

**Civil and Utilities
Infrastructure Report**
High Density Residential
Development
40 The Retreat
Bradfield NSW 2556

CLIENT/ SCG Developments

DATE/ 7/06/2024

CODE/ 23-1110

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1. Introduction

This Civil and Utilities Infrastructure Plan has been prepared by AT&L on behalf of SCG Developments to support the State Significant Development Application (SSDA) of the proposed development at 40 The Retreat, Bradfield NSW 2556.

The site is located within the development area of the Western Sydney Aerotropolis Precinct. It is approximately 2.1 hectares in area and is currently occupied by a single house and presumed farmland. The main access point is via a vehicular driveway on The Retreat, on the southwest corner of the site. Refer to Figure 1 for location of the proposed development.



Figure 1: Site Location (Source: Nearmap image dated 30/03/2024)

1.1. Development Description

This State Significant Development Application seeks consent for the detailed design and delivery (including construction and use) of a new mixed use residential development, to be developed in two (2) stages. Specifically, development consent is sought for:

Stage 1

- Overall site clearing and preparation works, including demolition of all existing development on the Site;
- The redevelopment of the northern portion of the Site, comprising:
 - ▶ Temporary Site access to the northern portion of the Site from The Retreat;
 - ▶ Temporary bin enclosure adjacent the temporary access;
 - ▶ Excavation works and construction of a shared two (2) storey basement to a maximum depth of RL 60.60, with capacity for 311 vehicle car spaces;
 - ▶ Construction of three (3) individual mixed use buildings, comprising:
 - ▶ Maximum building heights between 30.4m and 39.8m;
 - ▶ A total Gross Floor Area (**GFA**) of 26, 204sqm, comprising 25,744 sqm of residential GFA, 248 sqm of non-residential GFA and 212 sqm of retail GFA, distributed across the three buildings;
 - ▶ 254 residential units, distributed across the three buildings.
 - ▶ Associated landscaping, communal open space and embellishment works; and
 - ▶ Delivery and augmentation of services.

Stage 2

- The redevelopment of the southern portion of the Site, comprising:
 - ▶ Removal of the Stage 1 temporary access from The Retreat;
 - ▶ Connection and access of the Stage 1 basement to the western boundary (to become a future Collector Road);
 - ▶ Excavation works and construction of a shared three (3) storey basement to a depth of RL 56.35, with capacity for 336 vehicle car spaces;
 - ▶ Site and basement access from the western boundary (to become a future Collector Road);
 - ▶ Construction of three (3) individual mixed use buildings, comprising:
 - ▶ Maximum building heights between 23.8m and 39.9m;
 - ▶ A total Gross Floor Area (**GFA**) of 29,126 sqm, comprising 28,540 sqm of residential GFA, 212 sqm of retail GFA and 374 sqm of non-residential GFA, distributed across the three buildings;
 - ▶ 279 residential units, distributed across the three buildings.
 - ▶ Associated landscaping, communal open space and embellishment works; and
 - ▶ Delivery and augmentation of services.

A detailed description of the proposed development is detailed in Section 3.0 of the Environmental Impact Statement prepared by Ethos Urban.

Refer to Figure 2 for a conceptual ground level layout of site. The proposed development incorporates various landscaping measures including swales and a raingarden, in-line with Western Sydney Aerotropolis's vision for new high-density developments in the precinct.



Figure 2: Proposed Development (Source: DKO DA Drawings)

1.2. Scope of Report

The scope of this report is to summarise civil issues including earthworks and to discuss utilities infrastructure to service the site based on currently available information.

1.3. Supporting Documentation

The following documentation is referred to throughout and should be read in conjunction with this report:

- Water and Stormwater Management Plan (AT&L)
- Civil Drawings (AT&L)
- Erosion and Sediment Control Plan (AT&L)
- Preliminary Geotechnical Investigation Report (Intrax, dated 22/02/2024)

2. Compliance with SEARs

This report responds to the NSW Planning Secretary's Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning, Industry and Environment (DPIE) on 21 September 2022. Table 1 below summaries all key utilities infrastructure issues raised in the SEARs and how they have been addressed in this report.

Table 1: SEARs addressed in this report

Key Issue listed in the SEARs	Response
Infrastructure Requirements and Utilities	
- Assess the impacts of the development on existing utility infrastructure and service provider assets surrounding the site. - Identify any infrastructure required on-site and off-site to facilitate the development and any arrangements to ensure that the upgrades will be implemented on time and be maintained. - Provide an infrastructure delivery and staging plan, including a description of how infrastructure requirements would be co-ordinated, funded and delivered to facilitate the development.	Section 5 addresses these requirements.

3. Proposed Staging and Site Access

As mentioned in Section 1, the development is proposed to be carried out in two (2) stages, as shown in Figure 3 below. Stage 1 will be accessed via existing The Retreat and will remain in place until the adjacent future roads and access points are developed. Once this infrastructure is built, Stage 2 will be accessed via a future road to the west of site, and the access point on The Retreat will be made redundant. We note that at the time of this report, timeframes and details for the delivery of this infrastructure are largely unavailable, which affects the delivery of Stage 2 of the proposed development. It is also assumed that the Sydney Water regional stormwater scheme will be in place at the time Stage 2 is developed, as discussed in the *Water and Stormwater Management Plan* prepared by AT&L.

