	0
E.macrorhyncha	0	0	12	11
E.mannifera	0	0	2	15
E.melliodora	68	58	32	22
E.polyanthamos	2	0	0	0
E.rossii	11	13	13	18
E.rubida	7	1	2	0
E.unknown	4	22	0	0

Tree hollows

From the eleven categories of eucalypt species recorded *E. mannifera* followed by *E. rossii* contained the greatest number of tree hollows at 3.0 and 2.7 hollows per tree respectively, see Table 5. The 26 trees that could not be identified (*E. unknown*) were in most cases either *E. mannifera* or *E. rossii* with the difficulty being to identify with confidence the two species from each other. Therefore, of the four eucalypt species that contained the most hollows all were 'gums' and in all cases the most common hollow size was between 6 and 10 cm diameter.

Of the remainder only *E. blakelyi* was a 'gum' the others being a 'stringybark', three 'box' and one 'peppermint' species and in most cases the most common hollow size was less than 6 cm diameter. Of the two most frequent tree species present for *E. blakelyi* the most common hollow size was in the 6-10 cm category with an average of 1.05 hollows per tree whilst for *E. melliodora* the most common hollow size was less than 6 cm with an average of 0.53 hollows per tree; that is too small for the Superb Parrot to use as a nesting hollow.

Table 5. Number of trees and number of hollows per tree for eucalypt tree species found in four proposed suburbs Gungahlin, ACT.

	No. trees	No. hollows per tree				
		Small	Medium	Large	V. large	Overall
E.mannifera	17	0.94	1.18	0.65	0.29	3.1
E.rossii	55	0.80	1.35	0.45	0.09	2.7
E.unknown	26	0.65	1.15	0.19	0.00	2.0
E.rubida	10	0.50	0.60	0.30	0.00	1.4
Dead	57	0.65	0.53	0.16	0.05	1.4
E.macrorhyncha	23	0.83	0.35	0.00	0.00	1.2
E.blakelyi	311	0.30	0.54	0.19	0.01	1.0
E.polyanthamos	2	0.50	0.50	0.00	0.00	1.0
E.bridgesiana	7	0.14	0.57	0.00	0.00	0.7
E.melliodora	180	0.63	0.61	0.35	0.09	0.5
E.dives	15	0.20	0.00	0.00	0.00	0.2

By extrapolation overall there were approximately 3000 eucalypts within the area surveyed for Superb Parrots with a DBH > 0.3 m. There was an estimated 1,100 small, 1,530 medium, 550 large and 80 very large tree hollows, see Table 6.

TABLE 6. Estimated total number of trees and tree hollows within four proposed suburbs, Gungahlin, ACT.

	No. native	No. tree hollows*			
	trees	Small	Medium	Large	V. large
Kenny	864	375	469	130	24
Throsby	1030	338	570	142	20
Moncrieff	831	216	297	178	11
Jacka	244	171	200	101	29
Total	2969	1100	1536	552	83

* After Manning et al. 2004. Hollow size: estimated diameter

Registered trees

In four sites (4, 5, 9, 11) certain trees were labelled with an aluminium tag and numbered. It is assumed that the tagged trees had been identified with certain attributes that allow them to be classified as Registered Trees. The attributes chosen are not necessarily those that provide resources for hollow-nesting bird species so analyses comparing small, medium and large tree hollows, DBH and height from ground to the first main branch were made between labelled and unlabelled trees.

Data from a total of 298 trees were analysed using a Generalised Linear Mixed Model (GLMM) and a Walt Test to assess the significance of the difference between the two

types of trees The only significant difference (p= 0.006) between the two groups was the higher distance from ground to first main branch of the Registered Trees, see Appendix II for analysis).

A GLM was used to determine differences in tree species between the two groups with an analysis of deviance used to assess statistical differences. *E. rubida*, *E. dives* and *E. macororhyncha* had a low probability of being a Registered Tree whilst *E. melliodira* and *E. rossii* had a high probability, see Appendix III for details. *E. unknown*, *Dead*, *E. bridgesiana*, *E. mannifera* and *E. polyanthamos* had insufficient data to be included in the analysis.

Estimate of number of potential Superb Parrot nesting trees

Manning et al. (2004) investigated the nest tree requirements for the Superb Parrot on the south-west slopes NSW. The natural vegetation of the south-west slopes is box-gum woodlands similar to that found in the Gungahlin survey area. After modelling the various measured attributes they concluded that the best predictor for Superb Parrot nest hollows was DBH, Blakleys Red Gum and Dead trees and tree condition, the latter was not assessed in the present survey.

Taking the 25% quartile as 90 cm DBH (see Figure 2, Manning et al., 2004) then 75% of nests were found in trees with a DBH of greater than 90 cm. The diameter of multi-stemmed trees is calculated by adding the diameter of each trunk giving a large diameter yet each trunk is thin and unlikely to develop hollows. Excluding multi-stemmed trees, the 606 trees that had a DBH of greater than 90 cm and with at least one hollow of more than 5 cm diameter was as follows (Table 7):

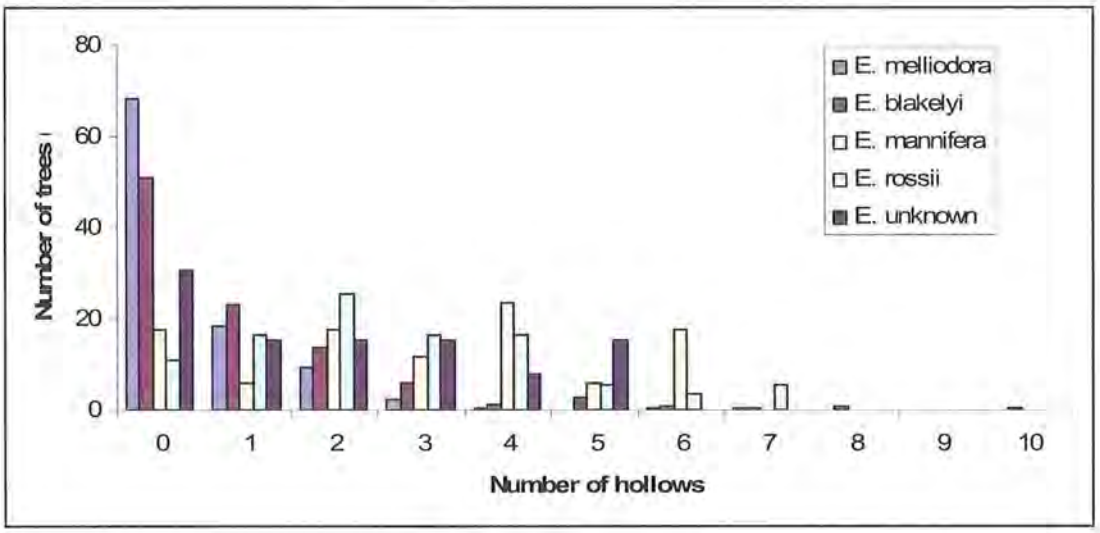
Table 7. Estimated number of suitable Superb Parrot nesting trees.

	Kenny	Throsby	Jacka	Moncrieff	Total	No. trees in sample
Dead	0	4	1	0	5	45
E. blakelyi	17	25	3	7	52	262
E. bridgesiana	2	0	0	0	2	6
E. dives	0	0	0	0	0	11
E. macrorhyncha	0	0	1	0	1	21
E. mannifera	0	0	6	0	6	13
E, melliodora	7	9	4	2	22	161
E. polyanthamos	1	0	0	0	1	2
E. rossii	5	7	6	2	20	51
E. rubida	3	0	0	0	3	10
E. unknown	2	11	0	0	13	24
Total	37	56	21	11	125	

The total number of hollows in a tree has consistently been shown as a variable associated with occupancy (Gibbons and Lindenmayer, 2002) implying that those trees with a greater number of hollows should be retained. In the Gungahlin area very few *E. blakelyi* or *E.mannifera* contained more than 2 hollows with only 9% of tree containing more than two hollows.

There was a tendency for *E. mannifera*, *E. rossii* and E. *unknown* to contain more larger hollows than *E. blakelyi* or *E. melliodora* with 47% of trees containing more than two hollows, see Figure 1.

Figure 1. Distribution of the percentage of hollows for each of five tree species



Summary of tree survey

The area under survey can best be described as structurally altered Yellow Box-Red Gum woodland with an herbaceous layer of introduced grasses. With the two species comprising 70% of the eucalypt species present both are well endowed with tree hollows with a minimum of 14% of Yellow Box and 20% of Blakelys Red Gum containing hollows of a size potentially suitable for the Superb Parrot to nest.

Two other eucalypt species *E. rossii* and *E. mannifera,* remnant trees from cleared dry schlerophyll forest and occupying the dryer ridges, are also well endowed with tree hollows.

Although not measured it is apparent that due to present and past stock grazing regimes, apart from site 1b (Kenny) there is virtually no eucalypt regeneration occurring on any of the sites that could in the future provide additional or replacement hollows.

Gibbons and Lindenmayer (2002) note that the entrance dimensions are not strongly correlated with predicting hollow occupancy and in east Gippsland it was found that only 29% of all hollows between two and five cm contained evidence of prior occupation. For those with an entrance width of six to 10 cm, 44% contained evidence of prior occupancy whilst the occupancy rate increased to 62% for hollows with entrance diameter greater than 10 cm. Overall, only 43% of hollows contained evidence of prior occupancy. Given a similar rate for the Gungahlin area this reduces the number of hollows available to fauna, from 1100 to 330 small hollows from 1536 to 676 medium hollows and from 635 to 393 hollows greater than 10 cm. and the number of potential nest trees for the Superb Parrot from 125 to 54.

Although the Superb Parrot has only recently been recorded as breeding within the ACT, there is every possibility that this has been due to food resources provided by the urban open spaces. Their successful breeding will depend on the retention of appropriately sized eucalypt species on rural lands. Although suitable hollows may be present the Superb Parrot is unlikely to breed within the dry sclerophyll forests of the Canberra nature park system preferring instead woodland habitats on high fertility soils; in Canberra, these are the very areas where lowland woodland has been lost to urban development.

Any reduction in the tree hollow estate in rural land surrounding the urban areas of Canberra caused by clearing or lack of regeneration will affect species seen within the Bush Capital. The urban forest provides little in the way of nesting for hollow-dependent bird species and their occurrence within the urban area is largely due to breeding on those rural lands as well as within the Canberra Nature Park.

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Finally I would like to acknowledge the 26 members of the Canberra Ornithologists Group for participating in the bird surveys.

Chris Davey for the Canberra Ornithologists Group.

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Appendix I

The number of surveys recorded for each of 106 bird species.

										Total
Survey area	1a/1b	2a/2b	3	4	5	6	7	8	9	number
Number of surveys	4	3	3	3	4	4	4	4	4	of sites
Stubble Quail	1									1
Australian Wood Duck	3	2	3	3	3	4	2	1	4	9
Grey Teal	2	3				3			2	4
Pacific Black Duck	3	1	2	2	1			2	3	7
Hardhead	1								1	2
Australasian Grebe	2	2				1	1	1	3	6
Rock Dove								2		1
Common Bronzewing	1		1		1				1	4
Crested Pigeon	3	2	2	3	2		3		4	7
Little Pied Cormorant	2	1	1	1						4
White-necked Heron			1					1	1	3
White-faced Heron	1	1	3	3		1	1	1	1	8
Australian White Ibis	2	1						1		3
Straw-necked Ibis			1	1	1	2	1	3		6
Black-shouldered Kite	1							1		2
Brown Goshawk	1	1					1	1	2	5
Collared Sparrowhawk									1	1
Wedge-tailed Eagle	3	1	1							3
Nankeen Kestrel	3	3	2	2	3	1	4	2	2	9
Brown Falcon	1	1	3			3	1	2		6
Australian Hobby	1				1		1			3
Peregrine Falcon									1	1
Black-winged Stilt	1									1
Black-fronted Dotteral						1				1
Banded Lapwing**			3							1
Masked Lapwing	3		2	3				1	1	5
Yellow-tailed Black-Cockatoo			1							1
Galah	4	3	3	3	4	4	4	4	4	9
Little Corella		3		1	1	2	3	2		6
Sulphur-crested Cockatoo	4	3	3	3	4	4	4	4	4	9
Australian King-Parrot	2								1	2
Superb Parrot	2	3	3	2						4
Crimson Rosella	4	3	1	3	4	4	4	4	4	9
Eastern Rosella	4	3	3	3	3	4	4	4	4	9
Red-rumped Parrot	4	3	3	3	2	3	4	4	4	9
Horsfield's Bronze-Cuckoo	1				2	1	1		3	5
Shining Bronze-cuckoo									1	1
Pallid Cuckoo	1	2	2		3	1	2	1	4	8
Fan-tailed Cuckoo					1				1	2
Laughing Kookaburra	1	1			3	1	3	2	4	7
Sacred Kingfisher	1		1						3	3

Dollarbird						1	1		1	3
White-throated Treecreeper					4				4	2
Superb Fairy-wren	3	1			3			3	4	5
Speckled Warbler					2				4	2
Weebill	4	2	2		4	1	2	3	4	8
Western Gerygony			2	1	1		2	1	4	6
White-throated Gerygony				1	4	3	1	2	3	6
Striated Thornbill		1		2	2	2		2	3	6
Yellow-rumped Thornbill	3	3	2	3	4	2	3	4	4	9
Buff-rumped Thornbill		1			3		2	2	4	5
Yellow Thornbill	1				1					2
Brown Thornbill					3					1
Southern Whiteface					1	2		1	3	4
Spotted Pardalote	1		1		4	2	1		1	6
Striated Pardalote	4	2	3	3	4	4	4	3	4	9
Eastern Spinebill					1					1
Yellow-faced Honeyeater					4	1	1	1	3	5
White-eared Honeyeater									2	1
White-plumed Honeyeater							1	1	2	3
Noisy Miner	3	3	3	3			4	4	3	7
Red Wattlebird	4	1		1	4	1	2	2	4	8
Brown-headed Honeyeater	1	1					1		3	4
White-naped Honeyeater					1				1	2
Noisy Friarbird	3	3	1	3	2	1	1	4	3	9
Varied Sittella	1	2				1	1		2	5
Black-faced Cuckoo-shrike	4	3	2	2	4	2	2	4	4	9
White-winged Triller	1	1	1	2		2	2	1	2	8
Golden Whistler									3	1
Rufous Whistler		2	2		4	3	1	2	4	7
Grey Shrike-thrush			2		2				4	3
Olive-backed Oriole	1								3	2
Dusky Woodswallow				2		3	2	3	2	5
Pied Butcherbird							1		1	2
Grey Butcherbird	1		2						3	3
Australian Magpie	4	3	3	3	4	4	4	4	4	9
Pied Currawong	3	2		1	3				4	5
Grey Currawong									1	1
Grey Fantail	2	2	1	1	4	3	3	4	4	9
Willie Wagtail	2	2	3	3	2	4	4	4	3	9
Australian Raven	4	3	3	3	4	4	4	4	4	9
Little Raven	1		1		1					3
Leaden Flycatcher					2				3	2
Magpie-lark	3	2	3	3	2	1	4	4	4	9
White-winged Chough	1				4	1	2	1	4	6
Jacky Winter						1				1
Scarlet Robin									4	1
Red-capped Robin					2				1	2
Eurasian Skylark	3							1		2
Australian Reed-Warbler								2		1
Rufous Songlark	1	2			1	2	1	2	2	7
Brown Songlark						1	2			2

Silvereye	1					1			1	3
Welcome Swallow	3	1	1	1	1		1		3	7
Fairy Martin**		1			4				1	3
Tree Martin	4	3	2	3		4	3	4	2	8
Common Blackbird	1								1	2
Common Starling	4	3	3	3	4	4	4	4	4	9
Common Myna	4	3	1	2	3		3	3	1	8
Mistletoebird			1						4	2
Double-barred Finch									2	1
Red-browed Finch	1									1
Diamond Firetail						1			3	2
House Sparrow					1		1			2
Australasian Pipit	4			2	1	4			2	5
Common Goldfinch	1					1				2
Number of species	64	47	45	37	56	48	51	51	80	
Total number of apecies	106									

Appendix II

Analysis of potential differences in tree characteristics with respect to the labelled and the non-labelled trees

Data from a total of 298 trees sampled in two suburbs with four surveys were analysed using a mixed model. The fixed effect was labelled or non-labelled and a random effect, survey number included. This allowed for a potential correlation between trees within each survey to be incorporated into the test.

The mean responses for the dependent variables, number of small, medium and large hollows, diameter at breast height and the height of the main branch are presented in Table 1 for the four surveys.

Table 1. Observed mean values for response variables, number of small hollows, medium hollows and large hollows, diameter at breast height and the height of the main branch, classified by survey number and labelled versus un-labelled trees.

Response variable		Survey			
		11	4	5	9
Small_holes	Label				
	Unlabelled	0.3333	0.2899	0.3793	0.2632
	Labelled	0.2143	0.0000	0.4545	0.1111
Medium_holes	Label				
	Unlabelled	0.3725	0.5942	0.3966	0.3158
	Labelled	0.4286	0.0000	0.2727	0.3333
Large_holes	Label				
	Unlabelled	0.0980	0.1159	0.1207	0.2807
	Labelled	0.2143	0.0000	0.1818	0.3333
DBH	Label				
	Unlabelled	82.80	94.19	102.84	75.93
	Labelled	91.57	114.83	100.91	77.22
Main_branch	Label				
	Unlabelled	3.484	2.685	3.751	3.902
	Labelled	4.261	3.583	4.118	4.617

A Wald test was used to assess the significance of the differences between the labelled and unlabelled trees. Results are presented in Table 2.

Table 2. Wald statistic tests derived from GLMM or REML models fitted to the response variables, number of small, medium and large hollows, diameter at breast height (DBH) and height of main branch. 'n.d.f.' and 'd.d.f.' refer to numerator and denominator degrees of freedom.

Fixed term	Wald statistic	n.d.f.	F statistic	d.d.f.	F pr
Small hollows	1.65	1	1.65	296.0	0.200
Medium hollows	0.74	1	0.74	244.1	0.390
Large hollows	0.96	1	0.96	287.6	0.328
DBH	1.75	1	1.75	295.3	0.187
Main branch	7.66	1	7.66	293.0	0.006

Appendix III

Analysis of potential differences in tree characteristics with respect to the labelled and the non-labelled trees

Relationship between species identity and affiliation with unlabelled or labelled group

Data from a total of 298 trees sampled in two suburbs with four surveys were analysed using a generalized linear model (GLM). The response variable was membership of the labelled group (determined by using the variate Label and performing a logical test to see if the label was greater than zero). The potential predictor or independent variate was the factor 'Tree_name'.

The number of individuals of each species surveyed, number in the labelled group and the observed probability that an individual belonged to the labelled group are presented in Table 1.

Table 1. Number of individuals of each species surveyed, number in the labelled group and the observed probability that an individual belonged to the labelled group, classified by species of tree.

Species	No. of individuals	No. in Labelled group	Probability individual is in Labelled group
Dead	23	2.000	0.0870
E.blakelyi	131	26.000	0.1985
E.bridgesiana	5	0.000	0.0000
E.dives	14	1.000	0.0714
E.macrorhyncha	12	1.000	0.0833
E.mannifera	2	0.000	0.0000
E.melliodora	84	26.000	0.3095
E.polyanthamos	2	2.000	1.0000
E.rossi	13	4.000	0.3077
E.rubida	9	0.000	0.0000
E.unknown	3	1.000	0.3333

Only six species, *E.blakelyi, E.dives, E.macrorhyncha, E.melliodora, E.rossi and E.rubida* had sufficient individuals sampled to enable realistic estimates of the probability of an individual being in the Labelled group. Restricting the data to these six species and fitting a GLM to the data to test if the species have different probabilities of an individual being in the Labelled group gave a highly significant test (Table 2). The test is based on the change in deviance from a null model (one in which the overall mean is fitted) and the model with the factor Tree_name fitted is assumed to be distributed as a Chi-squared statistic.

Table 2. Analysis of deviance table derived from GLM model fitted to the response variable, individual is a member of the Labelled group, as a function of the identity of the species of the individual. 'd.f. is the degree of freedom, deviance is a measure of the fit.

Source	d.f.	deviance	mean deviance	deviance ratio	approx chi pr
Regression	5	12.9	2.573	2.57	0.025
Residual	257	264.6	1.030		
Total	262	277.5	1.059		

The fitted probability that a tree will be in the Labelled group together with an estimate of the 95% confidence limits are presented in Table 3 for those species with nine or more individuals samples.

Table 3. The predicted probability of an individual of selected species being a member of the Labelled group and the 95% confidence interval for those predictions.

Species	95% lower	Mean	95% upper
E.blakelyi	0.14	0.20	0.28
E.dives	0.01	0.07	0.38
E.macrorhyncha	0.01	0.08	0.42
E.melliodora	0.22	0.31	0.42
E.rossi	0.12	0.31	0.60
E.rubida	0.00	0.00	1.00

Broadly there are three groups of species, those with a low probability of being the Labelled group, E.rubida, E.dives, and E.macrorhyncha, E.balkelyi with an intermediate level and tow final group, E.mellidora and E.rossii with a higher probability of being in the Labelled group. Note that the very wide confidence limits attached to the estimate for E.ribida is due to the comparatively small sample size and the observed probability of an individual being in the Labelled group being zero

Distribution, abundance and breeding status of the Superb Parrot (Polytelis swainsonii) during the 2010-11 breeding season, Gungahlin, ACT.

Throsby Ridge (Chris Davey)

Prepared for the Canberra Ornithologists Group (COG)

By Chris Davey

Date: 10th May 2011

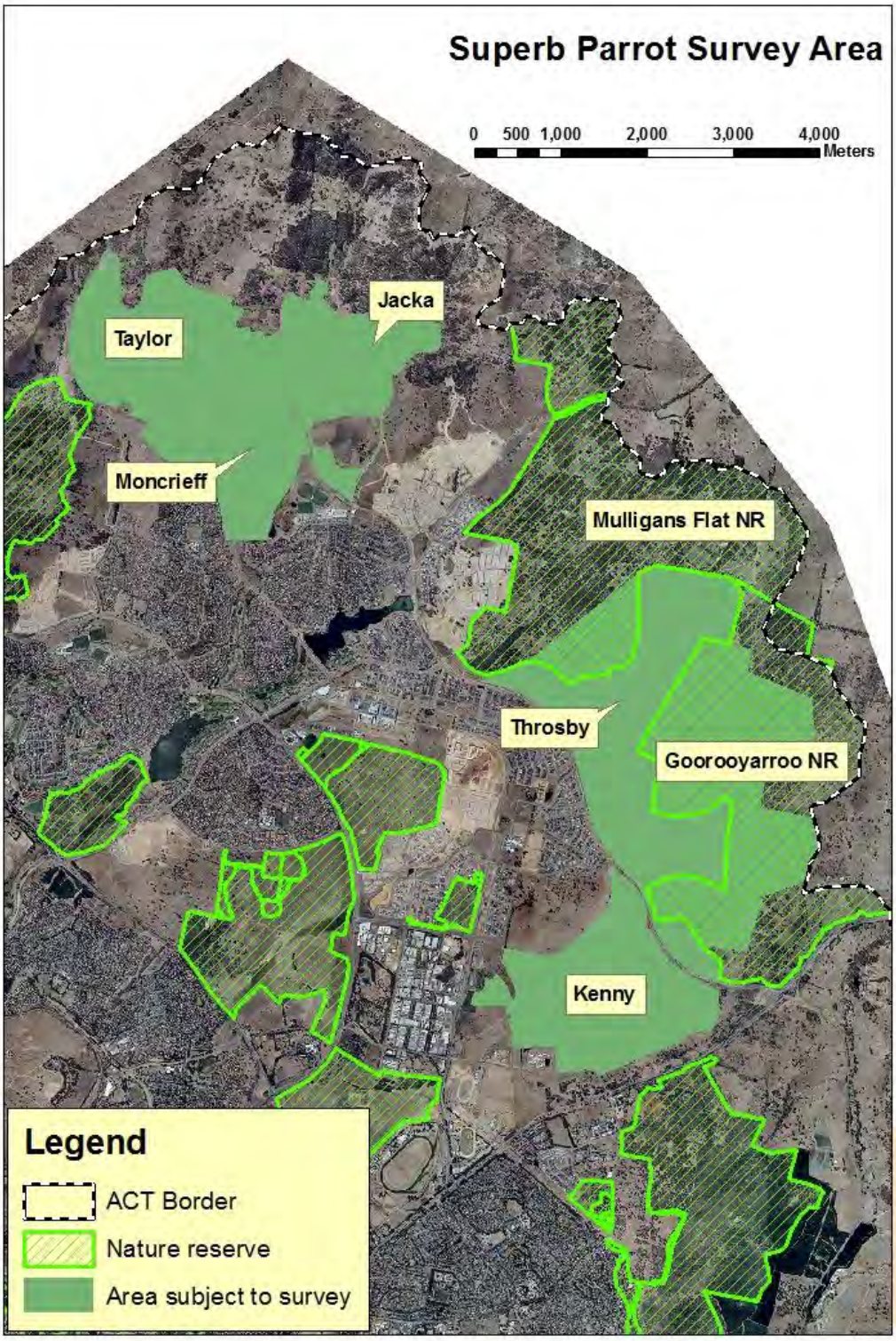
Distribution, abundance and breeding status of the Superb Parrot during the 2010-11 breeding season, Gungahlin, ACT.

Background

An unprecedented number of Superb Parrots (*Polytelis swainsonii*), including many dependent young, were observed in the northern Belconnen suburbs over the summer of 2005-06 (Lashko, 2006). Since then increasing numbers have been reported from the northern suburbs of Canberra, the Goorooyarroo/ Mulligan's Flat Nature Reserve and in particular from the Gungahlin suburb of Harrison. Occasional reports are now received from as far south as Hoskinstown, NSW.

Concerned about the possibility of unknown breeding sites within areas set aside for future development within the township of Gungahlin, the Canberra Ornithologists Group (COG) approached the ACT Government for approval and support to survey those areas under consideration for future suburbs. This was provided and surveys were conducted within the proposed suburbs of Kenny, Throsby, Moncrieff, Jacka and Kinlyside between early September and mid-December 2009, that is from the time of arrival of this migrant species to the ACT until the end of the breeding season. In addition, a survey was conducted in selected areas to determine the condition of the tree hollow estate within all areas except Kinlyside. The results of the Superb Parrot survey and the tree hollow survey were provided by COG to the ACT Government in April 2010, see Davey (2010).

In early November 2010 the ACT Government Department of Territory and Municipal Services, Conservation Planning and Research approached COG for an additional survey to determine the distribution and abundance of the Superb Parrot's breeding activity within the Goorooyaroo Nature Reserve-Throsby area, the proposed suburb of Moncrieff and a site under construction for the Harrison School Secondary Campus. In addition, it was agreed that COG would resurvey the proposed suburb of Kenny. The extent of the survey area is shown in Map 1.



Map 1. Superb Parrot survey area, 2010-2011

Methods

Survey work did not start until 15th November due to delays in the contractual agreement between the ACT Government and COG. COG members had observed Superb Parrots in the ACT since early September and the breeding season had commenced. All those involved in the survey were familiar with the Superb Parrot and at least one member of each team was familiar with the calls. The location of all Superb Parrots seen was recorded with a GPS unit, their behaviour was recorded and any tree that from behavioural observations suggested a possible breeding site was photographed for identification purposes, see Appendix 1.

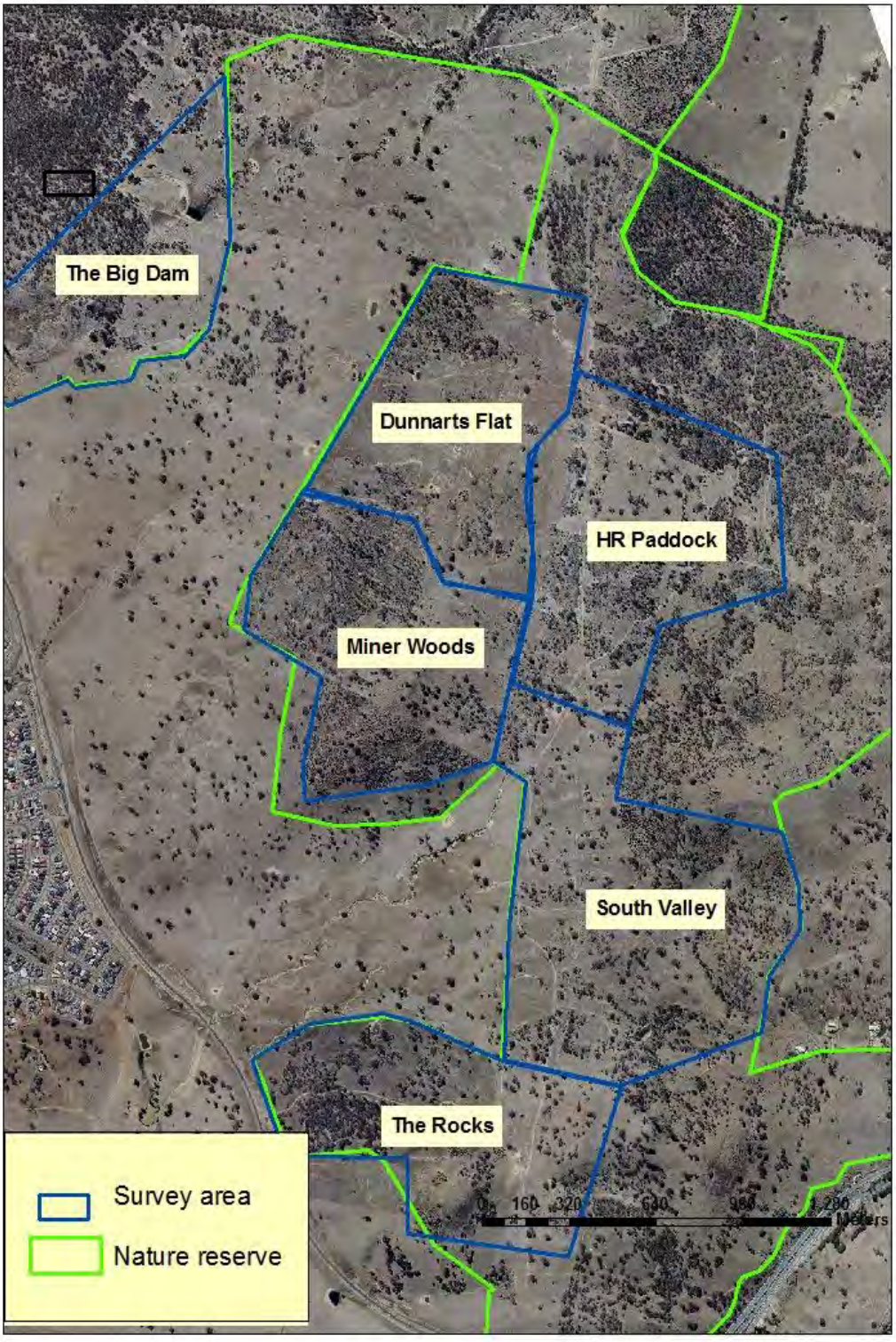
Signs of breeding included the following observations:

- A reluctance by either sex to leave the vicinity of a tree with suitable hollow nearby;
- female or male observed entering or leaving a hollow;
- copulation;
- aggressive interactions between pairs with a potential nest hollow nearby;
- a male 'on station' indicated by the presence of a lone bird perched quietly in a tree occasionally making a soft call with a possible nest hollow in the same or nearby tree; and
- the feeding by adult birds of young with very short tails and limited capacity of flight with a possible breeding hollow in the same or nearby tree.

The sighting of any ACT threatened bird species was recorded during the course of the survey.

<u>Goorooyarroo/ Mulligan's Flat Nature Reserve</u>.
The survey area within Goorooyarroo/Mulligan's Flat focused on those areas where in spring Superb parrots had been observed during general bird surveys, undertaken as part of an ANU research project.

For the last six years, over a 10-day period in October, members of the Fenner School of Environment and Society, Australian National University, with help from members of COG, have conducted bird surveys within the Mulligan's Flat and Goorooyarroo Nature Reserves. Observations on the Superb Parrot from the 2009 and the 2010 ANU surveys were plotted and this determined the areas that were surveyed by COG in 2010 for signs of breeding. The areas included parts of the Goorooyarroo Nature Reserve and an area within Mulligan's Flat that includes the 'Big Dam' located at S 35^0 10' 45.28" E 149^0 09' 30.29", see Map 2.



Map 2. Location of Superb Parrot survey areas within Goorooyarroo Nature Reserve

Starting 15 minutes after sunrise on 20th November and again on 11th December 2010 five teams of two to three individuals each searched allocated areas within the Goorooyarroo Nature Reserve for a four hour period or until each team was satisfied the areas had been thoroughly covered. For the November survey it was possible to drive to the allocated areas. This was not possible in December as roads within the Reserve were impassable due to wet conditions, so observers walked in to their respective search areas.

Superb Parrots were infrequently recorded from Mulligan's Flat Nature Reserve during the ANU surveys and these observations are confirmed from ad hoc reports collected by COG members. Breeding has occurred in the past around the 'Big Dam' and this area was surveyed on 23 November and 5 December. During the latter visit the COG quarterly woodland bird survey was conducted with survey teams scattered throughout the reserve and sanctuary. Any observations on Superb Parrots were noted by team members.

Moncrieff

The entire area covered by the proposed suburb of Moncrieff was searched on foot over a period of four hours starting at 6:30am on 26 November and again on 14 December 2010.

Kenny

Similar to 2009, Kenny was surveyed as two areas defined by likely Superb Parrot habitat. The smaller western area adjacent to the Mitchell Recycling Centre was surveyed in a similar manner to Moncrieff on 24 November and again on 9 December. The larger eastern and northern section of Kenny was surveyed on 24 November and again on 11 December.

Harrison School Secondary Campus

The construction site was visited on 24 November, 3 December and again on 9 December with a minimum of 45 minutes spent during each visit recording any activity of Superb Parrots visiting the construction site. On each occasion the Heritage Lane to as far south as the end of the suburb and as far north to where the Gungaderra Creek flows below Horse Park Drive was surveyed.

Throsby

In this report an area where the majority of breeding was found in 2009-10 is referred to as 'Throsby Ridge' located in the general area of S 35^0 11' 43" E 149^0 10' 15". An area of woodland between Mulligan's Flat and Goorooyarroo Nature Reserves in the general area of S 35^0 10' 46" E 149^0 10' 10" is referred to as 'Throsby Neck'.

The area north of a fence running north-east, south-west and stretching from Horse Park Drive to the north-western facing Goorooyarroo boundary fence and including the 'Throsby Neck' area was searched on 17 November, 25 November and 15 December. This area is referred to as North Throsby. The area to the south of the fence and involving the 'Throsby Ridge' area was searched on 16 November, 18 November, 12 December and 22 December. This area is referred to as South Throsby.

During early November 2009, two areas on 'Throsby Ridge' were assessed for tree hollows, see Map 2, areas 2b and 4 in Davey (2010). On 4th and again on 6th January 2011, an addition survey was conducted to ensure that the area between 2b and 4 was also assessed as were two additional areas adjacent to area 2b and 4 respectively. These additional surveys ensured that all trees within Throsby Ridge were assessed. The abundance, activity and location of Superb Parrots were also recorded at that time.

All surveys at Moncrieff, Kenny, the 'Big Dam' at Mulligan's Flat Nature Reserve, Throsby and Harrison School were conducted by Chris Davey with occasional help from other COG members.

Results

Superb Parrot observations

Goorooyarroo Nature Reserve

During the 20 November survey there were 12 sightings of between one or two birds in the general area of Dunnarts Flat, see Table 1 for details. There was much general activity but no conclusive signs of breeding were observed.