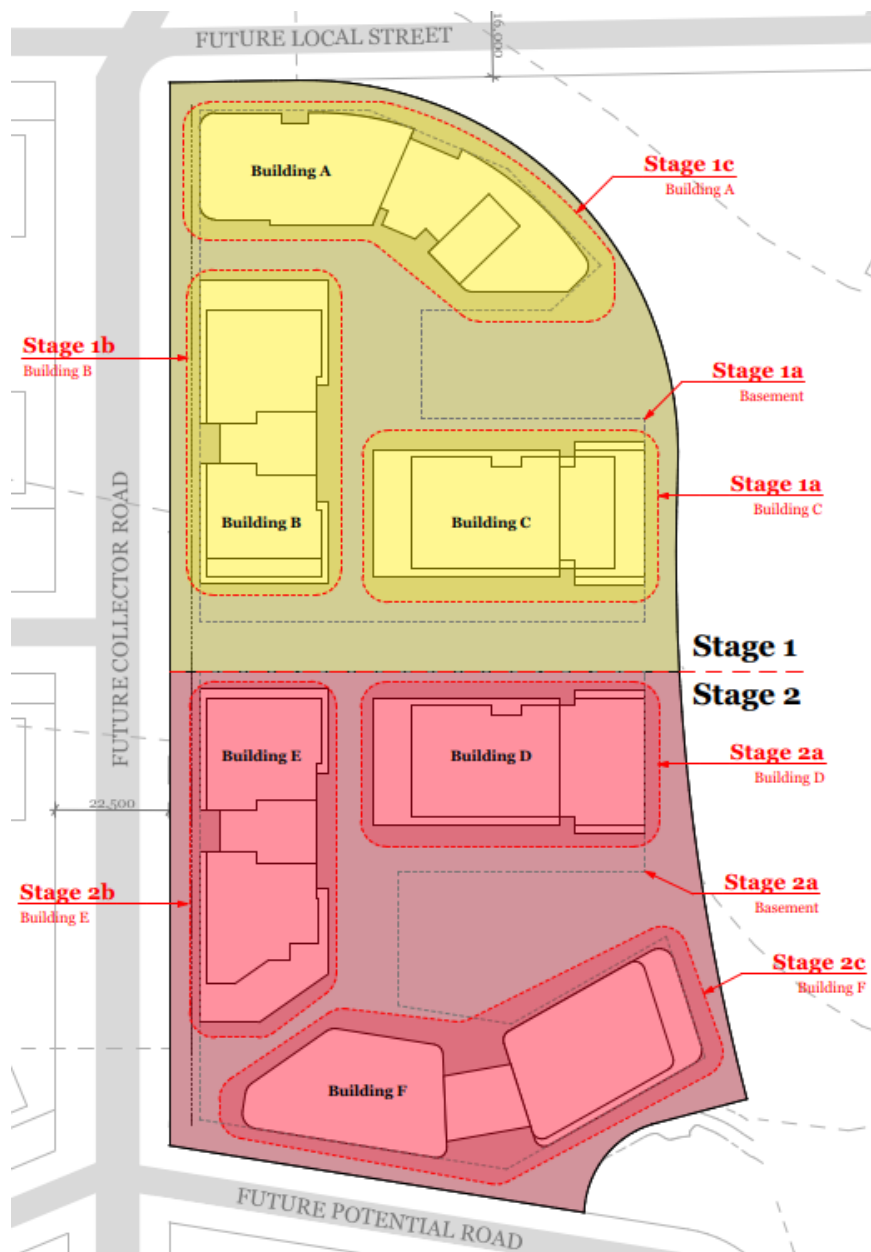


Figure 3: Staging Plan (Source: DKO DA Drawings)

3.1. Proposed Interim Access

During Stage 1, an interim access road is proposed in the southern portion of site, with the point of entry being a vehicular crossing on The Retreat. Figure 4 below presents the interim civil and stormwater layout prior to precinct roads and Sydney Water regional stormwater infrastructure being built.

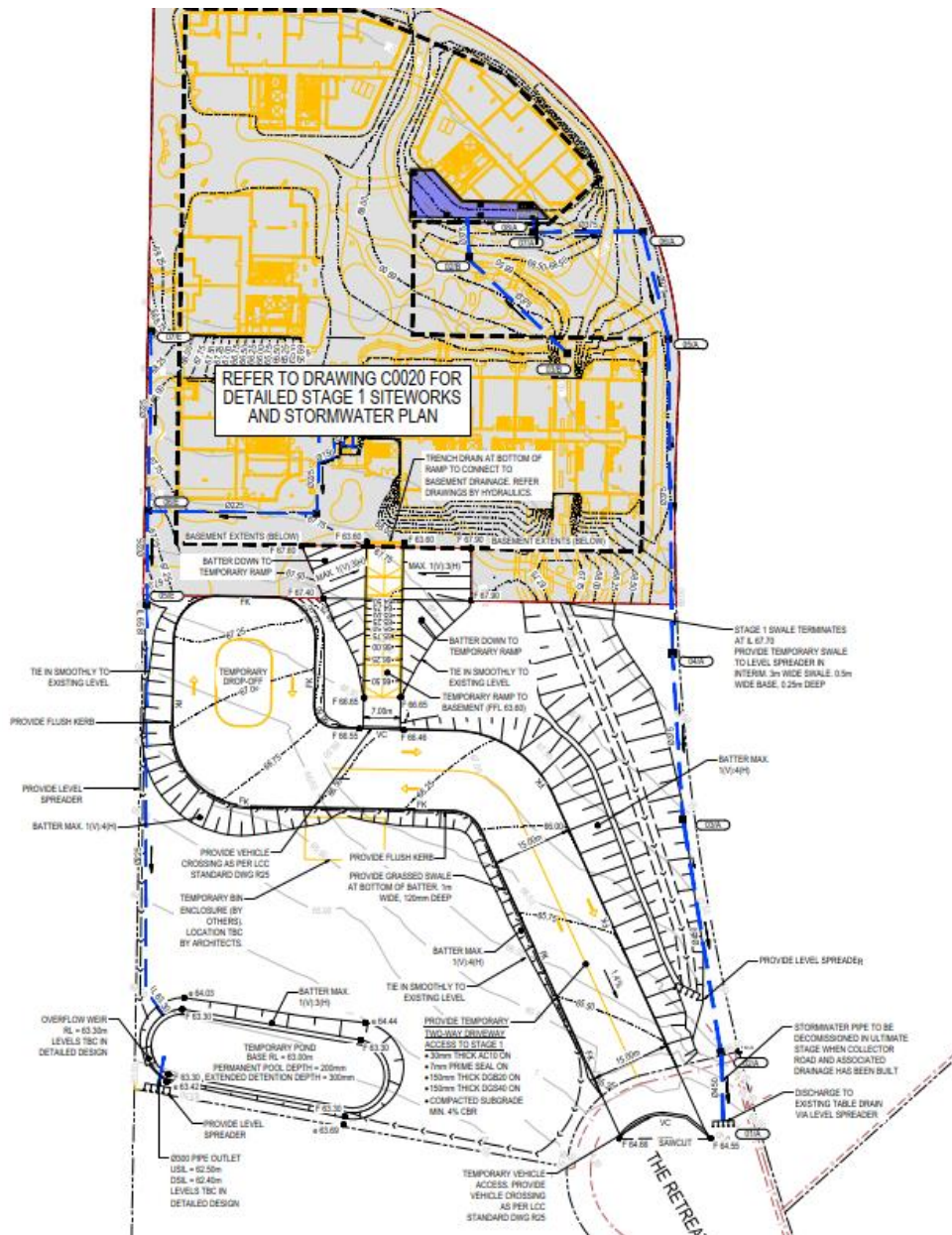


Figure 4: Interim Plan (AT&L Drawing C0015)

4. Earthworks

4.1. Site Geology

Based on the geotechnical investigation undertaken by Intrax Consulting Engineers (report dated 22/02/2024), the site is underlain by Bringelly Shale from the Wianamatta Group formation, typically comprising shale claystone, laminate, carbonaceous claystone and fine to medium-grained sandstone.

Based on Intrax's investigation, a summary of the inferred subsurface conditions across the site is summarised below:

- Topsoil/Fill (to depths of 0.1m) – generally Silty Sand; brown, fine to medium grained, medium dense and moist. Generally grey-brown to dark grey-brown, clayey silt and silty clay topsoil.
- Residual Soil (between 0.8m and 4.5m deep): Clay; high plasticity with variable minor sand content and lesser gravel.
- Extremely Weathered Bringelly Shale (EW BS – base ranging from 1.3m to 5.8mbgl) – extremely weathered siltstone or sandstone. Recorded as clay with high plasticity.
- Bringelly Shale (BS) – Siltstone or Sandstone bedrock, from moderately weathered to slightly weathered rock between 4.95 and 9.26 mbgl).

Further details can be found within Intrax's geotechnical investigation report.

4.2. Proposed Earthworks

A Bulk Earthworks Plan has been prepared by AT&L (refer drawing C0005 within Appendix A) which summarises the total cut, fill and balance achieved across site. It is noted that the majority of the site will be excavated up to approximately 8.5m deep for the proposed basement. The cut and fill volumes achieved are provided in Table 2 below.

Table 2: Summary of proposed cut and fill volumes across site

Item	Volume (m ³)
Net Cut (including topsoil stripping)	- 118,938
Net Fill	+ 1008
Balance	- 117,930 (export required)

Note these volumes are based on the current design, further detailed design may alter these. – (Negative) balance indicates net cut whilst + (positive) balance indicates import required. It is assumed that all topsoil from the site will be re-used on site as per the specification of the Geotechnical Engineer. Excess topsoil will be exported as required.

The cut and fill volumes presented above have been calculated based on the following assumptions:

- 200mm depth of topsoil stripping over the entire site
- 200mm thick building base slab
- 200mm thickness across all landscaped and paved areas

The volumes do not consider:

- Bulking factors of removed cut
- Removal and/or remediation or any existing uncontrolled fill
- Stormwater and utilities trenching
- Rainwater tank or OSD tank volumes

All import materials will comply with the requirements of the requirements of the Import Fill Protocol and Geotechnical Specifications for the Development. Topsoil stripping, blending and placement will be completed in accordance with the Geotechnical Engineering Specifications for the project.

5. Utilities Services

5.1. Existing Utilities

Based on information obtained from Before Your Dig Australia (BYDA) records and site survey by LTS (reference 51975 001DT, dated 21/03/2023), the following utility services are located within the vicinity of the site, on The Retreat.

- DN100 potable water owned by Sydney Water
 - ▶ Based on the Feasibility Advice Letter by Sydney Water (refer Appendix B), the existing line does not have sufficient capacity to supply the proposed development.
- Electrical line owned Endeavour Energy
 - ▶ Based on the capacity assessment within NDY's Infrastructure Due Diligence Report (reference rp231012s0020, dated 13/10/2023), the existing electrical infrastructure is insufficient to supply the proposed development.
- Telecommunications – Telstra and NBN

From BYDA, it is evident that there is no Authority sewerage or gas in the vicinity of the site such is the currently rural nature of the site. An in-ground concrete tank on the site is potentially utilised as an on-site sewer management system to support to current dwellings on the site.

All existing services across the site will be disused and removed as part of the proposed works.