Table 1. Goorooyarroo Nature Reserve Superb Parrot observations, 20 November 2011. Number in brackets (#) refers to photo number.

Location	Time	Number	Number	Flight	Lat:			Long:			Behaviour
		birds	males	direction	Deg	Min	Sec	Deg	Min	Sec	
Dunnarts Flat	7:25	1	0	NE	35	10	38.1	149	10	43.7	Flying chased by others
Dunnarts Flat	7:30	1	1	SW	35	10	38.1	149	10	43.7	Flying
Dunnarts Flat	7:38	2	1	SW	35	10	40.0	149	10	37.9	Flying to tree
Dunnarts Flat	7:40	1	1	NE	35	10	39.2	149	10	40.6	Flying
Dunnarts Flat	7:41	1	1	NE	35	10	39.2	149	10	40.6	Flying
Dunnarts Flat	7:42	1	0	SW	35	10	39.2	149	10	40.6	Flying, chased by Miners
Dunnarts Flat	8:28	2	1	SW	35	10	54.5	149	10	31.7	Roosting
Dunnarts Flat	8:32	1	0	SW	35	10	52.2	149	10	30.2	Flying
Dunnarts Flat	8:34	1	0	SW	35	10	52.2	149	10	30.2	Flying
Dunnarts Flat	8:43	1	0	SW	35	10	38.1	149	10	43.2	Flying
Dunnarts Flat	9:01	1	?		35	10	39.3	149	10	49.0	Heard calling
Dunnarts Flat	9:45	1	1	NW	35	10	49.9	149	10	35.8	Flying
Miner Woods	7:20	1	1		35	11	13.0	149	10	32.0	Male on station (# 1)
Miner Woods	7:50	1	?	NE	35	11	12.0	149	10	13.0	Flying
Miner Woods	8:10	1	1	S	35	11	5.0	149	10	28.0	Flying
Miner Woods	9:15	1	1		35	11	13.0	149	10	32.0	Male still on station (# 1)
H R Paddock	7:40	1	?	SW	35	11	7.0	149	10	44.0	Fly to tree
H R Paddock	8:00	4	3	E	35	11	10.2	149	10	40.6	Fly from tree copse
H R Paddock	8:20	1	1	NW	35	11	5.6	149	10	54.6	Fly from tree (# 2)
South Valley	7:12	?	?		35	11	56.9	149	10	57.2	Heard
South Valley	8:12	1	?	SE	35	12	4.9	149	11	18.8	Fly to tree
South Valley	8:16	2	1	SE	35	12	5.7	149	11	17.7	Fly to tree, enter hollow (# 3)
The Rocks											No sightings

In the Miner Woods area there were four sightings of single birds with one observation of a male on station which was still present just under two hours later, see Photo # 1.

In the general area of the HR (Hooded Robin) Paddock there were three sightings of between one and four birds. A male appeared to be reluctant to leave a tree and although the tree had no hollows it is possible that some nearby tree contained a breeding site, see Photo # 2.

Within the South Valley area there were three sightings of one or two birds. A single bird was observed flying into a tree then four minutes later a pair flew in to a nearby tree and after an altercation with a pair of Crimson Rosella the birds took turns to enter a tree hollow, sees Photo # 3. Interest in the tree hollow lasted for over 15 minutes. The pair eventually departed towards the suburb of Harrison, in the direction they came from.

No Superb Parrots were seen in The Rocks area

The following day, the area around Photo # 1 was revisited but no signs of activity were observed. At 35° 11' 06.7" 149 ° 10' 59.76" approximately 120m away from site Photo # 2 a male Superb Parrot was observed in a tree flying to the ground to feed, then on being disturbed returned to the tree from which it was most reluctant to leave, see Photo # 4. This observation would confirm that there is a high probability of at least one breeding site in the area.

During the survey of the Goorooyarroo Nature Reserve on 11 December there were six sightings of between one and two birds in the general area of Dunnarts Flat, see Table 2. As with the November survey there was much activity but no conclusive indications of breeding (but see later, North Throsby, 25 November and 15 December).

Table 2. Goorooyarroo Nature Reserve Superb Parrot observations, 11 December 2011.
Note: Geo-locations were not taken in the Miner Woods area.

Location	Time	Number	Number	Flight	Lat:			Long:			Behaviour
		birds	males	direction	Deg	Min	Sec	Deg	Min	Sec	
Dunnarts Flat	7:08	1	1	SW	35	10	51.0	149	10	33.0	Flying
Dunnarts Flat	7:18	1	1	NE	35	10	46.0	149	10	29.0	Flying
Dunnarts Flat	7:33	2	1	NE	35	10	39.0	149	10	41.0	Fly from tree
Dunnarts Flat	7:46	2	1		35	10	34.5	149	10	47.0	Roosting
Dunnarts Flat	8:28	1	0		35	10	47.0	149	10	34.0	Roosting
Dunnarts Flat	8:42	1	1	NE	35	10	41.0	149	10	35.0	Flying
Miner Woods	7:00										Heard
Miner Woods	7:05	2	2	SE							Flying
Miner Woods	7:07	2	2	NE							Flying
Miner Woods	7:12	3	2	NE							Flying
Miner Woods	7:25	2	2	SE							Flying
Miner Woods	7:32	4	2	NE							Flying
Miner Woods	7:50	3	1	SW							Flying, juvenile?
Miner Woods	7:55	2	1	E							Flying
Miner Woods	9:00	1	1	NE							Flying
H R Paddock	7:38	1	1	E	35	11	7.3	149	11	1.0	Perch in tree briefly
H R Paddock	7:50	3	1	W	35	11	7.3	149	11	1.0	Flying
H R Paddock	7:40	1	1	NE	35	11	18.0	149	11	8.0	Flying
H R Paddock	7:50	3	2	SW	35	11	18.0	149	11	8.0	Flying
H R Paddock	7:51	1	1	NE	35	11	18.0	149	11	6.0	Flying
H R Paddock	8:45	1		SW	35	11	0.0	149	11	3.0	Flying
H R Paddock	8:50	1	1	NE	35	11	0.0	149	11	3.0	Flying
South Valley											No sightings
The Rocks											No sightings

In the Miner Woods area there were nine sightings of between one and four birds but all were flying overhead and no signs of breeding were reported.

There were seven sightings of Superb Parrots in the HR Paddock area. None of the sightings give any indication of breeding.

Despite an intensive search of the South Valley and The Rocks areas there were no signs of Superb Parrots and there was no activity at the site where birds had been seen entering a hollow, (photo # 3) in November.

Mulligan's Flat

During a visit to the 'Big Dam' area on 23 November over one hour period from 8:20am no Superb Parrots were observed. On 5 December during the COG Woodland Survey of Mulligan's Flat over a 1 ½ hour period from 7.50am there were no signs of breeding and

the only Parrots seen were of a group of eight flying overhead in a north-east-east direction. No other observers recorded any Superb Parrots except for a single observation of one bird flying west to east over Mulligan's Flat.

Moncrieff

Despite a visit on 26 November and again on 14 December, with a total of eight hours spent in the area, there were no signs of Superb Parrots. These observations support those of the previous year when no Superb Parrots were observed.

Kenny

Despite four visits to the general area there was only one observation of a Superb Parrot heard on 11 December in the general area of S 35° 13' 10" E 149° 10' 00". An examination of the area did not locate the bird which may well have been passing through. These observations support those collected in 2009-10 and confirms that breeding within the surveyed area of Kenny is unlikely.

Harrison School Secondary Campus

During the COG survey on 20 November a team of observers walked the Gungaderra Creek from Horse Park Drive to the Harrison School construction site via the Heritage Lane and no Superb Parrots were reported.

Initial observations by the Site Manager (Mr. Paul Bogazattai) suggested that Superb Parrots had been observed visiting the tree at S 35° 12' 3.24" E 149° 9' 11.13" during the period September-October 2010 where breeding had been reported in previous years, see Photo # 5. Subsequent events indicate that these observations by the Site Manager may well have been of Red-rumped Parrots (*Psephotus haematonotus*). There is no doubt though that Superb Parrots were flying into and out of the wooded area on the school grounds. During a morning visit on 24 November over a period of 1 ½ hours a single bird was observed entering the woodland copse and another heard in the general area about 10 minutes latter. A walk up and down the Heritage Lane revealed no signs of activity.

During a second visit to the area on 3 December over a two hour period starting 7.30 am, singles and pairs of a total of nine birds was observed flying to the copse from the area of the Franklin Woods and then departing across Harrison to the general area of 'Throsby Ridge'. A total of 13 birds were recorded flying in the opposite direction and again landing in the copse. No birds were seen on walking the Heritage Lane.

During a visit on 9 December starting at 8.15 am for 45 minutes, three Superb parrots were seen flying from 'Throsby Ridge' to the copse , one was observed leaving the copse heading towards Franklin Woods whilst eight birds were seen flying from the Franklin Woods into the copse and then on to the 'Throsby Ridge'.

Throsby

North Throsby. In 2010, there were no signs of any breeding activity within the North Throsby area in contrast to sightings in three trees in 2009 where signs of breeding

activity had been recorded, see Davey (2010). Despite this, there was much activity in the general area with Superb Parrots regularly seen flying back and forth from the 'Big Dam' area in Mulligan's Flat through the 'Throsby Neck' area and on to the general area of Dunnarts Flat in Goorooyarroo and again back and forth from the 'Big Dam' area through the copse and on to 'Throsby Ridge'. In contrast to 2009, there were no signs of birds flying from the North Throsby area along Gungaderra Creek and into Harrison.

On 17 November over a 3 ½ period from 6.15am a total of 11 birds were seen as individuals or pairs flying over the wooded area. No signs of breeding activity were observed.

On 25 November over a 4 hour period from 6.00am the only observations were of a single male on station disturbed from a tree next to the Goorooyarroo boundary fence at 35° 10' 40.6" 149 ° 10' 30.8", see Photo # 6. On climbing through the fence into the Reserve, a second male was disturbed from a tree at S 35° 10' 43.6" E 149° 10' 35.0", see Photo # 7 and was most reluctant to leave. The male eventually flew to a nearby tree where it remained.

On 15 December over a 3 1/4 hour period from 6.50am a total of 14 birds in singles or as pairs were recorded in trees and/or flying back and forth between the 'Big Dam' and Dunnarts Flat or between the 'Big Dam' and 'Throsby Ridge'. At the site of Photo # 7 an adult pair was observed feeding two young with very short tails and just able to fly. This tree is most likely to be the breeding site.

South Throsby. On 16 November over a 3 ½ hour period from 6.20am, a total of 10 individuals were recorded in the area with individuals flying into or reluctant to leave five trees, see Table 3. Individual birds were either disturbed and then flew a short distance reluctant to leave or individuals flew in, landed in a tree and again were reluctant to leave. All activity was confined to the 'Throsby Ridge' area.

Table 3. Possible nest sites of Superb Parrots in South Throsby
Number in brackets (#) refers to photo number.

Date	Time	Lat:			Long:			
		Deg	Min	Sec	Deg	Min	Sec	
16-Nov-10	8:36	35	11	39.7	149	10	0.87	Male interested in tree, photo taken (# 8)
16-Nov-10	9:02	35	11	44.9	149	10	0.58	Male interested in tree, photo taken (# 9)
16-Nov-10	9:07	35	11	45.7	149	10	11.2	Male interested in tree, photo taken (# 10)
16-Nov-10		35	11	44.7	149	10	11.7	Male interested in tree, photo taken (# 11)
16-Nov-10	9:16	35	11	43.3	149	10	10.4	Male interested in tree, photo taken (# 12)
18-Nov-10	8:50	35	11	41.9	149	10	17.9	Male into hollow (# 13)
18-Nov-10	9:16	35	11	44	149	10	16.3	Male into and fem out hollow (# 14)
18-Nov-10	9:29	35	11	43.6	149	10	14	Pair fly out of tree, photo (# 15)
12-Dec-10		35	11	45	149	10	13.4	Pair sit quietly in tree (# 16)
12-Dec-10	7:40	35	11	37.5	149	10	9.6	Fem not want to leave tree, male nrby (# 17)
22-Dec-10	8:34	35	11	44	149	10	16.3	Fem fly into tree and disappears (# 14)
22-Dec-10	8:42	35	11	43.5	149	10	14	Pair feeding young just out of hollow (# 15)
22-Dec-10	9:21	35	11	46.1	149	10	26.9	Pair drive off another pair, return to sit quietly (# 18)

On 18 November over a period of 3 ½ hours from 6.20am nine birds were recorded in the general area flying into or out of Harrison. Birds were interested in three trees. In one case a male was seen entering and leaving a hollow (photo # 13), in a second case a male flew in , entered a hollow, a female appeared from the same hollow flew off and quickly returned (photo # 14) and in the third case a pair was most reluctant to leave (photo # 15). As with the previous visit to the area all activity was confined to the 'Throsby Ridge' area.

On 12 December over a 3 ½ hour period starting 6.30am again all activity was concentrated around the 'Throsby Ridge' area. A total of 22 individuals, some with young, with about 12 bird seen at any one time. Some birds were passing through, others had young and at least two pairs were likely to have nest sites as they were most reluctant to leave the area.

On 22 December there was much activity in the area of 'Throsby Ridge'. From 7.50am for a period of two hours approximately 8-10 pairs, some feeding young, were observed. Pairs were reluctant to move from three trees containing hollows. In one tree, where a pair had been observed entering a hollow on 18 November, a female arrived and disappeared into a hollow, see photo # 14, whilst in a second tree a pair that had been observed leaving a tree on 18 November was now feeding newly emerged young in the same tree, see photo # 15. At a third tree a pair was sitting quietly next to a hollow, they then aggressively chased off a nearby pair and returned to the tree (photo # 18).

Birds were still present during the tree survey conducted 4 January 2011 with an estimate of 15-20 birds with young not specifically associated with any tree but feeding in the

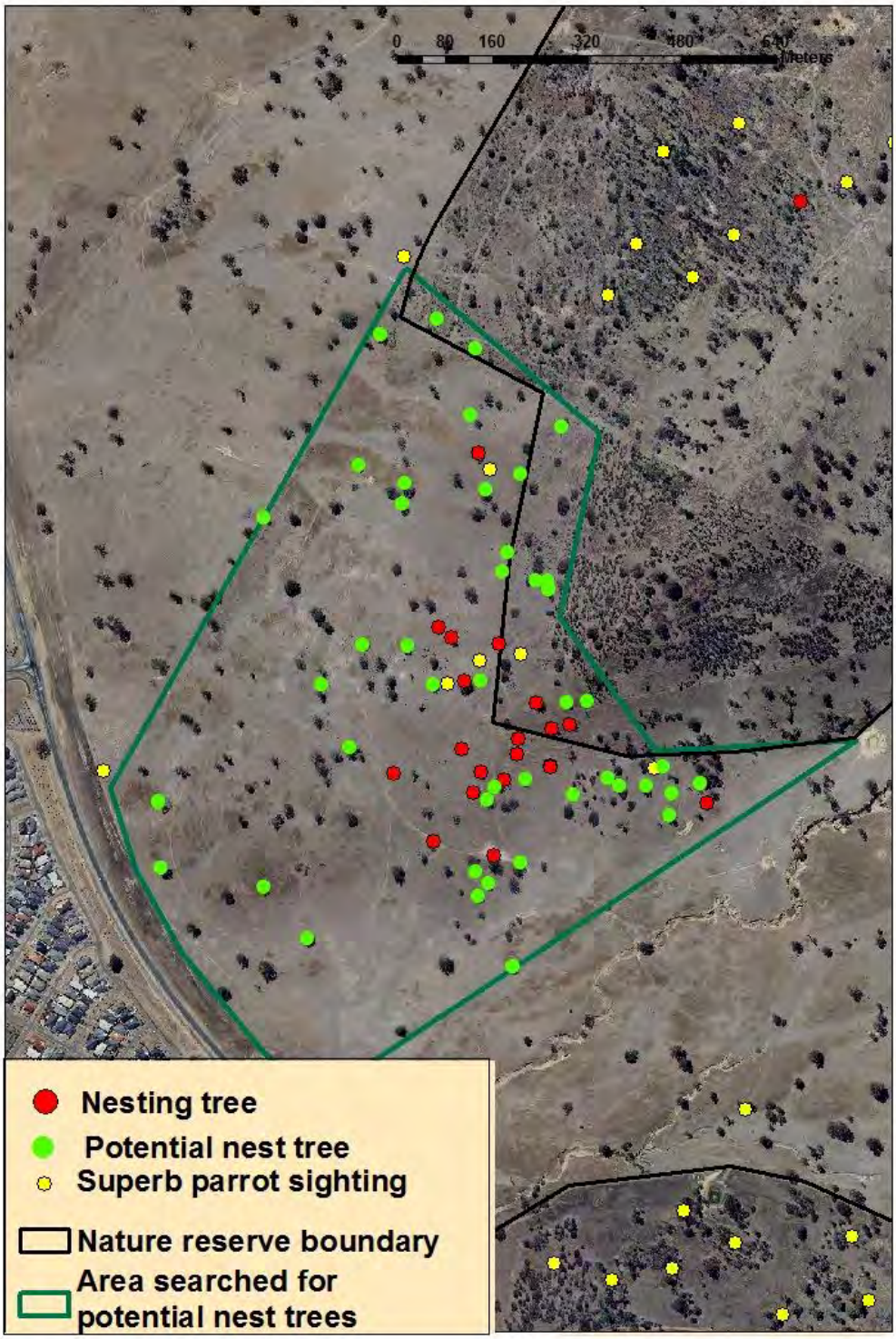
canopy within the general area. On 6 January, whilst finalizing the tree survey and despite being in the area for 2 ¼ hours, no Superb Parrots were seen or heard.

Potential Superb Parrot nesting sites on 'Throsby Ridge'

With the additional tree survey conducted in January 2011 at 'Throsby Ridge', all trees on the Ridge had been assessed for diameter at breast height (DBH), height to first main branch, tree species and number of hollows of varying size, see Davey (2010) for details of Methods. In addition, the site of all trees with a DBH > 30 cm were located off Google Earth and a geo-location recorded.

Manning et al. (2004) investigated the nest tree requirements for the Superb Parrot. After modeling the various measured attributes they concluded that the best predictor for Superb Parrot nest hollows was DBH, Blakely's Red Gum and Dead trees and tree condition; the latter attribute was not recorded in the present survey.

Taking the 25% quartile as 90 cm, (see Figure 2, Manning et al. 2004), 75% of nests were found in trees with a DBH greater than 90 cm. Excluding multi-stemmed trees, there were 67 trees with a DBH of greater than 90 cm and with at least one hollow of more than 5 cm diameter at 'Throsby Ridge', see Map 3.



Map 3. 'Throsby Ridge' showing potential Superb Parrot nesting trees (green) and trees that probably contained nesting hollow during the 2009-10 and 2010-11 breeding seasons (red).

Within the 'Throsby Ridge' area observations obtained during the 2009-10 and the 2010-11 breeding season indicated there are 19 trees identified as likely to have been used as nesting sites by Superb Parrots. Of these, one tree appeared to be used in both seasons. All but one had a DBH of greater than 90 cm, see Figure 1 so falling within the range predicted by Manning et al. (2004). The number of hollow greater than 5 cm diameter in any one tree varied between one and four, see Figure 2.

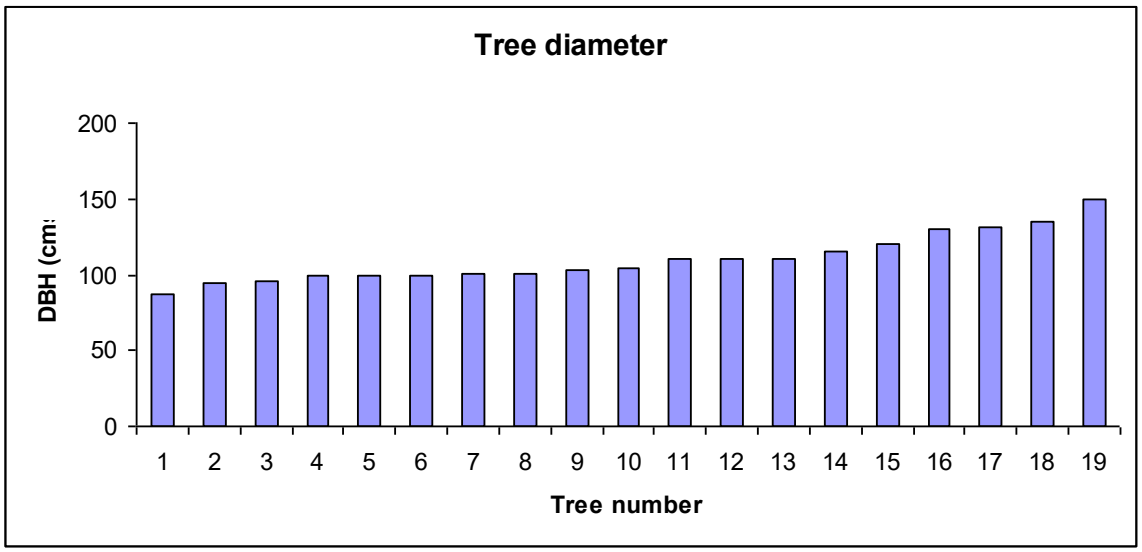


Figure 1. Diameter of nineteen trees identified as possible Superb Parrot nest sites at 'Throsby Ridge'.

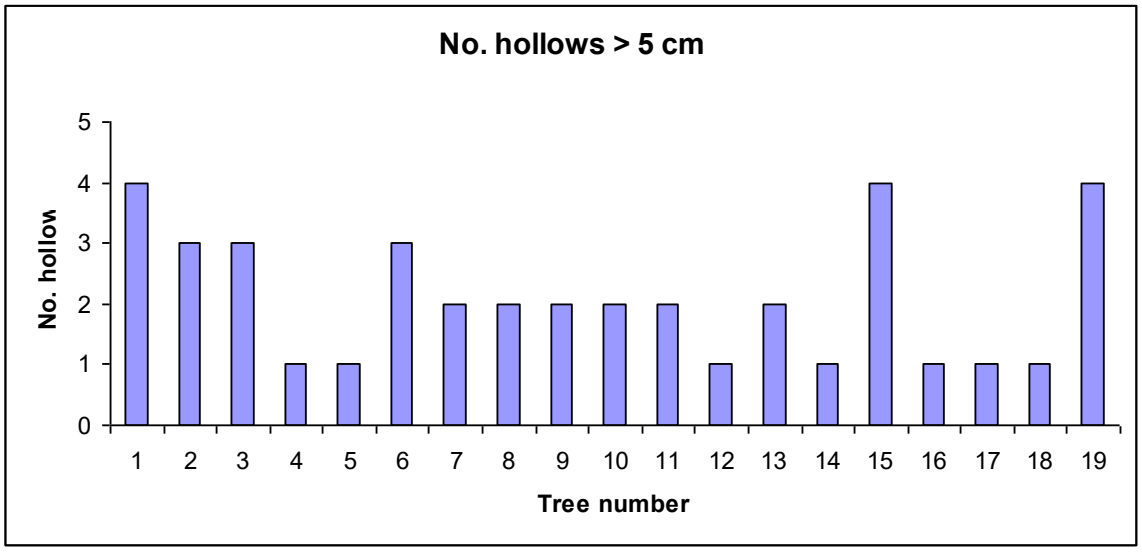


Figure 2. Number of hollows with a diameter greater than 5 cm from 19 trees identified as possible Superb Parrot nest sites at 'Throsby Ridge'.

Other threatened bird species

In addition to the Superb Parrot, there were two other threatened bird species recorded during the 2010-11 survey. Varied Sittella (*Daphoenositta chrysoptera*) was recorded from three sites whilst the Brown Treecreeper (*Climacteris picumnus*) was reported from two sites on two occasions, one of which was of a translocated banded bird released into Goorooyarroo Nature Reserve, see Table 4.

The ACT Flora and Fauna Committee list the Crested Shrike-tit (*Falcunculus frontatus*) and the Diamond Firetail (*Stagonopleura guttata*) on a watching brief of species described as 'insufficiently known'. The species are suspected to be endangered or vulnerable but for which there is inadequate information to make an assessment of risk based on distribution, population status or other attributes.

Table 4. Observations of the Varied Sittella, Brown Treecreeper, Crested Shrike-tit and Diamond Firetail during the 2010-11 Superb Parrot survey

Species	Date	Abundance	Lat:			Long:			Behaviour
			Deg	Min	Sec	Deg	Min	Sec	
Varied Sittella	20-Nov-10	2	35	10	39	149	11	16	Nest building
Varied Sittella	9-Dec-10	6	35	12	50.6	149	9	1.04	4 adult, 2 dependent young
Varied Sittella	11-Dec-10	3	35	10	57	149	11	12	2 adult, 1 dependent young
Brown Treecreeper	24-Nov-10	1	35	12	45.1	149	8	57.7	Banded bird
Brown Treecreeper	26-Nov-10	1	35	9	11.11	149	7	32	
Brown Treecreeper	9-Dec-10	1	35	12	45.1	149	8	57.7	Banded bird
Brown Treecreeper	14-Dec-10	1	35	9	11.11	149	7	32	
Crested Shrike-tit	11-Dec-10	1	35	11	12	149	11	10	
Diamond Firetail	18-Nov-10	1	35	11	42.25	149	10	36.81	

Discussion

Observations collected during the 2009-10 breeding season suggested that the Superb Parrot was widespread throughout the proposed suburb of Throsby with breeding occurring in an area between the 'Big Dam' at Mulligan's Flat and Dunnarts Flat, Goorooyarroo Nature Reserve and referred to here as 'Throsby Neck' and in an area referred to as 'Throsby Ridge', (Davey, 2010). The purpose of the 2010-11 survey was to confirm these observations and to compare with observations collected from within the adjacent lands in Mulligan's Flat and Goorooyarroo Nature Reserves.

General observation from members of the Canberra Ornithologists Group suggest that, for reasons unknown, the Superb Parrot is much more frequently recorded within the Goorooyarroo Nature Reserve than within the Mulligan's Flat Reserve. These observations are supported by data collected from the quarterly Woodland Survey conducted by COG over 24 sites at Mulligan's Flat and eighteen sites at Goorooyarroo in part to satisfy requirements of the ACT Lowland Woodland Conservation Strategy (ACT Government, 2004). These observations are further supported by observations collected by COG members for the Fenner School of Environment and Society, Australian National University, collected once a year in October from 48 sites in Mulligan's and 48 sites in Goorooyarroo. In Mulligan's Flat, with the exception of the area around the 'Big Dam', most records were of birds flying through the area.

It would have been desirable to commence the 2010 surveys earlier in the Superb Parrot breeding season, in September/October, when birds would be more active around selected nesting areas/tees and early breeding signs can be detected. Due to the late start of the survey and the number of observers that would have been required to cover the entire Goorooyarroo Nature Reserve it was decided that the survey would concentrate on those areas where Superb Parrots had been observed during the ANU surveys conducted in October 2009 and October 2010. Observations collected by COG members for the Woodland Survey conducted at a similar time of the year since 1998 confirmed the observations collected by the ANU surveys.

The 2010-11 survey confirmed the observations of the previous year with the Superb Parrot again not being observed in the proposed suburbs of Moncrieff or Kenny, although in both areas the threatened Brown Treecreeper was reported. The Superb Parrot was again reported in the proposed suburb of Throsby, particularly in the 'Throsby Neck' and the 'Throsby Ridge' areas, throughout the survey period.

In 2010-11 signs of breeding were not observed at either the 'Big Dam' or at 'Throsby Neck'. In addition, there were no confirmed signs of breeding at the Harrison School site or along the Gungaderra Creek in Harrison.

There is a general lack of knowledge concerning the nesting habits of the Superb Parrot. No work has been conducted on banded birds so it is unknown whether pairs return to breed in the same hollow as the previous year or whether a failed attempt early in the

season will lead to an abandonment of the site or the relaying of a second clutch. It is unknown whether pairs breed each year or return to the same area and the breeding success is unknown. It is therefore not possible to determine the reasons for the lack of breeding at sites where breeding had been observed the previous year.

From the observations collected in 2010-11 it is possible to say that the 'Throsby Ridge' is a most favoured breeding site and that no other such area existed within the surveyed area of Mulligan's Flat or Goorooyarroo Nature Reserves.

Where resources allow, the Superb Parrot will breed in close proximity to each other. It is known that on occasions there can be more than one nest in a tree. This appears to be the case at 'Throsby Ridge' where old *Eucalyptus rossii* and *E. blakelyi* provide an abundance of hollows, many of which appear to be suitable for Superb Parrot breeding.

There has been no work conducted to examine the association between disturbance and nesting success in eucalypt woodlands similar to that found in the ACT. In the Riverina it is recommended that no logging occurs within 100 m of nesting trees within the Barmah and Millewa State Forests (R. Webster *pers. comm.*). Given the known area for nesting and the location of potential nesting sites along 'Throsby Ridge' it is suggested that the entire Ridge area from the western edge of the Goorooyarroo Reserve to Horse Park Drive be set aside as an extension of the Goorooyarroo Nature Reserve. In addition, the 'Throsby Neck' area situated between the 'Big Dam' and Dunnarts Flat should be set aside as an area where breeding occurred in 2009-10 and as a very important movement link between known breeding sites at the 'Big Dam' and at Dunnarts Flat.

It is unfortunate that observations were not collected during September-October at the Harrison School site. The observations collected later in the season could not confirm whether birds intended to breed earlier in the area but were deterred by construction activity. There were no signs of breeding during November-December but there was no doubt that the construction activity appears to have had little effect on the birds using the area as a feeding site or as a stop-over between the 'Throsby Ridge' area and the suburbs of Harrison and Franklin and beyond.

Acknowledgements

I would like to thanks Sharon Lane (Manager, Research and Planning, Dept of Territories and Municipal Services) for discussions that led to the survey and to Dr. Michael Mulvaney (Research and Planning, Dept of Territories and Municipal Services) for his role as Liaison Officer between TAMS and COG and for his assistance in map preparation. I would like to thank Alan Pattinson (Horse Park) and Frank Kaveney for allowing access to their land.

Finally, I would like to acknowledge the 15 members of the Canberra Ornithologists Group for participating in the bird surveys.

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Appendix 1

Photo # 1.

Photo # 2.

Photo # 3.

Photo # 4.

Photo # 5.

Photo # 6.

Photo # 7.

Photo # 8.

Photo # 9.

Photo # 10.

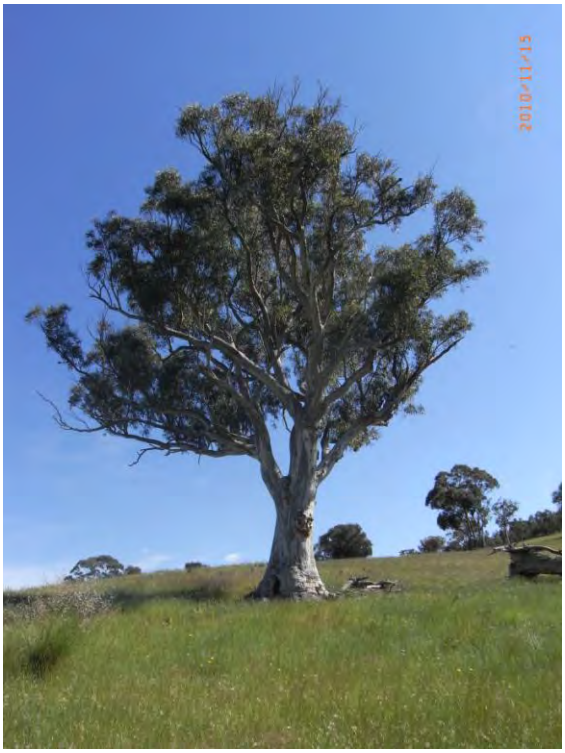


Photo # 11.

Photo # 12.

Photo # 13.

Photo #14.

Photo # 15.

Photo # 16.

Photo # 17.

Photo # 18.

Appendix H

Section 211 Environmental Impact Statement Exemption

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

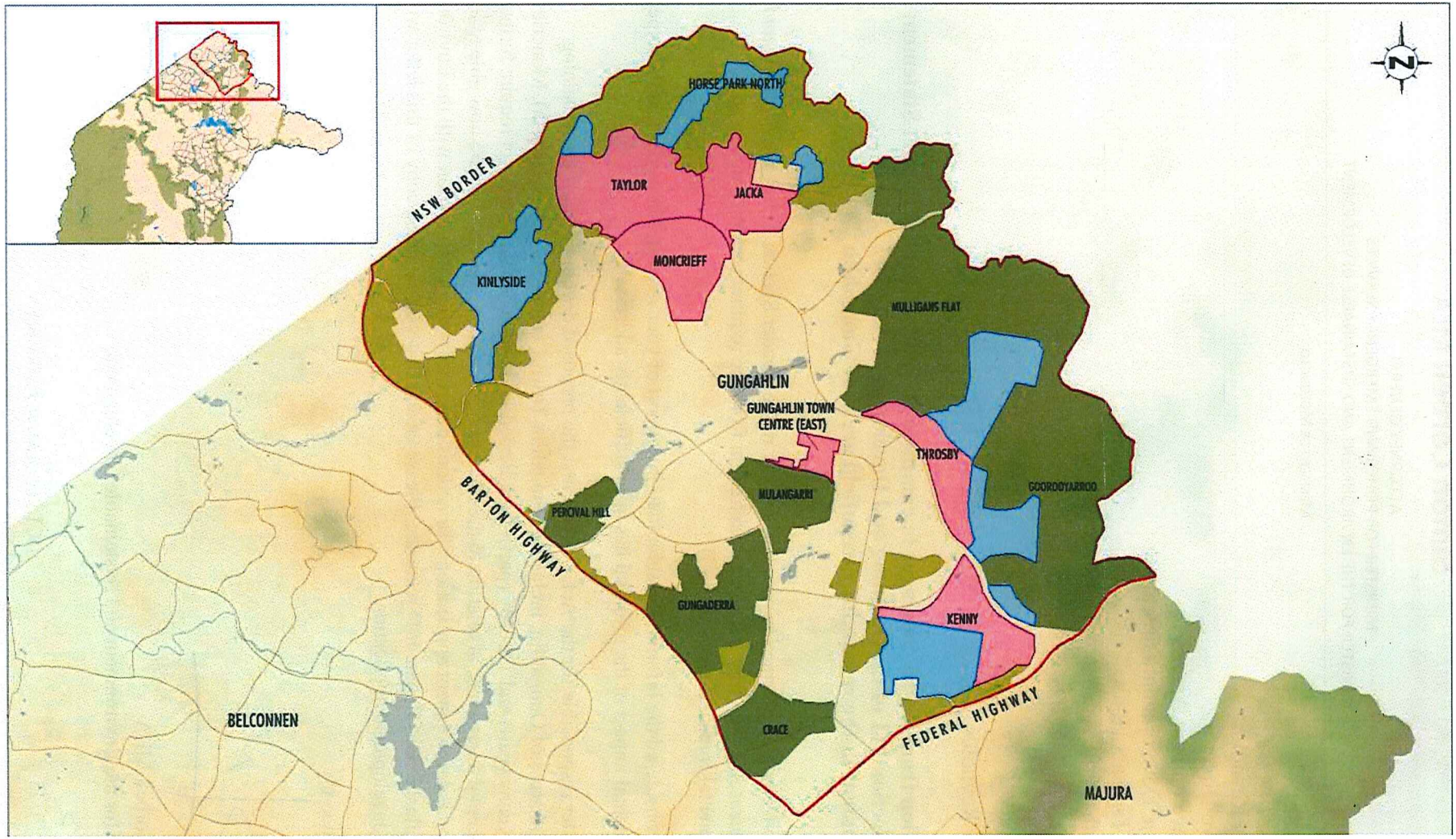
20.11.13

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

Navin Officer Cultural Heritage Assessment

Implementation of the Moncrieff Precinct Code

Cultural Heritage Assessment

April 2010

A Report to the ACT Planning and Land Authority (ACTPLA)

Navin Officer

heritage consultants Pty Ltd

acn: 092 901 605

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71 Leichhardt St.
Kingston ACT 2604

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EXECUTIVE SUMMARY

The new residential suburb of Moncrieff is located to the north of the existing suburbs of Ngunnawal and Amaroo in Gungahlin in the ACT.