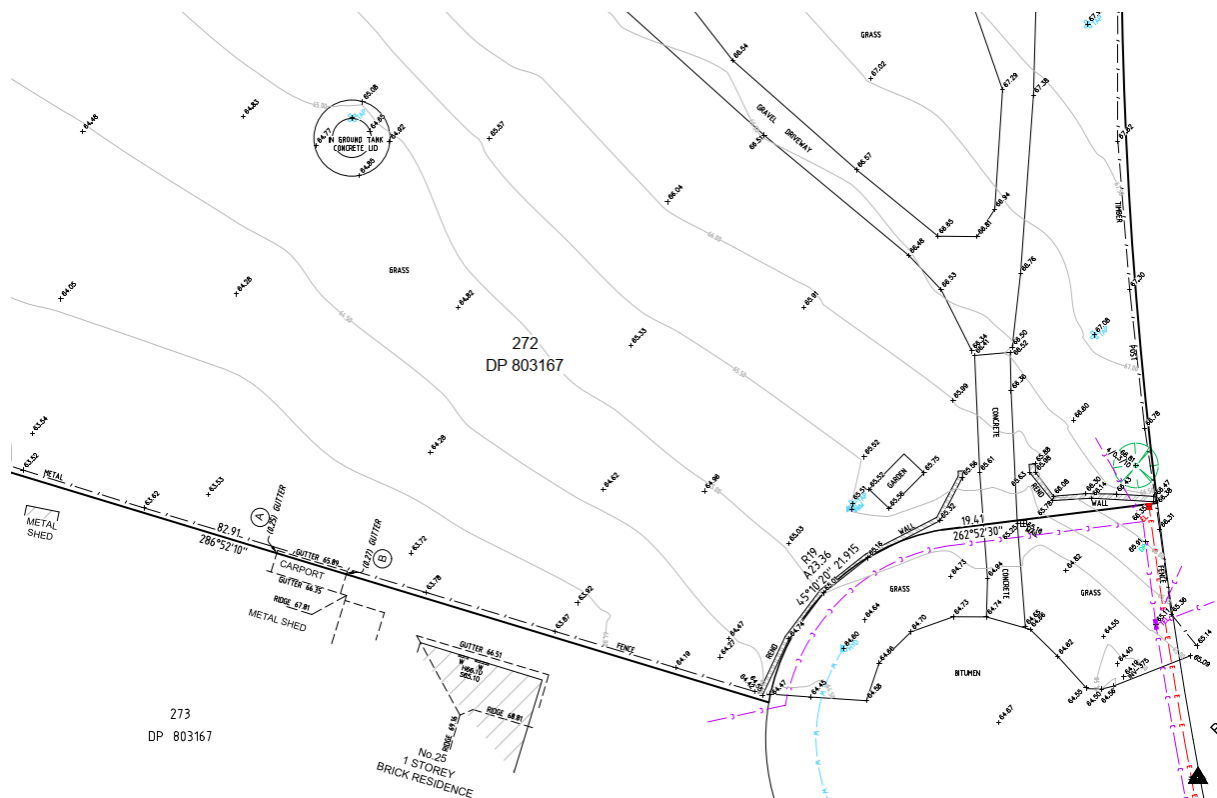


Figure 5: Detailed Site Survey (Source: LTS Lockleys)

5.2. Proposed Utilities

As the site is directly to the east of the Bradfield City Centre boundary, all infrastructure servicing will ultimately be delivered to the site within adjacent road corridors once they are operational.

Figure 6 below presents the proposed staging of the Bradfield City Centre. At the time of this report, the timeline of delivery of the required infrastructure to service the site is not available; however it is known that a 50 year horizon is anticipated for the completion of all four (4) stages of the Bradfield City Centre. With this consideration, this section of the report discusses the available information and options to service the site during the interim and ultimate stages of the development.



Figure 6: Bradfield City Centre staging (Source: Appendix A - Masterplan Report by WPCA)

5.2.1. Infrastructure Staging and Funding Arrangements

The developer will be responsible for the co-ordination and delivery of the infrastructure to service the development as described in the following sections. Where possible funding will be sought from Authorities to service the development. If funding is not available from the Authority then the developer understands that they are liable to fund the required services lead ins to supply the site.

5.3. Potable Water

As per Sydney Water's Feasibility Advice Letter (Appendix B), the ultimate servicing of potable water for the subject site will be from the new Badgerys Creek reservoir and trunk mains from that reservoir, which is currently proposed to be delivered in 2030/2031.

In the interim, Sydney Water's advice is to service the site via:

- A new Oran Park reservoir (WS0477 and WS0478) proposed to be delivered in 2025.
- From the Oran Park reservoir, a Pressure Reducing Valve (PRV) on DN450 main in Badgerys Creek Road is required (proposed to be delivered by the mid-2024)
- An extension main from the DN450 in Badgerys Creek Road to the proposed development. The first section of the extension is expected to be delivered by the Western Parkland City Authority (WPCA) for the Bradfield development. A further extension of this main will be required from Bradfield to the subject site.

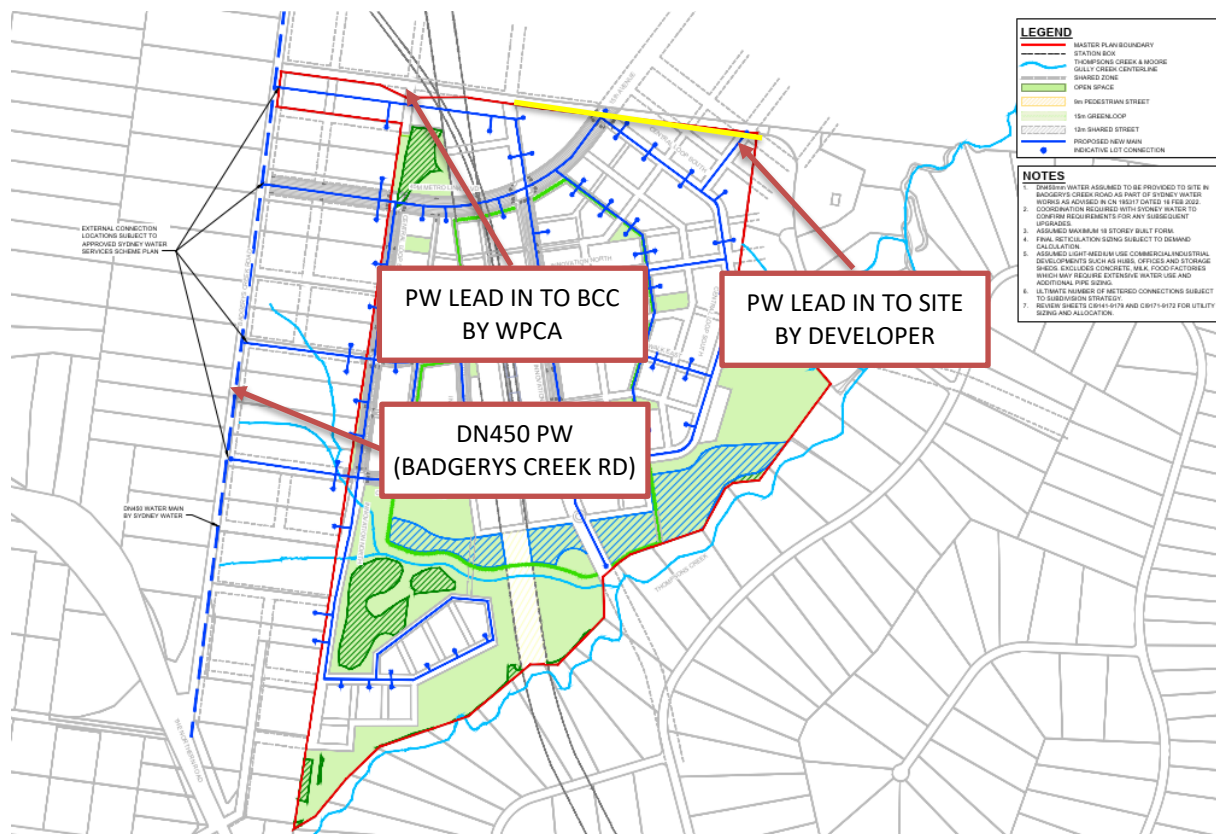


Figure 7: Potable Water servicing options (Source: Bradfield Masterplan Appendix H – Utility Infrastructure and Servicing Report)

Once the ultimate servicing infrastructure is available, the development will need to disconnect from this interim arrangement and connect to the ultimate servicing infrastructure at the developer's cost.