A concept plan for Moncrieff was prepared in December 2007. In March 2008, the concept plan became a Precinct Code under the provisions of the *Planning and Development Act 2007.*

This heritage assessment was undertaken to facilitate ongoing actions associated with implementing the Moncrieff Precinct Code. This study is an extension of Navin Officer Heritage Consultants (2009) report: Water Quality Control Pond and Extensions to Horse Park Drive and Mirrabei Drive, North Gungahlin, ACT.

The assessment included data and literature review, field survey and Aboriginal consultation.

- Seventeen Aboriginal sites and one PAD were recorded for the Moncrieff study area prior to the current assessment.
  - Ten of these sites were not re-found in the in the course of the current study:

    M/A4, M/IF3, M/IF5, SA1/3, HP13, HP14, HP33, HPIF10, GARIF5 and CH1.
  - Seven of the sites were re-found in the in the course of the current study:

    M/A1, M/A2, M/A3, M/A5, HP15, C3/14 and CAS5.
- Additional PADs were identified at sites M/A1, M/A2, M/A3, and M/A5.
- The boundary of site HP15 was modified from the original recording.
- Six previously unidentified Aboriginal sites were recorded in the current investigation

  M/A6, M/A7, M/A8, MAIF1, MAIF2 and MAIF3.
- Moncrieff PAD has been further defined in the current investigation and divided into two PAD areas, MA/3 and PAD and MA/2 and PAD.
- Eight historic sites were recorded for the Moncrieff study area prior to the current assessment.
  - Six of these sites were not re-found in the in the course of the current study

    M/H1 M/H2 M/H4 M/H6, M/H7 and M/H8.
  - Two of the sites were re-found in the in the course of the current study

    M/H3 and M/H9.
  - These two sites were combined in the current investigation as they form part of the one site now referred to as M/H3-H9.
- No previously unidentified historic sites were recorded in the current investigation.
- Consequently, **thirteen Aboriginal sites, including four PADs and two historic site**s are presently identifiable in the Moncrieff study area.

- All previously recorded Aboriginal sites in the Moncrieff study area are listed on the ACT Heritage Register. Sites recorded in the current study are not yet listed.

It is recommended that:

- No further action is required for sites M/A4, M/IF3, M/IF5, SA1/3, HP13, HP14, HP33, HPIF10 and CH1.

- A *Conservation Management Plan* (CMP) should be prepared that allows for the salvage of all Aboriginal artefact occurrences within the Moncrieff development prior to the commencement of construction activities.

- A program of archaeological subsurface testing should be undertaken within identified areas of potential archaeological deposit (PAD) that have been assessed as having moderate archaeological potential.

  These are M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD.

  The testing should be aimed at establishing the presence and nature of any subsurface Aboriginal archaeological deposits.

  This provision should be included in the CMP.

- The BNAC has requested that further discussion, with a view to reaching an outcome that will be amicable to all relevant parties, should take place regarding the area of cultural significance in the study area.

- It is inadvisable to leave parts of the fenceline M/H3 and M/H9 *in situ*.

  If the fenceline M/H3 and M/H9 is located within open space then it is preferable to preserve these items as a heritage feature in open space.

  An approach should be made to the Canberra Museum and Gallery for the possible curation of these items.

  This provision should be included in the CMP.

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 Project Description

The new residential suburb of Moncrieff is located to the north of the existing suburbs of Ngunnawal and Amaroo in Gungahlin in the ACT. The future Horse Park Drive extension defines the suburb"s northern boundary (Figures 1.1 to 1.3).

A concept plan for Moncrieff was prepared in December 2007. In March 2008, the concept plan became a Precinct Code under the provisions of the *Planning and Development Act 2007*.

The suburb is relatively small in comparison to other Gungahlin suburbs, with an area of approximately 200 ha, of which approximately 130 ha is able to be developed. The suburb is currently under rural lease and agistment.

The proposed block yield for Moncrieff is approximately 1800 dwellings. The suburb will contain a variety in housing types including:

- standard residential;
- medium and higher density residential adjacent to a commercial centre, main community facility site and along Horse Park Drive;
- compact block housing; and
- “affordable housing” in accordance with the *Affordable Housing Action Plan.*

A group centre will be provided with a retail component, including a supermarket, together with a government secondary college and a community facility site. Further small-scale community facility sites may also be provided in Urban Open Space.

This heritage assessment was undertaken to facilitate ongoing actions associated with implementing the Moncrieff Precinct Code. This study is an extension to the Navin Officer Heritage Consultants (NOHC) (2009) report:

> *Water Quality Control Pond and Extensions to Horse Park Drive and Mirrabei Drive, North Gungahlin, ACT.*

The assessment was commissioned by ACT Planning and Land Authority (ACTPLA).

1.2 Report Outline

This report:

- Documents consultation with the four ACT Representative Aboriginal Organisations (RAOs) carried out in the course of the cultural heritage assessment;
- Describes the environmental setting of the study area;
- Reviews relevant heritage databases and literature and provides a background of local and regional archaeology and history for the study area;
- Describes the results of a field survey of Moncrieff; and
- Provides management recommendations based on the results of the investigation and the anticipated impacts of the proposed development on the archaeological resource.

Figure 1.1 Moncrieff Study Area (red outline)
(base map supplied by ACTPLA).

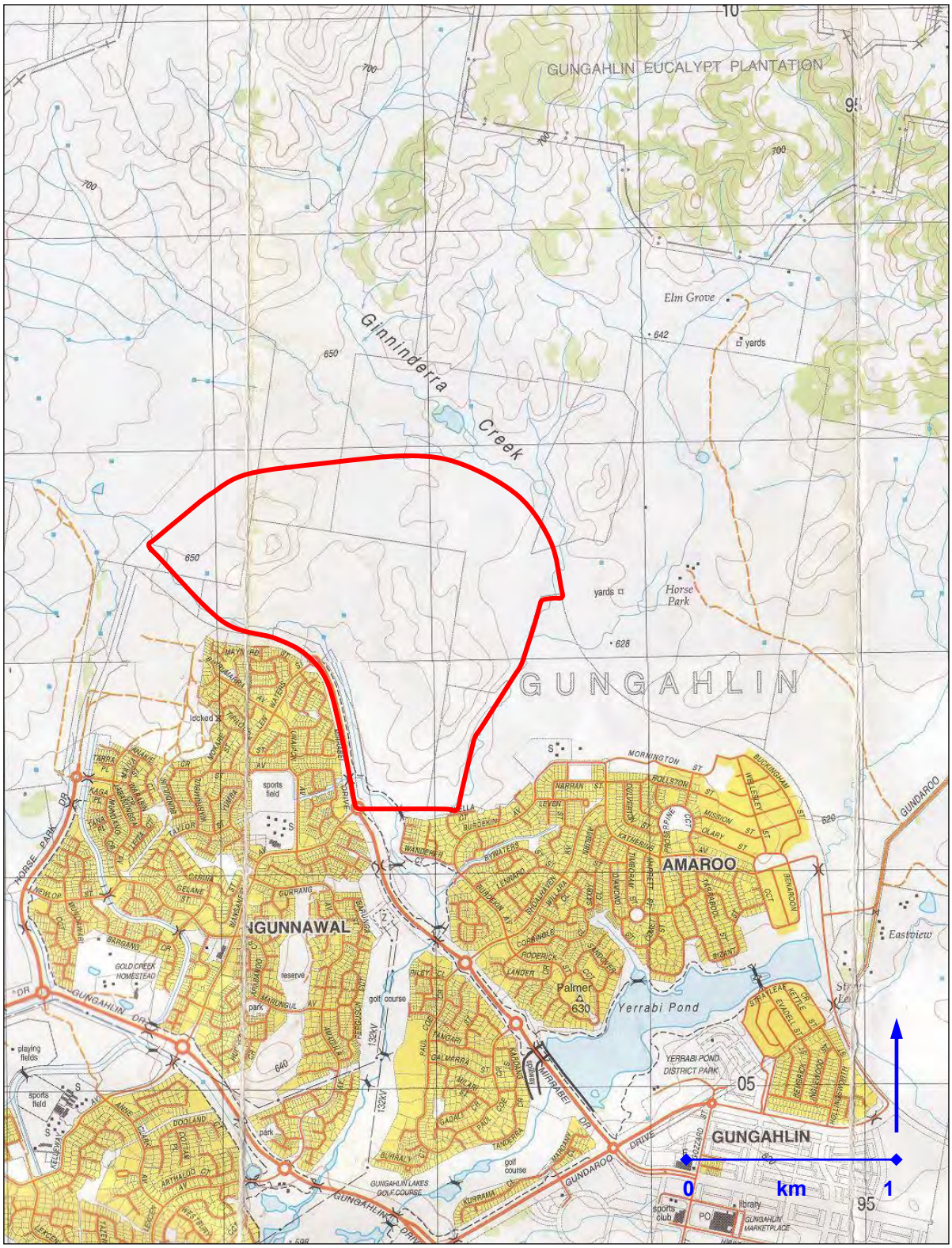

Figure 1.2 Moncrieff Study Area (red outline) (Extract from 1:25,000 topographic map, Hall 8727-4S, Second Edition, 2003, Land and Property Information NSW).

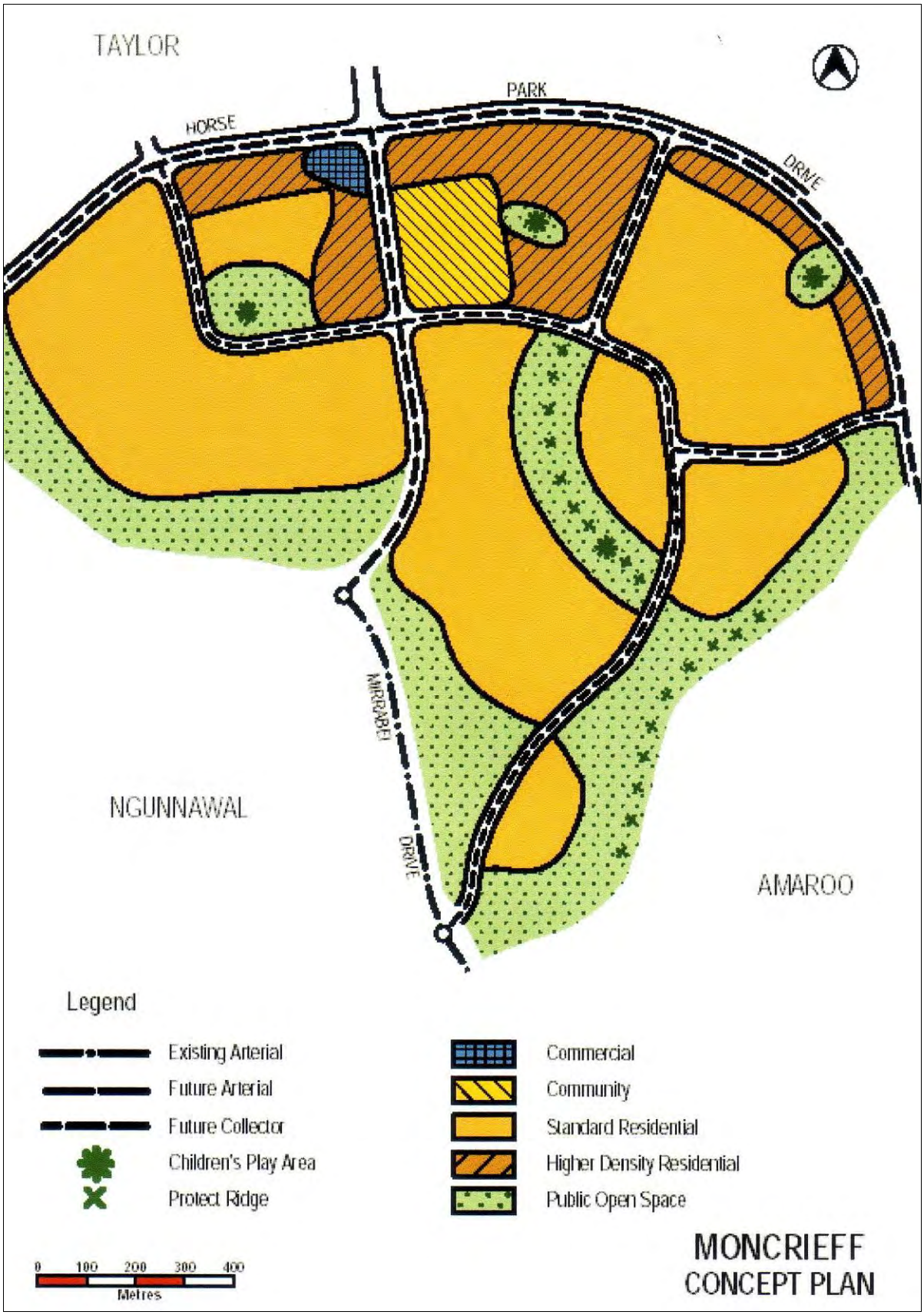

Figure 1.3 Moncrieff Concept Plan
(Plan supplied by ACTPLA).

2. ABORIGINAL PARTICIPATION AND CULTURAL VALUES

Under Section 14(7) of the *Heritage Act 2004*, the Minister for Territory and Municipal Services has declared four Aboriginal groups to be Representative Aboriginal Organisations (RAOs) in the ACT. They are:

- The Buru Ngunawal Aboriginal Corporation (BNAC);
- King Brown"s Tribal Group Pty Ltd (KBTG);
- The Little Gudgenby River Tribal Corporation (LGRTC); and
- The Ngarigu Currawong Clan (NCC).

Contact was made with each group to inform them of the project and to organise representation during the field survey. Subsequently, a representative from each of the groups attended and actively participated in the field program (Figure 2.1). The representatives were:

- Karen Denny (BNAC);
- Tina Williams and Bradley Brown (KBTG);
- Tiana House and Joe House (LGRTC; and
- James Mundy (NCC).

Records of Aboriginal Field Participation are provided in Appendix 1.

Records of Aboriginal Correspondence are provided in Appendix 2 (with the exception of correspondence from the BNAC regarding an area of special importance). This correspondence has been forwarded under separate cover to ACTPLA and the ACT Heritage Unit.

A copy of this report will be forwarded to each of the RAOs for their information.

Figure 2.1 RAOs representatives participating in the current field survey

3. STUDY METHODOLOGY

3.1 Literature and Database Review

A range archaeological and historical data was reviewed for the Moncrieff study area and its surrounds. This literature and data review was used to determine if known Aboriginal and historical sites were located within the area under investigation, to facilitate site prediction on the basis of known regional and local site patterns, and to place the area within an archaeological and heritage management context. The review of documentary sources included heritage registers and schedules, local histories, and archaeological reports.

Searches were undertaken of the following statutory and non-statutory heritage registers and schedules:

- The National Heritage List (Australian Heritage Council);
- The Commonwealth Heritage List (Australian Heritage Council);
- The Register of the National Estate (Australian Heritage Council);
- The Heritage Register (ACT Heritage Council); and
- Register of the National Trust of Australia (ACT).

3.2 Survey Methodology

Fieldwork was conducted by two archaeologists in September 2009. Representatives from each of the four ACT RAOs also participated in the fieldwork.

The field survey involved walking straight line transects across the study area, and conducting targeted and opportunistic inspections and survey traverses:

- Straight line transects involved team members inspecting the ground while walking approximately 25 m apart; and
- Opportunistic inspections and survey traverses were undertaken to examine areas of ground surface visibility within the study area.

The majority of bare ground within the assessment area was inspected and, in areas of limited exposure, an assessment was made of the archaeological potential for that area.

3.3 Project Personnel

Fieldwork was conducted by archaeologists Deirdre Lewis-Cook and Rebecca Parkes. This report was prepared by Lindsay Smith and Nicola Hayes and was edited by Kerry Navin.

3.4 Recording Parameters

3.4.1 Indigenous Sites and PADs

The archaeological survey aimed at identifying material evidence of indigenous occupation as revealed by surface artefacts and areas of archaeological potential unassociated with surface artefacts. Potential recordings fall into two broad categories: sites and potential archaeological deposits.

Sites

A site is defined as any material evidence of past indigenous activity that remains within a context or place which can be reliably related to that activity.

Most indigenous sites are identified by the presence of three main categories of artefacts: stone or shell artefacts situated on or in a sedimentary matrix; marks located on or in rock surfaces; and scars on trees.

Frequently encountered site types within southeastern Australia include stone artefact occurrences (including isolated finds and open artefact scatters), coastal and freshwater middens, rock shelter sites (including occupation deposit and/or rock art), grinding groove sites and scarred trees.

Isolated finds

An isolated find is a single stone artefact, not located within a rock shelter, and which occurs without any associated evidence of indigenous occupation within a radius of 60 metres. Isolated finds may be indicative of:

- Random loss or deliberate discard of a single artefact;
- The remnant of a now dispersed and disturbed artefact scatter; and
- An otherwise obscured or subsurface artefact scatter.

Except in the case of the latter, isolated finds may be considered to be constituent components of the background scatter present within any particular landform.

The distance used to define an isolated artefact varies according to the survey objectives, the incidence of ground surface exposure, the extent of ground surface disturbance, and estimates of background scatter or background discard densities. In the absence of baseline information relating to background scatter densities, the defining distance for an isolated find must be based on methodological and visibility considerations. Given the varied incidence of ground surface exposure and deposit disturbance within the study area, and the lack of background baseline data, the specification of 60 metres is considered to be an effective parameter for surface survey methodologies. This distance provides a balance between detecting fine scale patterns of indigenous occupation and avoiding environmental biases caused by ground disturbance or high ground surface exposure rates. The 60 metre parameter has provided an effective separation of low density artefact occurrences in similar southeast Australian topographies outside of semi-arid landscapes.

Artefact scatters

Artefacts situated within an open context are classed as an open artefact scatter (or „open camp site") when two or more occur no more than 60 metres away from any other constituent artefact. The 60 metre specification relates back to the definition of an isolated find (refer above). The use of the term „scatter" is intended only to be descriptive of the current archaeological evidence and does not infer the original human behaviour which formed the site. The term „open camp site" has been used extensively in the past to describe open artefact scatters. This was based on ethnographic modelling suggesting that most artefact occurrences resulted from activities at camp sites. However, in order to separate the description from the interpretation of field evidence, the terms artefact scatter, artefact distribution or artefact occurrence are now more extensively used. The latter two options can also be used to categorise artefacts occurring in subsurface contexts.

Potential Archaeological Deposits (PADs)

A potential archaeological deposit, or PAD, is defined as any location where the potential for subsurface indigenous archaeological material is considered to be moderate or high, relative to the surrounding study area landscape.

The potential for subsurface material to be present is assessed using criteria developed from the results of previous surveys and excavations relevant to the region. Under these criteria, PADs can be given an indicative rating of their „archaeological potential" based on an assessment of their potential to contain subsurface artefacts, as follows:

- *Low*: where there is negligible probability for a location to contain subsurface artefacts (in such cases the potential incidence of artefactual material is considered to be the same as, or close to that for background scatter, and such locations fall below the threshold of classification);

- *Moderate:* where there is reasonable probability for a location to contain subsurface artefacts; and

- *High*: where there is high probability for a location to contain subsurface artefacts.

The boundaries of PADs are generally defined by the extent of particular micro-landforms known to have high correlations with archaeological material. A PAD may or may not be associated with surface artefacts. In the absence of surface artefacts, a location with potential will be recorded as a PAD. Where one or more surface artefacts occur on a sedimentary deposit, a PAD may also be identified where there is insufficient evidence to assess the nature and content of the underlying deposit. This situation is due mostly to poor ground surface visibility.

3.4.2 Historical Sites and Features

Historical archaeology refers to the 'post-contact' period and includes domestic, commercial and industrial sites as well as most maritime sites. It is the study of the past using physical evidence in conjunction with historical sources. In the Moncrieff study area, the two primary types of places or items that may form part of the historical archaeology context include:

1. Below ground evidence, including building foundations, occupation deposits, features and artefacts; and above ground evidence, including buildings, works, industrial structures and relics that are intact or ruined; and

2. Areas of land that display evidence of human activity or occupation.

Within these broad parameters, an historical archaeological site may include:

- Topographical features and evidence of past environments;

- Evidence of site formation, evolution, redundancy and abandonment (that is, features and materials associated with land reclamation, sequences of structural development, demolition/deconstruction, and renewal);

- Evidence associated with domestic occupation including household items and consumables, ornaments, personal effects and toys;

- Evidence of diet including animal and fish bones, and plant residues;

- Evidence of pastimes and occupations including tools of trade and the often fragmentary signatures of these activities and processes; and

- Any surviving physical evidence of the interplay between site environment and people.

The information found in historical archaeological sites is often part of a bigger picture which offers opportunities to compare and contrast results between sites. The most common comparisons are made at the local level, however, due to advances in research and the increasing sophistication and standardisation of methods of data collection, the capacity for wider reference (nationally and, occasionally, internationally) exists and places added emphasis on identification and conservation of historical archaeological resources.

4. ENVIRONMENTAL CONTEXT

The Moncrieff study area is located to the north of the existing suburbs of Ngunnawal and Amaroo, within a landscape associated with the upper catchment of Ginninderra Creek. The area comprises gently rolling to hilly terrain and local elevation averages 635 m AHD, the major points of relief being minor ridgelines.

Geology of the area is typified by Lower to Middle Silurian mudstone, siltstone and minor shales, cherts and limestone of the Canberra Formation. Outcrops of more resistant rocks are known to occur in the general area, including dacite and dacitic tuff.

The area is drained by Ginninderra Creek and unnamed tributaries to Ginninderra Creek.

Soils of the Moncrieff study area vary in accordance with topography and include thin, gravelly lithosols on ridges and steeper slopes, and podzols in the more undulating terrain. Surface scatters of small angular quartz, chert and tabular shale cobbles are common throughout the area. Alluvial flats in valley bottom contexts are deeper in section and are characterised by a dark humic and silt rich upper horizon. These soils grade into gravelly clays, which in turn overly bedrock.

Local vegetation is characterised by Yellow Box-Red Gum (*Eucalyptus melliodora*/*Eucalyptus blakelyi*) grassy woodland. Although much of the tree cover has been cleared, occasional isolated trees and remnant woodland stands survive at points within the proposed suburb. The majority of the ground surface within the study area supports native and introduced grasses. Comparatively poorly drained soils along the creek lines exhibit sedge growth. Local vegetation is classified as grassy woodland; however, weeds such as thistle are present in the creeklines.

European landuse within the study area has resulted in the widespread disturbance of the upper soil layers and probable changes in the rate and character of erosion and sedimentation. The types of landscape disturbance that are evident within the study area include:

- Original clearance of much of the native tree cover and understorey;
- Cultivation and deeper ploughing of topsoil for establishment of pasture and other crops;
- Construction of farm dams, water diversion features, fences and vehicular access roads;
- Grazing of cattle and sheep, with associated animal tracks and surface disturbance; and
- Rabbit and other animal activity.

Changes in vegetation cover and grazing impact will have had considerable impact on the upper soil profile of the basal slopes within the study area. The removal of native vegetation in favour of grassland would have promoted erosion and surface instability and subsequent sedimentation of valley floors. The establishment of introduced pasture grasses would have required ploughing.

This landuse history will have significantly impacted the survival and integrity of the prehistoric archaeological record. It is probable that most surface scatters of artefacts that occur within the uppermost soil layers will have undergone varying degrees of horizontal and vertical disturbance. However, unless impact has been wholesale, (such as in quarrying, filling or recontouring) it is frequently possible to identify a remnant scatter of disturbed artefacts that mark sites.

Site types which would be *unlikely* to survive these levels of disturbance include carved and scarred trees, stone arrangements and earth rings or bora grounds.

European occupation and agricultural sites are equally susceptible to disturbance or destruction as a result of such activities. House sites and associated deposits can be churned and scattered by ploughing and more ephemeral sites such as selectors and shepherds huts may be completely obliterated.

5. ABORIGINAL CONTEXT

5.1 Tribal and Linguistic Boundaries

Tribal boundaries within Australia are based largely on linguistic evidence and it is probable that boundaries, clan estates and band ranges were fluid and varied over time. Consequently, 'tribal boundaries' as delineated today must be regarded as approximations only, and relative to the period of, or immediately before, European contact. Social interaction across these language boundaries appears to have been a common occurrence.

A reconstruction of clan boundaries based on Tindale (1940, 1974) indicates that the northern Canberra area fell within the tribal boundaries of the Ngunnawal people. There is some uncertainty as to which language was spoken by the Aborigines of north Canberra. This area appears to have been close to the linguistic boundary between the Gundungurra and Ngunnawal languages. Eades (1976) notes that published grammars for these two languages (Mathews 1900, 1901, 1904) are virtually identical. However, according to Eades" boundaries, the Ngunnawal of northern Canberra probably spoke the Gundungurra language.

Bluett states that the Aboriginal group which camped at Pialligo were referred to by early settlers as the „Pialligo Blacks" and the larger group which camped near Black Mountain were called the „Canburry or Nganbra Blacks" (Bluett 1954).

Jackson-Nakano (2001:xiv) notes that Aboriginal family groups within the Canberra-Queanbeyan district and surrounds were known by many names in the early nineteenth century, but local Europeans who knew them best referred to them as Kamberri – also spelled Kgamberry, Kamberra and even Nganbra (Ngambri). She says the heart of their country was centred on the area now referred to as the Acton Peninsular. Some Kamberri individuals, she says, intermarried with neighbouring Ngunnawal families from the 1880s, and some descendants of such marriages re-identify in modern times as Ngunnawal. While maintaining their distinct association with the ACT and surrounds, members of Kamberri-Ngunnawal families might also identify personally as Ngunawal, Walgalu or even Wiradjuri through their familial links to these other groups (Jackson-Nakano 2001:xv).

References to the traditional Aboriginal inhabitants of the Canberra region are rare and often difficult to interpret (Flood 1980, Huys 1993). However, the consistent impression is one of rapid depopulation and a desperate disintegration of a traditional way of life over little more than 50 years from initial white contact (Officer 1989). The disappearance of the Aborigines from the tablelands was probably accelerated by the impact of European diseases, which may have included the smallpox epidemic in 1830, influenza, and a severe measles epidemic by the 1860s (Butlin 1983, Flood 1980).

By the 1850s, the traditional Aboriginal economy had largely been replaced by an economy based on European commodities and supply points. Reduced population, isolation from the most productive grasslands and the destruction of traditional social networks meant that the final decades of the region's indigenous culture and economy were centred on white settlements and properties (Officer 1989).

By 1856, the local 'Canberra Tribe', presumably members of the Ngunnawal or Ngarigo, were reported to number around 70 (Schumack 1967) and by 1872, recorded as only five or six 'survivors' (*Goulburn Herald* 9 November 1872). In 1873, one so-called 'pure blood' member remained, known to the white community as Nelly Hamilton or 'Queen Nellie'.

Based on the above overview, it is probable that Aboriginal scarred trees would date to no later than the 1850s and 1860s. Tree scars with an Aboriginal origin would therefore have to be at least in the order of 150-160 years old. Early accounts of Aboriginal lifestyles in areas comparable with the study locality describe aspects of a successful hunting and gathering economy and eventful social life and inter-group contacts. The material culture, which is partly reflected in the surviving archaeological record, included stone and wooden artefacts, skin clothing and bark and bough temporary dwellings (Flood 1980, Huys 1993).

5.2 Local Overview

Archaeological surveys and recording work conducted in the central and northern Canberra regions have resulted in the location of numerous archaeological sites.

Stone artefact scatters are the most frequently occurring residue of prehistoric activity in these areas. They are fundamental in documenting the intensity of usage of the landscape and its resources by its past Aboriginal inhabitants. They provide insight into stylistic and technological behaviours. Such scatters are representative of one or more stages in what is termed a 'reduction sequence', that is, the entire process from obtaining stone raw material, to manufacture of stone tools and to eventual discard or loss and incorporation into the archaeological record. Other less common site types that have also been identified in the region are scarred trees and lithic raw material sources.

The Canberra Archaeological Society (CAS) conducted the first archaeological survey in the northern Canberra area in 1975-76. The survey located 'seven sites' and a larger number of 'less significant finds'.

From the 1980s, archaeological recording and survey in the ACT became more systematic and comprehensive and the majority of work since then has been conducted in the context of development impact assessment.

With the release of large areas of land for urban development in Gungahlin, several large-scale systematic archaeological surveys were undertaken to define the archaeological resource of the release areas (Kuskie 1992a, 1992b; Officer and Navin 1992; Wood and Paton 1993). Numerous other archaeological assessments have been carried out in Gungahlin for smaller land areas that were likely to be affected by specific proposed developments such as roads, golf courses, water storage facilities, pipelines, etc.

Archaeological studies that have been conducted in the vicinity of the current study area include assessments of Horse Park Drive and associated roads, the suburbs of Ngunnawal and Amaroo, and the proposed suburbs of Bonner, Jacka and Moncrieff.

An archaeological assessment of the proposed route of Clarrie Hermes Drive and adjoining sections of Horse Park Drive and Mirrabei Drive was carried out by Access Archaeology in 1992. This study involved survey of an 80 m wide road corridor for a length of approximately 6.2 km. Eight Aboriginal sites (three artefact scatters, five isolated finds, and five Aboriginal scarred trees) were recorded during the survey (Access Archaeology 1992:10-13). None of the recordings occur within the current Moncrieff study area.

In 1993, Huys carried out surveys in the Gungahlin district as part of his Honours thesis research at the Australian National University. He recorded approximately 10 Aboriginal sites (Huys 1993).

An area adjacent to Casey was surveyed by Saunders in 1994. The survey incorporated a 2.5 km x 200 m strip of land extending between the (then) proposed Clarrie Hermes Drive and Horse Park Drive. Three low-density artefact scatters and three isolated finds were recorded by Saunders (1994a:14). The artefact scatters contained between two and five artefacts and were located on crest/upper slope features, flats and saddles (Saunders 1994a:14). The isolated finds were found on spur, ridge slope features (Saunders 1994a:15).

Saunders‟ 1994 study of the proposed Moncrieff suburb and adjacent areas involved the survey of 290 ha of elevated landform units, ridges and wide stream valleys flanking an upper tributary to Ginninderra Creek. While good coverage of all topographic units was achieved in the survey, including high potential zones such as creek flats and low gradient basal slopes, survey effectiveness was hampered by poor visibility. As a consequence, the survey relied primarily upon inspection of exposures such as stock trails, vehicle tracks, creek/gully erosion and areas exposed by animal digging or concentrated stock activity (Saunders 1994b:15).

Eleven Aboriginal sites were recorded by Saunders. Artefacts at sites M/A1 to M/A5 were subsequently collected by Saunders (1995) in accordance with recommendations made in the

original impact mitigation plan (Saunders 1994b). Saunders also identified an area of potential archaeological deposit (PAD1) in the northern section of the current study area.

In 2002, NOHC conducted an archaeological re-assessment of a proposed extension to Horse Park Drive from Katherine Avenue south at Amaroo to the planned main intersection point at the future suburb of Taylor (NOHC 2002b). The locations of the sites recorded and/or collected by Saunders (1994, 1995) were revisited. It was concluded that there was considerable potential for additional archaeological material to occur in the more or less intact deposits in the vicinity of the larger recorded artefact scatters, in particular sites M/A2, M/A3 and M/A4 (NOHC 2002b). The re-assessment also included the review of an archaeologically sensitive area identified by Saunders in 1994.

In 2002, NOHC conducted an archaeological re-assessment of a proposed extension to Horse Park Drive

After the Canberra fires of 2003 the ACT Heritage Unit commissioned a series of archaeological surveys of the fire containment lines that had been bulldozed around the northern and western margins of Canberra. The surveys aimed to take advantage of the (temporary) ground surface visibility provided by the lines as the exposures afforded by the lines comprised near-continuous linear grades approximately ten metres wide (ACT Heritage Unit 2003).

AASC (2004) conducted a cultural heritage evaluation study of the approximately 260 ha Bonner Residential Estate. The area was bounded by Horse Park Drive and Amaroo to the south, Gundaroo Road and Forde to the east, the future suburb of Jacka to the west, and the Mulligans Flat Nature Reserve to the north. Three previously identified Aboriginal sites were re-located and recorded (sites C/59, HP32 and 1465). Five previously unrecorded sites and two PADs were identified and recorded. Many of the sites were located on small rises in the landscape in close proximity to creek margins and wetlands. The majority of sites are located approximately 1-2 km to the east of the current study area.

NOHC (2005) conducted impact mitigation works on a range of cultural heritage sites within the vicinity of the Bonner Water Quality Ponds and Forde Access Road. The works included subsurface testing of potential archaeological deposit BPAD1 and salvage of sites C5/2, BIF1, BAS1 and BAS2.

Eleven shovel pits were excavated at BPAD1 and 301 lithic items were salvaged from BPAD1. Six petrological or geological types were identified in the lithic assemblage. In order of frequency these were quartz (67%), volcanic (20%) and minor components (less than 10%) of chert, quartzite, silcrete and tuff. The categories of lithic items identified in the assemblage were: lithic fragment; flake; broken flake; backed flake; broken backed flake; flaked piece; flake fragment; bipolar flake; microblade portion and microlith. Ten artefacts were salvaged from sites BAS1, BAS2, BIF1 and C5/2.

AASC"s (2005) study of Jacka Residential Estate involved a cultural heritage evaluation for the proposed subdivision area which comprised approximately 275 ha. Nine PADs, five previously identified Aboriginal sites (HP20, HP21, HP22, HP26, and BAS3), and six previously unidentified Aboriginal sites were recorded.

In 2008, surveys for a residential estate in the nearby suburb of Casey, two kilometres southwest of the Moncrieff study area, were completed by NOHC (2008a). One Aboriginal site and six PADs had been previously recorded in the study area. One Aboriginal site, a scarred tree, and two areas of potential archaeological deposit were identified during that study.

Subsequently, an archaeological subsurface testing program was conducted within Casey (NOHC (2008b, 2008c). Four stone artefacts were retrieved from excavated test pits and one artefact was collected from the surface of PAD10. The test excavation results indicated that the archaeological resource within Casey could be characterised as an open context, very low areal incidence surface and subsurface cultural deposit of lithic artefacts. The human activities indicated by direct evidence were stone knapping and/or limited discard of lithic material and it was concluded that the area had low archaeological sensitivity.

In 2009, NOHC undertook a cultural heritage assessment for the proposed Horse Park Drive and Mirrabei Drive extensions and associated water quality control pond in Gungahlin. No previously unrecorded Aboriginal sites or areas of archaeological potential were identified within that study area in the course of that investigation.

5.3 The Moncrieff Study Area

A number of previous cultural heritage assessments have included parts, or all, of the suburb of Moncrieff.

The Canberra Archaeological Society (CAS) identified one site, CAS5, an open artefact scatter of five artefacts (one backed blade and four flakes) in the Moncrieff study area. The artefacts have been collected from CAS5 (Bindon and Pike 1979).

Kuskie (1992) conducted archaeological surveys as part of a large study of the north Gungahlin area. One site is within the current study area, C3/14 were located during this study.

Huys (1993) identified five sites within in the Moncrieff study area. These sites are HPIF10, HP13, HP14 (also identified as SA1/2), HP15 and HP33.

Saunders (1994) identified eight sites within in the Moncrieff study area. These are M/A1, M/A2, M/A3, M/A4, M/A5, SA1/3, M/IF3, and M/IF5. The artefacts have been collected from M/A1, M/A2, M/A3, M/A4 and M/A5.