5.4. Recycled Water

As per the Feasibility Advice Letter, the ultimate servicing of non-potable water for the subject site will be from the new Upper South Creek Advanced Water Recycling Centre (AWRC). It is known that the AWRC will be commissioned in 2026. Sydney Water is currently investigating the preferred servicing option to reticulate recycled water from the plant to the Bradfield City Centre.

In the interim, Sydney Water advises for the recycled water network to be supplied by the adjacent potable water network.

Sydney Water will be able to confirm the requirements for recycled water mains and connections for the development, on finalisation of the preferred recycled water servicing option and scheme plan for the Aerotropolis Initial Precincts. The development may be required to deliver some of this infrastructure as developer delivered works under a developer works deed.

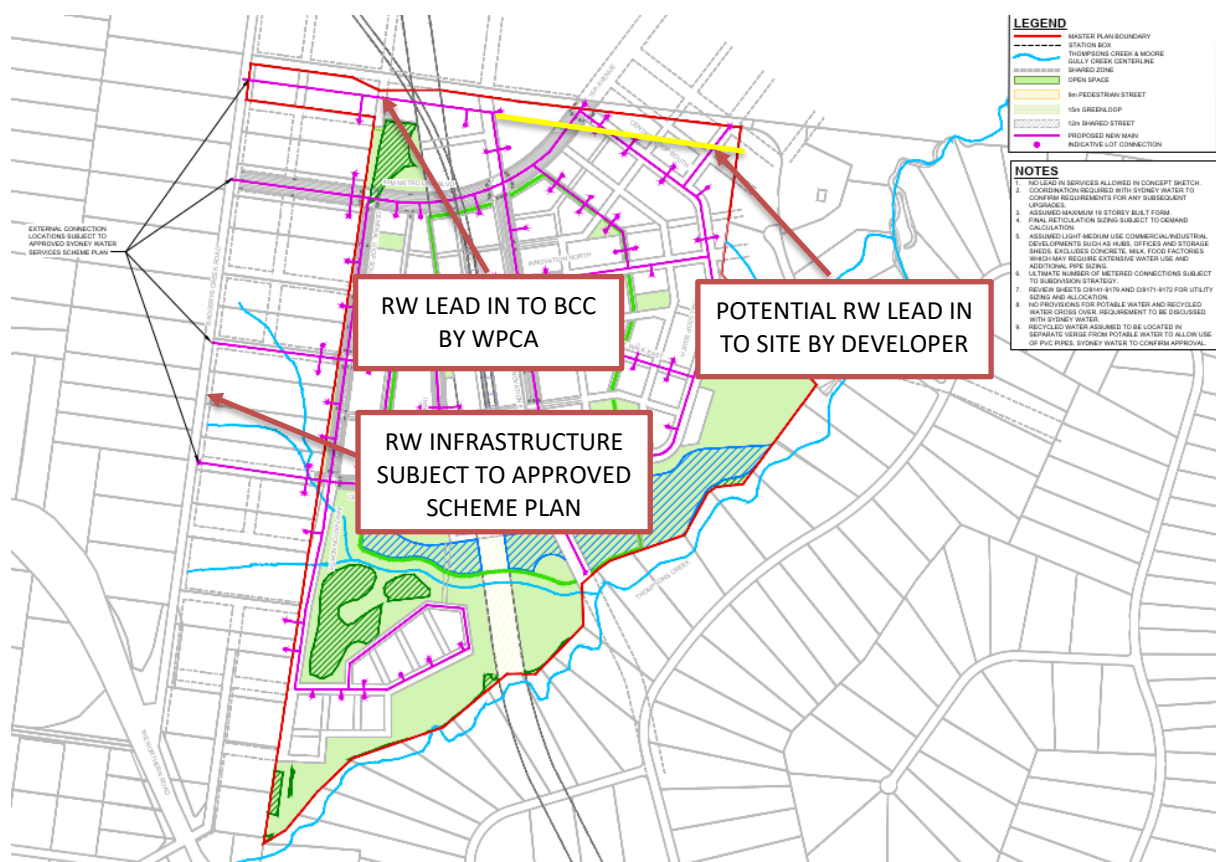


Figure 8: Recycled Water servicing options (Source: Bradfield Masterplan Appendix H – Utility Infrastructure and Servicing Report)

5.6. Electrical

Based on NDY's Infrastructure Due Diligence Report (reference rp231012s0020, dated 13/10/2023), it is proposed to allocate 2 kiosk substations at each stage progressively. See Figure 10 below.