A re-assessment was conducted in 2002 by NOHC of an archaeologically sensitive area identified by Saunders in 1994. The review effectively extended the ridgeline and slopes *generalised* PAD zone identified in the vicinity of M/A2, M/A3 and M/A4 northwards to incorporate the adjacent valley bottom features primarily to the south of the creek line. A portion of the identified PAD falls within the Moncrieff study area.

In March/April 2009 NOHC undertook an Aboriginal and historical cultural heritage assessment for the proposed Horse Park Drive and Mirrabei Drive extensions and associated water quality control pond. This study is located within the partially current study area. The study found three previously recorded Aboriginal sites and one area of archaeological potential (PAD). No previously unrecorded Aboriginal sites or areas of archaeological potential were identified.

It was recommended that visible Aboriginal artefacts associated with three sites within the proposed North Gungahlin Pond and Roads development area should be salvaged (collected) prior to the commencement of construction activities. These were:

- site M/A5 - which is located in the current Moncrieff study area; and
- sites HP11 and IF3 - which are located southeast (and outside of) the current Moncrieff study area.

A program of archaeological subsurface testing was also recommended to ascertain the presence, extent and integrity of any archaeological deposits within the identified PAD.

Based on the review of previous archaeological studies, seventeen Aboriginal sites and one area of Aboriginal archaeological potential are recorded as occurring within the Moncrieff study area. Site information is summarised in Table 5.1 and site locations are shown on Figure 5.1.

Table 5.1 Previously recorded Aboriginal sites and PADs in the Moncrieff study area

Site	Description/Comments
M/A1	**Artefact scatter:** Three stone artefacts on crest and southwest slopes of small spur. Recorded by Saunders (1994). • Site collected by Saunders (1995).
M/A2	**Artefact scatter:** Twenty-eight stone artefacts on mid to lower south eastern slopes of broad ridge bordering an intermittent wetland. Recorded by Saunders (1994). • Site collected by Saunders (1995).
M/A3	**Artefact scatter:** Seven stone artefacts on crest and slopes of small spur at western end of low ridgeline overlooking an intermittent wetland. Recorded by Saunders (1994). • Site collected by Saunders (1995).
M/A4	**Artefact scatter:** Three stone artefacts on crest of low, broad level ridge adjacent to an intermittent wetland. Recorded by Saunders (1994). • Site collected by Saunders (1995).
M/A5	**Artefact scatter:** Five stone artefacts on southern bank of branch of northern headwater tributary of Ginninderra Creek. Recorded by Saunders (1994). • Site collected by Saunders (1995).
HPIF10	**Isolated Find:** Grey chert broken blade located on the upper slope of a knoll, 300 m from creek, and 500 m west of Horse Park homestead (Huys 1993 and Saunders 1994).
HP13	**Artefact scatter:** Two stone artefacts (grey chert) located on top of hill overlooking creek 1 km southwest of Horse Park homestead. • Located in Gungahlin Forward Tree planting area – now disturbed (Huys 1993 and Saunders 1994).
SA1/3	**Isolated Find:** Single stone artefact located just below the crest of a hill on an east facing slope at approx. 662 m AHD. It lies approx. 9 m north of a fence (scheduled for removal) west of a broad shallow gully in a clump of eucalypts on disturbed soil (Saunders 1994).
HP14 (SA1/2)	**Artefact scatter**: Three stone artefacts located off saddle of spur 100 m from creek. • Located in Gungahlin Forward Tree planting area – now disturbed (Huys 1993 and Saunders 1994).
M/IF3	**Isolated Find:** A single stone artefact located on a medium gradient hill slope approx. 150 m west of the northern headwater tributary of Ginninderra Creek. Located on spoil from recent fence construction 1 m to the south (Saunders 1994 and 1995).
M/IF5	**Isolated Find:** A single stone artefact located in a disturbed floodplain context on creek bank erosion 4 m north of the present channel of a western branch of the northern headwater tributary of Ginninderra Creek. Located approx. 45 m from two eucalypts (Saunders 1994 and 1995).
HP15	**Artefact scatter**: Four stone artefacts located on broad saddle of spur, 300 m from creek (quartz core, brown river pebble hammerstone, cream silcrete core; black volcanic flaked piece) (Huys 1993, Saunders 1994)
CAS5	**Artefact scatter**: Five stone artefacts located near a western tributary of the western arm of Ginninderra Creek west of Horse Park homestead. • Site has been collected (Bindon and Pike 1978, 1989, Anutech 1984).
HP33	**Artefact scatter**: Two stone artefacts (grey chert) located on broad saddle of knoll. • Located in Gungahlin Forward Tree planting area – now disturbed (Saunders 1994).

Site	Description/Comments
C3/14	**Isolated Find:** A single stone artefact located on the side of a knoll on a slope adjacent to Ginninderra Creek. • The site was included in the program of second stage salvage works undertaken by Walshe in 1993. However, the artefact was not re-found.
GARIF5	**Isolated Find:** A single stone artefact located on grey soil of flat gradient on an animal track at the margin of Ginninderra Creek. The artefact was located 25 m from the centre line of Clarrie Hermes Drive. • The site was not relocated by Kuskie 1992. The site was included in follow up collection works undertaken by Walshe 1993 but was not re-found. Walshe noted that creek development had probably destroyed the site.
CH1	**Aboriginal stone source**: Chert outcrop approximately 200 m in length and 50 m wide extending in a northerly direction. The outcrop displays considerable natural exfoliation. Several artefact scatters in close proximity to outcrop (eg HP14, HP15). • Recorded by Huys in 1993.
Moncrieff PAD	**PAD:** Potential archaeological deposit (Saunders 1994 and NOHC 2002).

Figure 5.1 Locations of previously recorded Aboriginal sites and PADs within Moncrieff study area (Base map Google earth 2009).

5.4 Predictive Model for Aboriginal Sites

As a result of the numerous archaeological surveys undertaken to date in the Gungahlin area, qualitative observations regarding Indigenous site location parameters may be summarised as follows:

- Artefact occurrences (such as artefact scatters and isolated finds) in open contexts are the most common archaeological recoding type;
- Artefact densities (both on the ground surface and within the soil profile) in open artefact scatters may vary considerably;
- Open artefact scatters are most likely to occur on relatively level ground, in locally well-drained contexts, in relative proximity to a natural fresh-water source. Landforms on which open artefact scatters are likely to occur include elevated creek and river banks, low gradient basal slopes adjacent to creeks and rivers, terrace edges, and the crests of ridges and spurs;
- The majority of open artefact scatters, (particularly larger sites), are situated adjacent to, or in close proximity to, creek flats or valley bottom contexts, frequently on low gradient basal slopes adjacent to streams or wetlands;
- Open artefact scatters which contain relatively large artefact assemblages and densities occur most frequently and consistently within 100-150 m of major and relatively permanent drainage lines;
- Open artefact scatters which occur away from basal valley contexts and major streams and tributaries tend to be small and sparse in artefact content;
- Open artefact scatters may be more likely to be present at major confluences and valley constrictions;
- Most sites located away from major water sources will consist of low density scatters of artefacts, and mostly contain less than 10 visible surface artefacts;
- Artefacts may occur wherever surface exposures of exploited rock occur, rock sources which are known to have been exploited in the ACT include chalcedony, chert, quartz and fine grained igneous rocks such as fine-grained porphyry and fine-grained intrusives within granodiorite;
- Some natural exposures of fine grained siliceous rocks are unassociated with evidence for Aboriginal exploitation of that resource;
- Aboriginal scarred trees may occur anywhere old-growth trees survive. It is probable that such trees would date to no later than the 1850s and 1860s. Tree scars with an Aboriginal origin would therefore have to be at least in the order of 150-160 years old; and
- Arising from the results of the subsurface investigations at several PAD and non-PAD locations in the nearby suburb of Casey it is predicted that in upper catchment contexts characterised by non-permanent water sources and first or second order streamlines; and relatively low undulating landforms with open valley floors; the archaeological resource will consist of very low density and discontinuous occurrences of stone artefacts (with a low proportion present in subsurface contexts), in locations which in other regards, mostly comply with the general location model of locally elevated, relatively level ground situated in relative proximity to (non-permanent) water, or on major spurline or watershed crests.

6. HISTORICAL CONTEXT

6.1 Local History

About the end of 1824, J. J. Moore, an officer of the Supreme Court of NSW, was the first to settle south of the Goulburn district, selecting Acton on the Molonglo River, now in the heart of Canberra. In May 1825, Robert Campbell, a Sydney merchant, selected 4,000 acres about Mount Pleasant, and formed the nucleus of the Duntroon Estate.

The rapid change in settlement is illustrated by the population figures for the County of Murray. In 1833 the total population was 510 and by 1841 it was 2,111. By 1836, landowners had become residents, and a post office was established at the site of Queanbeyan, where the roads from Gundaroo and the country about the Shoalhaven joined the road to the Monaro.

Dr. J. F. Murray, a brother of Sir T. A. Murray of Yarralumla, obtained the grant of Woden, which he later sold to Charles and Martin Byrne. In 1835, James and William Wright and J. H. M. Lanyon obtained grants on the river below Tharwa. In 1837, William Wright was shot, and, shortly after, J. H. M. Lanyon returned to England, and James Wright formed the Lanyon Estate. In 1837, Thomas McQuoid was granted Tuggeranong, and, in 1841, bequeathed it to his son T. H. McQuoid. The son was drowned in the wreck of the Dunbar in 1857, when Andrew Cunningham purchased the property. In 1839, Alexander McDonald acquired Uriarra; in 1842, George Webb acquired Tidbinbilla; and in 1847, James Wright removed from Lanyon to Cuppacumbalong. During these years, Joseph and Emanuel Mandelson settled in the Naas Valley, Alexander McKeahnie at Orroral, and Charles McKeahnie at Booroomba (QCC 1938).

Around the 1840s, European land use within the study area commenced when Mulligans Flat and the Horse Park area were settled by William Ryan and John Gillespie (Gillespie 1985, 1992). Properties such as Canberra Park, Tea Gardens, Gungahlin and Palmerville appeared soon afterwards.

While landuse up until the late 1850s was focused on sheep runs and some grain production, the establishment of smaller holdings with the passing of the Robertson Land Acts in 1861 heralded the emergence of a closer pattern of settlement. Sheep grazing continued, but with the addition of dairying and smaller scale cereal production. This landuse was characterised by the establishment of numerous small field systems and grazing, with limited cultivation and orchards around home paddocks (Farrington and Williams 1992).

The ACT was established from land ceded by New South Wales in 1911 and in 1913, the Commonwealth Government named the City of Canberra. Initial development of the ACT was slow, and the Commonwealth with only gradual changes continued management of the existing NSW infrastructure. The last „freehold" properties were not resumed until the 1980s. Names already in use in 1911, and these were mainly natural features and locality names, were retained. Although some localities, overtaken by urban development, have disappeared, their names have usually been retained in some form.

The 1915 Federal Territory Feature Map shows the local area in general to have been well-cleared and fenced by the early 1900s, with a number of scattered cottages and houses established across the landscape. By this stage many dams had been constructed on drainage lines and areas of cultivation and cropping (some noted as being 'old' or 'very old') were in existence on flats and in valley bottom contexts.

The Gungahlin area and upper Sullivans Creek catchment are known to contain a number of sites associated with various phases of local European settlement and pastoralism. Site types include homestead complexes, early house sites and ruins, ploughlands, yards, rubbish pits, stone cairns and border markers, old fence-lines, tree plantings and old road alignments (Bindon and Pike 1979; Kuskie 1992b; Wood and Paton 1993; Saunders 1995; Williams and Barber 1995).

The Federal Territory Feature Map (c. 1912/1915) shows the Moncrieff study area to have been largely cleared and fenced by the early twentieth century. It is apparent from this document that the

flats and creek fringes within the study area did not exhibit evidence of old or contemporary cultivation at the time.

6.2 Previous Studies

A number of the studies mentioned above in Section 5.2 also included an historical heritage component.

Eleven European heritage sites were recorded by Saunders" (1994b) in her study of Moncrieff, eight of which fall within the present Moncrieff study area.

One historic place (Horse Park Homestead Complex, Sedgeland and Surrounds) is listed on the Register of the National Estate (Item No. 14894). This site is located to the northeast of, and outside, the Moncrieff study area.

6.3 The Moncrieff Study Area

Eight historic sites (M/H1 to M/H4 and M/H6 to M/H9) have been previously recorded as occurring within the Moncrieff study area. They are listed in Table 6.1 and their locations are shown in Figure 6.1.

Figure 6.1 Locations of previously recorded historic sites within the Moncrieff study area (Base map Google earth 2009).

Table 6.1 Previously recorded historic sites in Moncrieff study area.

Site	Description/Comments
M/H1	**A strainer post** and two six-wire fence posts were recorded by Saunders (1994) on creek flats east of the northern headwater tributary of Ginninderra Creek („Horse Park Creek"). The posts are parallel to the present fence and about 3 m to the west of it. The line between the posts is marked by thin pine trunks, post fragments and a linear depression approximately 1 m wide and 10 to 15 cm deep. • The site was assessed by Saunders as not having heritage significance.
M/H2	**Set of two covered metal sheep troughs**, each divided into smaller sections, supported by star pickets and covered by a length of curved heavy duty cast iron. The structure is made of re-used material. It was constructed by the previous owner of „Horse Park" between 10 and 20 years ago. • Recorded by Saunders (1994) and assessed by her as not having heritage significance.
M/H3	**Barbed wire,** comprising single short pieces of wire soldered at right angles to the main strand, was recorded along the top of two sections of old fencing. The barbed wire is attached to the top of old timber posts and occurs only in those sections in which timber posts have been retained. The old fence has been extensively repaired with star pickets, netting and modern barbed-wire. A five-wire fence is recorded at this location on the 1915 Federal Territory Feature Map. Recorded by Saunders (1994) and assessed by her as having heritage significance. Saunders (1994:20) notes that, "while further research is required to fully assess M/H3; it is thought to represent a rare example of an early fencing material no longer used. It is significant on criterion 3 and possibly on criterion 5, pending further research". • Saunders (1994:21) recommended that further research is required to set M/H3 in its historical context and to determine its rarity and significance.
M/H4	**Gate** associated with the old fencing (M/H3). The metal frame comprises a number of separate sections joined by sockets at the top and by bolts at the bottom. Some of the sockets are missing and the gate has been repaired and wire netting added. The gate is similar in construction to M/H9 and to the „Horse Park" entrance gate east of the study area and may originally have had a spring catch for use by horse riders. • Recorded by Saunders (1994) and assessed by her as not having heritage significance.
M/H6	**Single concrete laundry tub stock trough**. A half concrete laundry tub stands against a red spotted gum approximately 70 m north of a fence. The tree has been scarred by an axe. Deposits in the tub suggest that it may have been used to hold salt for stock. The tub was placed there by the previous owner of „Horse Park" between 10 and 20 years ago. • Recorded by Saunders (1994) and assessed by her as not having heritage significance.
M/H7	**Double concrete laundry tub stock trough**. This tub has been placed between two trees about 10 m south of a vehicle track. A large tyre has been placed under the tub to make it level. Two timber posts with barbed wire attached stand at one end. The posts served as supports for a galvanised iron roof, which has fallen over the tubs. A timber beam and three other pieces of galvanised iron lie nearby. The tubs have been used to hold salt licks for stock. They were placed there by the previous owner of „Horse Park" between nine and 20 years ago. • Recorded by Saunders (1994) and assessed by her as not having heritage significance.
M/H8	**Piece of farm machinery.** A rusted heavy duty cast iron disk 50 cm in diameter with a scalloped edge and a square hole at the centre was located on an uprooted tree trunk 5 m north of a fenceline. • Recorded by Saunders (1994) and assessed by her as not having heritage significance.
M/H9	**Farm gate with cast iron spring catch**. A cast iron spring which could be operated from horse back was recorded on an old metal farm gate. The cast iron spring catches were individually made, possibly at the historic Ginninderra Village blacksmith's workshop. This example is no longer operational. The gate frame comprises a number of separate sections joined by metal sockets at the top and by bolts at the bottom and is similar to gate M/H4. Recorded by Saunders (1994) and assessed by her as having heritage significance. Saunders (1994:20) notes that, "M/H9 (cast iron spring gate catch) is one of two reasonably well preserved examples of this type so far noted in Gungahlin (the other example, at a fence corner on the Gundaroo Road just north of „East View", was not recorded in the cultural resource survey of the area). Two other gates, with the catch partly or completely

Site	Description/Comments
	missing (including possibly M/H4) are also located on „Horse Park". As a gate catch associated with the use of the horse as a principal means of transport on rural properties, M/H9 is part of an era now past and is significant on criterion 3. Further research is required to determine its significance on criterion 5". • Saunders (1994:21) recommended that further research is required to ascertain the rarity in the ACT of M/H9 and to fully assess its significance.

6.4 Predictive Historical Archaeology Statement

Unrecorded historic sites and features of heritage significance that may occur within the study area include old fence lines, such as post and rail fencing; these may occur along road easement boundaries and between stock grazing paddocks.

Other indications of field systems, such as drainage channels and ridge and furrow ploughlands, are likely to survive in low lying agricultural ground, especially in areas that are now used for grazing, rather than cropping. Structures of historical interest and heritage significance may be standing, ruined, buried, abandoned or still in use.

7. RESULTS

7.1 Summary

- Seventeen Aboriginal sites and one PAD were recorded for the Moncrieff study area prior to the current assessment.
  - Ten of these sites were not re-found in the in the course of the current study:

    M/A4, M/IF3, M/IF5, SA1/3, HP13, HP14, HP33, HPIF10, GARIF5 and CH1.
  - Seven of the sites were re-found in the in the course of the current study:

    M/A1, M/A2, M/A3, M/A5, HP15, C3/14 and CAS5.
- Additional PADs were identified at sites M/A1, M/A2, M/A3, and M/A5.
- The boundary of site HP15 was modified from the original recording.
- Six previously unidentified Aboriginal sites were recorded in the current investigation

  M/A6, M/A7, M/A8, MAIF1, MAIF2 and MAIF3.
- Moncrieff PAD has been further defined in the current investigation and divided into two PAD areas, MA/3 and PAD and MA/2 and PAD.
- Eight historic sites were recorded for the Moncrieff study area prior to the current assessment.
  - Six of these sites were not re-found in the in the course of the current study

    M/H1 M/H2 M/H4 M/H6, M/H7 and M/H8.
  - Two of the sites were re-found in the in the course of the current study

    M/H3 and M/H9.
  - These two sites were combined in the current investigation as they form part of the one site now referred to as M/H3-H9.
- No previously unidentified historic sites were recorded in the current investigation.
- Consequently, **thirteen Aboriginal sites, including four PADs and two historic site**s are presently identifiable in the Moncrieff study area.

A site inventory is provided for all sites recorded for the Moncrieff study (below).

Site locations are shown on Figure 7.17.

7.2 Site Inventory

Recording Type	Recording Code	GDA Reference	Comments
artefact scatter	MA/6	693092.6107279	Recorded in the current study
artefact scatter	MA/7	692254.6107655	Recorded in the current study
artefact scatter	MA/8	693048.6109373	Recorded in the current study
isolated find	MAIF1	693125.6106799	Recorded in the current study
isolated find	MAIF2	693613.6107670	Recorded in the current study
isolated find	MAIF3	692935.6107267	Recorded in the current study
isolated find and PAD	M/A1 and PAD	692450.6107300 and 692385.6107280 to 692555.6107265 to 692500.6107145	Site collected in 1995 Additional artefacts located in current study
artefact scatter and PAD	MA/2 and PAD	693140.6107515 to 693320.6107810 to 693190.6107590	Site collected in 1995 Additional artefacts located in current study
artefact scatter and PAD	MA/3 and PAD	692775.6107590 to 692935.6107890 to 692785.6107780 to 692885.6107730	Site collected in 1995 Additional artefacts located in current study
artefact scatter	M/A4		Not re-found in the current study
artefact scatter and PAD	MA/5 and PAD	693485.6107764	Site collected in 1995 Additional artefacts located in current study
isolated find	M/IF3		Not re-found in the current study
isolated find	M/IF5		Not re-found in the current study
isolated find	HPIF10		Not re-found in the current study
artefact scatter	HP13		Not re-found in the current study
artefact scatter	HP14 (SA1/2)		Not re-found in the current study
artefact scatter	HP15	693065.6106724 to 693058.6106670	Additional artefacts located in current study
artefact scatter	HP33		Not re-found in the current study
isolated find	SA1/3		Not re-found in the current study
isolated find	C3/14	692945.6106351	Re-found in current study
isolated find	CAS5	693415.6107181	Single artefact found in current study

Recording Type	Recording Code	GDA Reference	Comments
isolated find	GARIF5		Not re-found in the current study
Aboriginal stone source	CH1	6933246.6106730	Not re-found in the current study nothing resembling a potential Aboriginal stone source was identifiable in this location
original fence line featured on the Federal Territory Feature Map	M/H3-H9	693162.6107503 to 693398.6107471	This site was originally recorded as two sites M/H3 and M/H9. The original GPS point for M/H9 was not correct, the GPS point here is.
strainer post	M/H1		Not re-found in the current study
set of two covered metal sheep troughs	M/H2		Not re-found in the current study
gate	M/H4		Not re-found in the current study
single concrete laundry tub	M/H6		Not re-found in the current study
Double concrete laundry tub stock trough	M/H7		Not re-found in the current study
Piece of farm machinery	M/H8		Not re-found in the current study

7.3 Aboriginal Sites

M/A1 and PAD

GDA 692450.6107300 and 692385.6107280 to 692555.6107265 to 692500.6107145

This site was originally recorded by Saunders (1994) as three stone artefacts located on crest and south west slopes of small spur, the site was collected in 1995. The current investigation found one artefact at the location and identified an area of potential archaeological deposit.

The site is located on a low spur crest, the artefact was located at the centre of the crest and the PAD covers the crest (Figure 7.7). The site and PAD measure approximately 20 x 100 m; the exposure incidence was 10% with 30% visibility. The artefact was located in an area of sheet erosion measuring 10 x 10 m with 80% exposure incidence and 60% visibility. The soil is a humic loam and is possibly 20 cm deep. The site is assessed as having moderate archaeological potential.

Artefact recorded in the current investigation:

1. grey silcrete flake 35 x 30 x 8 mm

Figure 7.1 Location of MA/1 and PAD looking south

MA/2 and PAD

GDA 693140.6107515 to 693320.6107810 to 693190.6107590

This site was originally recorded by Saunders (1994) as 28 stone artefacts on mid to lower south eastern slopes of broad ridge bordering an intermittent wetland. The site was collected in 1995. This site is also included in Moncrieff PAD The current investigation found 16 artefacts at the location and refined the surrounding PAD.

The site is located on a low gradient spur (Figure 7.8). The artefacts were exposed on a vehicle track measuring approximately 3 x 150 m with an exposure incidence of 75 and 70% visibility. The PAD covers an area of approximately 56,000 m². The site is assessed as having low to moderate archaeological potential.

Artefacts recorded in the current investigation:

1. light grey chert distal flake portion 8 x 13 x 4 mm
2. white quartz flake 20 x 25 x 5 mm
3. light grey silcrete core fragment 20 x 20 x 25 mm
4. grey tuff flake 20 x 15 x 8 mm
5. cream tuff flake, proximal portion 15 x 15 x 4 mm
6. cream tuff proximal flake portion 20 x 14 x 6 mm

7. light grey volcanic flake 25 x 30 x 6 mm
8. grey volcanic proximal flake portion 20 x 20 x 6 mm
9. grey volcanic flaked piece 25 x 15 x 7 mm
10. grey volcanic flaked piece 28 x 20 x 6 mm
11. light grey tuff lithic fragment 20 x 30 x 5 mm
12. light grey tuff flake 30 x 20 x 6 mm
13. light grey chert proximal flake portion 10 x 20 x 7 mm
14. white quarts flake 22 x 15 x 5 mm
15. brown chert flake 15 x 25 x 7 mm
16. brown chert proximal flake portion 20 x 15 x 10 mm

Figure 7.1 Location of MA/2 and PAD looking east

MA/3 and PAD

GDA 692775.6107590 to 692935.6107890 to 692785.6107780 to 692885.6107730

This site was originally recorded by Saunders (1994) as seven stone artefacts located on crest and slopes of small spur at western end of low ridgeline overlooking an intermittent wetland. The site was collected in 1995. This site is also included in Moncrieff PAD. The current investigation located three additional artefacts at the location and refined the surrounding PAD.

The site is located on a broad open spur (Figure 7.2). The artefacts were located over an area of 3 x 15 m with an exposure incidence of 70% with 80% visibility. Away for the exposure the exposure incidence was 5% with 60% visibility. The PAD covers an area of approximately 40,000 m². The site is assessed as having low to moderate archaeological potential.

Artefacts recorded in the current investigation:

1. cream tuff flaked piece, 20 x 11 x 6 mm
2. cream tuff proximal flake portion, 12 x 11 x 4 mm
3. cream tuff distal flake portion, 13 x 15 x 4 mm
4. dark grey tuff flake, 30 x 27 x 14 mm

Figure 7.2 Location of MA/3 and PAD looking south

MA/5 and PAD

GDA 693485.6107764

This site was originally recorded by Saunders (1994) as five stone artefacts on southern bank of branch of northern headwater tributary of Ginninderra Creek. The site was collected in 1995. The current investigation located nine artefacts and identified a PAD at the site.

The site is located on creek flats approximately 4 m above the creek in a well drained area (Figure 7.3). The artefacts were eroding out of the top 15 cm over and area of approximately 3 x 15 m. The area of PAD measures approximately 50x x100 m. The site is assessed as having moderate archaeological potential.

Artefacts recorded in the current investigation:

1. light grey chert flake, 25 x 17 x 6 mm, broken termination
2. grey silcrete flake, 22 x 30 x 5 mm
3. grey chert distal flake portion, 7 x 16 x 6 mm
4. grey silcrete flake, 30 x 15 x 6 mm
5. grey tuff flake, 23 x 10 x 4 mm, broken termination
6. grey tuff flaked piece, 20 x 18 x 6 mm
7. grey silcrete flake fragment, 7 x 14 x 3 mm
8. grey silcrete flake, 30 x 20 x 7 mm
9. grey silcrete flake, 20 x 30 x 5 mm

Figure 7.3 Location of M/A5 and PAD looking southeast

HP15

GDA 693065.6106724 to 693058.6106670

The site was originally recorded as an artefact scatter of four artefacts. The originally recorded artefacts could not be relocated in the current survey however 10 additional artefacts were recorded at the location. The site is located on an open aspect low gradient spur crest. The site has been disturbed by tree plantings (Figure 7.4).

The exposure incidence was 40% with 60% visibility. The site is assessed as a low density artefact scatter with low archaeological potential.

Artefacts recorded in the current investigation:

1. grey chert flaked piece, 35 x 25 x 15 mm
2. grey tuff flaked piece, 20 x 13 x 5 mm
3. grey silcrete flaked piece, 15 x 15 x 5 mm
4. grey silcrete flake, lateral portion, 32 x 16 x 4 mm
5. grey silcrete flake, 20 x 15 x 3 mm
6. grey silcrete flake, missing termination, 20 x 10 x 5 mm
7. grey silcrete flake, 30 x 25 x 7 mm
8. grey silcrete flaked piece, 25 x 18 x 5 mm
9. white quartz flake, 30 x 17 x 6 mm
10. grey silcrete flaked piece, 52 x 20 x 18 mm

Figure 7.4 Location of HP15 looking north

C3/14

GDA 692945.6106351

This site was originally recorded as an isolated artefact find located on the side of a knoll on a slope adjacent to Ginninderra Creek. One artefact was located during the current investigation.

The site is located on a low gradient spur slope (Figure 7.5). The artefact was exposed on a track with 50% exposure incidence and 70% visibility. Outside of the site the area had 5% exposure incidence with 50% visibility. The site is assessed as having low archaeological potential.

Artefact recorded in the current investigation:

1. grey silcrete proximal flake portion, 25 x 20 x 4 mm

Figure 7.5 Location of C3/14 looking west

CAS5

GDA 693415.6107181

This site was originally recorded as an open artefact scatter (five artefacts) located near a western tributary of the western arm of Ginninderra Creek west of Horse Park homestead. The site has been collected. The current investigation located an additional artefact approximately 50 m from the original recording.

The site is located on a terminal spur crest (Figure 7.6). The artefact was exposed on collapsed rabbit burrows with an exposure incidence of 25% and 60% visibility. Away from? the site the exposure incidence was 5% with 30% visibility. The site is assessed as having low archaeological potential.

Artefact recorded in the current investigation:

1. light grey silcrete proximal flake portion, 5 x 23 x 4

Figure 7.6 Location of CAS5 looking west

MA/6

GDA 693092.6107279

This site is a scatter of 4 artefacts located midslopes on a spur within a tree plantation area (Figure 7.7). The artefacts were located over an area of approximately 50 x 30 m. Exposure incidence was 50% with 80% visibility. Outside of the scatter the exposure incidence was 20% with 60% visibility. The site is a low density artefact scatter and is assessed as having low archaeological potential.

Artefacts:

1. red/grey silcrete flake 30 x 30 x 15 mm, proximal portion
2. grey silcrete flaked piece 19 x 9 3 mm
3. grey chert flake 23 x 15 x 5 mm, use wear, step retouch on distal margin
4. grey silcrete flake 35 x 53 x 16 mm

Figure 7.7 Location of MA/6 looking north east

MA/7

GDA 692254.6107655

An artefact scatter located on a broad low gradient spur crest. The artefacts were exposed on a track measuring approximately 3 x 200 m (Figure 7.8) with an exposure incidence of 60% and 70% visibility. The site is a low density artefact scatter and is assessed as having low archaeological potential.

Artefacts:

1. dark grey volcanic flake 17 x 12 x 3 mm
2. light grey tuff flake 20 x 15 x 5 mm
3. dark grey volcanic flake 22 x 15 x 7 mm possible retouch on one margin

Figure 7.8 Location of MA/7 looking northwest

MA/8

GDA 693048.6109373

This site is a scatter of six artefacts located on a spur crest (Figure 7.9). The artefacts were exposed on a track and by sheet erosion over an area of approximately 600 m^2. Bedrock was exposed across the crest. The exposure incidence over the area was 20% with 80% visibility. The site is assessed as having low archaeological potential.

Artefacts:

1. grey tuff flaked piece 35 x 20 x 5 mm
2. grey volcanic flaked piece/core fragment 39 x 32 x 17 mm
3. grey chert flake 36 x 13 x 6 mm, termination missing
4. grey chert flake 25 x 10 x 3 mm
5. grey silcrete flake 14 x 20 x 5, medial portion, 90% terrestrial core

Figure 7.9 Location of MA/8 looking south west

MAIF1

GDA 693125.6106799

This site is an isolated find located on a low gradient spur crest (Figure 7.10). The area of exposure measured 5 x 10 m with 80% visibility. Outside of the exposure the area had 10% exposure incidence with 50% visibility. The area has had moderate disturbance. The site is assessed as having low archaeological potential.

Artefact:

1. grey tuff flake 17 x 30 x 8 mm, proximal

Figure 7.10 Location of MAIF1 looking east

MAIF2

GDA 693613.6107670

This site is an isolated find located on a spur side slope c.30 m from a creek bed (Figure 7.11). The artefact was exposed on a stock track that measured approximately 1 m x 100 m. The artefact may have originated on the spur crest (which is outside of the current study area). Exposure incidence was 60% with 70% visibility. Outside of the exposure the exposure incidence of the areas was 5% with 60% visibility. The site is assessed as having low archaeological potential.

Artefact:

1. grey tuff flaked piece 36 x 21 x 12 mm

Figure 7.11 Location of MAIF2 looking southeast

MAIF3

GDA 692935.6107267

This site is an isolated find located on a ridge crest/upper slope on a stock track (Figure 7.12). The artefact was located in an exposure area of approximately 10 x 15 m. Exposure incidence was 50% with 70% visibility. The site is assessed as having low archaeological potential.

Artefact:

1. light grey silcrete flake 28 x 25 x 7 mm, proximal

Figure 7.12 Location of MAIF3 looking south east

7.4 Aboriginal Cultural Values

The Buru Ngunawal Aboriginal Corporation identified an area within the Moncrieff study area as „An area of cultural significance due its spiritual significance to us as the Ngunawal Traditional Owners" (correspondence BNAC to NOHC 12 October 2009).

The nature of this area was not divulged, however, the general location was identified, The BNAC have requested that „further discussion and agreement for that particular area" will be required in order to reach an „outcome that will be amicable to all relevant parties" (ibid).

7.5 European Sites

Of the eight previously recorded historic sites, six were either not relocated, removed/destroyed or (re)assessed as having no heritage significance.

Two previously recorded historic sites, M/H3 and M/H9, were re-found, re-assessed and combined into one site (MH3/H9)

M/H3-H9

M/H3 GDA 693162.6107503 to 693398.6107471; M/H9 GDA 692164.6107670

M/H3 and M/H9 were originally recorded by Saunders (1994) as two separate sites:

> M/H3 - barbed wire, comprising single short pieces of wire soldered at right angles to the main strand, the barbed wire is attached to the top of old timber posts and occurs only in those sections in which timber posts have been retained. (Figure 7.13 and 7.14).
>
> M/H9 - a farm gate with cast iron spring catch (Figure 7.15). (GPS co-ordinate supplied in 1994 was wrong, the correct location is recorded here)

The current investigation has found that these sites form part of the one site - an original fence line that is featured on the Federal Territory Feature Map (c. 1912/1915) (Figure 7.17). The fence line is on an original alignment and retains several original features including the barbed wire, gate and split log posts and droppers. The site has been modified through time and it is the alignment rather than the physical features of the site that gives it any heritage significance.

Figure 7.13 M/H3 close up of wire

Figure 7.14 M/H3 fence line

Figure 7.15 M/H9

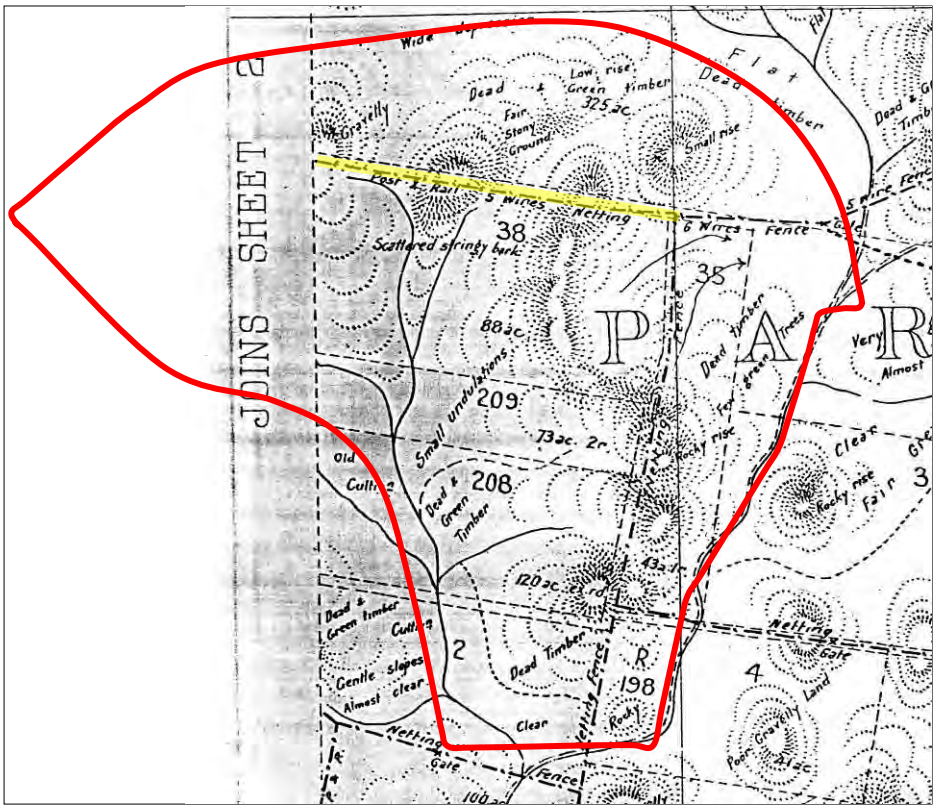

Figure 7.16 Extract of Federal Territory Feature Map (c. 1912/1915) showing the Moncrieff study area and the original fenceline (site H3-H9)..

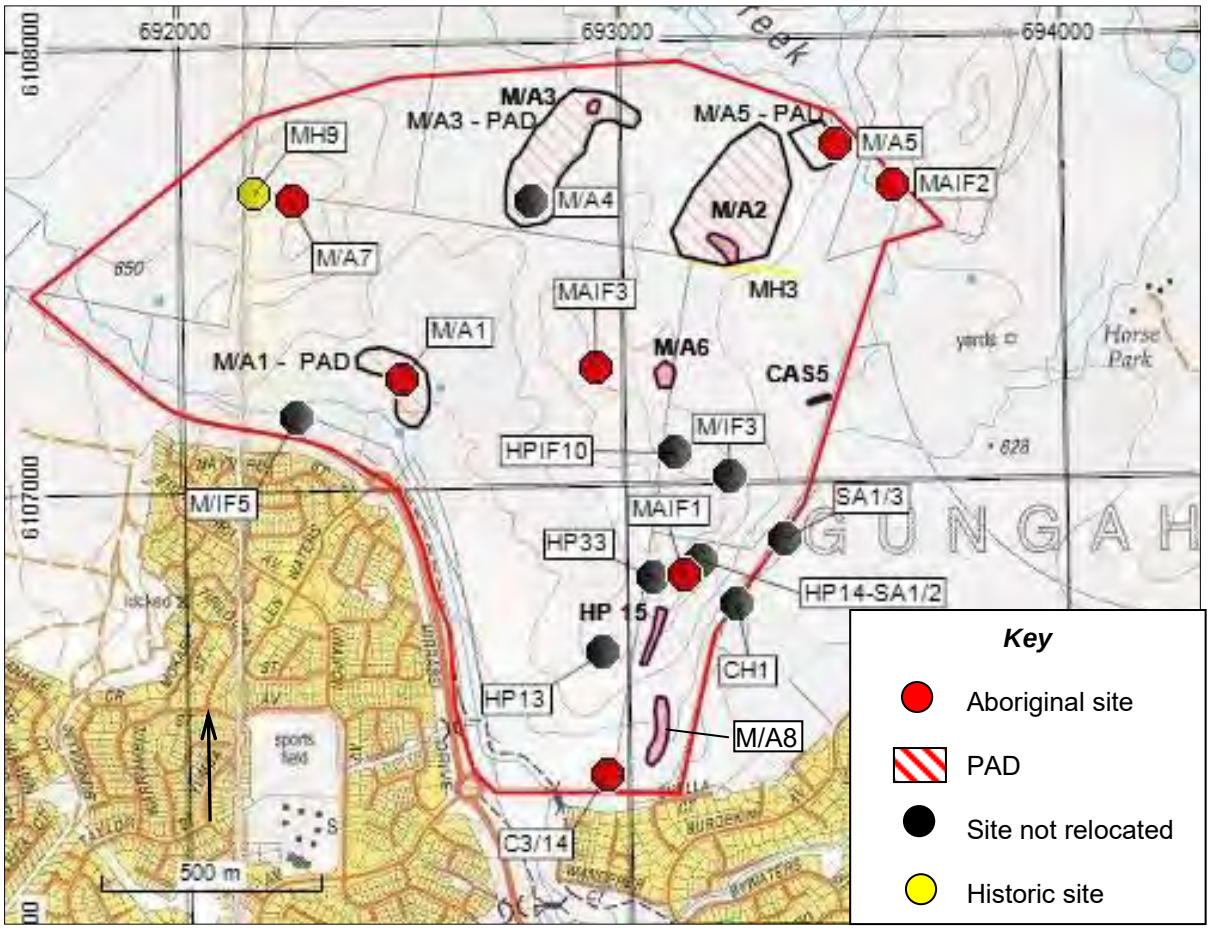

Figure 7.17 Location of sites within Moncrieff study area (Extract from 1:25,000 topographic map, Hall 8727-4S, Second Edition, 2003, Land and Property Information NSW)

8. SIGNIFICANCE ASSESSMENT

8.1 Assessment Criteria

Criteria suitable for the assessment of the heritage values and significance of the archaeological resource within the ACT have been defined in Section 10 of the *Heritage Act 2004*. These are reproduced in Appendix 3.

Nine of the 12 specified criteria are potentially applicable to cultural remains and places. These can be summarised as follows:

a. A high degree of ***technical*** and/or ***creative*** achievement;

b. Outstanding ***design*** and/or ***aesthetic*** qualities;

c. Evidence of a ***distinctive*** way of life, tradition, land use, custom, process or function, no longer practised, rare or of exceptional interest;

d. Highly valued by a community or cultural group for its ***cultural associations***

e. Significant to the ACT due to importance as part of ***Aboriginal tradition***;

f. A ***rare*** or ***unique*** example of its kind or in its intactness;

g. A ***notable*** and ***characteristic*** example of its type;

h. Strong or special ***historical associations*** with significant events/people; and

j. Potential to provide significant information through use as a ***research*** or ***teaching*** site.

Considerable overlap exists across each of these criteria and many sites will be significant according to several criteria.

8.2 Aboriginal Heritage

Aboriginal sites MA/6, MA/7, MA/8, MAIF1, MAIF2, MAIF3, HP15, C3/14 and CAS5 are low density occurrences and contain artefacts that are common to the area, and all are assessed as having low archaeological significance.

Aboriginal sites M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD are low density occurrences and have moderate archaeological potential. The significance of the potential archaeological deposits identified within the Moncrieff study area cannot be determined on available data.

Regardless of archaeological value, most, if not all stone artefacts are regarded to have cultural value and significance by the local Aboriginal communities. This significance falls under ACT criteria (d) and (e).

8.3 European Heritage

M/H3 and M/H9

These sites form part of an original fenceline that is featured on the Federal Territory Feature Map (c. 1912/1915).Some physical elements of the fence are also original including some lengths of barbed wire and a gate. Much of the fence line has been altered overtime. The alignment itself is the most important feature of the site.

The site is assessed as having low to moderate heritage significance under criterion c and g.

9. STATUTORY AND POLICY CONTEXT[1]

9.1 *Heritage Act 2004*

This Act provides for the protection, management and conservation of heritage places and objects in the ACT. The Act establishes a Heritage Register of heritage places and objects and establishes procedures for both provisional and full listing to the Register. The Act establishes the ACT Heritage Council to function as the main advisory body to the Minister on heritage issues. The Council receives administrative support from the ACT Heritage Unit, Environment ACT, Department of Territory and Municipal Services. The Council has the power to provisionally and fully register Heritage places and objects. Under the Act, the ACT Heritage Council is to be responsible for the Heritage Register and the heritage registration process.

An „Aboriginal Place" and „Aboriginal Object" are defined as „a place/object of particular significance to Aboriginal people because of either or both:

(a) Aboriginal Tradition; and/or

(b) The history, including contemporary history, of Aboriginal people (s9).

Under s74 and s75 of the Act a person commits an offence if they engage in conduct that diminishes the heritage significance of a place or object, or engage in conduct that causes damage to an Aboriginal place or object. These offences are graduated according to whether an offender was reckless or negligent „about whether the conduct would diminish the heritage significance" or „cause damage" to an Aboriginal Object or Place. To „cause damage" is inclusive of disturbing or destroying.

A person also commits an offence under the Act if they do not report an Aboriginal place to the Heritage Council, and has 5 working days to do so (s51).

The reporting and offence provisions of the Act apply irrespective of land status or whether registration to the Heritage Register occurs.

The Act provides for the development and application of Heritage Guidelines. These are to be formulated by the Heritage Council and will set the policy for how places and objects are to be conserved, including registered places and objects. The guidelines may control how development is to take place in an area which is a heritage place or contains a heritage object. They will be performance-based but may include mandatory provisions (Part 5). During the transitional phase of the Act a heritage or conservation requirement for a place is taken to be a heritage guideline under the Heritage Act (s129).

The only provisions for legally sanctioned disturbance to an Aboriginal place or object, or the diminution of the heritage value of a Heritage Place or Object is to conform to one of the exceptions listed in s76 of the Act. According to this section, the offence provisions of the Act (s74 and s75) do not apply if conduct is engaged in accordance with a heritage guideline, heritage direction, heritage agreement, a conservation management plan, or an approval for a development under the *Planning and Development Act 2007* (Part 10).

Disturbance to an Aboriginal site or place can only take place if the following conditions have been met:

- The place (or site) has been registered; and the proposed disturbance is compatible with the heritage guidelines for the conservation of that place or object (Part 5); or

[1] The following information is provided as a guide only. Readers are advised to seek qualified legal advice relative to legislative matters.

- The proposed development follows a DA approval under the *Planning and Development Act 2007* (Part 10); or

- The minister has issued a heritage direction for that place or object (Part 11); or

- The minister has entered into an heritage agreement with a person to conserve the heritage significance of a registered place or object (Part 15); or

- The proposed development follows a conservation management plan that has been approved by the Heritage Council (section 110).

Heritage recordings which occur on National Land under the National Land Ordinance 1989 (or subsequent amendments), or which occur in Designated Areas under the National Capital Plan are subject to development approval processes which may be in addition to, or instead of requirements identified as management requirements under the *Planning and Development Act 2007.*

Development approval processes within the ACT can be summarised as follows:

- Work carried out on National Land in Designated Areas is subject to the approval of the National Capital Authority (NCA);

- Work carried out on Territory Land in Designated Areas is generally subject to approval by the NCA but Territory requirements may also apply to development where the Territory is the approving Authority;

- Work carried out on National Land outside of Designated Areas must be in accordance with a Development Control Plan agreed by the NCA that reflects the requirements of the Territory Plan; and

- Work carried out on Territory Land outside Designated Areas is subject to the Territory Plan and Territory Approval processes.

9.2 Implications for the Moncrieff Study Area

All previously recorded Aboriginal sites in the Moncrieff study area are listed on the ACT Heritage Register. Sites recorded in the current study are not yet listed.

There is the possibility that the project may „cause damage" to an Aboriginal place or an Aboriginal object. Damage to an Aboriginal place or object can only take place if the following conditions have been met:

- The place (or site) has been registered; and the proposed disturbance is compatible with the heritage guidelines for the conservation of that place or object (Part 5); or

- The proposed development follows a DA approval under part 6 of the Land Act (Part 10); or

- The minister has issued a heritage direction for that place or object (Part 11); or

- The minister has entered into an heritage agreement with a person to conserve the heritage significance of a registered place or object (Part 15); or

- The proposed development follows a conservation management plan that has been approved by the Heritage Council (section 110).

10. RECOMMENDATIONS

The following recommendations are made after consideration of the location of heritage sites, the assessment of significance of the sites, more recent archaeological methods of assessment and standard practice within the legislative framework for heritage sites in the ACT.

It is recommended that:

1. No further action is required for sites M/A4, M/IF3, M/IF5, SA1/3, HP13, HP14, HP33,CH1 and HPIF10.

2. A *Conservation Management Plan* (CMP) should be prepared that allows for the salvage of all Aboriginal artefact occurrences within the Moncrieff development prior to the commencement of construction activities.

3. A program of archaeological subsurface testing should be undertaken within identified areas of potential archaeological deposit (PAD) that have been assessed as having moderate archaeological potential.

   These are: M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD.

   The testing should be aimed at establishing the presence and nature of any subsurface Aboriginal archaeological deposits.

   This provision should be included in the CMP.

4. The Buru Ngunawal Aboriginal Corporation has identified an area of cultural significance in the study area. The BNAC has requested that further discussion, with a view to reaching an outcome that will be amicable to all relevant parties, should take place regarding the area.

5. It is inadvisable to leave parts of the fenceline M/H3 and M/H9 *in situ*.

6. If the fenceline M/H3 and M/H9 is located within open space then it is preferable to preserve these items as a heritage feature in open space.

   An approach should be made to the Canberra Museum and Gallery for the possible curation of these items.

   This provision should be included in the CMP.

7. The ACT RAOs should be consulted with regard to the drafting of the CMP. They should be provided with a copy of the draft CMP and invited to provide comment.

8. A copy of this report should be sent to the ACT Heritage Unit at the following address:

   ACT Heritage Unit
   Department of Territory and Municipal Services
   PO Box 158 Canberra City 2601

9. The *Unanticipated Discovery Plan* (Appendix 4) which provides a protocol to be followed in the event that previously unrecorded heritage sites/artefacts are revealed during construction works should be adopted and implemented as necessary.

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APPENDIX 1

RECORD OF ABORIGINAL FIELD PARTICIPATION

Record of Aboriginal Representative Participation*

Name(s) of Aboriginal Representative: Karen Denny

Name of Aboriginal Organisation: **Buru Ngunawal Aboriginal Corporation**

Archaeologist(s): name & address: Rebecca Parkes & Deirdre Lewis-Cook
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street, Kingston, ACT 2604

Project Name: **Moncrieff**

Client: name & address: c/o Bronwyn Noack
(please send your invoice to this address) ACT Planning and Land Authority
GPO Box 1908
Canberra ACT 2601

Please provide a copy of this form when sending in your invoice

Type of participation:

- ☐ Guided inspection of study area and sites
- ☒ Accompanied/participated in archaeological survey
- ☐ Separate inspection or survey
- ☐ Accompanied/participated in excavation program

Period of participation:

Date(s)	Start	Finish
29/9/09	9am	5pm
30/9/09	9am	1:30pm

Issues raised:

Signed *(archaeologist)*: D Rebecca

Signed *(Aboriginal representative(s))*: Karen Denny

please note this form is not an invoice. For payment, please send an invoice from your organisation to the client name and address provided above.

Record of Aboriginal Representative Participation*

Name(s) of Aboriginal Representative: Tina Williams / Bradley Brown.

Name of Aboriginal Organisation: **King Brown's Tribal Group**

Archaeologist(s): name & address: Rebecca Parkes & Deirdre Lewis-Cook
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street, Kingston, ACT 2604

Project Name: **Moncrieff**

Client: name & address: c/o Bronwyn Noack
(please send your invoice to this address) ACT Planning and Land Authority
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- ☐ Separate inspection or survey
- ☐ Accompanied/participated in excavation program

Period of participation:

Date(s)	Start	Finish
29/9/09	9am	5pm
30/9/09	9am	1:30pm

Issues raised:

Signed *(archaeologist)*: D Lewis-Cook

Signed *(Aboriginal representative(s))*:

* *please note this form is not an invoice. For payment, please send an invoice from your organisation to the client name and address provided above.*

Record of Aboriginal Representative Participation*

Name(s) of Aboriginal Representative: Tiana House, Joe House

Name of Aboriginal Organisation: **Little Gudgenby River Tribal Council**

Archaeologist(s): name & address: Rebecca Parkes & Deirdre Lewis-Cook
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street, Kingston, ACT 2604

Project Name: **Moncrieff**

Client: name & address: c/o Bronwyn Noack
(please send your invoice ACT Planning and Land Authority
to this address) GPO Box 1908
Canberra ACT 2601
Please provide a copy of this form when sending in your invoice

Type of participation:

- ☐ Guided inspection of study area and sites
- ☒ Accompanied/participated in archaeological survey
- ☐ Separate inspection or survey
- ☐ Accompanied/participated in excavation program

Period of participation:

Date(s)	Start	Finish
29/9/09	9am	5pm
30/9/09	9am	1:30pm

Issues raised:

Signed *(archaeologist)*:

Signed *(Aboriginal representative(s))*:

* *please note this form is not an invoice. For payment, please send an invoice from your organisation to the client name and address provided above.*

Record of Aboriginal Representative Participation*

Name(s) of Aboriginal Representative: James Mundy

Name of Aboriginal Organisation: **Ngarigu Currawong Clan**

Archaeologist(s): name & address: Rebecca Parkes & Deirdre Lewis-Cook
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street, Kingston, ACT 2604

Project Name: **Moncrieff**

Client: name & address: c/o Bronwyn Noack
(please send your invoice to this address) ACT Planning and Land Authority
GPO Box 1908
Canberra ACT 2601

Please provide a copy of this form when sending in your invoice

Type of participation:

- ☐ Guided inspection of study area and sites
- ☒ Accompanied/participated in archaeological survey
- ☐ Separate inspection or survey
- ☐ Accompanied/participated in excavation program

Period of participation:

Date(s)	Start	Finish
29/9/09	9am	5pm
30/9/09	9am	1:30pm

Issues raised:

Signed *(archaeologist)*: D de Looze

Signed *(Aboriginal representative(s))*: J Mundy

* *please note this form is not an invoice. For payment, please send an invoice from your organisation to the client name and address provided above.*

APPENDIX 2

CORRESPONDENCE FROM ACT RAOS

BURU NGUNAWAL ABORIGINAL CORPORATION

ABN : 24 059 704 833

18 November 2009

Navin Officer Heritage Consultants
4/71 Leichhardt St
Kingston ACT 2604

RE: Draft Report – Moncrieff Aboriginal Heritage Survey Results - Response

I write in response to the above draft report to make comment on certain aspects of the program and its management recommendations.

Buru Ngunawal Aboriginal Corporation (BNAC) must point out that the consultant archaeologist's reporting of the results of the investigations is based on purely scientific values. The report does not contain any pertinent comment of Aboriginal cultural values which in our view devalues the importance of conducting an Aboriginal cultural heritage program for the area that is to be developed.

We must reiterate that all sites and lands within our tribal boundary do hold a very significant spiritual and cultural importance to us as the area was used prior to European settlement by our direct ancestors. Due to this connection to the land we have a strong desire to protect and conserve our heritage for posterity.

It is now apparent that in our endeavours to protect our cultural heritage that it would be near impossible to salvage all artefactual materials and avoid destruction of spiritual places and sites of significance, but if the opportunity arises where impacts to areas can be kept to a minimum we would like to take advantage of those opportunities.

In particular we provide the following comment:

- BNAC wish to indicate that we are content with the program coverage as it addressed our concerns in relation to our goal to protect and preserve our cultural heritage from any form of destruction while conforming to the wheels of progress for the betterment of society as a whole. The only disappointing aspect was, as a common courtesy, no scope to discuss the planned daily work so that we were able to provide comment that could have had an impact on daily work practices and be fully aware of the way the program was being conducted prior to attending to undertake the survey works.

- BNAC has an unreserved enthusiasm, passion, and commitment to our culture which relates strongly to how we regard the Aboriginal cultural significance of our Country. Therefore you can and must understand that due to Aboriginal protocols and/or lore not all can be told about certain locations that have significance to Aboriginal people. This may seem like a reluctance on our part to openly discuss significant issues although there are references made to certain areas that from a scientific viewpoint provides no systematic or site specific cultural values basis.

PO Box 6900, CHARNWOOD ACT 2615 Ph: 02 62591672 Fax: 02 6258 1264 Email: walbell@bigpond.net.au

NOTE: A letter was provided to your office on 12 October 2009 which provided comment in relation to an area of significance and is pertinent to this report.

- BNAC has a requirement in relation to the development, use and interpretation of the Conservation Management Plan (CMP). BNAC has seen how the CMP is used as the overriding implement in all dealings and would appreciate being part of the consultation process. BNAC would like to be able to have within any future CMPs a condition that states that the CMP should cater for any unforseen/unanticipated changes to allow for further negotiation to take place and for the CMP to be reviewed so that it has the capacity for any change in circumstance.

- BNAC would like to add that we are an independent not for profit, family based community group. BNAC has been made to change the way it carries out its strong sense of duty for the protection of our culture due to the bureaucratic processes of today's society. These bureaucratic processes require us having to work with consultant archaeologists and not for them.

- BNAC comments on the management recommendations made at sections 7.1 and 10 as follows:

RECOMMENDATIONS

The following recommendations are made after consideration of the location of heritage sites, the assessment of significance of the sites, more recent archaeological methods of assessment and standard practice within the legislative framework for heritage sites in the ACT.

It is recommended that:

1. No further action is required for sites M/A4, M/IF3, M/IF5, SA1/3, HP13, HP14, HP33, HPIF10 and CH1.

   Agreed

2. A *Conservation Management Plan* (CMP) should be prepared that allows for the salvage of all Aboriginal artefact occurrences within the Moncrieff development prior to the commencement of construction activities.

   Agreed but BNAC must be part of the consultation process.

3. A program of archaeological subsurface testing should be undertaken within identified areas of potential archaeological deposit (PAD) that have been assessed as having moderate archaeological potential.

   These are M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD.

   The testing should be aimed at establishing the presence and nature of any subsurface Aboriginal archaeological deposits.

   This provision should be included in the CMP.

   Agreed

PO Box 6900, CHARNWOOD ACT 2615 Ph: 02 62591672 Fax: 02 6258 1264 Email: walbell@bigpond.net.au

4. It is inadvisable to leave parts of the fenceline M/H3 and M/H9 *in situ*.

   An approach should be made to the Canberra Museum and Gallery for the possible curation of these items.

   This provision should be included in the CMP.

   Outside our jurisdiction

5. The ACT RAOs should be consulted with regard to the drafting of the CMP. They should be provided with a copy of the draft CMP and invited to provide comment.

   Totally agree

6. A copy of this report should be sent to the ACT Heritage Unit at the following address:

   ACT Heritage Unit
   Department of Territory and Municipal Services
   PO Box 158 Canberra City 2601

   Agree

7. The *Unanticipated Discovery Plan* (Appendix 3) which provides a protocol to be followed in the event that previously unrecorded heritage sites/artefacts are revealed during construction works should be adopted and implemented as necessary.

   Agree that such a plan is required but cannot fully come to terms with the implementation of such a plan on the ground.

Wally Bell
Chair

PO Box 6900, CHARNWOOD ACT 2615 Ph: 02 62591672 Fax: 02 6258 1264 Email: walbell@bigpond.net.au

NGARIGU CURRAWONG CLAN
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Implementation of the Moncrieff Precinct Code Cultural Heritage Assessment

28th October, 2009

SUMMARY

The Ngarigu Currawong Clan is happy with the survey coverage and consultation. We also acknowledge the list of other surveys which allow for a broader view than just the study area. Regarding the Aboriginal cultural significance of these sites, the Ngarigu Currawong Clan has mentioned before that the study area is part of the Ginninderra Creek drainage system which was of great importance to our ancestors. With Sullivans Creek, these places were part of the social and living areas, warmer, away from the mountain weather. After the rains, after the rush of Ginninderra Creek towards the Murrumbidgee, many ponds were formed as the waters receded and allowed for long term food and water sources. In the very near area were a number of Ochre pits and were well used until recently. From Gunning to Well's Station there are a number of 'special' sacred ochre sites, some such as Harrison only exist as a platform for Housing. ACT Heritage do not treat these sites as warmly as other Heritage Units throughout Australia.

The Ngarigu Currawong Clan endorses the following recommendations from page 38 of the report; No further action is required for sites M/A4, M/IF3, M/IF5, SA1/3, HP13, HP14, HP33, HPIF10 and CH1. A Conservation Management Plan (CMP) should be prepared that allows for the salvage of all Aboriginal artefact occurrences within the Moncrieff development prior to the commencement of construction activities.

A Program of Archaeological subsurface testing should be undertaken within identified areas of potential archaeological deposits (PADs) that have been assessed as having moderate archaeological potential. The mentioned PADs are; M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD. The testing should be aimed at establishing the presence and nature of any subsurface Aboriginal archaeological deposits. This provision should be included in the CMP.

The Ngarigu Currawong Clan should be consulted with regard to the drafting of the CMP and we should be provided with a copy of the draft CMP and invited to provide comment.

The Unanticipated Discovery Plan (Appendix 3) which provides a protocol to be followed in the event that previously unrecorded heritage sites/artefacts are revealed during construction works should be adopted and implemented as necessary.

The Ngarigu Currawong Clan endorses the recommendations for artefact collection and areas requiring further archaeological investigation such as potential archaeological deposits.

5.1 Tribal and Linguistic Boundaries

We feel very strongly about the Ngarigu Boundary and it is well defined in our Native Title Claim. In Victoria we have compromised with surrounding groups and are realising a common agreement with the Kurnai and other groups.

In the north of the Ngarigu Boundary, as outlined on our Web page; www.ngarigu.com.au, we accept the northern ridgeway but not the straight line approach of the ACT border.

We would like to see the inclusion of Bob Dixon's map (published and available on the Ngarigu website, also other maps provided by Josephine Flood (also on our web site) and the linguistic work by Professor Koch (ANU), to provide a clearer picture of the North of Canberra.

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We have often mentioned that local History has ignored the contribution of the Wolgal (Walgalu), the Wiradjuri and Gundungurra people and the ancestors of the many people who had strong links with the mountain Law and Custom.
In too many reports we see the acceptance of the works of Anne Jackson-Nakano, who we and many others refute and yet the more accurate and elegant works of Harold Koch, Bob Dixon and Nicolas Peterson are ignored. Peterson's 1998 Report, prepared for the ACT Chief Minister's Department, does not even get a mention. We feel that the following statement be reviewed, if not now then for future publications.
A reconstruction of clan boundaries based on Tindale (1940, 1974) indicates that the northern Canberra area fell within the tribal boundaries of the Ngunnawal people. There is some uncertainty as to which language was spoken by the Aborigines of north Canberra. This area appears to have been close to the linguistic boundary between the Gundungurra and Ngunnawal languages. Eades (1976) notes that published grammars for these two languages (Mathews 1900, 1901, 1904) are virtually identical. However, according to Eades' boundaries, the Ngunnawal of northern Canberra probably spoke the Gundungurra language.

References to the traditional Aboriginal inhabitants of the Canberra region are rare and often difficult to interpret (Flood 1980, Huys 1993). Josephine Flood in 2005 wrote to us with a very definite view that this was Ngarigu Country and apologised to us for the misinterpretation of the 'Moth Hunters'.

However, the consistent impression is one of rapid depopulation and a desperate disintegration of a traditional way of life over little more than 50 years from initial white contact (Officer 1989). The disappearance of the Aborigines from the tablelands was probably accelerated by the impact of European diseases, which may have included the smallpox epidemic in 1830, influenza, and a severe measles epidemic by the 1860s (Butlin 1983, Flood 1980). We do not accept this interpretation.

By 1856, the local 'Canberra Tribe', were members of the Wolgal and Ngarigu, were reported to number around 70 (Schumack 1967) and by 1872, recorded as only five or six 'survivors' (Goulburn Herald 9 November 1872). In 1873, one 'pure blood' member who was known to remain in the white community was Nelly Hamilton ('Queen Nellie'). Nellie was a Wolgal (Walgalu) and Ngarigu woman.

9.2 Implications for the Moncrieff Study Area
The Ngarigu Currawong Clan is appalled and disappointed that Aboriginal and Historic sites identified in the Moncrieff study area are not included on the ACT Heritage Register.

James Mundy
Ngarigu Currawong Clan

APPENDIX 3

ACT HERITAGE SIGNIFICANCE ASSESSMENT CRITERIA

ACT *Heritage Act 2004*: Section 10: Heritage Significance

Heritage significance criteria for the assessment of the heritage significance of places or objects in the ACT

1. Under Section 10 of the *Heritage Act (2004), a place or object* has heritage significance if it satisfies one or more of the following criteria:

   (a) it demonstrates a high degree of technical or creative achievement (or both), by showing qualities of innovation, discovery, invention or an exceptionally fine level of application of existing techniques or approaches;

   (b) it exhibits outstanding design or aesthetic qualities valued by the community or a cultural group;

   (c) it is important as evidence of a distinctive way of life, taste, tradition, religion, land use, custom, process, design or function that is no longer practised, is in danger of being lost or is of exceptional interest;

   (d) it is highly valued by the community or a cultural group for reasons of strong or special religious, spiritual, cultural, educational or social associations;

   (e) it is significant to the ACT because of its importance as part of local Aboriginal tradition;

   (f) it is a rare or unique example of its kind, or is rare or unique in its comparative intactness;

   (g) it is a notable example of a kind of place or object and demonstrates the main characteristics of that kind;

   (h) it has strong or special associations with a person, group, event, development or cultural phase in local or national history;

   (i) it is significant for understanding the evolution of natural landscapes, including significant geological features, landforms, biota or natural processes;

   (j) it has provided, or is likely to provide, information that will contribute significantly to a wider understanding of the natural or cultural history of the ACT because of its use or potential use as a research site or object, teaching site or object, type locality or benchmark site;

   (k) for a place – it exhibits unusual richness, diversity or significant transitions of flora, fauna or natural landscapes and their elements;

   (l) for a place – it is a significant ecological community, habitat or locality for any of the following:

      i) the life cycle of native species;

      ii) rare, threatened or uncommon species;

      iii) species at the limits of their natural range; and

      iv) distinct occurrences of species.

~ o0o ~

APPENDIX 4

UNANTICIPATED DISCOVERY PLAN

Protocol to be followed in the event that (previously unrecorded) Aboriginal or historical objects/sites are revealed during construction works

In the event that an Aboriginal or historical object/artefact or site is revealed during construction works, the following protocol should be actioned (refer also to the flowchart below):

1. The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the Aboriginal object so that work can be temporarily halted, and advise the site supervisor;

2. The discoverer of the find will immediately notify the site supervisor. If the discoverer is a machine operator then they will stop work in the vicinity of the find and immediately notify the site supervisor.

3. The site supervisor will then determine the approximate nature and extent of the find.

4. If the site supervisor, in consultation with others as necessary, determines that the artefact ***is not an Aboriginal or historical site*** or possible Aboriginal artefact, then, at the site supervisor"s direction, ***work will resume*** in that area. In reaching this decision the site supervisor might seek advice from the project archaeologist.

5. If the site supervisor, in consultation with others as necessary, determines that the artefact ***is an Aboriginal or historical site*** or possible Aboriginal artefact, then, at the site supervisor"s direction, ***work should stop*** in that area. In reaching this decision the site supervisor might seek advice from the project archaeologist.

6. Following (5) above, if not already done, the project manager and the project archaeologist will be notified of the discovery of the artefact.

7. Following (6) above, the project archaeologist will determine the nature of the feature:

a) If the project archaeologist determines that the artefact ***is not an Aboriginal or historical artefact/site***, then, at the site supervisor"s direction, ***work will resume*** in that area.

b) If the project archaeologist determines that the feature ***is an Aboriginal or historical artefact/site***, then, at the site supervisor"s direction, ***work stops*** in that area until:

i. The place (or site) has been registered; and the proposed disturbance is compatible with the heritage guidelines for the conservation of that place or object (Part 5 of the ACT *Heritage Act 2004*); or

ii. The proposed development follows a DA approval under part 6 of the Land Act (Part 10); or

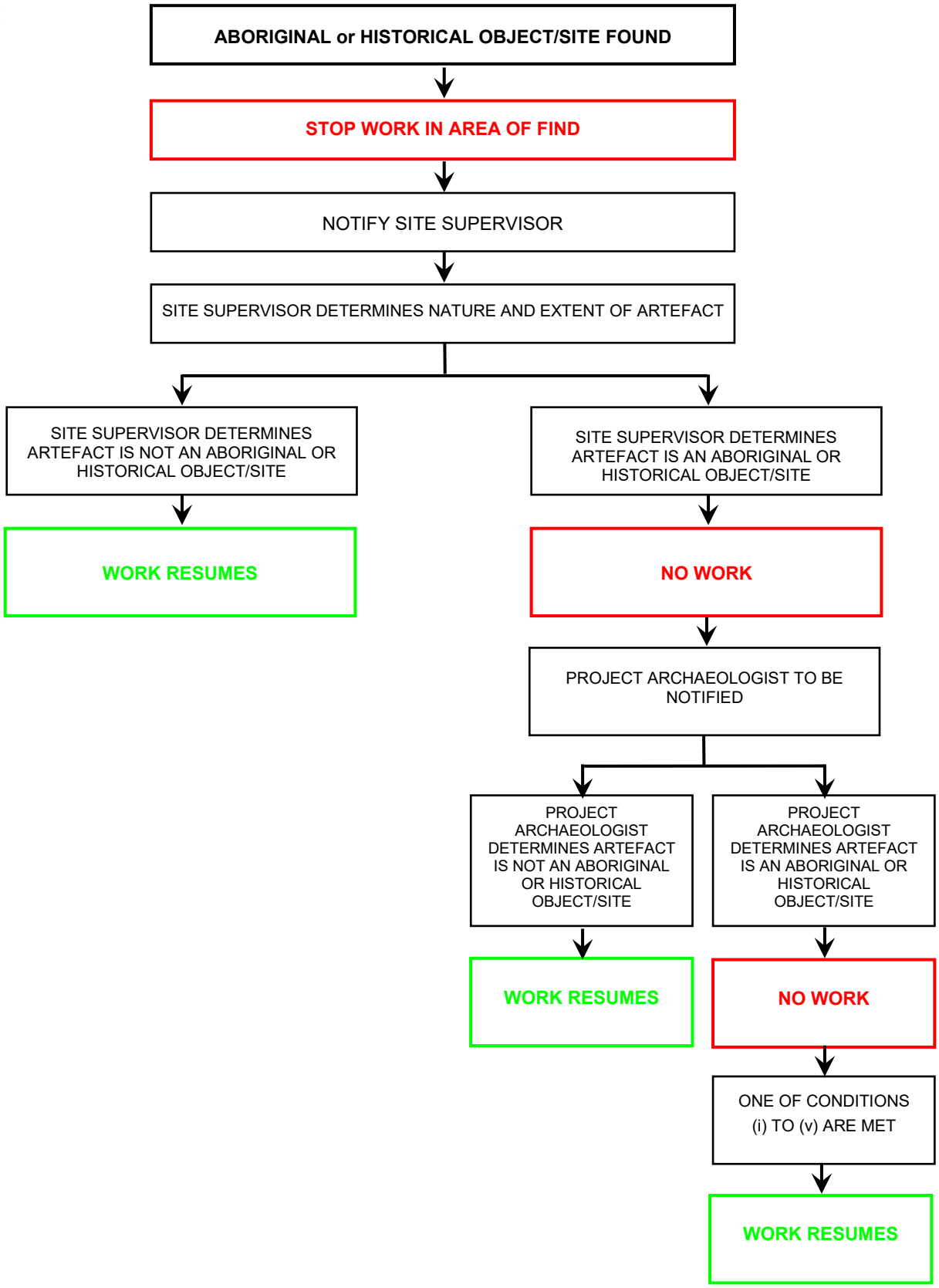
iii. The minister has issued a heritage direction for that place or object (Part 11); or

iv. The minister has entered into an heritage agreement with a person to conserve the heritage significance of a registered place or object (Part 15); or

v. The proposed development follows a conservation management plan that has been approved by the Heritage Council (section 110).

8. Work may resume once one of the above conditions is met.

Flowchart – Actions relating to Aboriginal or Historical Objects/Sites



Conservation Management Plan Moncrieff, ACT

Management of Impacts to Cultural Heritage Values

April 2010

Prepared for ACT Planning and Land Authority (ACTPLA)

Navin Officer

heritage consultants Pty Ltd

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1. INTRODUCTION

1.1 Project Background

The new residential suburb of Moncrieff is located to the north of the existing suburbs of Ngunnawal and Amaroo in Gungahlin in the ACT.

A concept plan for Moncrieff was prepared in December 2007. In March 2008, the concept plan became a *Precinct Code* under the provisions of the *Planning and Development Act 2007*.