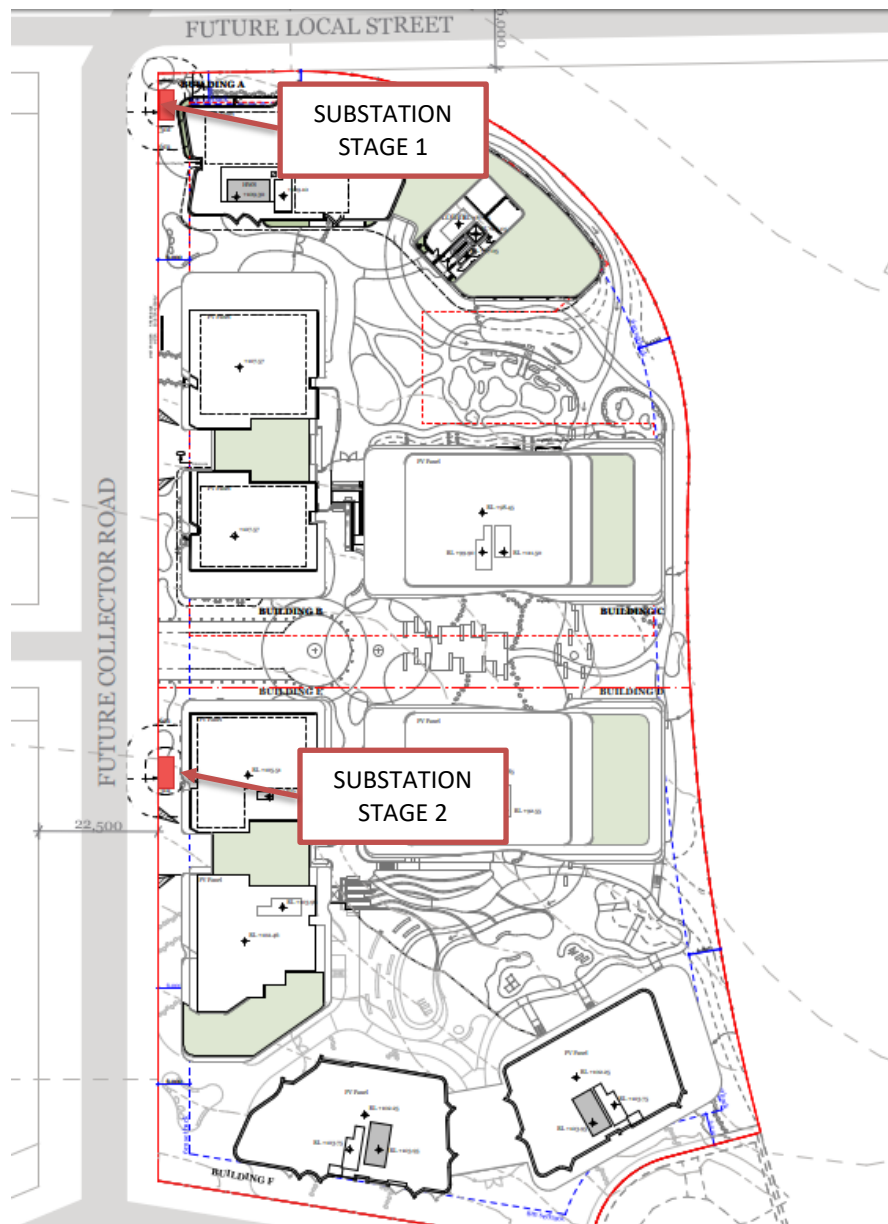


Figure 10: Architectural Site Plan (Source: DKO DA Documentation)

The following options are presented to service power to the site and is subject to further investigation/advice by the services designer for the site and WPCA:

1. Investigate whether the Bradfield City Centre electrical infrastructure has sufficient capacity to service the development and if so, what the timeline for delivery of infrastructure is.
2. If feeders are required from the Bradfield Zone Sub then WPCA is to confirm whether the proposed development can utilise any spare ducts through the Bradfield City Centre or a suitable alignment that can be adopted by the proposed development through the masterplan to service the development.

Figure 11 below presents the Bradfield Master Plan electrical layout which will need to be considered.

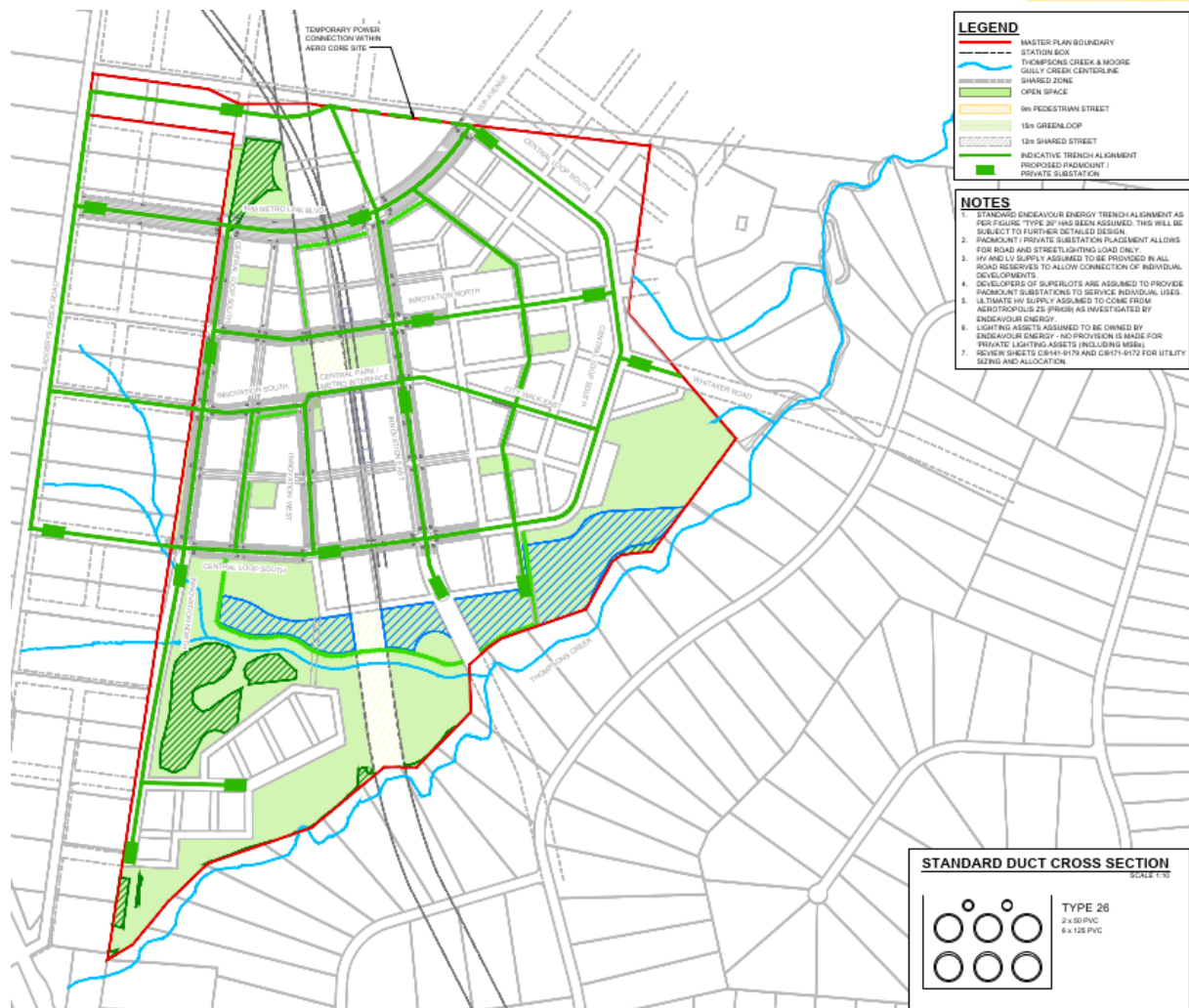


Figure 11: Bradfield Masterplan electrical layout (Source: Bradfield Masterplan Appendix H – Utility Infrastructure and Servicing Report)