Navin Officer Heritage Consultants Pty Ltd (NOHC) undertook an Aboriginal and European cultural heritage study of Moncrieff in September 2009. The assessment was undertaken to facilitate ongoing actions associated with implementing the Moncrieff Precinct Code. The study was an extension of the NOHC (2009) study: *Water Quality Control Pond and Extensions to Horse Park Drive and Mirrabei Drive, North Gungahlin, ACT*.

It was recommended that:

- No further action was required for sites M/A4, M/IF3, M/IF5, SA1/3, HP13, HP14, HP33, HPIF10 and CH1.

- A *Conservation Management Plan* (CMP) should be prepared that allowed for the salvage of all Aboriginal artefact occurrences within the Moncrieff development prior to the commencement of construction activities.

- A program of archaeological subsurface testing should be undertaken within identified areas of potential archaeological deposit (PAD) that have been assessed as having moderate archaeological potential. These are: M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD.

  The testing should aim to establish the presence and nature of any subsurface Aboriginal archaeological deposits in these areas.

- It is inadvisable to leave parts of the fenceline M/H3 and M/H9 *in situ*.

  If the fenceline M/H3 and M/H9 is located within open space then it is preferable to preserve these items as a heritage feature in open space.

  If the fenceline M/H3 and M/H9 is not located within open space then an approach should be made to the Canberra Museum and Gallery regarding the possible curation of these items.

1.2 This CMP

For the purposes of the ACT *Heritage Act 2004*, this document constitutes a *Conservation Management Plan* (CMP) as defined under section 15 of that Act.

The CMP will be submitted to the ACT Heritage Council for approval.

The plan includes:

- a brief description of the Moncrieff project;
- a description of the nature and significance of the subject sites/PADs;
- a description of the potential impacts of the Moncrieff project on cultural heritage values; and
- cultural heritage management strategies.

2. THE MONCRIEFF DEVELOPMENT AREA

The future suburb of Moncrieff is located to the north of the existing suburbs of Ngunnawal and Amaroo. The future Horse Park Drive extension defines the suburb"s northern boundary. (Figure 2.1).

The suburb is relatively small in comparison to other Gungahlin suburbs with an area of approximately 200 ha, of which approximately 130 ha is able to be developed. The land is currently under rural lease and agistment.

The proposed block yield for Moncrieff is approximately 1800 dwellings. The suburb is to contain a variety in housing types including (Figure 2.2):

- Standard residential;
- Medium and higher density residential adjacent to a commercial centre, main community facility site and along Horse Park Drive;
- Compact block housing; and
- "Affordable housing" in accordance with the ACT Government"s *Affordable Housing Action Plan*.

A group centre shall be provided with a retail component, including a supermarket, together with a government secondary college and a community facility site. Further small-scale community facility sites may also be provided in Urban Open Space.

Figure 2.1 Moncrieff Study Area (red outline) (ACTPLA).

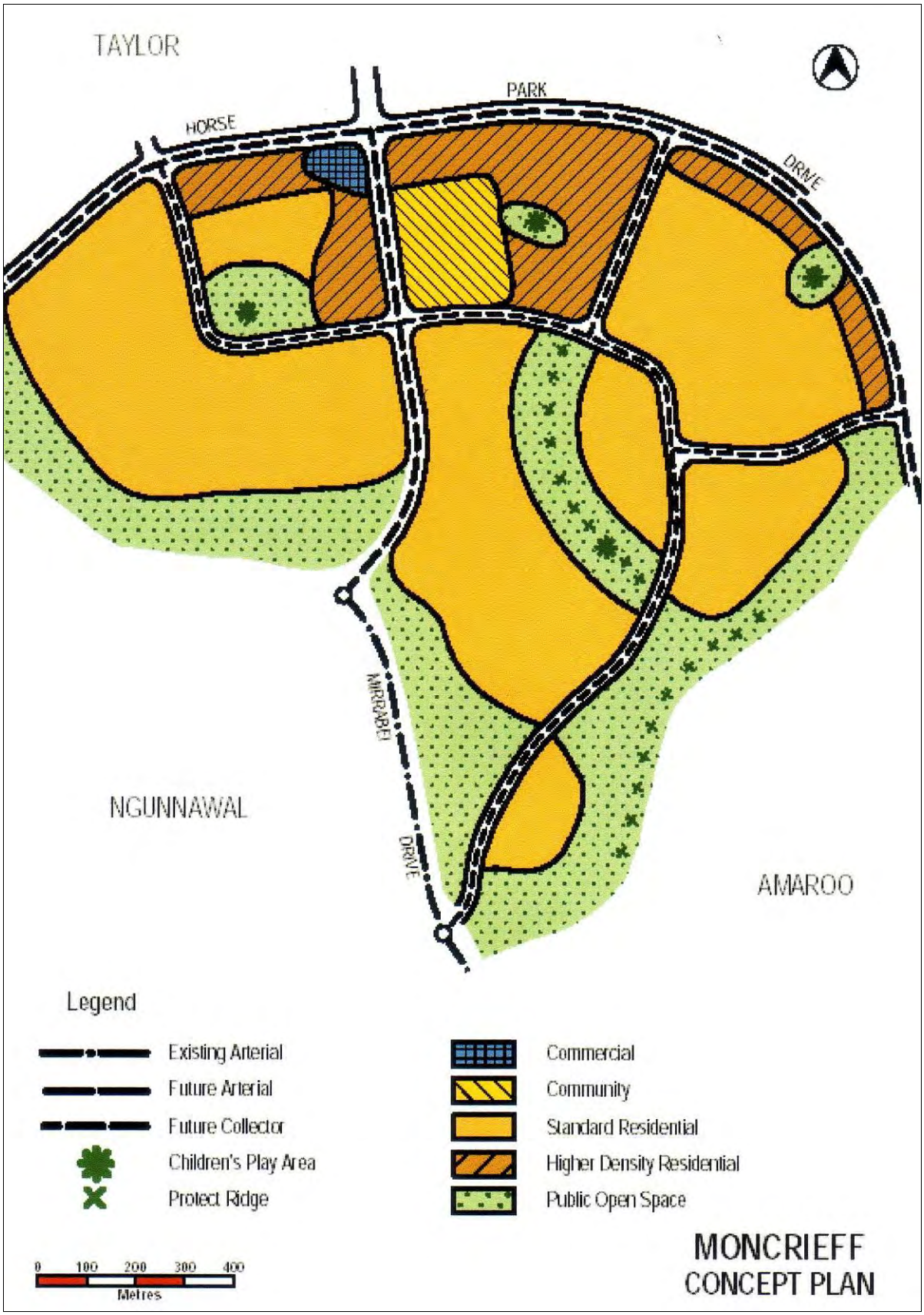


Figure 2.2 Moncrieff Concept Plan (ACTPLA).

3. CONSULTATION WITH ACT RAOS

3.1 Representative Aboriginal Organisations

Under Section 14(7) of the *Heritage Act 2004*, the Minister for Territory and Municipal Services has declared four Aboriginal groups to be Representative Aboriginal Organisations (RAOs) in the ACT. They are:

- The Buru Ngunawal Aboriginal Corporation (BNAC);
- King Brown"s Tribal Group Pty Ltd (KBTG);
- The Little Gudgenby River Tribal Corporation (LGRTC); and
- The Ngarigu Currawong Clan (NCC).

3.2 Consultation conducted for the Moncrieff Cultural Heritage Assessment

Contact was made with each group to inform them of the project and to organise representation during the field survey. Subsequently, a representative from each of the groups attended and actively participated in the field program. The representatives were:

- Karen Denny (BNAC);
- Tina Williams and Bradley Brown (KBTG);
- Tiana House and Joe House (LGRTC); and
- James Mundy (NCC).

3.2.1 Identified area of cultural significance

The Buru Ngunawal Aboriginal Corporation identified an area within the Moncrieff study area as „An area of cultural significance due its spiritual significance to us as the Ngunawal Traditional Owners" (correspondence BNAC to NOHC 12 October, 2009).

The nature of this area was not divulged, however, the general location was identified, The BNAC have requested that „further discussion and agreement for that particular area" will be required in order to reach an „outcome that will be amicable to all relevant parties" (ibid).

3.3 Consultation conducted for the Moncrieff CMP

A copy of a draft of this CMP was forwarded to each of the RAOs with an invitation to read and review the document and to provide comments.

No comments or contributions were received from the ACT Representative Aboriginal Organisations (RAOs) with regard to this CMP:

4. SITE AND PAD DESCRIPTIONS

4.1 Summary

- Seventeen Aboriginal sites and one PAD were recorded for the Moncrieff study area prior to the current assessment.
    - Ten of these sites were not re-found in the in the course of the current study:

      M/A4, M/IF3, M/IF5, SA1/3, HP13, HP14, HP33, HPIF10, GARIF5 and CH1.
    - Seven of the sites were re-found in the in the course of the current study:

      M/A1, M/A2, M/A3, M/A5, HP15, C3/14 and CAS5.
- Additional PADs were identified at sites M/A1, M/A2, M/A3, and M/A5.
- The boundary of site HP15 was modified from the original recording.
- Six previously unidentified Aboriginal sites were recorded in the current investigation

  M/A6, M/A7, M/A8, MAIF1, MAIF2 and MAIF3.
- Moncrieff PAD has been further defined in the current investigation and divided into two PAD areas, MA/3 and PAD and MA/2 and PAD.
- Eight historic sites were recorded for the Moncrieff study area prior to the current assessment.
    - Six of these sites were not re-found in the in the course of the current study

      M/H1 M/H2 M/H4 M/H6, M/H7 and M/H8.
    - Two of the sites were re-found in the in the course of the current study

      M/H3 and M/H9.
    - These two sites were combined in the current investigation as they form part of the one site now referred to as M/H3-H9.
- No previously unidentified historic sites were recorded in the current investigation.
- Consequently, **thirteen Aboriginal sites, including four PADs and two historic site**s are presently identifiable in the Moncrieff study area.

A site inventory is provided for all sites recorded for the Moncrieff study area in Table 4.1.

Site locations are shown on Map 4.1.

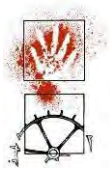


Table 4.1 Site Inventory

Recording Type	Recording Code	GDA Reference	Comments
artefact scatter	MA/6	693092.6107279	Recorded in the Sept 2009 study
artefact scatter	MA/7	692254.6107655	Recorded in the Sept 2009 study
artefact scatter	MA/8	693048.6109373	Recorded in the Sept 2009 study
isolated find	MAIF1	693125.6106799	Recorded in the Sept 2009 study
isolated find	MAIF2	693613.6107670	Recorded in the Sept 2009 study
isolated find	MAIF3	692935.6107267	Recorded in the Sept 2009 study
isolated find and PAD	M/A1 and PAD	692450.6107300 and 692385.6107280 to 692555.6107265 to 692500.6107145	Site collected in 1995 Additional artefacts located in Sept 2009 study
artefact scatter and PAD	MA/2 and PAD	693140.6107515 to 693320.6107810 to 693190.6107590	Site collected in 1995 Additional artefacts located in Sept 2009 study
artefact scatter and PAD	MA/3 and PAD	692775.6107590 to 692935.6107890 to 692785.6107780 to 692885.6107730	Site collected in 1995 Additional artefacts located in Sept 2009 study
artefact scatter	M/A4		Not re-found in the Sept 2009 study
artefact scatter and PAD	MA/5 and PAD	693485.6107764	Site collected in 1995 Additional artefacts located in Sept 2009 study
isolated find	M/IF3		Not re-found in the Sept 2009 study
isolated find	M/IF5		Not re-found in the Sept 2009 study
isolated find	HPIF10		Not re-found in the Sept 2009 study
artefact scatter	HP13		Not re-found in the Sept 2009 study
artefact scatter	HP14 (SA1/2)		Not re-found in the Sept 2009 study
artefact scatter	HP15	693065.6106724 to 693058.6106670	Additional artefacts located in Sept 2009 study
artefact scatter	HP33		Not re-found in the Sept 2009 study
isolated find	SA1/3		Not re-found in the Sept 2009 study
isolated find	C3/14	692945.6106351	Re-found in Sept 2009 study

Recording Type	Recording Code	GDA Reference	Comments
isolated find	CAS5	693415.6107181	Single artefact found in Sept 2009 study
isolated find	GARIF5		Not re-found in the Sept 2009 study
Aboriginal stone source	CH1	6933246.6106730	Recorded by Huys in 1993 Not re-found in the current study;nothing resembling a potential Aboriginal stone source was identifiable in this location
original fence line featured on the Federal Territory Feature Map	M/H3-H9	693162.6107503 to 693398.6107471	This site was originally recorded as two sites M/H3 and M/H9. The original GPS point for M/H9 was not correct, the GPS point here is.
strainer post	M/H1		Not re-found in the Sept 2009 study
set of two covered metal sheep troughs	M/H2		Not re-found in the Sept 2009 study
gate	M/H4		Not re-found in the Sept 2009 study
single concrete laundry tub	M/H6		Not re-found in the Sept 2009 study
Double concrete laundry tub stock trough	M/H7		Not re-found in the Sept 2009 study
Piece of farm machinery	M/H8		Not re-found in the Sept 2009 study

4.2 Aboriginal Sites

M/A1 and PAD

GDA 692450.6107300 and 692385.6107280 to 692555.6107265 to 692500.6107145

This site was originally recorded by Saunders (1994) as three stone artefacts located on crest and south west slopes of small spur, the site was collected in 1995. The September 2009 investigation found one artefact at the location and identified an area of potential archaeological deposit.

The site is located on a low spur crest, the artefact was located at the centre of the crest and the PAD covers the crest. The site and PAD measure approximately 20 x 100 m; the exposure incidence was 10% with 30% visibility. The artefact was located in an area of sheet erosion measuring 10 x 10 m with 80% exposure incidence and 60% visibility. The soil is a humic loam and is possibly 20 cm deep.

The site/PAD is considered to have moderate archaeological potential.

Artefact recorded in the September 2009 investigation:

1. grey silcrete flake 35 x 30 x 8 mm

Location of MA/1 and PAD looking south

MA/2 and PAD

GDA 693140.6107515 to 693320.6107810 to 693190.6107590

This site was originally recorded by Saunders (1994) as 28 stone artefacts on mid to lower south eastern slopes of broad ridge bordering an intermittent wetland. The site was collected in 1995. This site is also included in Moncrieff PAD. The September 2009 investigation found 16 artefacts at the location and refined the surrounding PAD.

The site is located on a low gradient spur. The artefacts were exposed on a vehicle track measuring approximately 3 x 150 m with an exposure incidence of 75 and 70% visibility. The PAD covers an area of approximately 56,000 m².

The site/PAD is considered to have low to moderate archaeological potential.

Artefacts recorded in the September 2009 investigation:

1. light grey chert distal flake portion 8 x 13 x 4 mm
2. white quartz flake 20 x 25 x 5 mm
3. light grey silcrete core fragment 20 x 20 x 25 mm
4. grey tuff flake 20 x 15 x 8 mm
5. cream tuff flake, proximal portion 15 x 15 x 4 mm
6. cream tuff proximal flake portion 20 x 14 x 6 mm
7. light grey volcanic flake 25 x 30 x 6 mm
8. grey volcanic proximal flake portion 20 x 20 x 6 mm
9. grey volcanic flaked piece 25 x 15 x 7 mm
10. grey volcanic flaked piece 28 x 20 x 6 mm
11. light grey tuff lithic fragment 20 x 30 x 5 mm
12. light grey tuff flake 30 x 20 x 6 mm
13. light grey chert proximal flake portion 10 x 20 x 7 mm
14. white quarts flake 22 x 15 x 5 mm
15. brown chert flake 15 x 25 x 7 mm
16. brown chert proximal flake portion 20 x 15 x 10 mm

Location of MA/2 and PAD looking east

MA/3 and PAD

GDA 692775.6107590 to 692935.6107890 to 692785.6107780 to 692885.6107730

This site was originally recorded by Saunders (1994) as seven stone artefacts located on crest and slopes of small spur at western end of low ridgeline overlooking an intermittent wetland. The site was collected in 1995. This site is also included in Moncrieff PAD. The September 2009 investigation located four additional artefacts at the location and refined the surrounding PAD.

The site is located on a broad open spur. The artefacts were located over an area of 3 x 15 m with an exposure incidence of 70% with 80% visibility. Away for the exposure the exposure incidence was 5% with 60% visibility. The PAD covers an area of approximately 40,000 m².

The site/PAD is considered to have low to moderate archaeological potential.

Artefacts recorded in the September 2009 investigation:

1. cream tuff flaked piece, 20 x 11 x 6 mm
2. cream tuff proximal flake portion, 12 x 11 x 4 mm
3. cream tuff distal flake portion, 13 x 15 x 4 mm
4. dark grey tuff flake, 30 x 27 x 14 mm

Location of MA/3 and PAD looking south

MA/5 and PAD

GDA 693485.6107764

This site was originally recorded by Saunders (1994) as five stone artefacts on southern bank of branch of northern headwater tributary of Ginninderra Creek. The site was collected in 1995. The September 2009 investigation located nine artefacts and identified a PAD at the site.

The site is located on creek flats approximately 4 m above the creek in a well drained area. The artefacts were eroding out of the top 15 cm over and area of approximately 3 x 15 m. The area of PAD measures approximately 50x x100 m.

The site/PAD is considered to have moderate archaeological potential.

Artefacts recorded in the September 2009 investigation:

1. light grey chert flake, 25 x 17 x 6 mm, broken termination
2. grey silcrete flake, 22 x 30 x 5 mm
3. grey chert distal flake portion, 7 x 16 x 6 mm
4. grey silcrete flake, 30 x 15 x 6 mm
5. grey tuff flake, 23 x 10 x 4 mm, broken termination
6. grey tuff flaked piece, 20 x 18 x 6 mm
7. grey silcrete flake fragment, 7 x 14 x 3 mm
8. grey silcrete flake, 30 x 20 x 7 mm
9. grey silcrete flake, 20 x 30 x 5 mm

Location of M/A5 and PAD looking southeast

HP15

GDA 693065.6106724 to 693058.6106670

The site was originally recorded as an artefact scatter of four artefacts. The originally recorded artefacts could not be relocated in the September 2009 survey however 10 additional artefacts were recorded at the location. The site is located on an open aspect low gradient spur crest. The site has been disturbed by tree plantings.

The exposure incidence was 40% with 60% visibility.

The site is considered to have moderate archaeological potential.

Artefacts recorded in the September 2009 investigation:

1. grey chert flaked piece, 35 x 25 x 15 mm
2. grey tuff flaked piece, 20 x 13 x 5 mm
3. grey silcrete flaked piece, 15 x 15 x 5 mm
4. grey silcrete flake, lateral portion, 32 x 16 x 4 mm
5. grey silcrete flake, 20 x 15 x 3 mm
6. grey silcrete flake, missing termination, 20 x 10 x 5 mm
7. grey silcrete flake, 30 x 25 x 7 mm
8. grey silcrete flaked piece, 25 x 18 x 5 mm
9. white quartz flake, 30 x 17 x 6 mm
10. grey silcrete flaked piece, 52 x 20 x 18 mm

Location of HP15 looking north

C3/14

GDA 692945.6106351

This site was originally recorded as an isolated artefact find located on the side of a knoll on a slope adjacent to Ginninderra Creek. One artefact was located during the September 2009 investigation.

The site is located on a low gradient spur slope. The artefact was exposed on a track with 50% exposure incidence and 70% visibility. Outside of the site the area had 5% exposure incidence with 50% visibility.

The site is considered to have low archaeological potential.

Artefact recorded in the September 2009 investigation:

1. grey silcrete proximal flake portion, 25 x 20 x 4 mm

Location of C3/14 looking west

CAS5

GDA 693415.6107181

This site was originally recorded as and open artefact scatter (five artefacts) located near a western tributary of the western arm of Ginninderra Creek west of Horse Park homestead. The site has been collected. The September 2009 investigation located an additional artefact approximately 50 m from the original recording.

The site is located on a terminal spur crest. The artefact was exposed on collapsed rabbit burrows with an exposure incidence of 25% and 60% visibility. Away for the site the exposure incidence was 5% with 30% visibility.

The site is considered to have low archaeological potential.

1. light grey silcrete proximal flake portion, 5 x 23 x 4 mm

Location of CAS5 looking west

MA/6

GDA 693092.6107279

This site is a scatter of 4 artefacts located midslopes on a spur within a tree plantation area. The artefacts were located over an area of approximately 50 x 30 m. Exposure incidence was 50% with 80% visibility. Outside of the scatter the exposure incidence was 20% with 60% visibility.

The site is considered to have low archaeological potential.

Artefacts:

1. red/grey silcrete flake 30 x 30 x 15 mm, proximal portion
2. grey silcrete flaked piece 19 x 9 3 mm
3. grey chert flake 23 x 15 x 5 mm, use wear, step retouch on distal margin
4. grey silcrete flake 35 x 53 x 16 mm

Location of MA/6 looking north east

MA/7

GDA 692254.6107655

An artefact scatter located on a broad low gradient spur crest. The artefacts were exposed on a track measuring approximately 3 x 200 m with an exposure incidence of 60% and 70% visibility.

The site is considered to have low archaeological potential.

Artefacts:

1. dark grey volcanic flake 17 x 12 x 3 mm
2. light grey tuff flake 20 x 15 x 5 mm
3. dark grey volcanic flake 22 x 15 x 7 mm possible retouch on one margin

Location of MA/7 looking northwest

MA/8

GDA 693048.6109373

This site is a scatter of six artefacts located on a 7.9). The artefacts were exposed on a track and by sheet erosion over an area of approximately 600 m^2. Bedrock was exposed across the crest. The exposure incidence over the area was 20% with 80% visibility.

The site is considered to have low archaeological potential.

Artefacts:

1. grey tuff flaked piece 35 x 20 x 5 mm
2. grey volcanic flaked piece/core fragment 39 x 32 x 17 mm
3. grey chert flake 36 x 13 x 6 mm, termination missing
4. grey chert flake 25 x 10 x 3 mm
5. grey silcrete flake 14 x 20 x 5 mm, medial portion, 90% terrestrial core

Location of MA/8 looking southwest

MAIF1

GDA 693125.6106799

This site is an isolated find located on a low gradient spur crest. The area of exposure measured 5 x 10 m with 80% visibility. Outside of the exposure the area had 10% exposure incidence with 50% visibility. The area has had moderate disturbance.

The site is considered to have low archaeological potential.

Artefact:

1. grey tuff flake 17 x 30 x 8 mm, proximal

Location of MAIF1 looking east

MAIF2

GDA 693613.6107670

This site is an isolated find located on a spur side slope c.30 m from a creek bed. The artefact was exposed on a stock track approximately 1 m x 100 m. The artefact may have originated on the spur crest (which is outside of the Sept 2009 study area). Exposure incidence was 60% with 70% visibility.

The site is considered to have low archaeological potential.

Artefact:

1. grey tuff flaked piece 36 x 21 x 12 mm

Location of MAIF2 looking southeast

MAIF3

GDA 692935.6107267

This site is an isolated find located on a ridge crest/upper slope on a stock track. The artefact was located in an exposure area of approximately 10 x 15 m. Exposure incidence was 50% with 70% visibility.

The site is considered to have low archaeological potential.

Artefact:

1. light grey silcrete flake, proximal, 28 x 25 x 7 mm

Location of MAIF3 looking southeast

4.3 European Sites

Of the eight previously recorded historic sites, six were either not relocated, removed/destroyed or (re)assessed as having no heritage significance.

Two previously recorded historic sites, M/H3 and M/H9, were re-found, re-assessed and combined into one site (MH3-H9)

M/H3-H9

M/H3 GDA 693162.6107503 to 693398.6107471; M/H9 GDA 692164.6107670

M/H3 and M/H9 were originally recorded by Saunders (1994) as two separate sites:

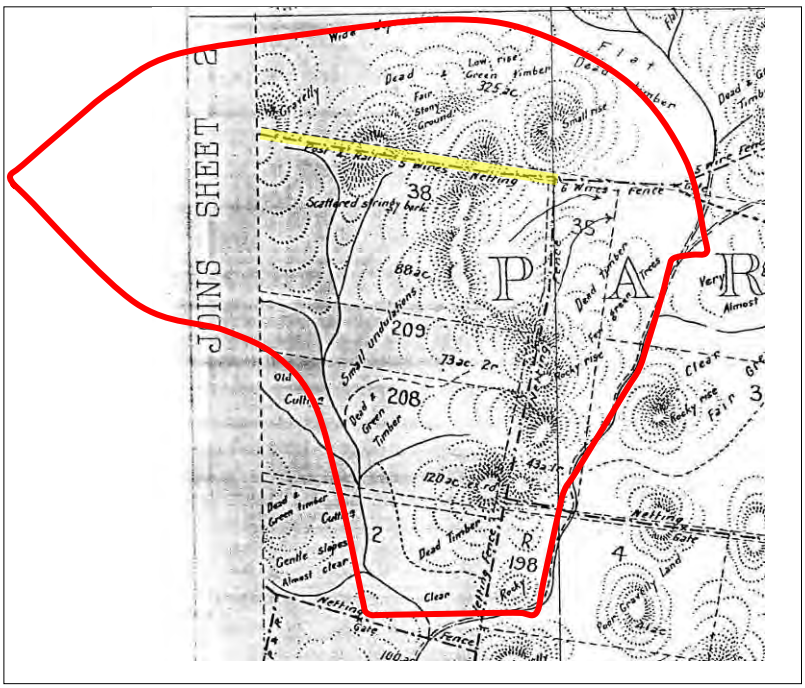
> M/H3 - barbed wire, comprising single short pieces of wire soldered at right angles to the main strand, the barbed wire is attached to the top of old timber posts and occurs only in those sections in which timber posts have been retained.
>
> M/H9 - a farm gate with cast iron spring catch. (GPS co-ordinate supplied in 1994 was wrong, the correct location is recorded here)

The September 2009 investigation has found that these sites form part of the one site - an original fence line that is featured on the Federal Territory Feature Map (c. 1912/1915). The fence line is on an original alignment and retains several original features including the barbed wire, gate and split log posts and droppers. The site has been modified through time and it is the alignment rather than the physical features of the site that gives it any heritage significance.

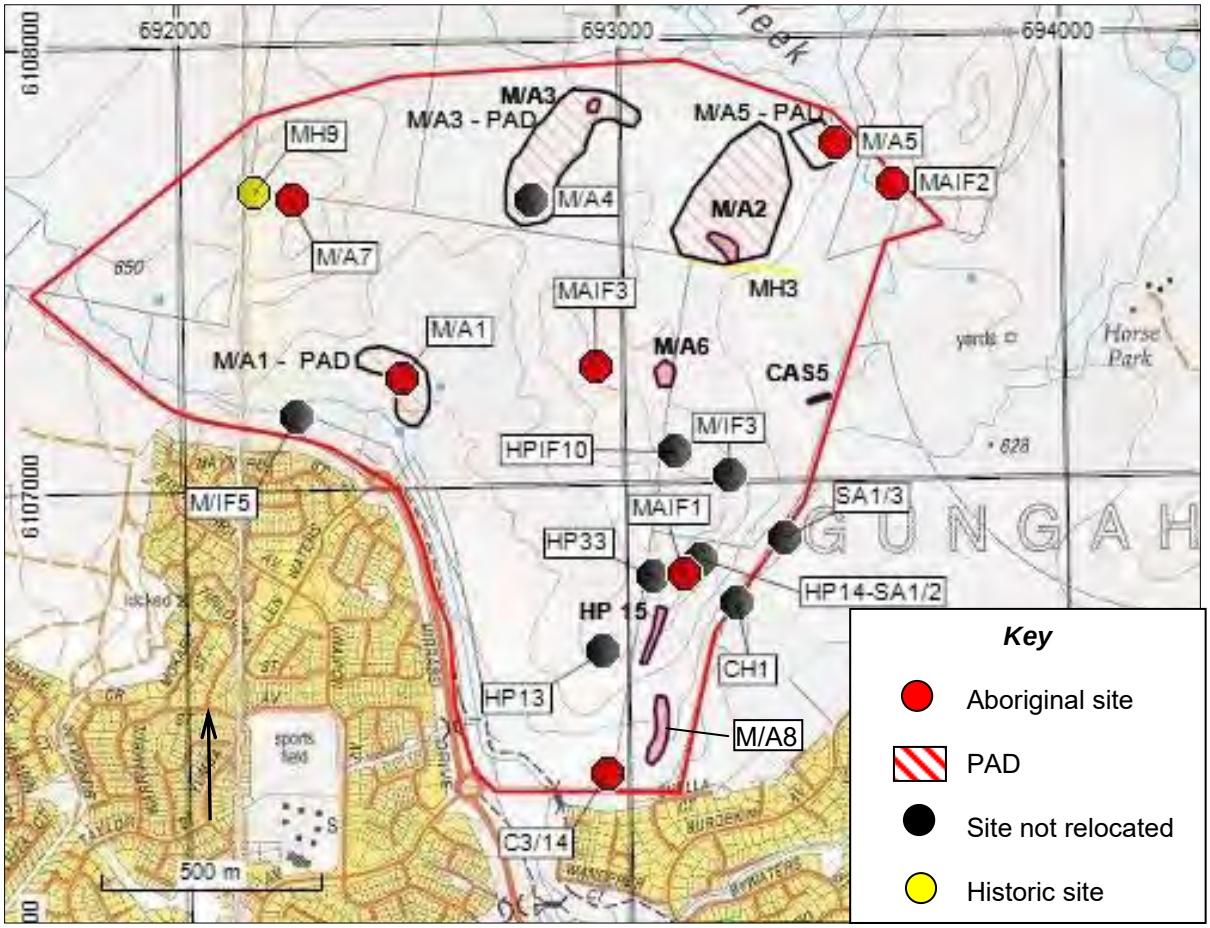
M/H3 close up of wire

M/H3 fence line

M/H9



Extract of Federal Territory Feature Map (c. 1912/1915) showing the Moncrieff study area and the original fenceline (site H3-H9)



Map 4.1 Location of sites within Moncrieff
(Extract from 1:25,000 topographic map, Hall 8727-4S, Second Edition, 2003,
Land and Property Information NSW)

4.4 Significance Assessment

Aboriginal sites **MA/6, MA/7, MA/8, MAIF1, MAIF2, MAIF3, HP15, C3/14 and CAS5** are low density occurrences and contain artefacts that are common to the area; all are assessed as having low archaeological significance.

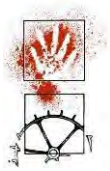
Aboriginal sites **M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD** are low density occurrences and have moderate archaeological potential. The significance of the potential archaeological deposits identified within the Moncrieff study area cannot be determined on available data.

Regardless of archaeological value, most, if not all stone artefacts are considered to have cultural value and significance by the local Aboriginal communities. This significance falls under ACT criteria (d) and (e).

M/H3-M/H9

These sites form part of an original fenceline that is featured on the Federal Territory Feature Map (c. 1912/1915).Some physical elements of the fence are also original including some lengths of barbed wire and a gate. Much of the fence line has been altered overtime. The alignment itself is the most important feature of the site.

M/H3-M/H9 is assessed as having low to moderate heritage significance under criterion c and g.



5. EXISTING STATUTORY REQUIREMENTS

The Aboriginal and European heritage recordings subject to potential impact from the proposed Moncrieff development - MA/6, MA/7, MA/8, MAIF1, MAIF2, MAIF3, HP15, C3/14, CAS5, M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD are listed on the ACT Heritage Register.

In the absence of specific conservation requirements (as would be defined as part of registration), these places, values and objects are protected under the general provisions of the *Heritage Act 2004.*

Under s74 and s75 of the Act a person commits an offence if they engage in conduct that diminishes the heritage significance of a place or object, or engage in conduct that causes damage to an Aboriginal place or object. These offences are graduated according to whether an offender was reckless or negligent „about whether the conduct would diminish the heritage significance" or „cause damage" to an Aboriginal Object of Place. To „cause damage" is inclusive of disturbing or destroying.

The only provisions for legally sanctioned disturbance to an Aboriginal place or object, or the diminution of the heritage value of a Heritage Place or Object is to conform to one of the exceptions listed in s76 of the Act. According to this section, the offence provisions of the Act (s74 and s75) do not apply if a person"s conduct is in accordance with a heritage guideline, heritage direction, heritage agreement, a conservation management plan (CMP), or an approval for a development under the *Planning and Development Act 2007* Chapter 7 (Part 13 (s76(2)).

Disturbance to an Aboriginal Place or Aboriginal Object or to the heritage significance of a place or object can only take place if the following conditions have been met:

- The place has been registered; and the proposed disturbance is compatible with the heritage guidelines for the conservation of that place or object (Part 5); or
- The proposed development follows a Development Approval under the Planning and Development Act 2007 (section 76); or
- The minister has issued a heritage direction for that place or object (Part 11); or
- The minister has entered into an heritage agreement with a person to conserve the heritage significance of a registered place or object (Part 15); or
- The proposed development follows a conservation management plan (CMP) that has been approved by the Heritage Council (section 110).

Following approval of this CMP by the Heritage Council, the conduct of actions which diminish the heritage significance of, or damage the heritage places or objects identified in the CMP, will be lawful, provided that the requirements and specified actions in the CMP are implemented.

6. POTENTIAL IMPACT AND IMPACT MITIGATION

6.1 Potential Impacts

The proposed Moncrieff residential development will be associated with a range of potential impacts to existing cultural heritage sites and places. These include both direct and indirect impacts and can be summarised by the following categories:

- Direct impact resulting in the complete loss of heritage values. This is most likely to occur as a result of the construction and maintenance of roads, underground services, buildings and other structures, and major earthworks and landscaping.

- Direct impact resulting in partial loss of heritage values. This is likely to occur as a result of minor or limited land surface disturbance associated with all forms of earthworks, construction of fencing, overhead services (if any), and vegetation clearance. Sites such as artefact scatters and subsurface deposits of artefacts may be partially destroyed by these practices.

- Indirect impact resulting in partial loss of heritage values. This is most likely to occur as a result of the loss of contextual values associated with a surviving site or damage to a site from inadequate management and maintenance. Examples are the loss of surrounding vegetation or open space, and the destruction of site features through erosion, vandalism or inappropriate landuse and recreational visitation.

The options for site conservation and management within residential developments are fairly limited due to the nature of the new range of potential land uses. Sites must be robust enough or „hardened" in some way to withstand recreational visitation and other potential landuse pressures. Historic surviving structures are unlikely to survive in the long term unless they can be reused in some viable and productive way. Sites which are fragile, visitor-sensitive, or economically unviable are difficult to conserve and collection and/or recording prior to destruction is often the only effective means of salvaging significant site elements.

In the case of Aboriginal sites, subsurface archaeological deposits and scarred trees represent the best opportunity for *in situ* site conservation. Both can be protected in properly managed open space. Surface scatters of artefacts and isolated finds, even if conserved within open space reserves, will not normally survive unless the soil surfaces are stable and the artefacts buried or concealed by vegetation. This is because surface artefacts are vulnerable to collection by visitors, or dispersal and destruction through erosion or heavy machinery and earthworks.

Protection of artefact scatters within open space reserves is not normally warranted unless the site has potential for subsurface material or displays minimal surface disturbance. In sites where there has been considerable ground disturbance and poor potential for subsurface material, site salvage through the controlled collection of surface artefacts, represents a more effective long-term conservation option than maintenance within urban open space.

In the case of historic sites, archaeological sites which warrant permanent conservation may be conserved in open space, provided that archaeological deposits are protected and exposed remains are protected from collection and visitor impact.

Standing structures may be conserved provided that they serve a viable function within their new context, and sufficient attention is given to maintaining contextual values. Many types of historic sites or features will not warrant permanent conservation in these forms, or are too fragile and deteriorated to withstand these actions.

6.2 Mitigation Strategies

Based on the results of the cultural heritage assessments conducted for the Moncrieff project, there are no heritage sites or features within the Moncrieff development area which, as a result of their significance, must be conserved and/or would prevent all or some of the area from being developed.

It is proposed to implement the following strategies for the Moncrieff development with the aim of mitigating impact to cultural heritage values:

1. All actions relating to the identified cultural heritage in Moncrieff should be conducted with reference to the Existing Statutory Conservation Management Requirements (refer Section 5).

2. Access to the site of the Moncrieff project will be sought from the lessees and land owners.

3. Visible Aboriginal artefacts associated with sites: MA/6, MA/7, MA/8, MAIF1, MAIF2, MAIF3, HP15, C3/14, CAS5, M/A1 and PAD, M/A2 and PAD, MA/3 and PAD, MA/5 and PAD within the proposed Moncrieff development area should be salvaged (collected) prior to the commencement of construction activities

4. A program of archaeological subsurface testing should be undertaken within identified areas of potential archaeological deposit (PAD) that have been assessed as having moderate archaeological potential. These are:

   M/A1 and PAD – (dimensions approximately 20 m x 100 m);

   M/A2 and PAD - (dimensions approximately 360 m x 200 m);

   MA/3 and PAD - (dimensions approximately 380 m x 170 m); and

   MA/5 and PAD - (dimensions approximately 85 m x100 m).

   The testing should be aimed at establishing the presence and nature of any subsurface Aboriginal archaeological deposits.

5. The ACT Heritage Unit and Council require that non PAD areas are also tested in the context of archaeological subsurface testing programs. This should be included in the testing program.

6. Salvaged artefacts should be lodged with the ACT Heritage Unit for care and curation.

7. An approach will be made to the Canberra Museum and Gallery for the possible curation of items associated with site M/H3 - M/H9.

7. METHODOLOGY

7.1 Archaeological Collection Program

Each site location will be searched for artefactual material. The location of each artefact will be recorded by GPS, a site sketch will be made, and artefacts will be collected, bagged and labelled.

7.2 Archaeological Excavation Program

The objective of the archaeological subsurface excavation is to provide a dataset upon which a reliable evaluation can be made of the archaeological resource that is subject to development impact. This evaluation is required to assess the potential impact of the project and to draft appropriate management strategies.

7.2.1 Mechanical excavation with use of hand excavation where required

Two excavation methodologies are proposed:

- Mechanical test pit excavation using a backhoe or excavator; and
- By-hand test pit excavation.

It is proposed to employ the mechanical test pit methodology for all test pit excavations except where there is evidence to indicate that the mechanical method should be suspended and a by-hand excavation methodology should be adopted. A number of thresholds have been defined which will determine when a by-hand methodology should be employed and the machine methodology suspended (refer below).

The use mechanical excavation is proposed given that it provides an effective compromise between spatial recording accuracy, speed of excavation and an efficient use of time and resources. A consequence of machine excavation is that, for the same budget, a larger number of testpits can be conducted across larger areas, therefore facilitating a landscape based approach to research and management questions. Compared to hand excavation, the use of an excavator also allows for effective exploratory testing to deeper levels, reduces damage to artefacts in hard ground, and provides for a larger profile section allowing more effective geomorphological assessment and recording.

Thresholds for by-hand excavation

In the event that one or more of the following Aboriginal cultural features is detected on the land surface or during machine excavation (either by backhoe or excavator), then the machine methodology will be suspended and a by-hand excavation methodology will be conducted in the area of the find:

- *In situ* bone material relating to Aboriginal occupation;
- The remains of a hearth in a relatively undisturbed condition;
- A density of artefacts per spit which exceeds one artefact per litre of deposit (equivalent to 50 artefacts from a 10cm spit from a 100 x 50cm pit)
- A lithic flaking floor in a relatively undisturbed condition;
- An arrangement of stones (showing evidence of deliberate placement by a human agency) in a relatively undisturbed condition;
- A disposal pit or post hole in a relatively undisturbed condition;

- A dense layer or lens of cultural material which could be significantly damaged/fragmented by a mechanical excavation methodology; or

- A deposit containing artefacts which displays well preserved fine scale stratigraphy which probably relates to cultural episodes or phases.

The term *undisturbed condition* in this context is defined as:

Archaeological material evidence which can be reliably interpreted to be in a context, arrangement or position, which is substantially unchanged since the human behaviour that resulted in its current context, arrangement or position.

7.2.2 Mechanical excavation methodology

The following excavation methodology will be followed.

1. Mark out and record the required location of mechanical excavation pits.

M/A1 and PAD	(20 m x 100 m)	3 pits
M/A2 and PAD	(360 m x 200 m)	40 pits
MA/3 and PAD	(380 m x 170 m)	40 pits
MA/5 and PAD	(85 m x100 m)	9 pits

Test pits will be arranged along linear transects within the PAD areas; separated by a distance of 50 m.

2. Remove turf (as necessary).

Excavate pit.

Pits will be excavated by backhoe or excavator using, a straight-edged toothless bucket which is between 600 and 1000 mm in width (depending on availability). Where deposits with a high gravel and/or cobble content are encountered and cause refusal, the straight edged bucket will be replaced with a toothed bucket for the duration of that deposit type.

The intended depth interval for each spit will be 100 mm. In some cases, unforeseeable deposit characteristics, such as large cobbles or sudden changes in consistency, can cause the excavated spit depth to vary. This is an unavoidable consequence of the machine methodology and in most cases, involves variation of 40% or less (i.e. up to or less than 40 mm).

Machine excavated pits will have a potential final length of between 1 m and 4 m. The width of the pit will generally correspond to the width of the bucket plus up to 200 mm (depending on the width of any material systematically removed from the side of the pits (refer below)). The final length of the test pit is dependent both upon the final depth achieved in the test pit, and the nature of the deposit

The following machine excavation sequence will be followed (refer Figure 7.1):

- Where necessary, removal of top vegetation by scraping the surface with the edge of the machine bucket

- Excavation of spit one along an interval ranging between 0.7 and 2 m in length. A sample of spoil is removed from machine bucket for sieving (refer below), and the remaining spoil is set aside.

- Following the removal of spoil from the bucket, a 50-100 mm wide strip may be removed from (normally) one or (sometimes) both sides of the pit and the spoil set aside in a „mixed provenance" pile. This would be done where the sediment is loose or friable. This pit modification is conducted to make the pit marginally wider than the bucket so that on

the next spit excavation, the sides of the bucket do not contact the pit sides and dislodge material into the bucket from upper levels.

- Following the removal of the machine bucket from each spit excavation, loose surface material or other sediment will be removed either manually or using the mechanical bucket (depending on the risk of contamination from upper levels) prior to the commencement of the following spit excavation. This spoil will be incorporated with the corresponding spit material unless it is considered that contamination from upper levels is likely, in which case it will be set aside in the „mixed provenance" pile.

- Notable and representative areas of the base of the spit will be manually cleaned with a hand trowel and inspected for stratigraphic and pedological characteristics.

- Excavation of spit 2 (and all subsequent spits) will begin approximately 20-100 mm from the far end of the previous spit, this is done to create a 'clean' wall and to prevent contamination from loose sediments at the start of the pit. The bucket will be tilted and drawn up and away from the near end of the pit to minimise the risk of contamination from previous spits. The removal of a strip from one or both sides of the pit will be conducted as for spit 1, as will the manual or mechanical clean-up of the base of the spit prior to the next spit excavation.

- Following spit 2 (and after all subsequent spits), the near end of the pit may be extended by up to 300 mm in order to remove any fallen sediment from upper levels and to provide a 'clean' end point for the backhoe bucket.

- Following each spit excavation, a consistent sample of the excavated sediment will be recovered for sieving. The size of the recovered sample will vary as necessary, according to the actual depth of the spit achieved so that the volume is equivalent to the *in situ* deposit which would be recovered from an excavation area of 1000 x 500 mm[1].

  These varying sample sizes are shown in Table 7.1 (below). In the case of a spit with the preferred depth interval of 100 mm, the sample size would be 5.5 x 10 litre buckets.

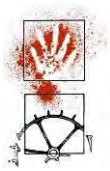
  The material for sieving will preferentially be taken from the middle of the backhoe/excavator bucket, prior to the emptying of the bucket. This minimises the potential for contamination from sediments falling to lower levels from the pit sides. All material remaining in the bucket after recovery of the sample for sieving (if any) will be set aside in a separate pile.

  A larger sample for sieving may be recovered from this separate pile, if an in-field assessment of results indicates that a larger sample would be beneficial.

  All sieving will be conducted with the aid of pressurised water from a water truck. All material will be sieved through 4 x 4 mm mesh, with the use of a top 10 x 10 mm mesh when required by the presence of large gravels.

  All identified or suspected cultural material recovered from sieving will be retained, bagged and labelled. Materials which offer the potential for radiometric or other forms of dating may also be sampled, bagged and removed, where these relate to cultural or key stratigraphic features. In addition samples of sediment may be taken for the purposes of

[1] This sample volume has been determined over a number of field programs as the most effective in providing a consistent sample within the constraints of a excavator methodology. These constraints include necessary pit dimensions to allow access and recovery at depths of potentially 1.5m or more, and to allow for the discard of contaminated materials. Fifty five litres of loose sediment represents about 50 litres of *in situ* sediment (allowing for 10% expansion following excavation). 50 litres of *in situ* sediment represents an *in situ* volume of 50,000 cubic cm or 50% of a 100 x 100 x 10cm spit volume.



palaeo-environmental analysis. A reference collection of natural gravels may be collected to aid in lithic interpretation, where appropriate.

3. Following cessation of excavation, the face of one or both sides of the pit will be cleaned and the stratigraphic, geomorphological and pedological characteristics of the soil profile described and checked with the separately documented incremental spit descriptions. pH measurements may be taken from representative pits at various vertical increments down the profile. The soil profile will be photographed, and where appropriate, also drawn and measured.

4. Excavation will cease at a depth of between 1.25 and 1.5 m, except where one or more of the following are encountered:

- bedrock;
- massive clay substrate;
- large cobbles or gravels preventing further effective excavation;
- the walls of the pit become unstable and represent a safety hazard;
- the water table; and/or
- material considered to pose a health or safety risk to field personnel.

In the event that the walls of a test pit become unstable or are considered a collapse hazard:

- the exaction of that pit will either be terminated, or
- in those cases where no archaeological material has been encountered in the preceding excavated deposits, the pit may be enlarged by benching or battering to produce secure pit walls, prior to continuing the excavation to the intended depth.

In the event that sterile sediment is reached (sterile in this context means the absence of artefactual material), and an assessment is made that further archaeological material is unlikely but that exploratory excavation into deeper deposits would aid geomorphological interpretation of the deposit, then subsequent spits of variable depth may be conducted without sieving of the spoil, and with basic recording only (this generally occurs within massive clay substrate).

5. All pits will be backfilled with the remaining excavated and sieved spoil. Where and as necessary, clean material will be sourced separately to allow backfilling of pits. Reserved topsoil will be placed in the correct position

6. Where necessary pits will be fenced to exclude stock prior to backfilling.

Table 7.1 Sample size of sediment recovered from each spit relative to spit depth

Spit depth interval cm	No. of 10 litre buckets*	Loose volume (litres)	Equivalent *in situ* volume (litres)
2.5	1.4	13.7	12.5
5	2.8	27.5	25.0
7.5	4.1	41.2	37.5
10	**5.5**	**55.0**	**50.0**
12.5	6.9	68.7	62.5
15	8.3	82.5	75.0
17.5	9.4	94.0	85.5
20	11.0	110.0	100.0
22.5	12	120.0	108
25	13.3	133.3	120

**Multiply spit depth (cm) by 0.535 to get no. of required 10 litre buckets*

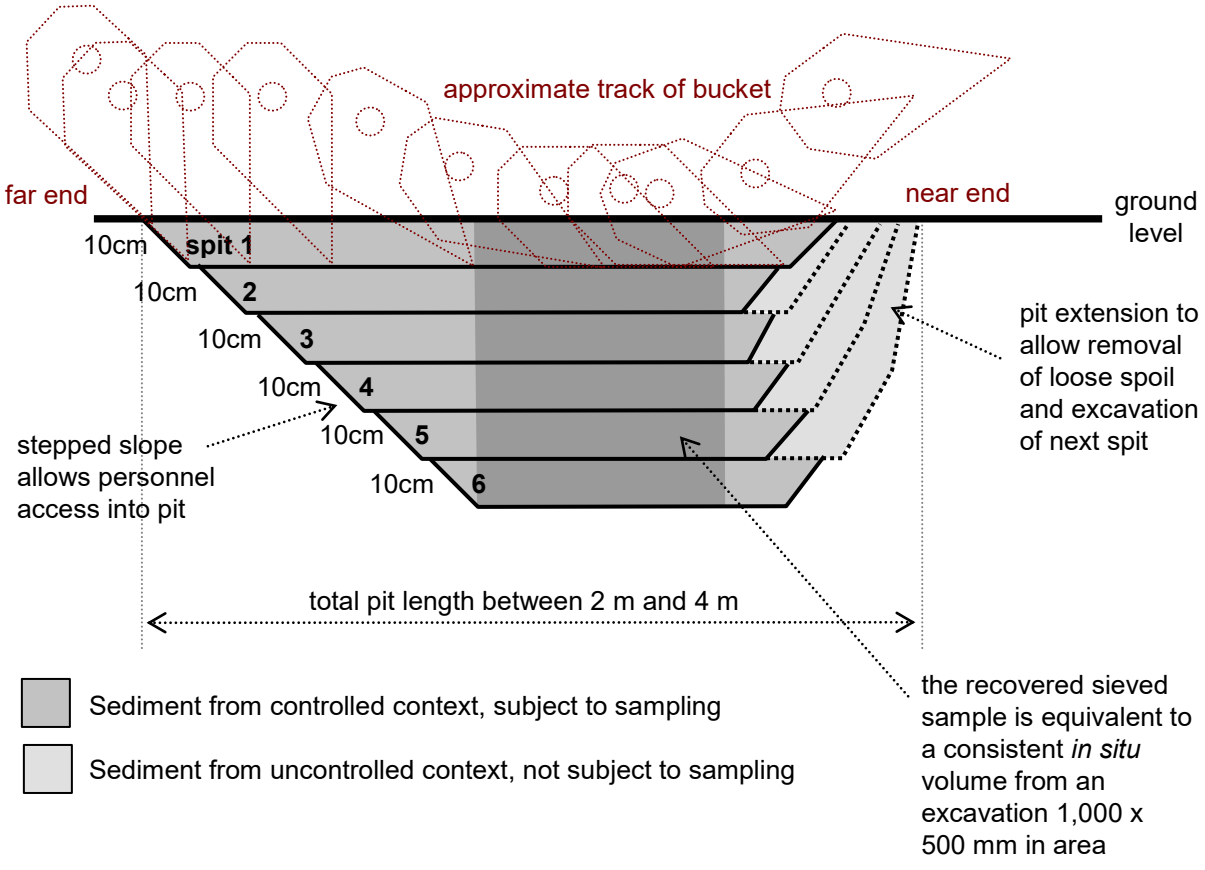


Figure 7.1 Indicative pit profile (not to scale) showing sampling methodology and sequence for mechanical pit excavation

7.2.3 Hand excavation methodology

1. Mark out and record pit location(s).

   The minimum size of an individual pit will be 500x 500 mm, and the maximum size will be 1000 x 1000 mm. The arrangement of by-hand excavation areas will vary according to the circumstances of the finds which warrant this methodology and the characteristics of the site. The most probable arrangement within the context of the current test excavation methodology will be single pits in isolated locations where, and as warranted.

2. Excavate pit.

   Pits will be excavated by shovel and trowel using standard by-hand archaeological methodologies including vertical and horizontal recording of spit levels and sedimentary, cultural and stratigraphic features. (Figure 4.8 provides an example of hand-excavated pits).

   Spit intervals will be 100 mm, except in circumstances where the excavation of cultural features or stratigraphic units necessitate that this interval be varied.

   Excavation will cease according to an on-site appreciation of the vertical extent of the archaeological deposit and the presence of features requiring by-hand excavation.

3. Where cultural features are identified, such as heat treatment pits or hearths, detailed plans will be drawn and samples of dateable material will be obtained.

4. Other samples may be obtained for the potential analysis of palaeo-environmental indicators such as pollen, phytoliths and microfauna.

5. All excavated archaeological deposit will be sieved either dry or with the aid of pressurised water from a water truck. The use of a dry sieving technique will be determined according to an appreciation of on-site characteristics (such as the potential presence of fragile organic remains). All material will be sieved through 4 x 4 mm mesh, with use of a top larger mesh (10 x 10 mm) where appropriate. All identified or suspected cultural material recovered from sieving will be retained, bagged and labelled.

6. All pits will be backfilled with the remaining excavated and sieved spoil (depending upon construction requirements).

7.3 Lithic Analysis

All lithic items recovered from archaeological test pits will be examined in detail by a qualified lithic specialist, Dr Chris Clarkson, using a low-power binocular microscope and incident illumination and/or hand lens.

Descriptive recording of collected material will be to a level concomitant with the stated aims of the investigation, and the number of artefacts recovered.

A basic analysis of lithic technology variables within the sample assemblage, such as rock type, lithic types, size distribution, utilisation and secondary flaking characteristics, etc., will be conducted to a level concomitant with the stated aims of the investigation, and the number of artefacts recovered. Observations about technological attributes and other relevant data will be documented.

7.4 Curation of the lithic artefact collection

The lithic items after examination and measurement will be stored individually in standard resealable plastic bags. These containers will be labelled in permanent black pen with the item's unique identification number and details of its provenance within the excavation.

Artefacts will be lodged with the ACT Heritage Unit.

Appendix J

Brown Consulting Moncrieff West

Traffic Report

BROWN

Smart Consulting

MONCRIEFF WEST
Traffic Report

February 2014
Job No: C11075

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Appendices

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1 CURRENT STUDY

As part of the Moncrieff EDP, the September 2011 EMME model was requested from the Territory and Municipal Services (TAMS) to confirm the previously adopted traffic estimate. The following was agreed to be adopted for the Moncrieff West EDP, Mirrabei Drive design and redesign of Horse Park Drive Extension (HPDE):

- Adopt the traffic volumes shown in the September 2011 EMME model as a base to estimate the traffic volume on HPDE in the year 2021 and 2031. The estimated traffic volume shown in the 2011 EMME model is assumed to consider the following suburb developments as determined:

Table 1 Forecast Suburb Population

Suburb	2021 Population	2031 Population
Jacka	3,810	3,810
Taylor	7,976	7,976
Moncrieff	4,572	4,800
Ngunnawal	10,000	10,000
Casey	5,800	6,400

- TAMS also confirmed that a Jacka Suburb link was not shown in the right location and this link was moved to the approximate position of Jacka Access 2. The following volume, in vehicles per day (vpd) and directional split was used for the study:

Table 2 Adopted Suburb Generated Volume Split

	Jacka Suburb Link Volume (vpd)	50% to HPDE (Mirrabei Dr – Katherine Ave) (vpd)	50% to HPDE (Mirrabei Dr – Burrumarra Ave) (vpd)
2021	4,590	2,295	2,295
2031	4,620	2,310	2,300

The following figures were provided by Land Development Agency (LDA) on the Group Centre locators and the number of dwellings in fully developed Moncrieff, Jacka and Taylor:

Table 3 Group Centre Developments and Nearby Suburb Dwelling numbers

		Total area in m2	Percentage
Group Centre	Supermarket	2,500	28%
	Retail	4,170	47%
	Commercial	1,550	18%
	Community Facility	600	7%
	Residential	278 (dwellings)	
		Dwellings	
Suburb	Moncrieff East and West	2,200	
	Jacka	1,500	
	Taylor	3,140	

2 MID-BLOCK ANALYSIS

LDA advised that full development figures in Moncrieff, Jacka and Taylor are to be adopted in estimating the traffic volume on Mirrabei Drive Extension and Horse Park Drive Extension in the year 2021 Traffic Analysis. Table 4 shows the computed values on Mirrabei Drive Extension of the daily vehicles derived from the assumptions outlined in the previous section.

Table 4 Mid–Block two-way Traffic Volumes

Mid-block	Period	Volume (vpd)
Mirrabei Drive Extension	2021	11,340
Mirrabei Drive Extension	2031	11,860

Section	September 2011 EMME Model (vpd)	
	2021	2031
Mirrabei Drive Extension between Horse Park Drive and Len Waters Street	11,340	11,860

Based on Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis Part 3 (2009), the mid-block capacity of one lane in each direction carriageway would be in the order of 1,500 vehicles/ hour. No duplication is foreseen for Mirrabei Drive Extension.

3 INTERSECTION ANALYSIS

Traffic generation for the proposed Group Centre and suburb developments was calculated using the ACT Residential Subdivision Code and the RTA Guide to Traffic Generating Developments (2002).

The adopted traffic generation rates were:

Supermarket	155 peak hour trips per 1000 m2 GLFA (10% daily rate)
Retail	121 daily trips per 100 m2 GLFA
Commercial	10 daily trips per 100m2 GFA
Community facility	4 daily trips per 100m2 GFA
Multi-unit dwelling	6 daily trips per dwelling
Single dwellings	8 daily trips per dwelling

SIDRA analysis was performed on the following intersections:

- Mirrabei Drive Extension / Moncrieff Group Centre
- Mirrabei Drive Extension / Moncrieff East West Access Road
- Road 4 / Road 3
- Road 13 / Road 3
- Road 2 / Road 3

Figure 1 shows a schematic of the Group Centre, traffic generation and anticipated movements. Table 5 shows the level of service criteria for intersection with the summarised results in Table 3-2 and Table 3-3.

Based on the SIDRA outputs, the proposed intersection arrangements for both AM and PM peak scenarios for the Mirrabei Drive Intersections and Moncrieff West Internal intersections would provide acceptable levels of service.

Figure 1 Moncrieff Group Centre Traffic Flows

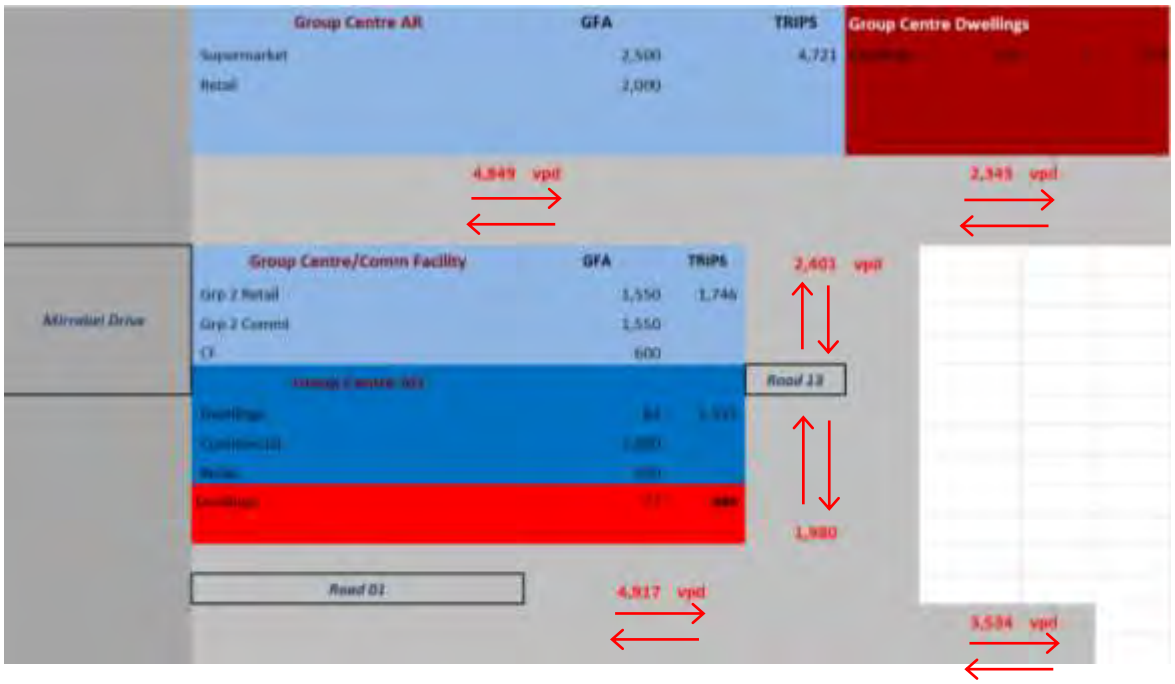


Table 5 Level of Service Criteria for Intersections

Level of Service	Average Delay per Vehicle (seconds)	Description for traffic signals and Roundabouts	Description for give way and stop signs
A	<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

Source: RTA Guide to Traffic Generating Developments 2002

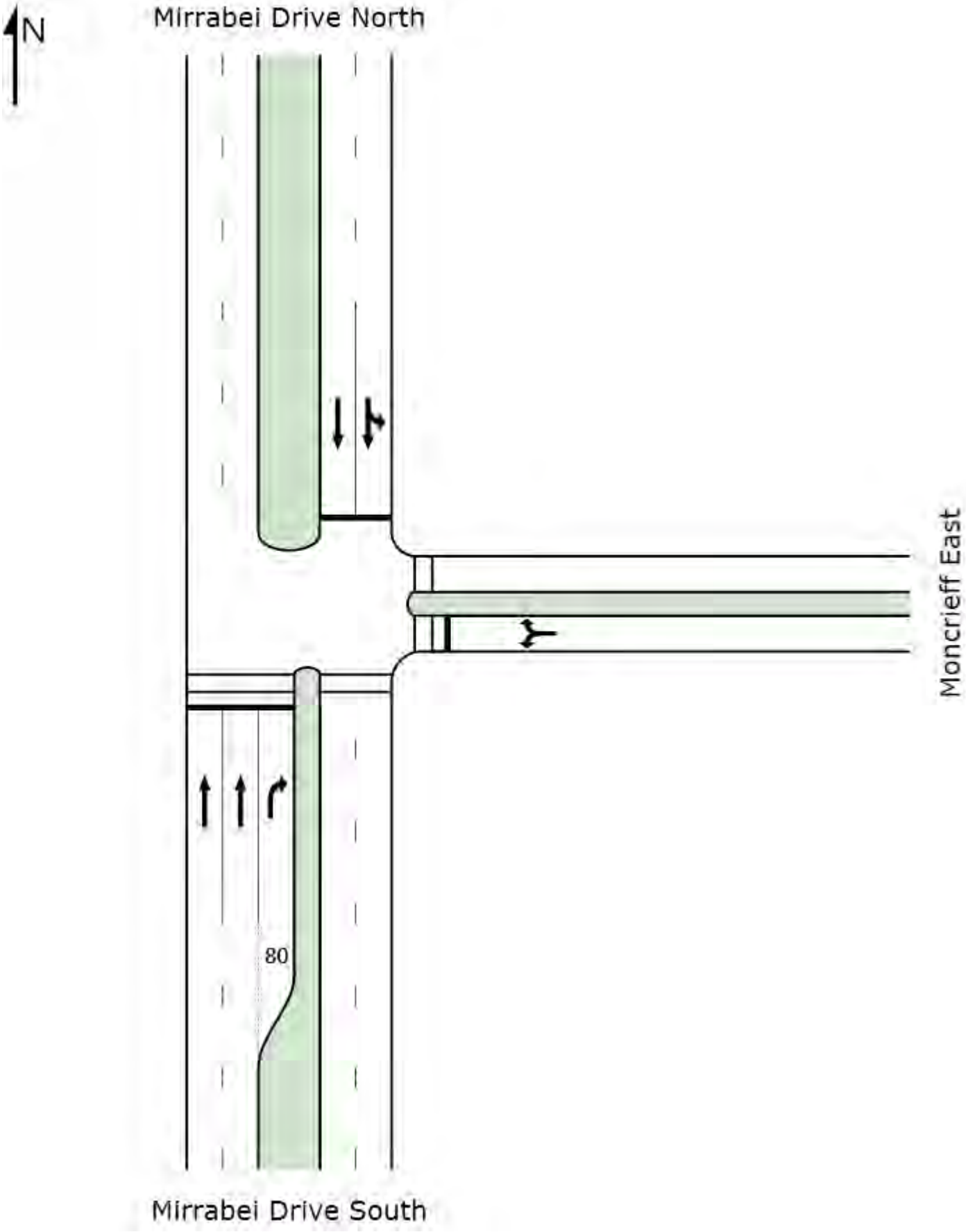
Table 6 Summary of SIDRA outputs for year 2031 – Mirrabei Drive Extension Intersections

Intersection	Year	Average Level of Service (LOS)	Average Delay	Queue
Mirrabei Drive Extension / Moncrieff Group Centre	AM Peak	B	24.1 seconds	80.0 m Moncrieff East Left/Right Movement
	PM Peak	C	28.9 seconds	58.7 m Mirrabei Drive Extension South Through Movement
Mirrabei Drive Extension / East West Access Road	AM Peak	C	34.3 seconds	99.4 m Mirrabei Drive Extension North Through movement
	PM Peak	C	36.2 seconds	87.8 m Mirrabei Drive Extension South Through movement

Table 7 Summary of SIDRA outputs 2031 AM Peak – Unsignalised Internal Intersections

Intersection	Worst LOS	Average Delay (seconds)	Queue
T Intersection Road 4 / Road 3	A	7.2	5.8 m Road 3 Right Movement
T Intersection Road 13 / Road 3	A	6.8	5.0 m Road 13 Movement
T Intersection Road 1 / Road 3	A	6.9	2.2 m Road 3 South Movement
T Intersection Road 5 / Road 15	A	8.6	1.1 m Road 15 south Movement
Road 01 / Road 15	B	20.6	37.2 Road 15 north Movement
Road 05 / Road 03	A	5.4	1.3 Road 3 west Movement
Road 10 / Road 03	A	5.5	2.2 Road 10 approach

Appendix A Final Sidra Results


N
Mirrabei Drive North
Moncrieff East
80
Mirrabei Drive South

MOVEMENT SUMMARY

Site: *2031 Updated Moncrieff Group Centre Access AM Peak - dual lane

Updated 2031
Mirrabei Drive Moncrieff Group Centre
AM peak
Signals - Fixed Time Cycle Time = 60 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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: Mirrabei Drive South											
2	T	319	3.0	0.354	21.4	LOS B	4.0	29.0	0.88	0.71	35.8
3	R	20	3.0	0.109	35.5	LOS C	0.6	4.1	0.94	0.70	29.4
Approach		339	3.0	0.354	22.2	LOS B	4.0	29.0	0.88	0.71	35.4
East: Moncrieff East											
4	L	222	3.0	0.658	25.9	LOS B	11.1	80.0	0.89	0.85	35.1
6	R	221	3.0	0.658	24.0	LOS B	11.1	80.0	0.89	0.84	31.7
Approach		443	3.0	0.658	24.9	LOS B	11.1	80.0	0.89	0.84	33.4
North: Mirrabei Drive North											
7	L	21	3.0	0.678	31.8	LOS C	8.7	62.3	0.96	0.89	33.1
8	T	589	3.0	0.678	24.3	LOS B	8.7	62.5	0.96	0.85	34.0
Approach		610	3.0	0.678	24.5	LOS B	8.7	62.5	0.96	0.85	34.0
All Vehicles		1392	3.0	0.678	24.1	LOS B	11.1	80.0	0.92	0.81	34.1

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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
P1	Across S approach	21	24.3	LOS C	0.0	0.0	0.90	0.90
P3	Across E approach	21	23.4	LOS C	0.0	0.0	0.88	0.88
All Pedestrians		42	23.9	LOS C			0.89	0.89

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.

MOVEMENT SUMMARY

Site: *2031 Updated Moncrieff Group Centre Access PM peak - dual lane

Updated 2031
Mirrabei Drive Moncrieff Group Centre
PM peak
Signals - Fixed Time Cycle Time = 70 seconds (Practical Cycle Time)

Movement Performance - Vehicles

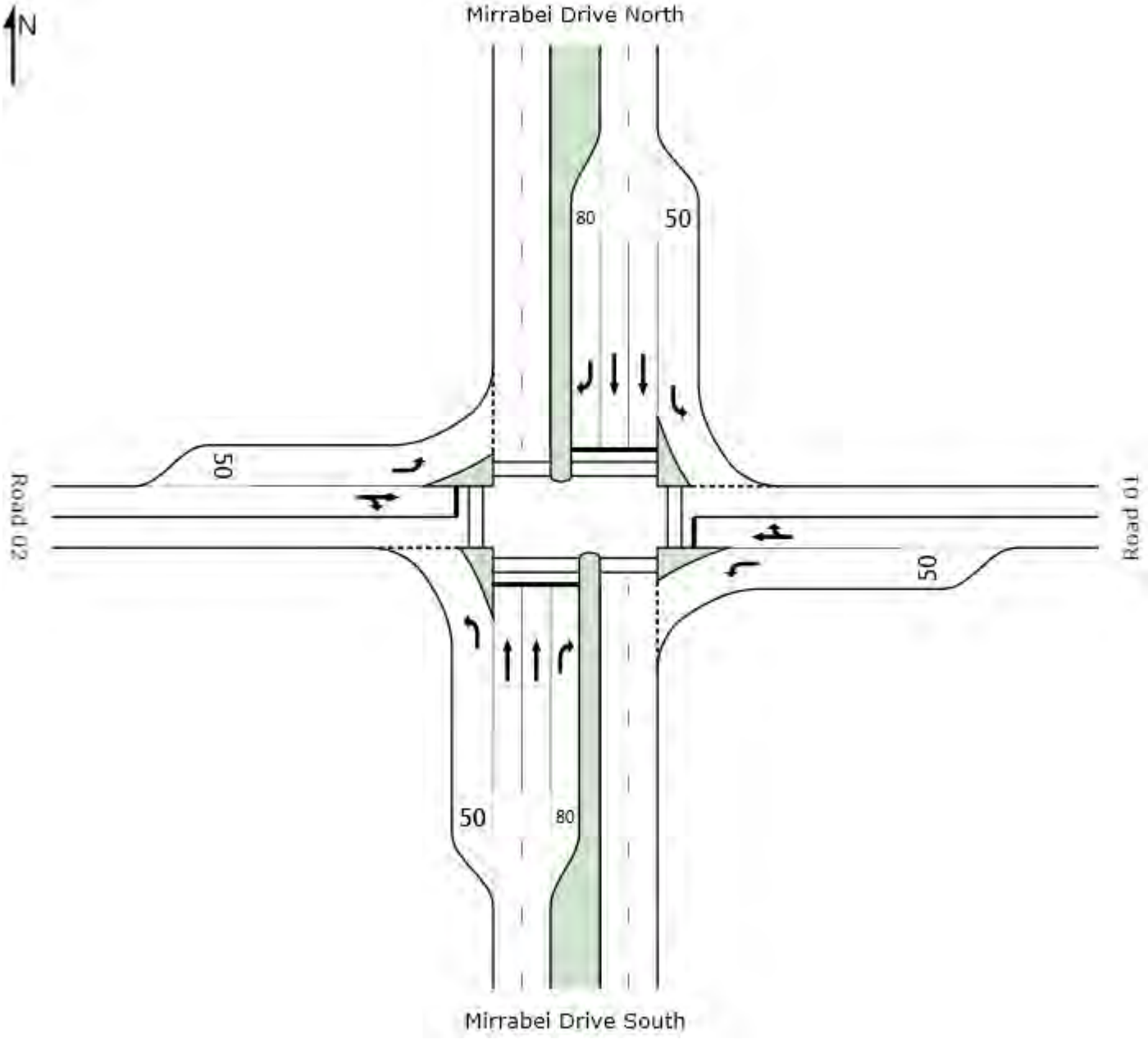
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mirrabei Drive South											
2	T	530	3.0	0.565	25.8	LOS B	8.2	58.7	0.93	0.78	33.4
3	R	200	3.0	0.586	37.5	LOS C	6.5	46.8	0.96	0.81	29.6
Approach		730	3.0	0.586	29.0	LOS C	8.2	58.7	0.94	0.79	32.2
East: Moncrieff East											
4	L	18	3.0	0.062	26.4	LOS B	0.9	6.2	0.73	0.73	34.8
6	R	18	3.0	0.062	26.3	LOS B	0.9	6.2	0.73	0.72	34.8
Approach		36	3.0	0.062	26.4	LOS B	0.9	6.2	0.73	0.72	34.8
North: Mirrabei Drive North											
7	L	199	3.0	0.529	33.8	LOS C	7.3	52.3	0.92	0.82	31.3
8	T	287	3.0	0.529	25.5	LOS B	7.6	54.4	0.92	0.76	33.3
Approach		486	3.0	0.529	28.9	LOS C	7.6	54.4	0.92	0.79	32.5
All Vehicles		1252	3.0	0.586	28.9	LOS C	8.2	58.7	0.92	0.78	32.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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
P1	Across S approach	53	29.3	LOS C	0.1	0.1	0.91	0.91
P3	Across E approach	53	25.7	LOS C	0.1	0.1	0.86	0.86
All Pedestrians		106	27.5	LOS C			0.89	0.89

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.