5.7. Telecommunications

Optus, Telstra and NBN services will be available within the adjacent Bradfield Master Plan as shown in Figure 12 below. An extension of this infrastructure will be required from Bradfield Master Plan to the subject site.

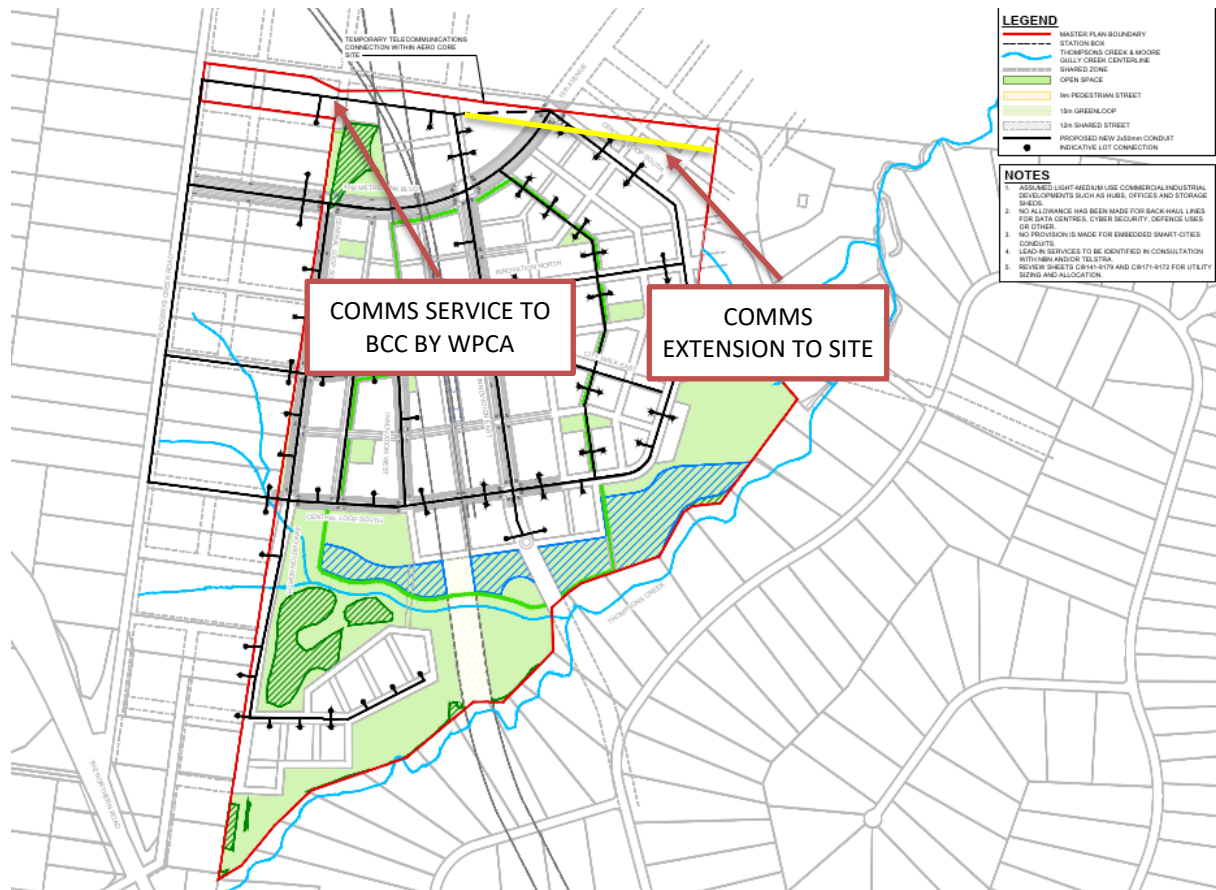


Figure 12: Telecommunications servicing options (Source: Bradfield Masterplan Appendix H – Utility Infrastructure and Servicing Report)

5.8. Stormwater Drainage

Stormwater drainage is discussed in detail in the *Water and Stormwater Management Plan* prepared by AT&L. In summary, an interim stormwater system has been designed to meeting Western Sydney Aerotropolis (WSA) Development Control Plan (DCP) (2022) requirements. It is assumed that Sydney Water's regional stormwater infrastructure will be available for connection at the time Stage 2 of the development is complete.

Figure 13 and Figure 14 below present images from the Bradfield masterplan Integrated Water Cycle Management Report showing the regional basin and the State Environmental Planning Policy (SEPP) acquisition land. The SEPP acquisition zone (Figure 14) as nominated by the masterplan does not impact the subject site. It is noted that there is some ambiguity in the plans with regards to the location of the regional basin and SEPP acquisition land, however, the proposed development intends to connect to the regional stormwater scheme once available.