N
Mirrabei Drive North
80
50
50
Road 02
Road 01
50
50
80
Mirrabei Drive South

MOVEMENT SUMMARY

Site: *2031 Mirrabei / Road 01 / Road 02 AM Peak - dual lane

2031
Mirrabei Drive / Road 01 / Road 02
AM peak
Signals - Fixed Time Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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: Mirrabei Drive South											
1	L	21	0.0	0.020	8.1	LOS A	0.1	0.6	0.14	0.62	49.0
2	T	215	3.0	0.531	50.0	LOS D	5.4	39.1	0.99	0.78	24.3
3	R	50	3.0	0.260	55.6	LOS D	2.4	17.6	0.96	0.74	22.9
Approach		286	2.8	0.531	47.9	LOS D	5.4	39.1	0.92	0.76	25.0
East: Road 01											
4	L	195	3.0	0.312	10.9	LOS A	2.5	17.7	0.33	0.68	46.3
5	T	33	0.0	0.412	39.2	LOS C	7.3	52.3	0.91	0.74	26.7
6	R	130	3.0	0.412	45.2	LOS D	7.3	52.3	0.91	0.80	24.3
Approach		358	2.7	0.412	25.9	LOS B	7.3	52.3	0.60	0.73	33.4
North: Mirrabei Drive North											
7	L	83	3.0	0.082	7.5	LOS A	0.4	3.0	0.17	0.61	48.5
8	T	600	3.0	0.627	38.3	LOS C	13.8	99.4	0.95	0.80	28.0
9	R	34	0.0	0.087	40.5	LOS C	1.3	9.2	0.80	0.72	28.4
Approach		717	2.9	0.627	34.8	LOS C	13.8	99.4	0.85	0.78	29.4
West: Road 02											
10	L	95	0.0	0.118	9.3	LOS A	0.8	5.7	0.24	0.65	47.8
11	T	42	0.0	0.286	38.0	LOS C	5.0	35.3	0.88	0.71	27.4
12	R	74	0.0	0.286	45.8	LOS D	5.0	35.3	0.88	0.79	27.1
Approach		211	0.0	0.286	27.8	LOS B	5.0	35.3	0.60	0.71	33.8
All Vehicles		1571	2.4	0.627	34.3	LOS C	13.8	99.4	0.77	0.75	29.8

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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
P1	Across S approach	21	46.7	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	21	33.6	LOS D	0.1	0.1	0.80	0.80
P5	Across N approach	53	46.7	LOS E	0.1	0.1	0.94	0.94
P7	Across W approach	53	46.7	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		148	44.8	LOS E			0.92	0.92

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.

MOVEMENT SUMMARY

Site: *2031 Mirrabei / Road 01 / Road 02 PM Peak - dual lane

2031
Mirrabei Drive / Road 01 / Road 02
PM peak
Signals - Fixed Time Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

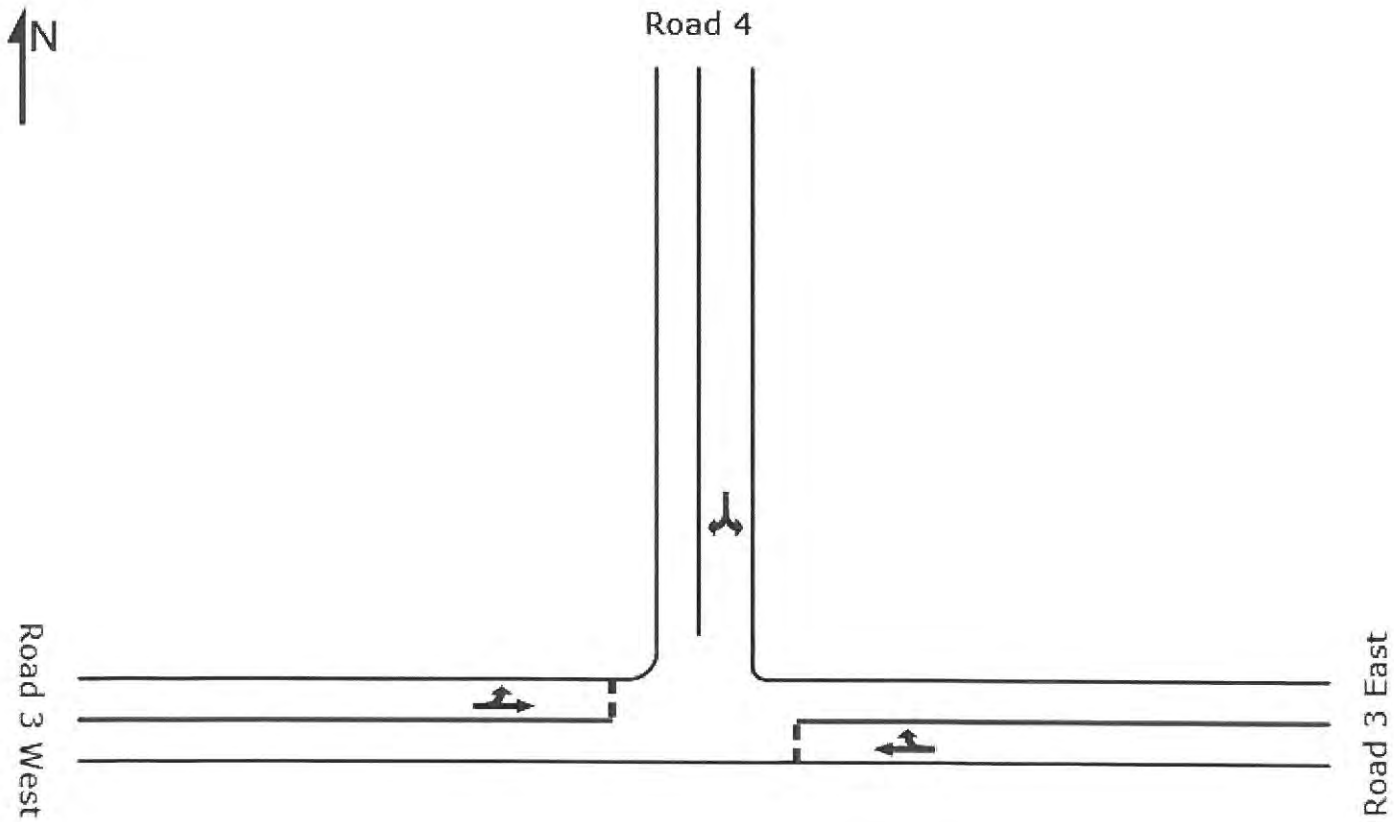
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mirrabei Drive South											
1	L	66	0.0	0.071	8.4	LOS A	0.4	2.6	0.18	0.63	48.7
2	T	540	3.0	0.564	37.6	LOS C	12.2	87.8	0.93	0.78	28.3
3	R	176	3.0	0.473	43.0	LOS D	7.6	54.4	0.88	0.80	26.6
Approach		782	2.7	0.564	36.3	LOS C	12.2	87.8	0.85	0.77	28.9
East: Road 01											
4	L	45	3.0	0.044	8.3	LOS A	0.2	1.6	0.16	0.63	48.9
5	T	38	0.0	0.283	38.0	LOS C	4.9	35.0	0.88	0.70	27.4
6	R	75	3.0	0.283	43.9	LOS D	4.9	35.0	0.88	0.78	24.8
Approach		158	2.3	0.283	32.3	LOS C	4.9	35.0	0.68	0.72	29.8
North: Mirrabei Drive North											
7	L	117	3.0	0.143	8.2	LOS A	0.9	6.5	0.23	0.62	47.8
8	T	194	3.0	0.479	49.7	LOS D	4.9	35.1	0.99	0.77	24.4
9	R	85	0.0	0.434	57.5	LOS E	4.3	29.9	0.98	0.77	23.3
Approach		396	2.4	0.479	39.1	LOS C	4.9	35.1	0.76	0.73	28.0
West: Road 02											
10	L	31	0.0	0.045	10.0	LOS A	0.3	2.2	0.27	0.64	47.1
11	T	29	0.0	0.118	36.3	LOS C	2.0	14.1	0.85	0.64	28.3
12	R	19	0.0	0.118	44.1	LOS D	2.0	14.1	0.85	0.76	27.9
Approach		79	0.0	0.118	28.0	LOS B	2.0	14.1	0.62	0.67	33.4
All Vehicles		1415	2.4	0.564	36.2	LOS C	12.2	87.8	0.80	0.75	29.0

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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
P1	Across S approach	21	46.7	LOS E	0.1	0.1	0.94	0.94
P3	Across E approach	21	46.7	LOS E	0.1	0.1	0.94	0.94
P5	Across N approach	53	46.7	LOS E	0.1	0.1	0.94	0.94
P7	Across W approach	53	33.6	LOS D	0.1	0.1	0.80	0.80
All Pedestrians		148	42.0	LOS E			0.89	0.89

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.


N
Road 4
Road 3 West
Road 3 East

MOVEMENT SUMMARY

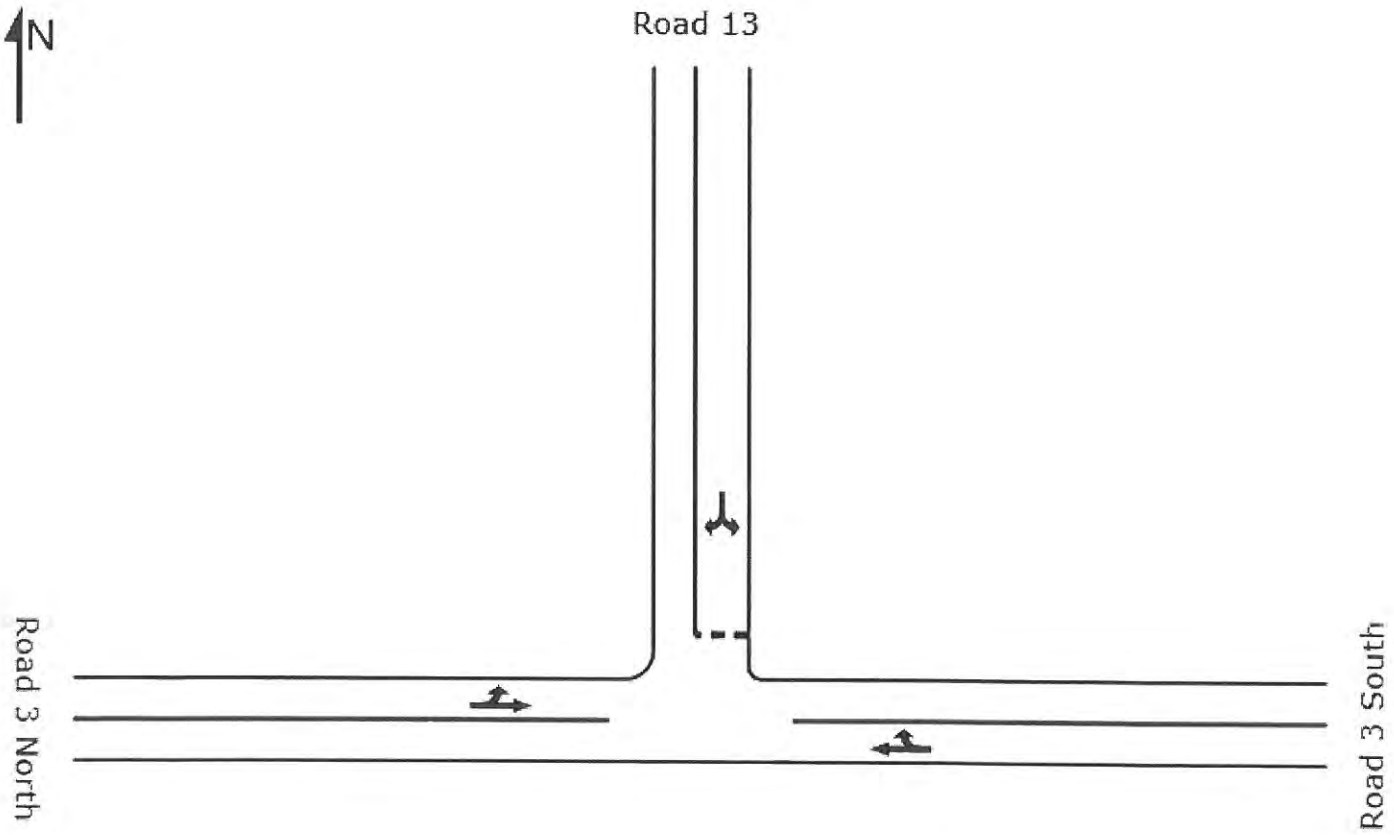
Site: 2031 AM Peak Road 4 and Road 3

2031
Moncrieff Internal - Road 4 and Road 3
AM peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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
East: Road 3 East											
5	T	11	3.0	0.133	6.8	LOS A	0.5	3.9	0.24	0.42	42.8
6	R	86	3.0	0.133	8.3	LOS A	0.5	3.9	0.24	0.65	41.7
Approach		97	3.0	0.133	8.2	LOS A	0.5	3.9	0.24	0.63	41.8
North: Road 4											
7	L	11	3.0	0.015	6.5	LOS A	0.0	0.0	0.00	0.59	43.3
9	R	17	3.0	0.015	6.8	LOS A	0.0	0.0	0.00	0.66	43.0
Approach		27	3.0	0.015	6.7	NA	0.0	0.0	0.00	0.63	43.1
West: Road 3 West											
10	L	137	3.0	0.085	6.7	LOS A	0.6	4.6	0.15	0.52	42.8
11	T	10	3.0	0.085	5.4	LOS A	0.6	4.6	0.15	0.45	43.7
Approach		147	3.0	0.085	6.6	LOS A	0.6	4.6	0.15	0.52	42.8
All Vehicles		271	3.0	0.133	7.2	NA	0.6	4.6	0.17	0.57	42.5

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.


N
Road 13
Road 3 North
Road 3 South

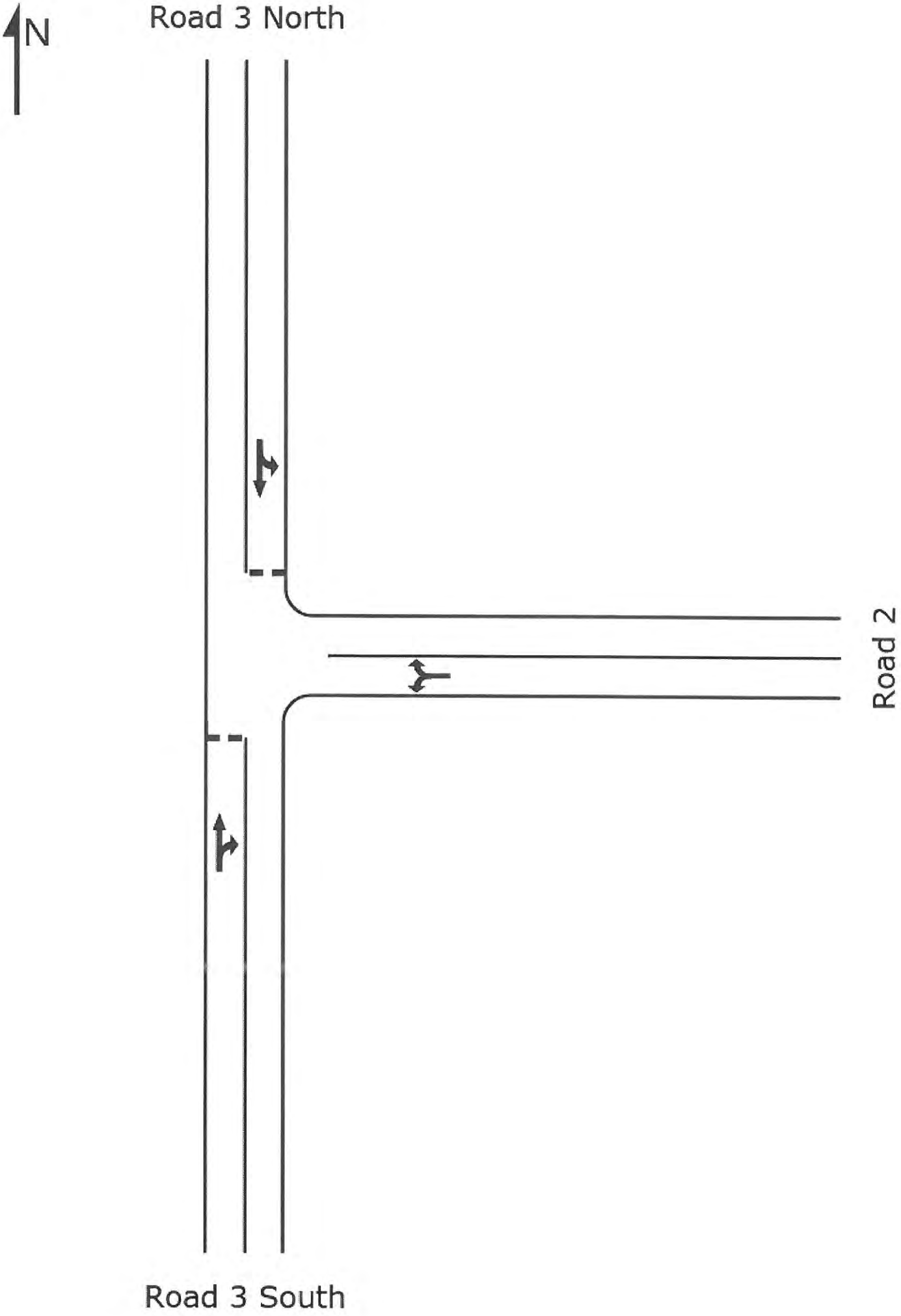
MOVEMENT SUMMARY

2031
Moncrieff Internal - Road 13 and Road 3
AM peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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
East: Road 3 South											
5	T	11	1.0	0.018	0.6	LOS A	0.1	0.7	0.21	0.00	46.9
6	R	11	1.0	0.018	7.3	LOS A	0.1	0.7	0.21	0.70	42.7
Approach		21	1.0	0.018	3.9	NA	0.1	0.7	0.21	0.35	44.7
North: Road 13											
7	L	112	1.0	0.158	6.5	LOS A	0.7	5.0	0.07	0.57	43.1
9	R	112	1.0	0.158	6.8	LOS A	0.7	5.0	0.07	0.64	42.8
Approach		223	1.0	0.158	6.7	LOS A	0.7	5.0	0.07	0.60	42.9
West: Road 3 North											
10	L	5	1.0	0.008	6.4	LOS A	0.0	0.0	0.00	0.78	43.3
11	T	10	1.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		15	1.0	0.008	2.2	NA	0.0	0.0	0.00	0.27	47.5
All Vehicles		259	1.0	0.158	6.2	NA	0.7	5.0	0.07	0.56	43.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.


N
Road 3 North
Road 2
Road 3 South

MOVEMENT SUMMARY

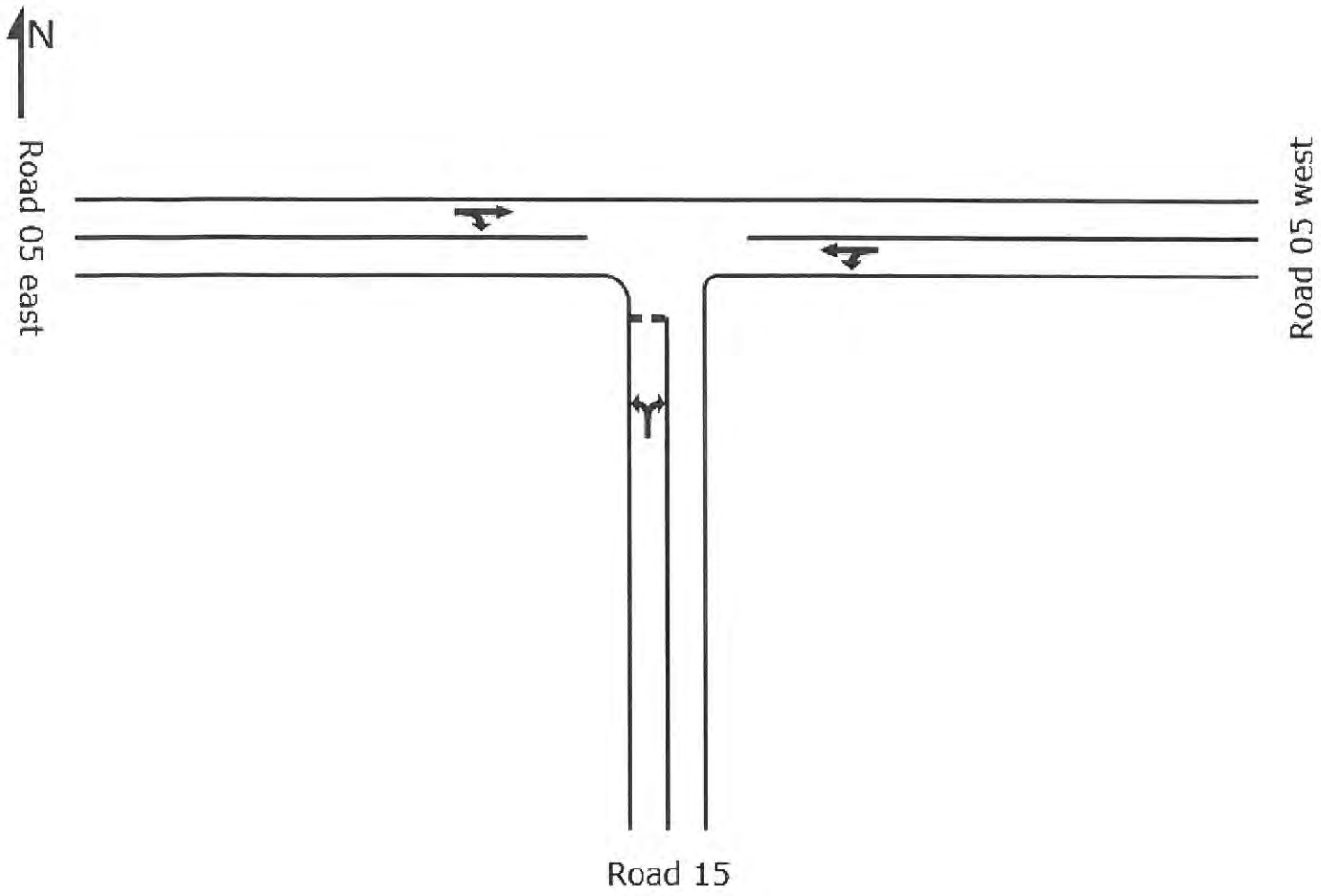
Site: 2031 AM Peak Road 2 and Road 3

2031
Moncrieff Internal - Road 2 and Road 3
AM peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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: Road 3 South											
2	T	33	1.0	0.059	7.9	LOS A	0.2	1.7	0.09	0.54	49.3
3	R	17	1.0	0.059	9.4	LOS A	0.2	1.7	0.09	0.75	47.7
Approach		49	1.0	0.059	8.4	LOS A	0.2	1.7	0.09	0.61	48.7
East: Road 2											
4	L	21	1.0	0.017	8.2	LOS A	0.0	0.0	0.00	0.66	49.0
6	R	11	1.0	0.017	6.7	LOS A	0.0	0.0	0.00	0.67	43.0
Approach		32	1.0	0.017	7.7	NA	0.0	0.0	0.00	0.66	46.9
North: Road 3 North											
7	L	209	1.0	0.116	6.4	LOS A	0.0	0.0	0.00	0.62	43.3
8	T	5	1.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		215	1.0	0.116	6.3	NA	0.0	0.0	0.00	0.61	43.6
All Vehicles		296	1.0	0.116	6.8	NA	0.2	1.7	0.02	0.61	44.8

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.


N
Road 05 east
Road 05 west
Road 15

MOVEMENT SUMMARY

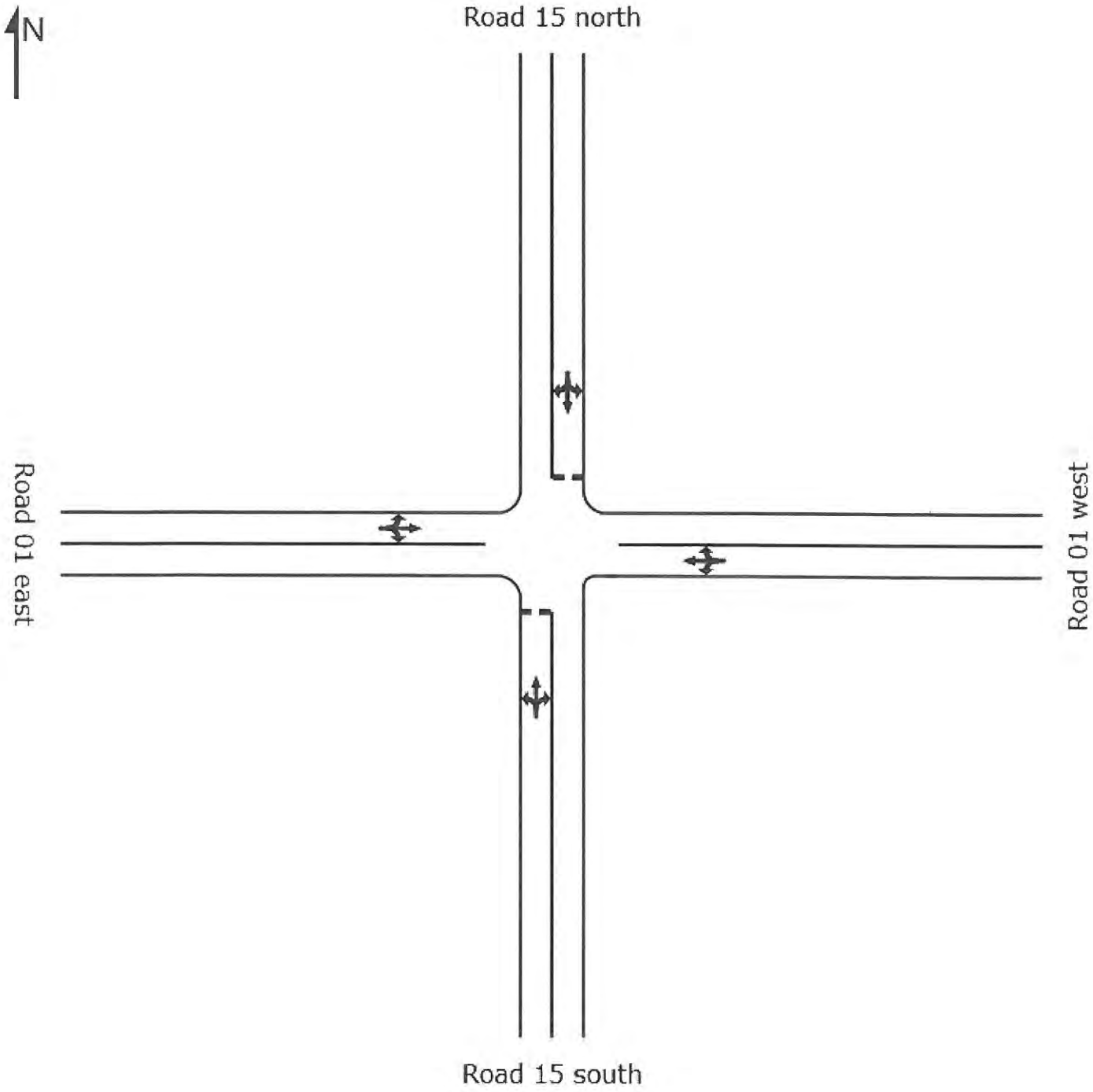
Site: 2031 -Road 05 / Road 15

Road 05 / Road 15
AM Peak
2031
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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: Road 15											
1	L	15	1.0	0.041	8.3	LOS A	0.2	1.1	0.37	0.60	41.6
3	R	16	1.0	0.041	8.6	LOS A	0.2	1.1	0.37	0.68	41.5
Approach		31	1.0	0.041	8.4	LOS A	0.2	1.1	0.37	0.64	41.6
East: Road 05 west											
4	L	144	1.0	0.152	6.4	LOS A	0.0	0.0	0.00	0.73	43.3
5	T	143	1.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		287	1.0	0.152	3.2	NA	0.0	0.0	0.00	0.37	46.4
West: Road 05 east											
11	T	16	1.0	0.026	1.2	LOS A	0.1	0.9	0.36	0.00	44.9
12	R	19	1.0	0.026	8.0	LOS A	0.1	0.9	0.36	0.72	42.4
Approach		35	1.0	0.026	4.9	NA	0.1	0.9	0.36	0.39	43.5
All Vehicles		353	1.0	0.152	3.8	NA	0.2	1.1	0.07	0.39	45.6

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.


N
Road 15 north
Road 01 east
Road 01 west
Road 15 south

MOVEMENT SUMMARY

Site: 2031 -Road 01 / Road 15

Road 01 / Road 15
AM Peak
2031
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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: Road 15 south											
1	L	11	1.0	0.065	11.6	LOS A	0.2	1.7	0.55	0.72	39.1
2	T	11	1.0	0.065	12.1	LOS A	0.2	1.7	0.55	0.73	44.6
3	R	11	1.0	0.065	11.9	LOS A	0.2	1.7	0.55	0.85	39.0
Approach		32	1.0	0.065	11.9	LOS A	0.2	1.7	0.55	0.77	40.8
East: Road 01 west											
4	L	11	1.0	0.212	6.7	LOS A	1.4	9.9	0.18	0.74	43.2
5	T	396	1.0	0.212	0.2	LOS A	1.4	9.9	0.18	0.00	47.7
6	R	2	1.0	0.212	8.7	LOS A	1.4	9.9	0.18	0.88	48.6
Approach		408	1.0	0.212	0.4	NA	1.4	9.9	0.18	0.02	47.6
North: Road 15 north											
7	L	11	1.0	0.634	20.4	LOS B	5.3	37.2	0.67	0.74	38.5
8	T	142	1.0	0.634	19.1	LOS B	5.3	37.2	0.67	1.05	39.0
9	R	153	1.0	0.634	20.6	LOS B	5.3	37.2	0.67	1.10	38.4
Approach		305	1.0	0.634	19.9	LOS B	5.3	37.2	0.67	1.06	38.7
West: Road 01 east											
10	L	21	1.0	0.038	10.1	LOS A	0.3	1.8	0.55	0.34	47.4
11	T	31	1.0	0.038	1.9	LOS A	0.3	1.8	0.55	0.00	42.9
12	R	11	1.0	0.038	8.7	LOS A	0.3	1.8	0.55	0.76	42.2
Approach		62	1.0	0.038	5.9	NA	0.3	1.8	0.55	0.25	44.2
All Vehicles		807	1.0	0.634	8.7	NA	5.3	37.2	0.41	0.46	43.2

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Appendix K

Block 4 Section 23 Moncrieff

Deposited Plan

SG/AG CO-ORDINATES OF REFERENCE MARKS		
REF MARK	EASTING	NORTHING
CRM 14064	209474.985	617840.08
CRM 14065	209523.025	617956.23
CRM 14067	209627.575	617843.675

22
1
DP11353

22
2
DP11353

16
1
DP11341

TERRITORY LAND

O'KEEFE DRIVE

AVENUE

FD (DP11353)

76° 05' 30" 133.00 BY DP11353 & BY ME

28.4 WIDE

225° 29' 33.01

FD DP11341
14065
B

104° 07' 13.655

82° 30' 93.115

127° 30' 7.07

PEG FD DSTB ADJ

PEG FD DSTB ADJ

172° 30' 3.645

PEG FD DSTB ADJ

R10.00 A12.455 C12.46 43° 57' 20"

DH&W IN CONC FD

RADIAL 95° 24' 49"

DH&W IN CONC FD

4
4154m²

DP11353

R477.00 6° 51' 38" C24.08 A24.085

DH&W IN CONC

116° 20' 1.765

90° 107.755

183° 21' A37.40 C37.175 R98.75

285° 38' 6.095

BY DP11353 & BY ME

STREET

146.59

189° 38' 20"

33
2
DP11450

23

R477.00 9° 29' 46" C19.815 A19.82

RADIAL 100° 41' 13"

PEG FD DSTB. ADJUSTED

22° 28' 10" 125.895 BY DP11353 & BY ME

38 WIDE

16
2
DP11341

DP11353

5
600Im²

R2022.00 11° 11' 50" C36.075 A36.08

FD (DP11353)

143° 35' 9.955

RADIAL 101° 42' 34"

DH&W IN BIT PATH FD (SHOWN AS GIN & WING)

(15.12)

274° 26'

PEG FD

98.075

274° 26'

82.955

PEG FD

RADIAL 277° 01' 45"

R2037.00 11° 58' 40" A&C22.89

PEG GONE

R500.00 11° 09' A&C20.065

PEG FD

A44.715 C44.50 R131.25 196° 41' 20"

PEG FD A21.285 C21.245 200° 22' 29" R98.75

RADIAL 116° 32' 58"

23.75 WIDE

A29.51 C29.45 0° 35' 20" R131.25

225° 01' 22.10

PEG FD

HOFFMANN

14067 FD DP11353

A
14064
FD DP11341

111° 39' 40" 49.41

MIRRABEI

23
2
DP11353

23
3
DP11353

33
4
DP11450

16
3
DP11341

REFERENCE MARKS

~~Denotes GIP in road 1.83 radially from TP~~
" CB " " 1.83 " " TP
" PLAQUE IN KERB
~~" DEEP DRIVEN ROD~~
" DH&W IN KERB
(Except as otherwise shown)

Azimuth: A-B (Strom)

All Easements are 2.5 metres wide
(Except as otherwise shown)

Ref: AQ79/2751

REPORT LODGED WITH SURVEYOR-GENERAL OF THE ACT

I ANTHONY QUINN of ANTHONY QUINN SURVEYS PTY LTD, CANBERRA a surveyor registered under the Surveyors Act 2007 hereby certify that the survey represented on this plan is accurate and has been made in accordance with the Surveyors Practice Directions and was completed on 25 FEBRUARY 2019

17 April 2019

(Signature) .....

Surveyor registered under the Surveyors Act 2007

I certify that this plan is the plan prepared in accordance with the Districts Act 2002

18/4/2019 for Surveyor-General of the ACT

PLAN OF

BLOCKS 4 & 5 SECTION 23
BEING A SUBDIVISION OF BLOCK 1

DIVISION: MONCRIEFF

DISTRICT: GUNGAHLIN

AUSTRALIAN CAPITAL TERRITORY

SCALE 1:500

0 5 10 20 30 40 METRES

Deposited in the office of the Registrar of Titles at Canberra

In the Australian Capital Territory at

3:51 pm, 01/05/2019

Approved

Dave Peffer
Registrar-General

Registrar of Titles

DEPOSITED PLAN

11653

AMENDS DP11353

*JH

X21670