Figure 11 – Bradfield Precinct Breakdown

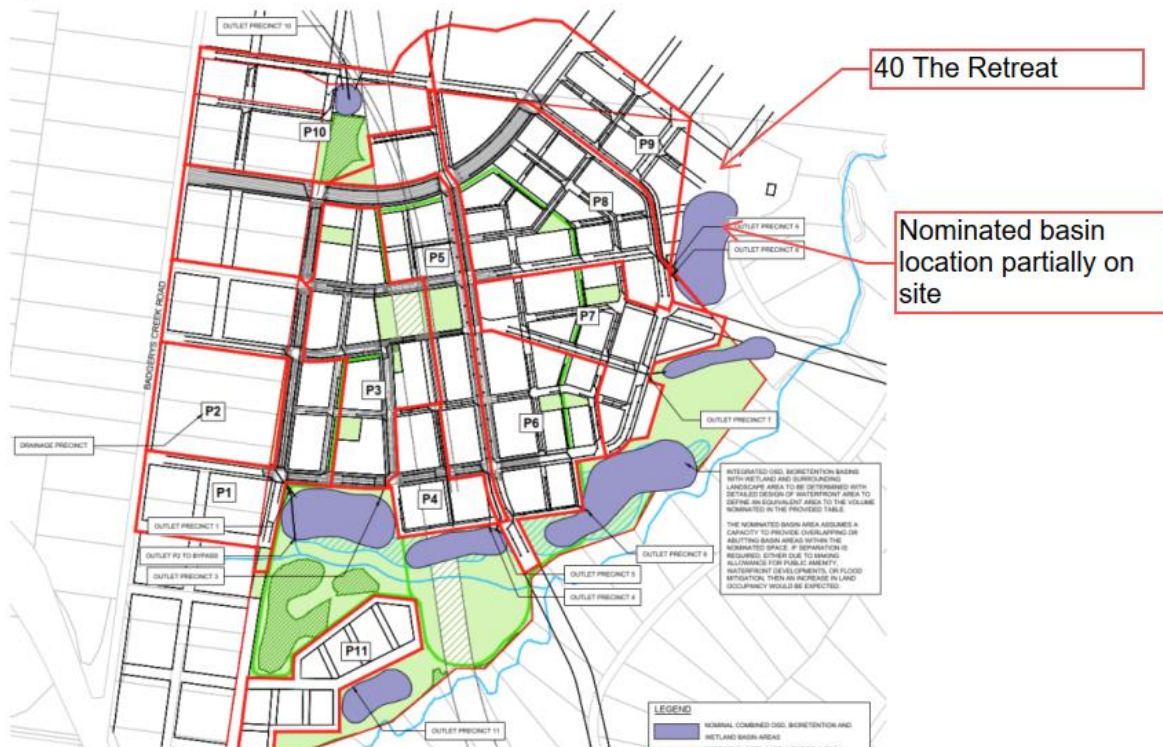


Figure 13: Regional Basin (Source: Bradfield Masterplan Appendix I – Integrated Water Cycle Management Report)

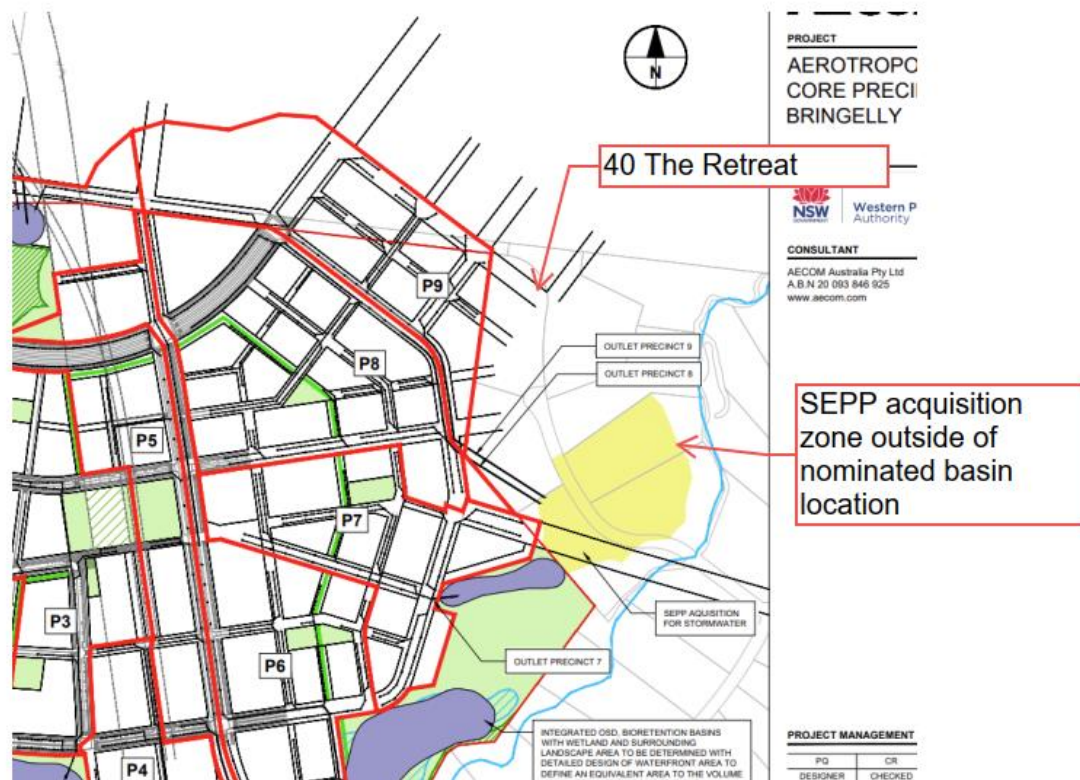


Figure 14: SEPP Acquisition land for stormwater (Source: Bradfield Masterplan Appendix I – Integrated Water Cycle Management Report)

Appendix A – Civil SSDA Drawings

Appendix B – Sydney Water Feasibility Letter

The first part of the paper discusses the importance of the research and the objectives of the study. It then presents a literature review of the existing research on the topic. The second part of the paper describes the methodology used in the study, including the data collection and analysis techniques. The third part of the paper presents the results of the study, and the fourth part discusses the conclusions and implications of the findings.

The study was conducted using a quantitative research design. Data was collected from a sample of 100 participants using a survey questionnaire. The data was then analyzed using statistical software to determine the relationships between the variables of interest.

The results of the study indicate that there is a significant positive relationship between the variables of interest. This finding is consistent with the previous research in the field. The implications of these findings suggest that the variables of interest are important factors in the study of the topic.

In conclusion, the study has shown that the variables of interest are important factors in the study of the topic. The findings of the study have implications for future research in the field.



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